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MODELING CARBON ALLOCATION, GROWTH AND RECOVERY IN SCRUB OAKS EXPERIENCING ABOVEGROUND DISTURBANCE

by

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ABSTRACT

Allocation of assimilated carbon amongst plant metabolic processes and tissues is important to understanding ecosystem carbon cycles. Due to the range of spatio-temporal scales and complex process interactions involved, direct measurements of allocation in natural environments are logistically difficult. Modeling approaches provide tools to examine these patterns by integrating finer scale process measurements. One such method is root:shoot balance, where plant growth is limited by either shoot activity (i.e. photosynthesis) or root activity (i.e. water and nutrient uptake). This method shows promise for application on frequently disturbed systems which perturb aboveground biomass and thus create imbalances in root and shoot activities. In this study, root:shoot balance, allometric relationships and phenological patterns were used to model carbon allocation and growth in Florida scrub oaks. The model was tested using ecosystem gas exchange (i.e. eddy covariance) and meteorological data from two independent sites at Merritt Island National Wildlife Refuge, FL which experienced two different types of disturbance events: a prescribed burn in 2006 and wind damage from Hurricane Frances in 2004. The effects of the two disturbance events, which differed greatly in magnitude and impact, were compared to identify similarities and differences in plant allocation response. Model results and process-based sensitivity analysis demonstrated the strong influence of autotrophic respiration on plant growth and allocation processes. Also, fine root dynamics were found to dominate partitioning trends of carbon allocated to growth. Overall, model results aligned well with observed biomass trends, with some discrepancies that suggest fine root turnover to be more dynamic than currently

parameterized in the model. This modeling approach can be extended through the integration with more robust process models, for example, mechanistic photosynthesis, nitrogen uptake and/or dynamic root turnover models.

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LIST OF ACRONYMS/ABBREVIATIONS

For a complete listing of model variables, refer to Appendix A

C	Carbon
CO_2	Carbon dioxide
GEP	Gross ecosystem production
GPP	Gross primary production
N	Nitrogen
NADP	National Atmospheric Deposition Program
NASA	National Aeronautics and Space Administration
NEE	Net ecosystem (CO_2) exchange
OTC	open-top chamber
USGS	United States Geological Survey

INTRODUCTION

Understanding the global carbon cycle has become increasingly urgent with the observed rise in atmospheric carbon dioxide (CO_2) concentrations from human activities and subsequent effects on the global energy balance (IPCC 2007). Terrestrial ecosystems represent a potential sink for atmospheric carbon which creates a feedback to climate change (Schimel et al. 2000, Davidson and Janssens 2006, Hungate et al. 2009, Billings et al. 2010), driven primarily by plant productivity (Körner 2006). Determining the fate of plant assimilated carbon is fundamental to understanding the global carbon cycle, since carbon allocation among plant tissues determines the magnitude and longevity of short-term fluctuations and long-term ecosystem storage (Dixon 1994). Dry matter allocation between plant tissues represents the cumulative result of many processes operating at various spatio-temporal scales (Cannell et al. 1994), and each process presents its own unique challenges for measurement. While data on some individual plant or ecosystem processes may be routinely collected (e.g., stem growth or leaf photosynthesis), others are logistically difficult or impractical to measure in natural environments (e.g., plant autotrophic respiration and root turnover). Modeling represents an effective compliment to empirical measurement to increase our understanding of terrestrial carbon cycle processes by leveraging existing data. A variety of allocation modeling approaches have been developed for application towards integrating process level data and filling knowledge gaps (Lacointe 2000, LeRoux et al. 2001). Previous allocation modeling efforts have found success pursuing the root:shoot balance approach (Reynolds and Thornley 1982, Dewar

1993, Shipley and Mezione 2002, Dewar et al. 2009). The concept assumes that plants will adjust carbon allocation patterns to increase access to the resource most limiting to growth (Thornley 1972). For example, when carbon is limited, plants will allocate more resources to shoot growth, thereby increasing leaf access to light and enhancing assimilation through photosynthesis. Alternatively, when water or nutrient availability is limited, root production may increase to enhance uptake. The approach has been validated using various tree seedlings (Agren and Ingestad 1987, Ericsson 1995), cotton seedlings (Chen and Reynolds 1997), and has also been extended to mature trees and natural ecosystems at various scales. For example, root:shoot balance approaches have been applied to regional scale pine stands (Running and Gower 1991), mature stands of Norway spruce (*Picea abies*) and Scots pine (*Pinus sylvetstris*) (Mäkelä et al. 2008), open and closed canopy sweetgum (*Liquidambar styraciflua*) plantations (McMurtrie et al. 2008) and mature pine (*Pinus taeda*) plantations under elevated atmospheric CO_2 (Franklin et al. 2009). Friedlingstein et al. (1999) also applied a similar approach to explore trends in carbon fluxes and effects on biochemistry at the global scale.

In addition, the allocation modeling holds promise for studying plant recovery from aboveground disturbance. Many ecosystems experience frequent, devastating aboveground disturbances from storm damage (Brokaw and Walker 1991) or fire (Bond and Keeley 2005) with significant impacts to carbon cycling (Running 2008). Plants have adapted to these disturbances with different strategies, including the development of belowground storage structures which may be remobilized for rapid recovery (Chapin 1990, Bond and Midgley 2001). Aboveground disturbance perturbs root:shoot balance, after which the plant can be viewed as trying to “correct” the imbalance by increasing resource allocation to aboveground growth. Here, I present an allocation model employing root:shoot balance, allometry and phenological rules for three co-existing Florida scrub oak species (i.e., *Quercus myrtifolia Willd.*, *Quercus geminate Small*, *Quercus chapmanii Sargent*). The scrub oaks develop extensive belowground root structures and carbohydrate reserves, which may be used during recovery from aboveground disturbance (Langley et al. 2002; Olano et al. 2006). The Florida scrub oak ecosystem regularly experiences fire, with return cycles estimated to be 7-10 years which severely disturbs aboveground biomass (Schmalzer and Hinkle 1992, Alexis et al. 2006). In addition, Florida is prone to tropical storms and hurricanes, which can result in significant defoliation (Li et al. 2007) and stem damage (Horvitz et al. 1999). In addition, the scrub oak ecosystem is a nutrient limited system, characterized by sandy, well-drained, nutrient poor soils (Schmalzer and Hinkle 1996). In this study, I present a scrub oak allocation model based on a root:shoot balance between nitrogen/water and carbon availability and provide simulation results for two observed disturbances of scrub oak sites at Kennedy Space Center, FL: 1) a defoliation event caused by Hurricane Frances in September 2004, and 2) a controlled burn in February 2006. The primary goals of this modeling effort are to integrate and evaluate the wealth of carbon and nutrient cycle process data collected during a long-term (11+ years) open top chamber study (see Day et al. 1996, Dijkstra et al. 2002) conducted at Kennedy Space Center, FL, USA (referred to herein as “OTC study”) and to quantify the impacts of hurricane and fire disturbances on scrub oak carbon allocation patterns.

METHODS

Model Algorithms

The model is constructed as a network of flows and reservoirs (or pools) to simulate the movement and transformation of carbon (*C*) from assimilation by photosynthesis to sequestration in structural tissue or loss from turnover or respiration (Figure 1). Non-structural carbohydrates are divided into two carbon pools representing 1) non-soluble sugars or reserves (CP_{Res}) and 2) soluble sugars (CP_{SS}). Soluble sugars can be readily utilized for respiratory and growth processes. For reserve *C* to be utilized, it must first be remobilized through the soluble sugar pool. Standing plant mass is represented by four structural tissue reservoirs: foliage (C_{Fo}), stems and branches (C_{Br}), coarse roots (>2mm diameter; C_{CR}) and fine roots (<2mm diameter; C_{FR}), each of which experiences turnover or senescence. Based on low observed acorn production at the test sites (<5 gC m^{-2} in 2001; Stiling et al. 2004), reproductive tissues were neglected in this model. Scrub oaks are evergreen species, so the foliage reservoir is arrayed to enable *C* tracking by cohort. Plant nitrogen (*N*) content is represented by two reservoirs: unallocated, reserve nitrogen (N_{res}) and structural nitrogen (N_{struct}) in plant tissues. In addition to uptake from the soil, a fraction of structural nitrogen can be retranslocated to the *N* reserve during tissue senescence. A typical growing year is divided into three phenological phases, consistent with observed monthly stem growth (J. Li, unpublished data) and trends in eddy covariance measurements (Powell et al. 2006): 1) spring leaf expansion, 2) summer stem growth, and 3) fall/winter aboveground no-growth period. An additional, recovery phase (phase 0) is initiated immediately following a disturbance event which is treated similar to the leaf expansion phase. The model is intended to operate at the community scale, rather than simulate individual plant growth, therefore all *C* and *N* reservoir units are in gC m^{-2} and gN m^{-2}, respectively. Governing equations for each simulated process are discussed in their respective sections below.

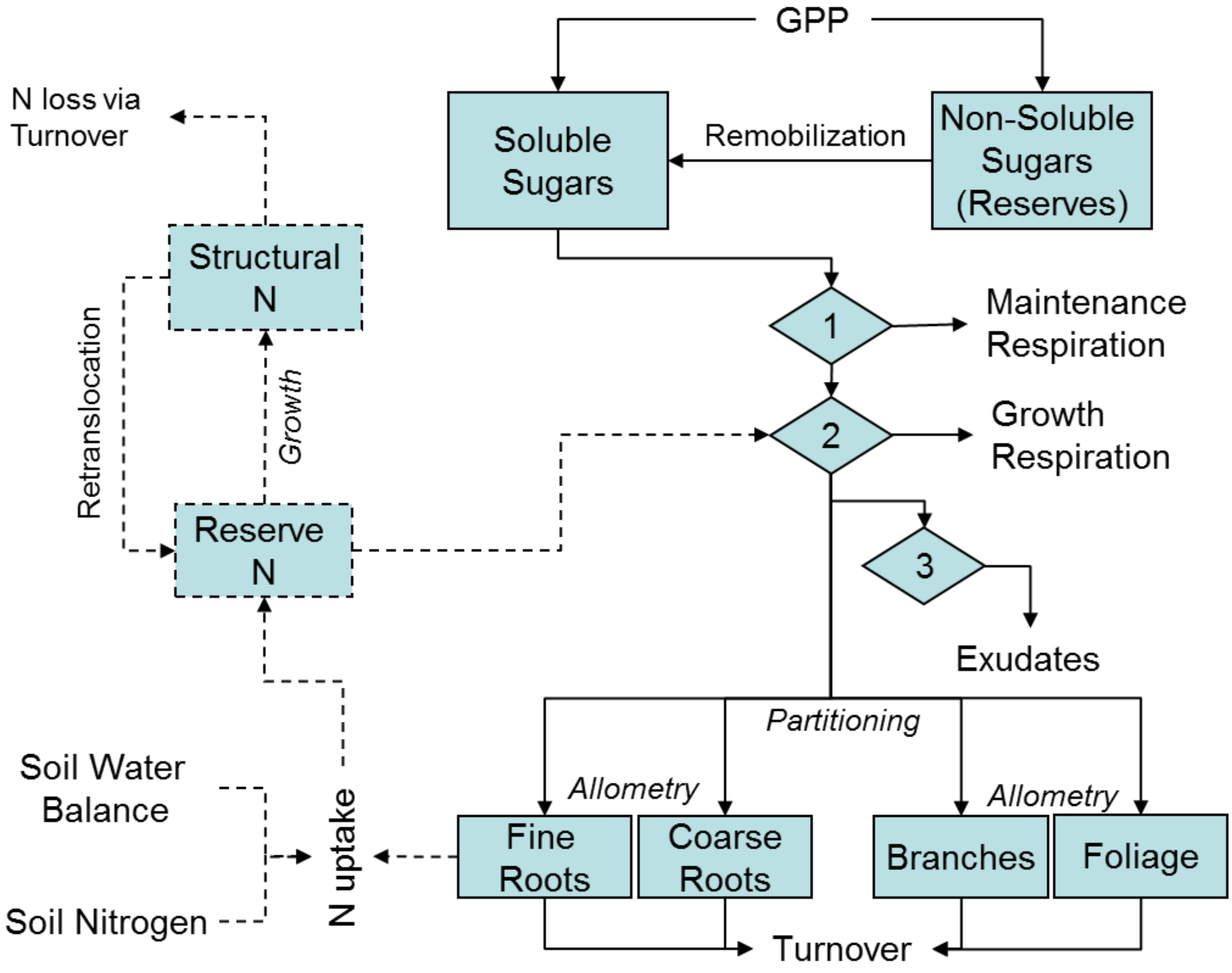

Figure 1. General schematic of model carbon and nitrogen flows. Boxes represent carbon (solid) and nitrogen (dashed) reservoirs, arrows indicate material flows (solid) and interactions

between carbon and nitrogen cycles (dashed), and diamonds indicate priorities within the carbon allocation hierarchy: 1) maintenance respiration demands 2) allocation to structural growth and 3) exudation or excess respiration.

Sugar Pools

Development of belowground storage reserves is particularly important for species that experience frequent, unpredictable disturbance of aboveground organs (Iwasa and Kubo 1997). Reserve carbohydrates (i.e. starch) are synthesized in a competing reaction to sucrose within the leaf (Smith and Stitt 2007) and development of storage reserves can occur in competition with growth processes (Chapin 1990). To represent these concepts, storage reserve development is simulated by allocating a baseline fraction ($f_{Res,BL}$)of total oak gross primary production (GPP_{oaks}) to reserves (C_{res}) each day, after the scheme of Rasse and Tocquin (2006):

$$C_{Res} = GPP_{oaks} * f_{Res,BL} \tag{1}$$

All remaining assimilates are partitioned to the soluble sugar pool. In the event that the soluble sugar pool becomes saturated, excess assimilates are diverted into the reserve pool. In cases where both carbohydrate pools are saturated and assimilated carbon exceeds respiratory and growth demands, excess C is released. Although I have arbitrarily labeled this release as exudation, this flux could also represent increased respiration in the leaf (Rasse and Tocquin 2006). Maximum capacities for the reserve sugar pool (Res_{max}) and soluble sugar pool (SS_{max}) are assumed to be proportional to structural reservoir size:

$$Res_{max} = \sum C_i * r_i \tag{2}$$

$$SS_{max} = \sum C_i * ss_i \tag{3}$$

Where C_i is mass of the *i*th tissue reservoir, r_i is the maximum reserve storage capacity and ss_i the maximum soluble sugar storage capacity of the *i*th structural tissue. Reserve remobilization (C_{remob}) may occur during any phenological phase in order to meet maintenance respiration demands. During leaf expansion and recovery phases, additional remobilization is allowed in order to meet foliage growth demands, but is limited by a maximum rate of remobilization using a modified first-order kinetics function after Greaves et al. (1999):

$$Remob_{max} = k_{remob} * \left(1 - \frac{CP_{SS}}{SS_{max}}\right) * CP_{Res} \tag{4}$$

where k_{remob} is the remobilization rate constant. Soluble sugar availability is further constrained by CP_{SS} concentration; so that carbon becomes less accessible for growth as soluble sugars supplies are depleted to a minimum value:

$$AC_1 = (\delta\mathrm{ss} * GPP_{oaks} + CP_{SS} - SS_{min}) * \left(\frac{\delta\mathrm{ss} * GPP_{oaks} + CP_{SS} - SS_{min}}{SS_{min}}\right) \tag{5}$$

Where AC_1 is carbon available at hierarchy level 1 (Figure 1), $\delta\mathrm{ss}$ is the fraction of soluble sugars produced from GPP_{oaks} and SS_{min} is the minimum soluble sugar pool value.

Maintenance Respiration

Maintenance respiration processes take top priority in soluble sugar allocation. Total maintenance respiration demand is the sum of computed demand for each tissue as a function of temperature (T) and percent nitrogen content ($pctN$), following the approach of Rasse et al. (2001):

$$R_m = \sum C_i * f_{live} * r_{m,i} * pctN_i * e^{(k_{Q10} * T)} \tag{6}$$

where r_m is an empirical maintenance respiration coefficient for the ith reservoir and k_{Q10} is a coefficient to achieve a desired Arrhenius type Q10 relationship with temperature. The k_{Q10} value is set to 0.0863 to achieve a Q10 value of 2.37 as observed by Dore et al. (2003). The empirical maintenance respiration coefficient applied for all tissues was estimated based on *Q. myrtifolia* leaf nitrogen content and leaf respiration measurements at 25°C as measured by Hymus et al. (2002). For f_{live}, a value of 1.0 is applied for foliage, fine roots and also for woody tissues with mass below 150gC m^{-2}. When branches and coarse root masses exceed 150gC m^{-2}, f_{live} is computed as sapwood fraction derived from data for *Quercus ilex* L. (Tognetti et al. 1998):

$$f_{live} = 2.1 * {C_{Br,Cr}}^{-0.15} \tag{7}$$

Daily mean air temperatures are required inputs and are applied for the aboveground tissue respiration calculations. Soil temperature (T_{soil}) is computed at each time step as a function of the previous day soil temperature ($T_{soil(t-1)}$), daily air temperature (T_{air}), mean annual air temperature (T_{ANair}), and a depth factor (df) which accounts for effects of depth and soil water content, following the method applied in the Soil and Water Assessment Tool (SWAT; Neitsch et al 2005):

$$T_{soil} = 0.8 * T_{soil(t-1)} + 0.2 * [df * (T_{ANair} - T_{air})] + T_{air} \tag{8}$$

For details regarding the calculation of *df*, see Neitsch et al. (2005) or Appendix B.

Structural Growth

Total *C* available for growth ($Grow_C$) at each time step is limited by either the contents of the soluble sugar pool after maintenance respiration demands have been met or by current nitrogen availability, minus growth respiration costs:

$$Growth = Minimum[AC2, Grow_N] * (1 - r_g) \tag{9}$$

Where r_g is the growth respiration coefficient which is assumed to be 20% of total *C* allocated for growth (Hoffman 1995, Rasse 2001), *AC2* is the amount of carbon available after maintenance respiration demands have been met (see Figure 1), and *GrowN* is the maximum potential growth based on nitrogen availability:

$$Grow_N = N_{res} * C{:}N_{opt} \tag{10}$$

$C{:}N_{opt}$ is an optimal whole plant carbon to nitrogen ratio, assuming balanced partitioning between aboveground and belowground tissues during the first two phenological phases and root growth only during the fall/winter phase:

<u>Phase 1 (and recovery)</u> (11)

$$C{:}N_{opt} = 0.5 * C{:}N_{Fo} + 0.5 * \left[\left(\frac{C{:}N_{FR}}{1 + CR{:}FR}\right) + \left(\frac{C{:}N_{CR} * CR{:}FR}{1 + CR{:}FR}\right)\right]$$

<u>Phase 2</u>

$$C{:}N_{opt} = 0.5 * C{:}N_{Br} + 0.5 * \left[\left(\frac{C{:}N_{FR}}{1 + CR{:}FR}\right) + \left(\frac{C{:}N_{CR} * CR{:}FR}{1 + CR{:}FR}\right)\right]$$

Phase 3

$$C\!:\!N_{opt} = \left(\frac{C\!:\!N_{FR}}{1 + CR\!:\!FR}\right) + \left(\frac{C\!:\!N_{CR} * CR\!:\!FR}{1 + CR\!:\!FR}\right)$$

Where $C{:}N_{Fo}$, $C{:}N_{Br}$, $C{:}N_{FR}$, $C{:}N_{CR}$ are C:N ratios for foliage, stem, fine root, and coarse root tissues, respectively, and *CR:FR* is the ratio of coarse root growth per unit fine root growth. Once growth and respiration demands are met, any *C* remaining in CP_{SS} which exceeds SS_{max} is released through exudation.

Growth Partitioning

Partitioning to the structural reservoirs during the aboveground growth phases is determined based on foliage demand and coordination between carbon and nitrogen availability, based on coordination theory (Reynolds and Chen 1996, Chen and Reynolds 1997). During leaf expansion, foliage growth takes priority over all other tissues. Foliage demand (Fo_{dem}) is defined as the amount of *C* required for the foliage reservoirs (all cohorts) to meet expected foliage mass (Fo_{exp}). Foliage demand cannot be negative:

$$Fo_{dem} = Maximum\left[0, Fo_{exp} - C_{Fo}\right] \tag{12}$$

At time *t* during leaf expansion, Fo_{exp} is determined using the sigmoid growth function developed by Yin et al. (2003):

$$Fo_{exp} = Fo_{max}\left(1 + \frac{t_e - t}{t_e - t_m}\right) * \left(\frac{t}{t_e}\right)^{\frac{t_e}{t_e - t_m}} \tag{13}$$

Where t_e is time when leaf expansion reaches maximum foliage mass (Fo_{max}) and t_m is time of maximum growth rate. Fo_{max} is computed based on community scale plant allometry. Total stem biomass and maximum summertime leaf area were computed using allometry (Alexis et al. 2006) from stem diameter measurements for each OTC study plot over 11 years of growth (Seiler et al. 2009). Plot level leaf area and stem biomass data were then correlated using the following function (r^2=0.99, n=264):

$$Fo_{max} = e^{0.875 * \ln(W_{Br}) + 0.15} \tag{14}$$

Total aboveground growth demand (AG_{dem}) is then calculated as:

$$AG_{dem} = \frac{Fo_{dem} * (1 + Br\colon Fo)}{(1 - r_g)} \tag{15}$$

Where *Br:Fo* is the ratio of stem growth to foliage growth. During periods when foliage demand exists, *Br:Fo* is defined as a constant, but once foliage mass reaches or exceeds Fo_{exp}, *Br:Fo* is defined using a power function to ensure foliage and stem mass growth follows the measured allometry:

$$\begin{aligned} BR\colon Fo &= {C_{Br}}^{0.125} && ; Fo_{dem} = 0 \\ BR\colon Fo &= 0.15 && ; Fo_{dem} > 0 \end{aligned} \tag{16}$$

Also, when Fo_{dem} = 0, growth *C* is partitioned between above- and belowground organs to achieve balanced growth in terms of *N* and *C* uptake following coordination theory (Reynolds and Chen 1996). At each time step, the model computes an imbalance (*Im*) based on substrate supply from shoot and root activities, respectively. In this formulation, GPP_{oaks} represents shoot activity and $Grow_N$ is applied to represent root activity, converted to units *C*:

$$Im = \frac{GPP_{oaks} - Grow_N}{Minimum(GPP, Grow_N)} \tag{17}$$

Partitioning coefficients for foliage (p_{Fo}) and fine roots (p_{FR}) are then calculated as follows (Chen and Reynolds 1997):

$$p_{Fo=}\frac{\frac{1}{C_{FR}}+\frac{(P+TO_{rateFo}-TO_{rateFR})}{minimum(GPP_{oaks},Grow_n)}}{\frac{1}{C_{Fo}}+\frac{1}{C_{FR}}} \tag{18}$$

$$p_{FR=}\frac{\frac{1}{C_{Fo}}-\frac{(P+TO_{rateFo}-TO_{rateFR})}{minimum(GPP_{oaks},Grow_n)}}{\frac{1}{C_{Fo}}+\frac{1}{C_{FR}}}$$

Where TO_{rateFo} and TO_{rateFR} are turnover rates of foliage and fine roots, and P is an allocation parameter used to adjust for the imbalance:

$$P=\frac{-Im}{\tau} \tag{19}$$

The coordination time parameter (τ) specifies the time scale of the plant response to adjust to the imbalance. Partitioning to stems and coarse roots is determined using allocation ratios:

$$p_{Br}=BR{:}Fo*p_{Fo} \tag{20}$$

$$p_{CR}=CR{:}FR*p_{FR}$$

Therefore, *pFo* and *pFR* are restricted to the range:

$$0\le p_{Br}\le\frac{1}{1+BR{:}Fo} \tag{21}$$

$$0\le p_{CR}\le\frac{1}{1+CR{:}FR}$$

During the summer stem growth phase, after foliage growth has ceased, all aboveground growth is allocated to stems. Scrub oaks typically only display aboveground growth for approximately half the year, between March-October (J. Li unpublished data). Therefore, during the aboveground no-growth period from October through March, all growth *C* is partitioned between fine and coarse roots as:

Phase 3

$$p_{FR} = \frac{1}{1 + CR{:}FR} \quad (22)$$

$$p_{CR} = \frac{CR{:}FR}{1 + CR{:}FR}$$

Turnover

Turnover rates for stems, coarse roots and fine roots are calculated proportional to structural mass of that organ; for example, for fine root turnover:

$$TO_{FR} = C_{FR} * \lambda_{FR} \quad (23)$$

Where λ_{FR} is the fine root turnover coefficient. The fine root turnover coefficient was estimated based on fine root production determined via in-growth bags (Langley et al. 2003) and assuming a steady state of growth and turnover rates. Stem turnover coefficient was based on comments by Abrahamson and Layne (2002), who observed 80-90% stem turnover in Quercus innopina within 9-10 years and expected Q. myrtifolia to be longer lived. Coarse root turnover rates are expected to be longer still, and the turnover coefficient was chosen assuming ~40 years for complete turnover of coarse root mass. Foliage cohorts have an expected lifespan and turnover rates apply a sigmoid function based on Yin et al. (2003) to compute daily senescence, starting from maximum cohort reservoir mass and decaying to empty the cohort reservoir at the end of the senescence period.

Nitrogen Cycle

A comprehensive nitrogen cycle model is beyond the scope of this study; however, due to the partitioning scheme dependency on nitrogen availability, a simplified nitrogen uptake and allocation module has been implemented. Nitrogen uptake (n_{upt}) is the minimum of nitrogen demand (n_{dem}) and uptake from the soil (n_{sup}). The calculation for n_{dem} assesses the amount of nitrogen required to utilize all available carbon for growth against the amount of nitrogen currently available to the plants, therefore reducing uptake when nitrogen is not limiting to growth. Uptake is also limited when nitrogen reservoir reaches a capacity proportional to plant tissue mass. Potential *N* uptake from the soil is calculated as:

$$n_{sup} = C_{FR} * SLR * \theta * SoilN * \gamma_{sup} \tag{24}$$

Where *SLR* is specific root length (m gC^{-1} fine root), θ is volumetric soil water content, $SoilN_l$ is plant available soil nitrogen (i.e. NH_4^+ and NO_3^-) concentration and γ_{sup} is a soil nitrogen uptake coefficient per fine root length. A single value for *SoilN* was computed from plant extractable N content by soil depth (McKinley et al. 2009) and weight-averaged by the fine root mass distribution (Brown et al. 2007) to 1 meter depth. Soil water content is calculated at each time step by the soil water balance sub-model, applying SWAT calculations (Neitsch et al. 2005; see Appendix B for details). As validation of the water balance calculations, modeled soil water content in the top 1 meter from soil surface were compared against measured values from the OTC study control plots (Figure 4; Hungate et al. 1999, unpublished data). Nitrogen enters first into a reserve pool (N_{res}), and when plant growth occurs, nitrogen is allocated to the structural nitrogen reservoir (n_{grow}) proportional to the amount of C allocated (δ) to each tissue i and its respective C:N ratio:

$$n_{grow} = \sum \frac{\delta_i}{C{:}N_i} \quad (25)$$

Upon non-woody tissue senescence (foliage and fine roots), a fraction of structural nitrogen is re-translocated to the *N* reservoir to become available for additional structural growth. A re-translocated fraction of 0.27 was applied based on the difference between standing aboveground tissue nitrogen content and litter nitrogen content as determined by Hungate et al. (2006). Nitrogen re-translocation does not occur during disturbance events.

Disturbance and Recovery

Disturbances are assumed to only impact aboveground organs, represented by an instantaneous fractional loss of stem and foliage mass. Disturbance events initiate an additional foliage expansion phase to recover to the foliage mass expected at that time of year. Foliage cohorts developed during recovery use the same lifespan as cohorts developed during the normal phenological phase.

Model Inputs

Since this study focuses on quantifying allocation and partitioning of plant assimilated *C*, the model requires daily input of gross primary production (*GPP*). In lieu of modeling photosynthesis, I have chosen to apply daily gross ecosystem production (*GEP*) values derived from existing eddy covariance measurements (Powell et al. 2006, Bracho et al. 2010). The eddy covariance technique exploits variability in micrometeorological parameters (i.e. wind speed and direction) and atmospheric CO_2 concentrations gathered via high-resolution, sequential measurements to compute net CO_2 exchange (*NEE*) between atmosphere and ecosystem (see Aubinet et al 1999, Baldocchi 2003). Nighttime measurements (after photosynthesis has ceased) can then be used to model ecosystem respiration (*ER*); and, assuming net lateral *C* transfers to be negligible (Aubinet et al 2003), *GPP* is estimated as (Chapin et al. 2006):

$$GPP = GEP = NEE - ER \tag{26}$$

To scale eddy covariance measurements down from the ecosystem level to scrub oak community level, *GPP* input values were multiplied by the fraction of scrub oak to total ecosystem leaf area ($frac_{oaks}$):

$$GPP_{oaks} = GPP * frac_{oaks} \tag{27}$$

For this study, two test cases have been developed using eddy covariance data collected at independent sites: 1) the CO_2 site (Powell et al. 2006) and 2) the Happy Creek site (Bracho et al. 2010), both located at Kennedy Space Center in Merritt Island National Wildlife Refuge, FL, USA (Figure 2). Test case specifics are provided in the next section, below. In addition to providing *GPP* values, mean daily air temperatures recorded at the respective eddy covariance towers were input for the model runs. Additionally, the water balance sub-model requires daily precipitation and potential evapotranspiration (*PET*) inputs. A total daily precipitation record was compiled using rain gauge data collected during the OTC study (Hungate et al. 2002) and gap-filled using rain gauge data from the NASA Shuttle Landing Facility and National

Atmospheric Deposition Program (NADP site FL99) (Figure 2). Satellite-derived *PET* data were collected from the U. S. Geological Survey's Florida Integrated Science Center Hydrologic Data Web Portal (Jacobs et al. 2008, USGS 2010). Several grid points were selected and averaged to generate a single *PET* dataset applied to both test cases (Figure 2).

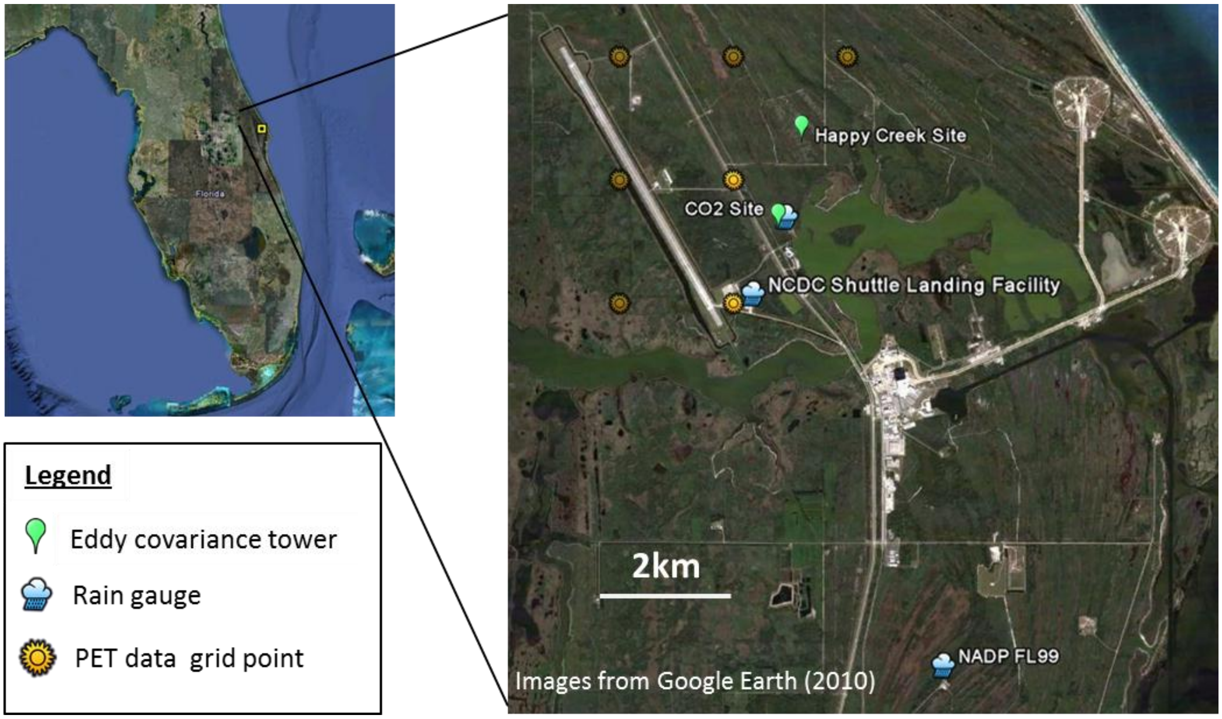

Figure 2. Location of model input data collection sites.

Additional calibration variables applied to both test cases are provided in Table 1. Parameters applicable only to the water balance sub-model are provided in Table 2.

Table 1. Calibrated model parameters common to both test cases.

Parameter	Description	Value	Units	Source/Reference
$C:N_{Br}$	C:N ratio for stems	100	$gC\ gN^{-1}$	Hungate et al. 2006
$C:N_{CR}$	C:N ratio for coarse roots	100	$gC\ gN^{-1}$	assumed equal to stem C:N
$C:N_{Fo}$	C:N ratio for foliage	40	$gC\ gN^{-1}$	Hungate et al. 2006
$C:N_{FR}$	C:N ratio for fine roots	100	$gC\ gN^{-1}$	Dilustro et al. 2001

Parameter	Description	Value	Units	Source/Reference
DOY_{AG}	starting day of aboveground no-growth season	185	day of year	J. Li, unpublished data
$frac_{C}$	carbon fraction of biomass	0.5	-	Brown et al. 2007, Hungate et al. 2006
$f_{Res,BL}$	baseline fraction of GPP partitioned to reserve pool	0.4	-	Li et al 1999
k_{Q10}	exponential coefficient to achieve specific Q10 relationship	0.0863	-	Dore et al. 2003
$MeanT_{air}$	annual mean air temperature	22	°C	Powell et al. 2006
r_{g}	growth respiration coefficient	0.2	-	Rasse et al. 2001
r_{m}	empirical maintenance respiration coefficient	2.0E-04	-	Hymus et al. 2002
$r_{max,Br}$	stems reserve pool capacity coefficient	0.01	-	unpublished data
$r_{max,CR}$	coarse root reserve pool capacity coefficient	0.106	-	Olano et al. 2006
$r_{max,Fo}$	foliage reserve pool capacity coefficient	0.02	-	Li et al. 1999
r_{maxFR}	fine root reserve pool capacity coefficient	0.01	-	assumed same as stems
$ss_{max,Br}$	stem soluble sugar pool capacity coefficient	0.0175	-	assumed 1/2 foliage value
$ss_{max,CR}$	coarse root soluble sugar pool capacity coefficient	0.08	-	Olano et al. 2006
$ss_{max,Fo}$	foliage soluble sugar pool capacity coefficient	0.035	-	Li et al. 1999
ss_{maxFR}	fine roots soluble sugar pool capacity coefficient	0.0175	-	assumed same as branches
$Life_{cohort}$	length of foliage cohort lifespan	380	days	personal obs.
t_{e}	day of end of leaf expansion period	100	day	Powell et al. 2006 (LAI)
t_{m}	day of maximum rate of leaf expansion	40	day	Powell et al. 2006 (LAI)
TO_{BR}	stem/branch turnover coefficient	2.0E-04	day^{-1}	Johnson and Abrahamson 2002
TO_{CR}	coarse root turnover coefficient	7.0E-05	day^{-1}	assumes complete turnover every ~40 years
TO_{FR}	fine root turnover coefficient	2.5E-03	day^{-1}	Langley et al. 2002, 2003
τ	coordination time parameter	5	days	assumption
SoilN	plant available soil N	1.8	gN m^{-2}	McKinley et al. 2009; Brown et al 2007
fN_{retrns}	fraction of structural N retranslocated from non-woody tissue during senescence	0.27	-	Hungate et al. 2006
SRL	specific fine root length	54	m gC^{-1}FR	Brown et al 2009
γ_{sup}	soil nitrogen uptake coefficient	7.5E-06	gN m^{-1}FR	calibrated

Although litter accumulation and decomposition are not explicitly part of the allocation model, the water balance sub-model requires a value for aboveground litter biomass. To estimate this value, total aboveground litter mass (Lit_{AG}) is computed as a function of time since last fire event (TSF) per the regression developed by Schmalzer and Hinkle (1996):

$$Lit_{AG} = 10^{0.558*LOG_{10}(TSF)+2.364} \tag{28}$$

To maintain consistency when converting between biomass and units of mass in gC, throughout the study, biomass is always assumed to be 50% *C* by dry weight, consistent with Hungate et al. (2006) and Brown et al. (2007).

Table 2. Calibrated parameters for water balance sub-model.

Parameter	Description	Value	Units	Source/Reference
SLA	specific leaf area	0.015	$m^2\ gC^{-1}$	Li et al. 1999
IntCap	canopy interception capacity	0.2*LAI	mm	Dickinson et al. 1984
BD	soil bulk density	1.5	$g\ cm^3$	NRCS 2010
RCN	runoff curve number	32	unitless	Neitsch et al 2005
FC	soil field capacity	0.13	$cm^3\ cm^{-3}$	Hungate et al. 2002
WP	soil wilting point	0.01	$cm^3\ cm^{-3}$	Hungate et al. 2002
slope	average slope of terrain	2.0E-03	$m^1\ m^{-1}$	Google Earth 2010

Test Cases and Input Sensitivity

The allocation model was programmed using STELLA 9.0 (isee Systems, Inc, Lebanon, NH, USA) dynamical modeling software and the computational solver applied was Euler's method. All model runs were executed at a daily time step. See Appendix B for full model code.

CO_2 Site Test Case: Hurricane Defoliation

The CO_2 site eddy tower located adjacent to the OTC study (Figure 2) was operated continuously over 6 years (April 2000-October 2006) (Powell et al. 2006, unpublished data). The ecosystem experienced a major defoliation event caused by sustained winds of 113 km hr^{-1}

with gusts to 152 km hr^{-1} when Hurricane Frances crossed the Florida peninsula on 5 September 2004 (Li et al. 2007). Stem damage was minimal, but leaf area index (LAI) was reduced by 21%, leading to a GPP reduction of 22% (Li et al. 2007). In the weeks following the disturbance, a new leaf flush was observed, uncharacteristic of typical scrub oak phenology. Due to the proximity of the site, lack of belowground biomass data, and similar observed ecosystem gas exchange trends (Dore et al. 2003), values from the OTC study were applied for initial structural reservoir masses (Dijkstra et al. 2002). Final standing biomass values were determined by destructive harvest at the conclusion of the OTC study in June 2007. In order to compare modeled standing biomass against harvested OTC values, eddy covariance data from 2005-06 was repeated to cover the gap from November 2006-June2007. This period of repeated data was used for comparison of final biomass only and was excluded from analyses of general allocation trends. Scenario specific calibration and initial parameter values are given in Table 3 below.

Table 3. Initial conditions and calibrated parameter values for CO_2 site (hurricane defoliation) test case.

Parameter	Description	Value	Units	Source/reference
-	Start date of model simulation	4-Apr-00	-	-
$Dist_{day}$	Julian date of hurricane defoliation	2453251	-	Li et al. 2007 (2 Sept. 2004)
C_{br}	structural stem mass	160	gC m^{-2}	Seiler et al. 2009
C_{cr}	structural coarse root mass	2500	gC m^{-2}	Schroeder et al. (in review)
$C_{foliage}$	structural foliage mass	13	gC m^{-2}	allometry
C_{fr}	structural fine root mass	600	gC m^{-2}	Schroeder et al. (in review)
CP_{ss}	Soluble sugar carbohydrate pool	160	gC m^{-2}	75% of calc. capacity
$CP_{storage}$	storage reserve carbohydrate pool	210	gC m^{-2}	75% of calc. capacity
f_{oak}	fraction ecosystem biomass comprised by scrub oaks	0.82	unitless	Hungate et al. 2006
TSF	time since last fire at start of simulation	1550	days	last burn Jan 1996
Lit_{AG}	accumulated aboveground litter	250	gC m^{-2}	Schmalzer and Hinkle 1996

Parameter	Description	Value	Units	Source/reference
$d_{Br,wind}$	fraction of on stem/branch mass loss due to disturbance	0	-	Li et al. 2007
$d_{Fo,wind}$	fraction of on foliage mass loss due to disturbance	0.21	-	Li et al. 2007

Happy Creek Site Test Case: Prescribed Burn

The Happy Creek eddy covariance site commenced measurements in April 2004 and concluded operations in November 2007 (Bracho et al. 2010). In February 2006, the site was burned. Fire destroyed 74% of standing aboveground biomass, including foliage and stem mass. Scrub oaks at Happy Creek comprised a smaller percentage (76%) of total aboveground biomass (R. Bracho, unpublished data) compared to 89% at the CO_2 site (Powell et al. 2006). Since no root data were available for calibration, the CO_2 site values were scaled by the difference in aboveground scrub oak biomass composition between the two sites. Scenario specific parameters and initial values are provided in Table 5 below. To prevent equipment damage during the prescribed burn, the site was dismantled for the month of February, 2006, thus leaving a 28 day data gap. To fill this gap, two linear regressions were fit between Happy Creek *GPP* and CO_2 Site *GPP*: one month pre-burn (Jan 2006) and one month post-burn (Mar 2006). Following the burn, GPP was linearly scaled from 0, on the day of the burn, up to the observed value once measurements resumed using the post-burn regression (Table 4). The pre-burn missing data were filled using the pre-burn regression and CO_2 site *GPP*. To explore post-burn recovery, data from the last year of tower operation were repeated for an additional 3 years. This site actually experienced two sequential disturbance events. In addition to the burn, the site experienced hurricane force winds similar to those observed at the CO2 site, thus similar defoliation impacts were assumed during this simulation.

Table 4. Regressions used to gap-fill Happy Creek *GPP* (GPP_{HC}) based on CO_2 site *GPP* data (GPP_{CO2})

	Regression	n	r^2
pre-burn	$GPP_{HC} = 0.6603*GPP_{CO2}+0.1638$	31	0.7982
post-burn	$GPP_{HC} = 0.3063*GPP_{CO2}+0.6836$	30	0.3815

Table 5. Initial conditions and calibrated parameter values for Happy Creek site (prescribed burn) test case.

Parameter	Description	Value	Units	Source/reference
-	Start date of model simulation	1-Apr-04	-	-
$Dist_{day1}$	Julian date of hurricane defoliation	2453251	-	Li et al. 2007 (2 Sept. 2004)
$Dist_{day2}$	Julian date of prescribed burn	2453785	-	Bracho et al. 2010 (18 Feb 2006)
C_{br}	structural stem mass	450	gC m^{-2}	R. Bracho, unpublished data
C_{cr}	structural coarse root mass	2130	gC m^{-2}	scaled from Schroeder et al. (in review)
$C_{foliage}$	structural foliage mass	17	gC m^{-2}	allometry
C_{fr}	structural fine root mass	510	gC m^{-2}	scaled from Schroeder et al. (in review)
CP_{ss}	Soluble sugar carbohydrate pool	140	gC m^{-2}	75% of calc. capacity
$CP_{storage}$	storage reserve carbohydrate pool	160	gC m^{-2}	75% of calc. capacity
f_{oak}	fraction ecosystem biomass comprised by scrub oaks	0.62	-	Bracho et al. 2010, unpublished data
TSF	time since last fire at start of simulation	2555	days	assumed 7 years
Lit_{AG}	accumulated aboveground litter	340	gC m^{-2}	Schmalzer and Hinkle 1996
$d_{Fo,wind}$	fraction of on foliage mass loss due to hurricane disturbance	0.21	-	Li et al. 2007
$d_{Br,wind}$	fraction of on stem/branch mass loss due to hurricane disturbance	0	-	Li et al. 2007
$d_{Br,fire}$	fraction of on stem/branch mass loss due to fire disturbance	0.74	-	Bracho et al. 2010
$d_{Fo,fire}$	fraction of on foliage mass loss due to fire disturbance	0.74	-	Bracho et al. 2010

Sensitivity Analysis

Two levels of sensitivity analysis were performed: 1) a local sensitivity analysis, whereby individual parameters values were adjusted one at a time (OAT) while all others remained fixed and 2) a process level sensitivity analysis to explore interactions between key model processes following the methodology of Brugnach (2005). For the process level sensitivity, the model was conceptualized as five key processes: 1) *C* availability, 2) respiration, 3) *N* availability, 4) below ground turnover and 5) growth and partitioning. The analysis was designed to explore the effects of the first four processes on the fifth (growth and partitioning) and the ultimate effect of each process on shoot and root standing biomass. Relationships between the processes and data flows are shown in

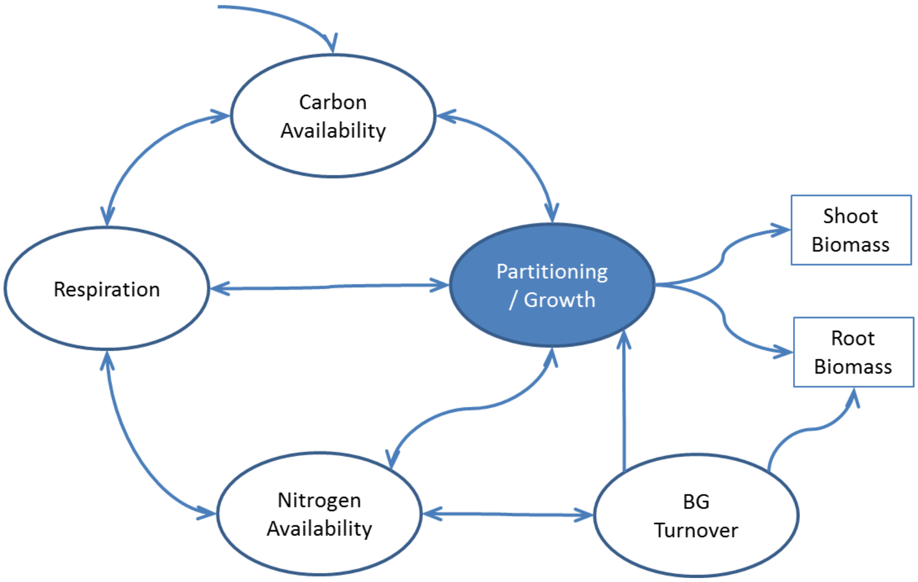

Figure 3.

Figure 3. Processes (ovals), data flows (arrows) and model output variables (boxes) identified for process level sensitivity analysis. Perturbed processes are shown in white and the target process shown in blue.

Parameters that were exclusively associated to each separate process were identified and perturbed OAT by ±10% of the calibrated value to determine each parameter's influence on the respective process target variable (Table 6).

Table 6. Processes, target variables and associated parameters used in sensitivity analysis. Associated parameters were perturbed by ±10% of their calibrated or input values.

Process	Target Process Variable	Associated Parameter
Available Carbon	$AC1$	f_{oak} k_{Rem} r_{max} ss_{max} fss_{min}
Respiration	$Rm+Rg$	k_{Q10} T_{air} r_m r_g
BG Turnover	$TO_{FR}+TO_{CR}$	λ_{FR} λ_{CR}
Nitrogen Uptake	n_{upt}	n_{sup} $SoilN$ PET Rainfall f_{Nrtrn}

Based on the results of the parameter perturbations (Table 12), one parameter was chosen to perturb the process target variable. Processes were then perturbed to ~±20% of their baseline value by randomly perturbing the selected parameters over 30 runs using a normal distribution (Table 7). While one process was being perturbed, all other processes remained fixed. Relative changes from the calibrated baseline runs ([output-baseline]/baseline) were computed for each target process variable for comparison.

Table 7. Parameter values, standard deviations and output processes used in process level sensitivity analysis. "Seed" represents randomization seed applied in STELLA 9.0 for simulation repeatability.

Process	Parameter	Mean	SD	Seed
Carbon Availability	f_{oak}	0.5	0.05	1

Process	**Parameter**	**Mean**	**SD**	**Seed**
	Output variable		AC1 (daily average)	
Nitrogen Availability	N_{soil}	1.8	0.75	3
		Output variable	n_{upt} (cumulative)	
Respiration	T_{air} (scalar)	1	0.1	1
		Output variable	$TO_{CR} + TO_{FR}$	
Root Turnover	λ_{FR}	0.0025	0.000625	1
		Output variable	R_g+R_m (cumulative)	

Relative changes in the target process variables were also compared to determine process effects on standing biomass at the end of the model runs. Due to use in respiration and growth processes, sensitivity to *C:N* ratio inputs were determined separately by perturbing the values uniformly from -10% to +50% of the calibrated value. For *C:N* sensitivity, effects on growth, nitrogen uptake, respiration and available carbon (*AC1*) were determined as percent change from the baseline calibrated run. Sensitivity of the $frac_{oaks}$ parameter was tested in a similar manner as C:N ratio. All sensitivity analyses were conducted using the CO_2 site test case scenario.

RESULTS

CO_2 Site Test Case

Modeled soil water content for the CO_2 site tracked fairly well with observed values from OTC study control plots, deviating by 33% on average during the period shown in Figure 4.

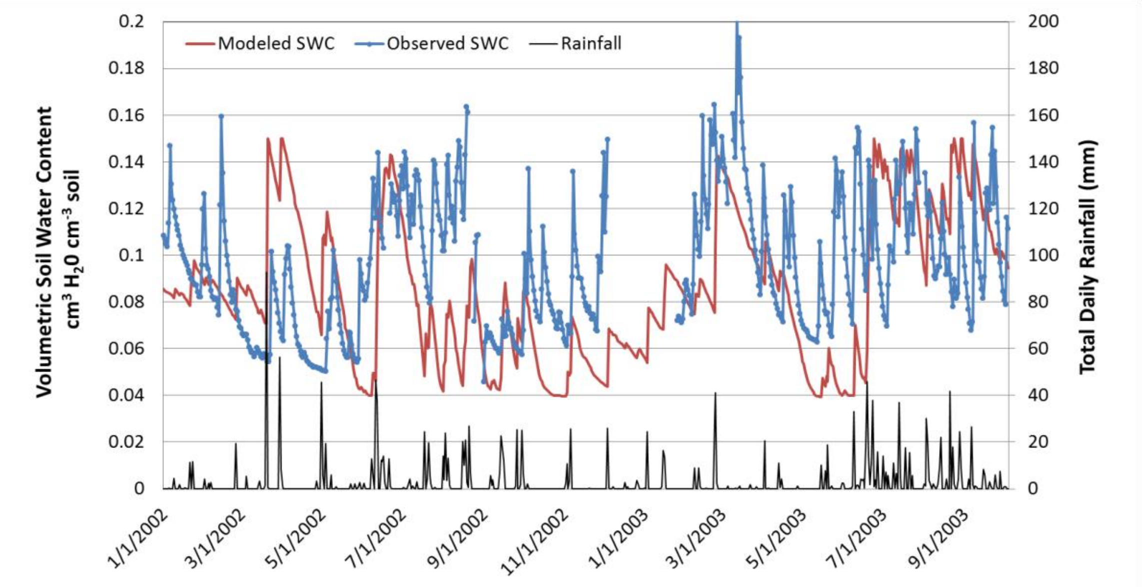

Figure 4. Modeled and observed soil water content and daily rainfall for the CO_2 site (Hungate et al. 1999, unpublished data).

Modeled coarse root mass remained relatively stable, but declined slightly over the length of the model run (Figure 5). Stem mass increased linearly at an average rate of 42.6 gC yr^{-1}, on par with the average growth rate observed in control plots during the OTC study (46.6 gC yr^{-1}; Seiler et al. 2009) and tracked annual growth measurements well (Figure 6). Foliage mass trended as expected based on allometry and the sigmoid growth function ((13 and (14). Fine root mass fluctuated inter-annually by ~100gC m^{-2}, but sustained a consistent level over the first several years of the simulation. However, fine root masses noticeably diminished following the disturbance event, primarily due to the observed 22% reduction in GPP during the period following the hurricane (Li et al. 2007). Total turnover at the CO_2 site was, on average, 730gC m^{-2} yr^{-1}, a majority of which was from fine root turnover (480gC m^{-2} yr^{-1}). This suggests that roughly the equivalent of the total amount of standing aboveground biomass after 11 years of growth (Seiler et al. 2009) is being added to the soil each year.

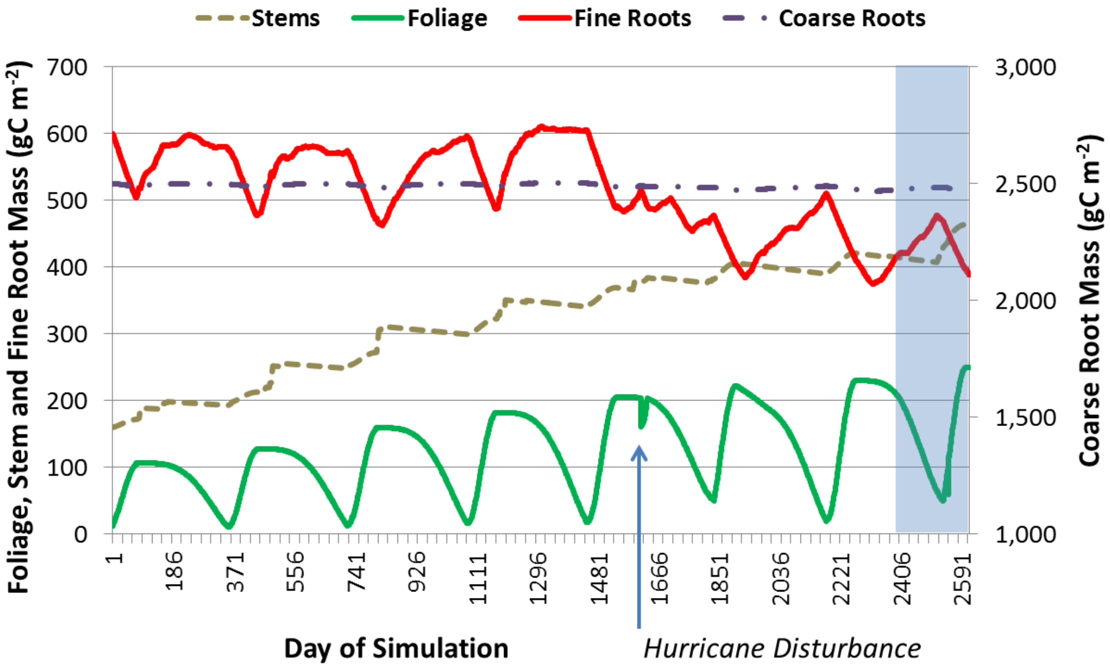

Figure 5. CO_2 site simulation results: structural organ reservoir masses. Shaded area indicates repeated data.

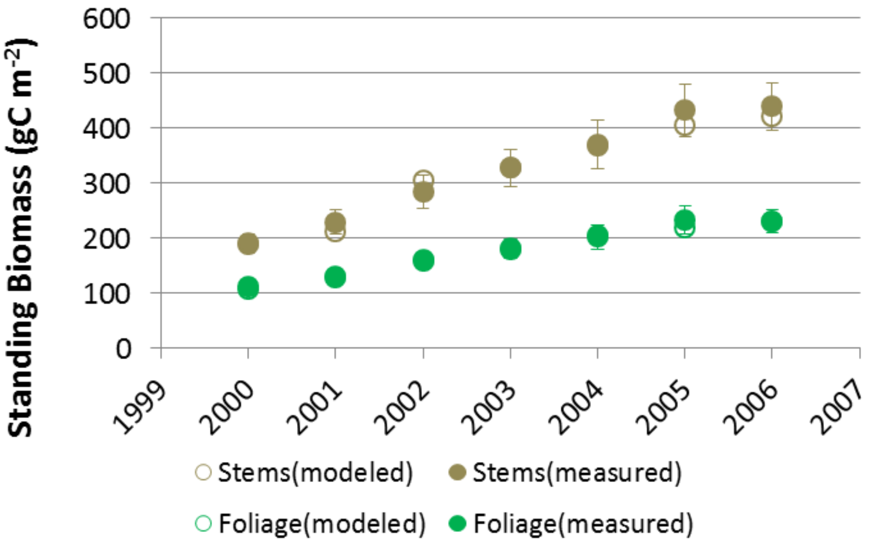

Figure 6. Modeled and measured (OTC control plots) annual aboveground biomass.

Stems, foliage and coarse root reservoirs all fell within standard error of measured values at the end of the OTC study, but fine root mass was 37% less than measured (Figure 7).

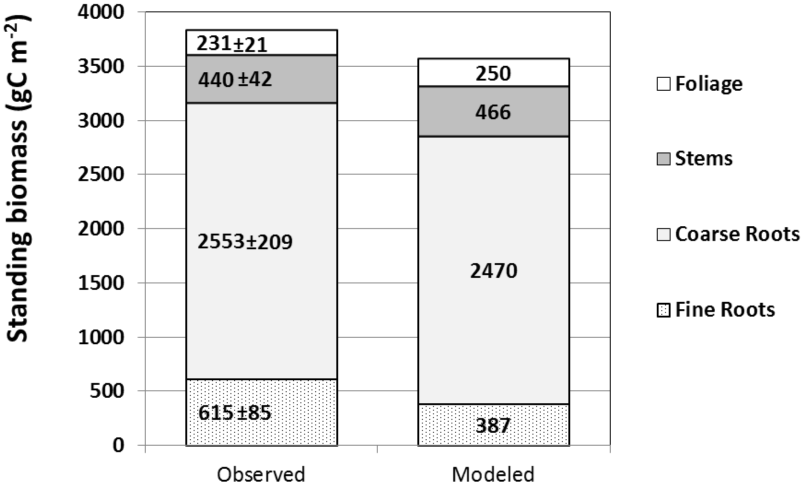

Figure 7. Modeled and observed (±standard error) biomass stocks at harvest of OTC study in June 2007.

As expected, modeled autotrophic respiration rates were lower than ecosystem respiration measured by eddy flux (Figure 8). By adding turnover to autotrophic respiration, and normalizing by GPP ([Respiration + Turnover] / GPP_{oaks}), the cumulative fraction of modeled *C* fluxed back to the environment (88%) was roughly equal to ecosystem respiration (ER / GPP) measured by eddy covariance (84%).

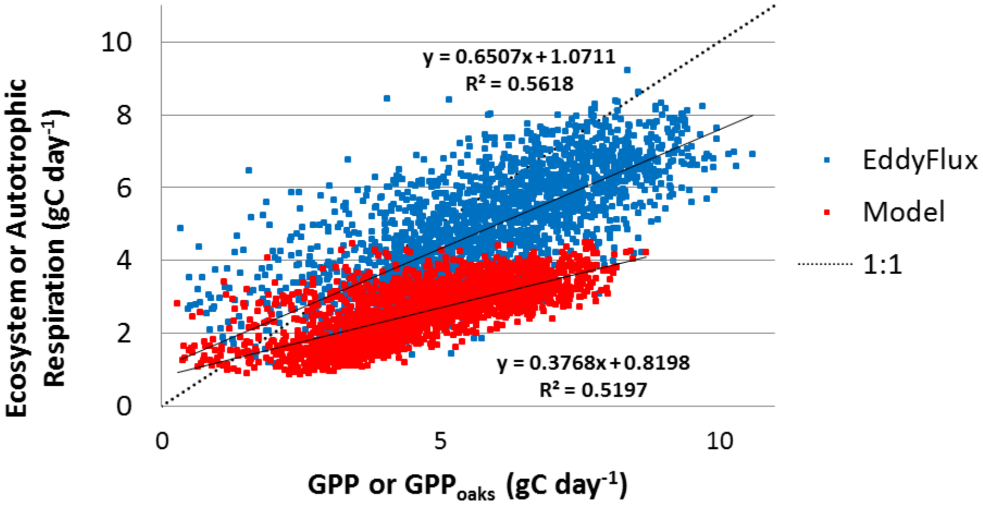

Figure 8. Ecosystem respiration from eddy covariance measurements and modeled autotrophic respiration versus GPP for the CO_2 site simulation.

Autotrophic respiration consumed a majority of assimilated carbon (55%) for the CO_2 site model run, dominated by root respiration (75% of total respiration). Fine roots received the majority of growth *C*, followed in order by foliage, coarse roots and stems (Table 8). Comparing slopes of modeled respiration against ecosystem respiration from eddy covariance measurements (Powell et al.; Figure 8), the model results indicate that autotrophic respiration accounted for ~58% of total ecosystem respiration.

Table 8. Cumulative percentage of *C* allocated to plant organ structural growth for CO_2 site simulation.

	Stems	**Foliage**	**Coarse Roots**	**Fine Roots**	**Total Shoots**	**Total Roots**
%of Growth	7.4%	25.1%	8.0%	59.5%	32.5%	67.5%
% of GPP_{oaks}	3.3%	11.1%	3.5%	26.4%	14.4%	29.9%

Foliage mass in the model run returned to the allometry-expected value 20 days after the defoliation event (Figure 5), faster than recovery as observed through LAI measurements, which did not fully recover until the following spring leaf flush (Li et al. 2007). The hurricane triggered an allocation shift from below- to aboveground, primarily directed towards leaf growth, a large portion of which was from stored *C* (Table 9). However, an additional model run with storage *C* remobilization disabled showed similarly rapid foliage recovery, indicating that the plants had sufficient soluble sugars available for fully recovering leaf loss to pre-defoliation levels without the need to remobilize non-soluble carbohydrates.

Table 9. Modeled *C* allocated to each tissue (including respiration) at the CO_2 site during the post-hurricane recovery period and over the same dates (Reference) one year prior, in 2003.

Growth period	**Foliage**	**Stem**	**Coarse Roots**	**Fine Roots**	**Total AG**	**Total BG**	**Storage C used**
Post-Hurricane Recovery	92.3	35.1	133.4	159.4	127.5	292.8	88.5
Reference (2003)	28.9	24.5	136.1	233.4	53.4	369.6	7.0

Happy Creek Test Case

Similar to the CO_2 site data, GPP at the Happy Creek site declined following the 2004 hurricane, and continued to decline until the prescribed burn of the area (Bracho et al. 2010). The hurricane effect is visible in the declining fine root mass during the initial years of model simulation (Figure 9). Fine root mass continued to decline during the period immediately following the burn, but were on the rebound at the discontinuation of measurements. By repeating data from the last year collected, the simulation shows a full recovery to pre-burn levels after 4 years. Aboveground biomass measurements are only available for 2004, 2005 and immediately post-burn 2006 at the site and show high variability for scrub oaks. For 2005, observed aboveground biomass was 646±227 gC m^{-2} (Bracho et al. 2010) and the modeled value was lower, but fell within the standard error (485 gC m^{-2}).

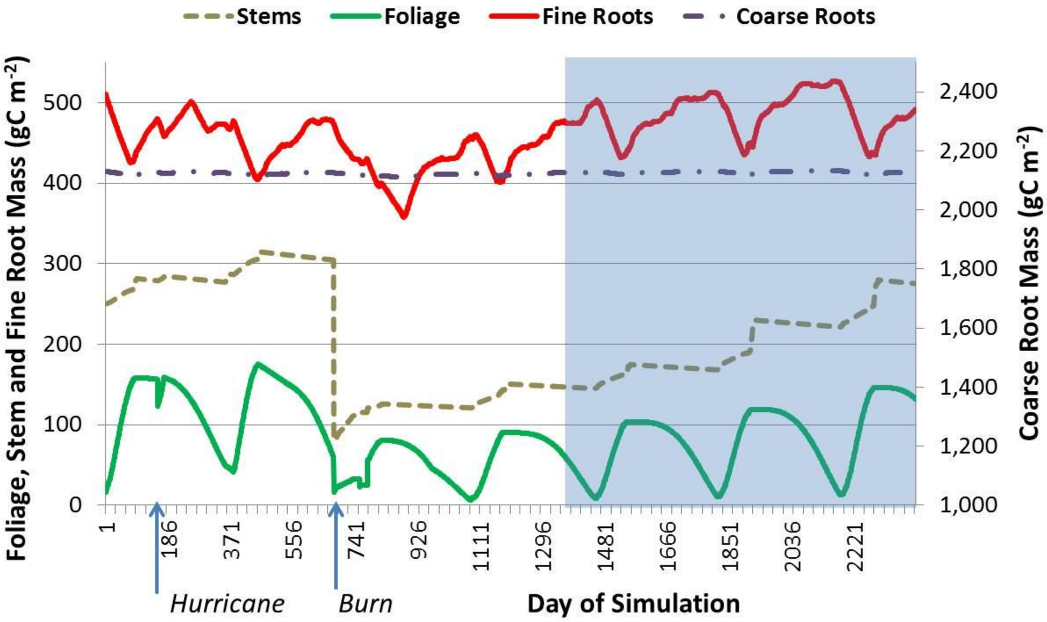

Figure 9. Model results for Happy Creek standing biomass. Shaded data indicate use of repeated GPP inputs.

Allocation patterns for one year preceding and following the burn primarily differed in foliage growth. The burn timing coincided approximately with the start of spring leaf expansion; therefore storage remobilization mirrored that of a typical growing season, as reflected in the amount of reserves used in both years (Table 10).

Table 10. Cumulative GPP, allocation (gC m^{-2}) and percent growth allocation by plant tissue for 1 year prior (2005-2006) and 1 year post-burn (2006-07). Tissue values represent structural C allocation only (respiration excluded).

Season	GPP_{oaks}	Total Respiration	Stems	Coarse Roots	Foliage	Fine Roots	Reserves Used
2005-06	1461.7	788.7	42.2	55.3	154.0	422.7	1.1
%growth	-	-	6.3%	8.2%	22.8%	62.7%	-

2006-07	1169.0	659.3	49.1	48.5	81.1	335.2	4.2
%growth	-	-	9.6%	9.4%	15.8%	65.2%	

The post-burn recovery period displayed much less allocation to foliage than the same time period the previous year, increased allocation to stems, decreased fine root allocation and increased reserve *C* usage (Table 11). However, the opposite trends in allocation to individual tissues offset each other and total C fraction allocated aboveground and belowground tissues remained remarkably stable (35% AG, 65%BG in 2005; 34.5% AG, 65.5%BG post-fire in 2006).

Table 11. Modeled *C* allocated to each tissue (including respiration) at the Happy Creek site during the post-burn recovery period and over the same dates (Reference) one year prior, in 2005.

Growth period	**Foliage**	**Stem**	**Coarse Roots**	**Fine Roots**	**Total AG**	**Total BG**	**Storage C used**
Post-Burn Recovery	34.5	52.2	79.7	85.0	86.7	164.7	87.9
Reference (2005)	80.1	34.6	76.3	137.1	114.8	213.4	13.8

Sensitivity Analysis

The OAT analysis revealed that parameter effects on target process variables differed greatly in magnitude (Table 12). For example, a 10% increase in f_{Oaks}, yielded a 43% increase in AC1, but a 10% increase in the soil nitrogen uptake coefficient produced only 0.7% increase in nitrogen uptake (Table 12).

Table 12. Sensitivity of targeted process variables to ±10% parameter perturbations. *C:Ncoeffs effects multiple processes.

Process and baseline value	**Parameter**	**-10%**	**+10%**
Available Carbon (*AC1*)	f_{oak}	-15.41%	43.16%
Baseline: 19.58	k_{Rem}	-6.30%	6.54%
	r_{max}	0.31%	5.57%

	ss_{max}	5.68%	-5.10%
	fss_{min}	11.47%	-11.65%
Respiration ($Rm+Rg$)	k_{Q10}	-10.08%	11.01%
Baseline: 6544.01	T_{air}	-9.53%	10.26%
	r_m	-5.25%	5.06%
	r_g	-1.46%	1.45%
	*C:Ncoeffs**	5.43%	-4.64%
BG Turnover ($TO_{FR}+TO_{CR}$)	λ_{FR}	-2.39%	2.93%
Baseline: 3225.30	λ_{CR}	-0.92%	0.61%
Nitrogen Uptake (n_{upt})	n_{sup}	0.06%	0.70%
Baseline: 33.33	*SoilN*	0.06%	0.70%
	PET	0.00%	-0.39%
	Rainfall	0.36%	-0.96%
	f_{Nrtrn}	4.01%	-4.69%

The results of the process level sensitivity analysis are shown in Figure 10, Figure 11, Figure 12, and Figure 13, along with the ranges of the process variable output values. The interaction plots showed mostly linear relationships between processes. Perturbation of *AC1* showed high sensitivity to input parameters (Table 12), but small changes to *AC1* had little influence over other processes (Figure 10). The interaction diagrams show that perturbations to respiration strongly impacted all other processes, especially aboveground growth, which was impacted by roughly a factor of 2 by the change in respiration. Perturbations to the respiration process limited carbon availability to other processes, demonstrated by the inverse relationships with *AC1*, nitrogen uptake, and above- and belowground growth allocation. Perturbing the nitrogen uptake process produced scattered effects, indicating non-uniform interactions with other processes. In fact, the effect of nitrogen uptake on standing biomass displayed a binary response, which can be attributed to the logic for determining nitrogen demand versus availability applied in the model (Figure 14). Also, the range of the perturbed nitrogen process values showed a negative skew, indicating a saturation point when soil *N* concentrations increase. The belowground turnover trends highlight the tradeoff between costs to maintain standing biomass and growth (Figure 13), observed when belowground turnover decreases, above- and belowground growth allocation decreases, but total respiration increases.

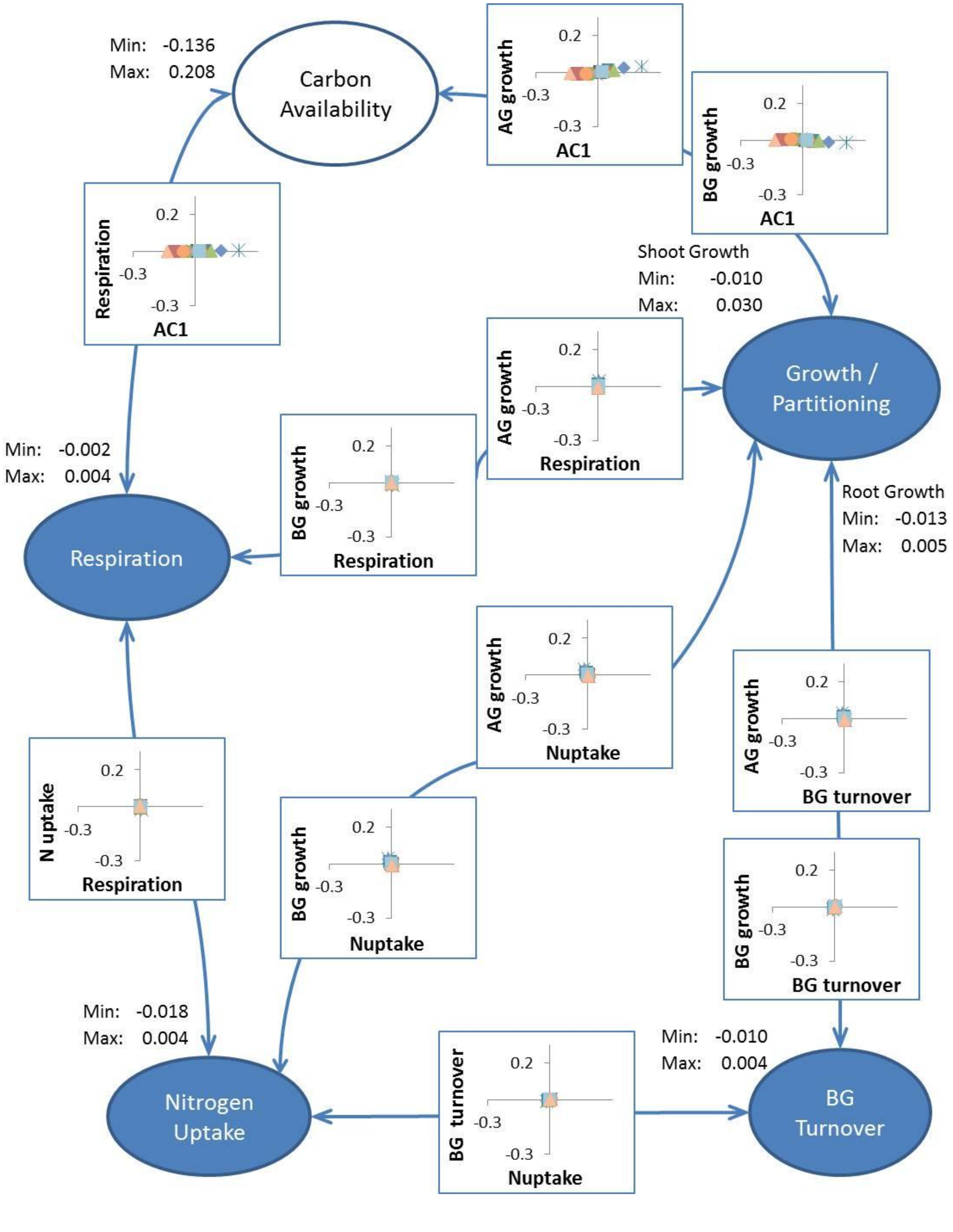

Figure 10. Results of perturbations to the available carbon process. Each marker represents one run out of 30 total. Range of output values are shown next to each process.

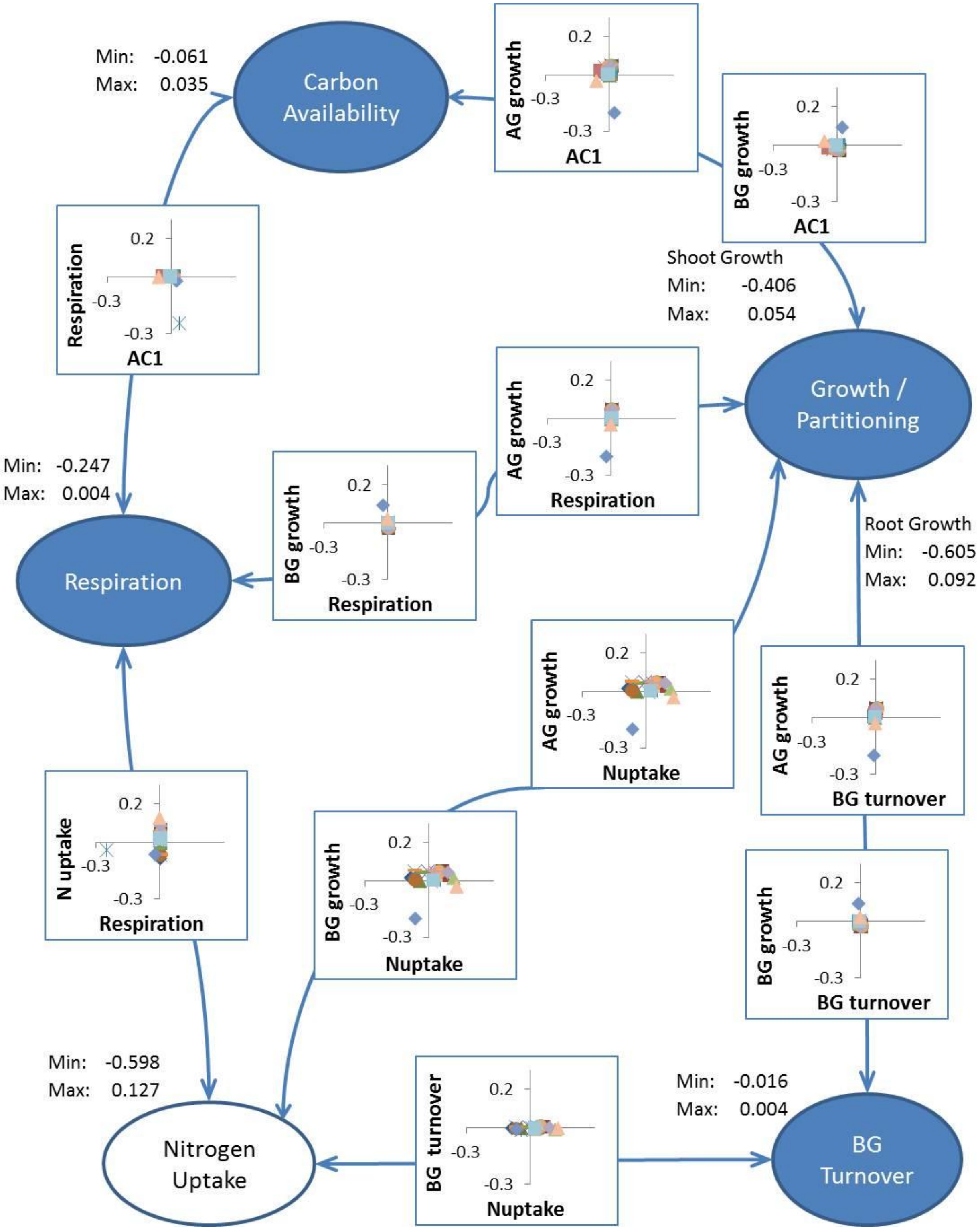

Figure 11. Results of perturbations to the available nitrogen process. Each marker represents one run out of 30 total. Range of output values are shown next to each process.

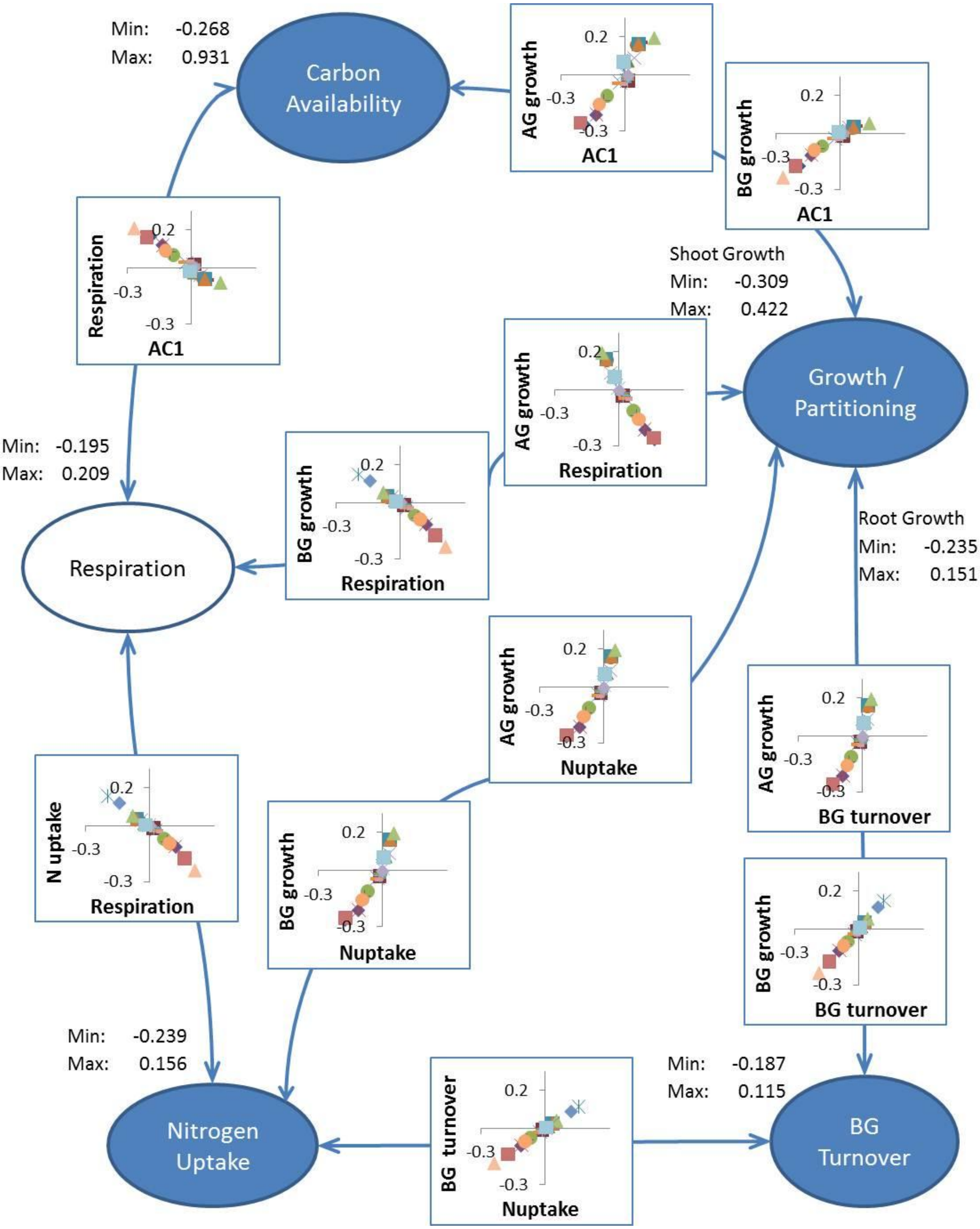

Figure 12. Results of perturbations to the respiration process. Each marker represents one run out of 30 total. Range of output values are shown next to each process.

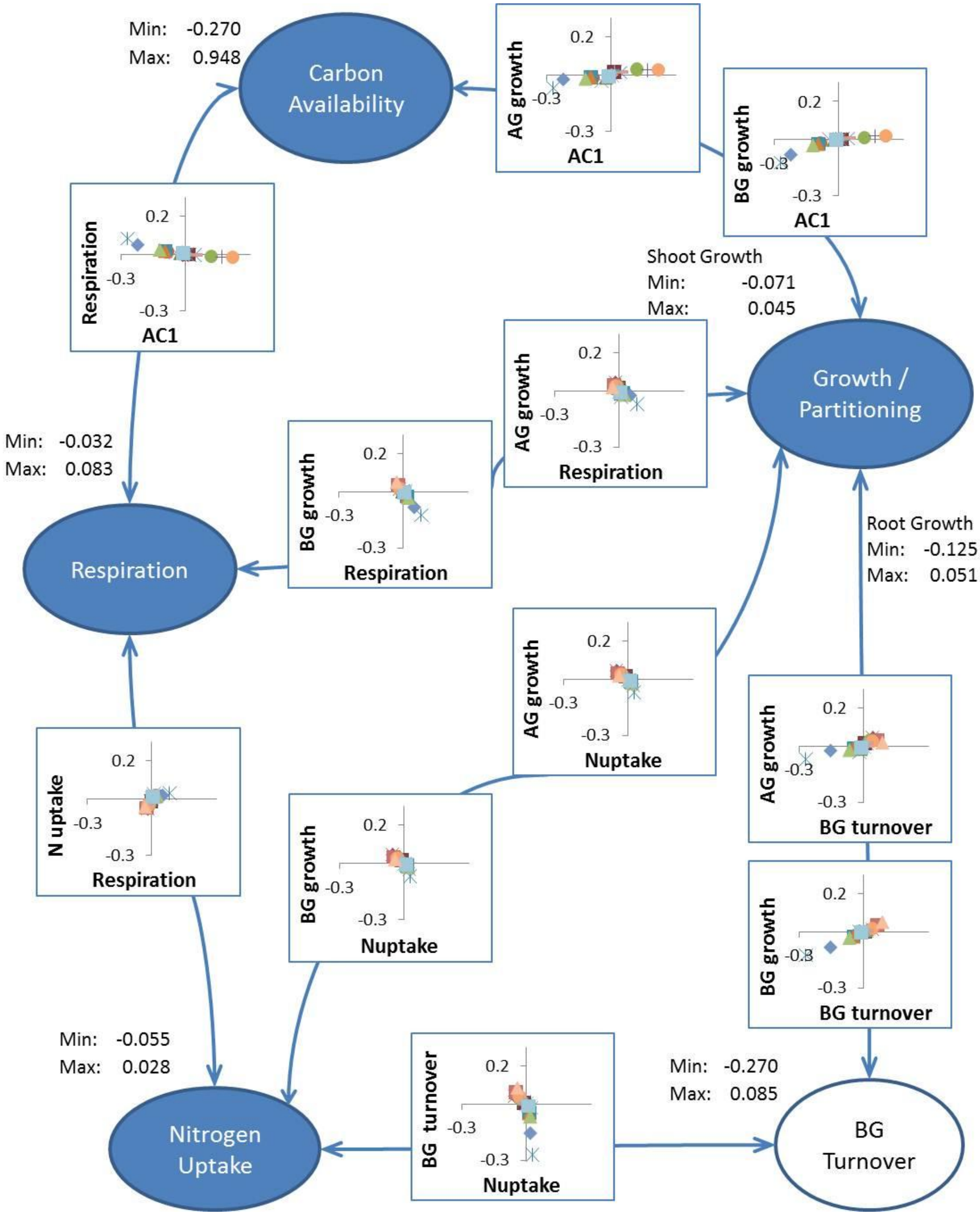

Figure 13. Results of perturbations to the root turnover process. Each marker represents one run out of 30 total. Range of output values are shown next to each process.

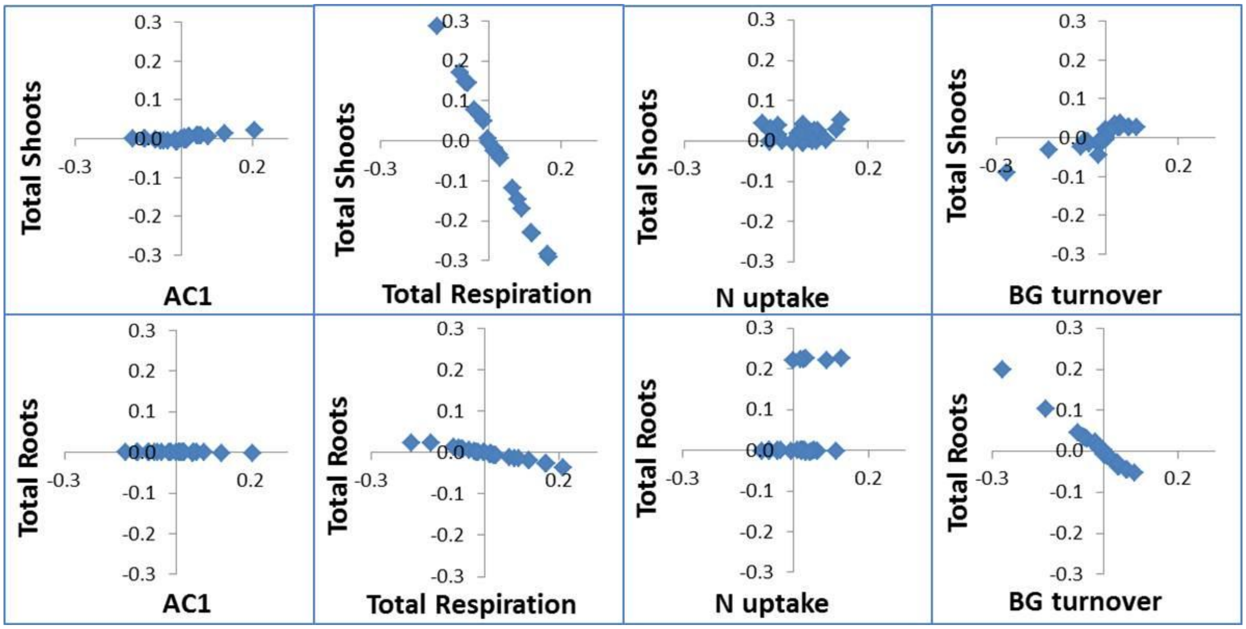

Figure 14. Process perturbation effects on standing shoot and root mass at end of leaf expansion in 2006.

Total root mass showed less relative effect to respiration process changes than shoots, as shown by Figure 14, owing to the absolute difference in mass. The C:N ratio parameter effected both the growth and respiration processes and results showed fairly linear relationships with respiration, AG and BG growth, nitrogen uptake and available carbon (Figure 15). Both aboveground and belowground growth increased with increasing C:N values, with shoots showing a greater relative impact. Available carbon decreased with increasing C:N, as nitrogen limitations relaxed and more labile carbon could be used for structural growth.

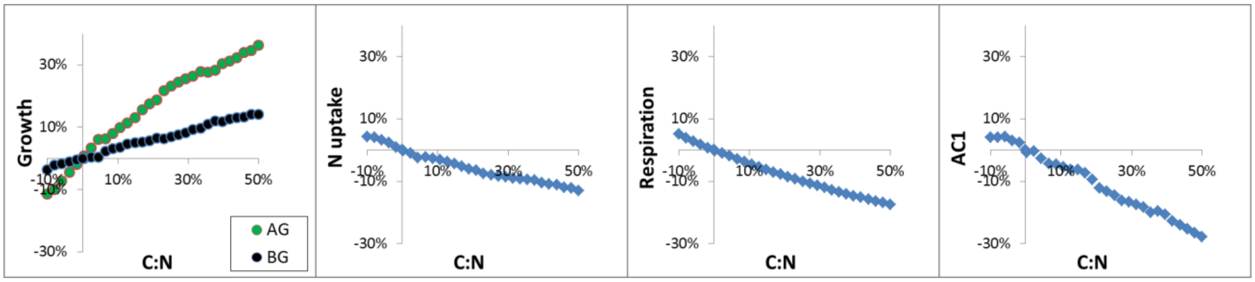

Figure 15. Effects of perturbation of C:N ratio on total respiration, aboveground (AG) and belowground (BG) growth allocation, nitrogen uptake and available carbon (AC1).

Model processes were highly sensitive to increased assimilated carbon due to perturbing *frac*$_{oaks}$ (Figure 16). Effect of changes in fracoaks on belowground growth were linear, but aboveground growth displayed non-linearity as a reflection of the relationship used for leaf allometry (Figure 16).

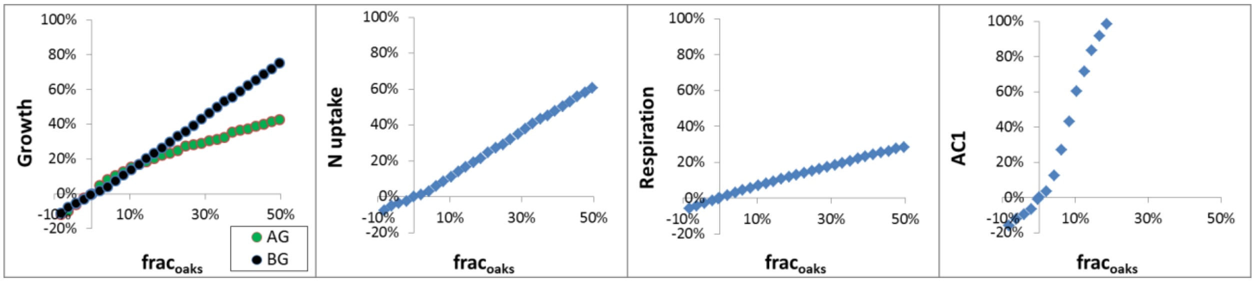

Figure 16. Effects of perturbation of *frac*$_{oaks}$ on above- and belowground growth, nitrogen uptake, total respiration, and available carbon (AC1).

DISCUSSION

General Discusson

Both test cases demonstrate the importance of belowground biomass to carbon cycling in this ecosystem. Over the course of the model runs, 76% and 72% of assimilated carbon was allocated to fine and coarse roots for growth and respiration at Happy Creek and the CO_2 site, respectively. Fine roots received the majority of growth partitioning and contributed the most carbon, via turnover, to the soil. However, the model underestimated standing fine root mass at the CO_2 site in comparison with observations. The fine root turnover coefficient was defined to allow fine roots to fluctuate in the short-term, but to maintain a steady state over the long-term, consistent with minirhizotron trends reported by Brown et al. (2009). The value applied (0.0025) to achieve steady-state was based on production rates of fine roots and mychorrizae observed using in-growth bags (Langley et al. 2003), an order of magnitude lower than fractional losses observed during the first two years of the OTC study which ranged from 0.015 to 0.025 (Dilustro et al. 2002) which is not sustainable over time. This indicates that fine root longevity varies considerably in this ecosystem and the model may benefit from implementation of a dynamic approach to fine root turnover which may be influenced by environmental factors (Rasse 2002). In an analysis of global allocation trends, Litton et al. (2007) compared GPP and total belowground allocation for 34 forest ecosystems. Figure 17 shows how the Florida scrub oak ecosystem, based on this study, compares to other forest ecosystems. The high allocation rate belowground highlights the uniqueness of the scrub oak ecosystem and speaks to the disturbance regimes which have pushed the plants to evolve such a belowground lifestyle.

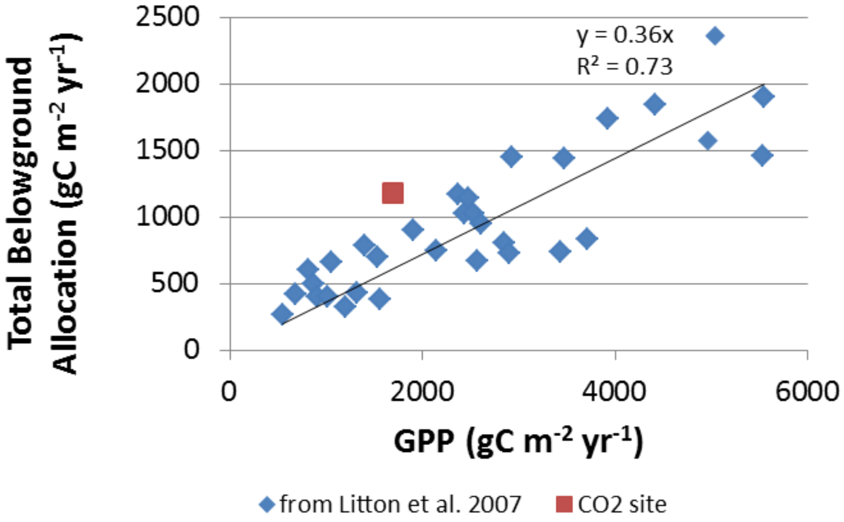

Figure 17. Correlation of GPP and Total belowground *C* flux (total root growth, respiration, and exudation) for scrub oaks as modeled in this study and 34 global forest ecosystems (temperate deciduous, needleleaf evergreen and broadleaf evergreen). Adapted from Litton et al. 2007.

Comparison of Disturbances

The fire and hurricane disturbance events modeled here were vastly different in nature as described in Table 13. While the disturbances differed greatly in magnitude, some similar recovery trends were observed; specifically, a sharp decline in fine root mass following the disturbance event. This decline was due to shifts in allocation patterns as well as through reduced GPP which reflects lost photosynthetic capacity. This decline in root mass is consistent with trends observed over the last years of the study via minirhizotron measurements (Day et al. in prep.) and reduced soil respiration in the period following the hurricane (Li et al. 2007), suggesting the correlation between *GPP* and soil respiration to be driven by root allocation and dynamics. By reducing carbohydrate availability for fine root growth, the aboveground disturbance effect is potentially compounded by reducing access to water and nutrients needed to regain leaf function. Such interactive effects, coupled with disturbance frequency, may explain why direct correlations between belowground biomass and time since last fire have not been found in scrub oaks (Saha et al. 2010).

Table 13. Distinguishing characteristics of hurricane and fire disturbances.

Hurricane Disturbance Characteristics	**Fire Disturbance Characteristics**
Defoliation only, stems generally undamaged (Li et al. 2007) Deposition of green foliage to forest floor; addition of *C* and *N* to soil surface (Li et al. 2007) Occurred in September, at start of typical aboveground no-growth period	Destruction of leaf and stem mass (Bracho et al. 2010) Combustion of leaf litter and topsoil; loss of *C* and *N* from soil surface (Alexis et al. 2006) Occurred in February, prior to normal spring leaf flush

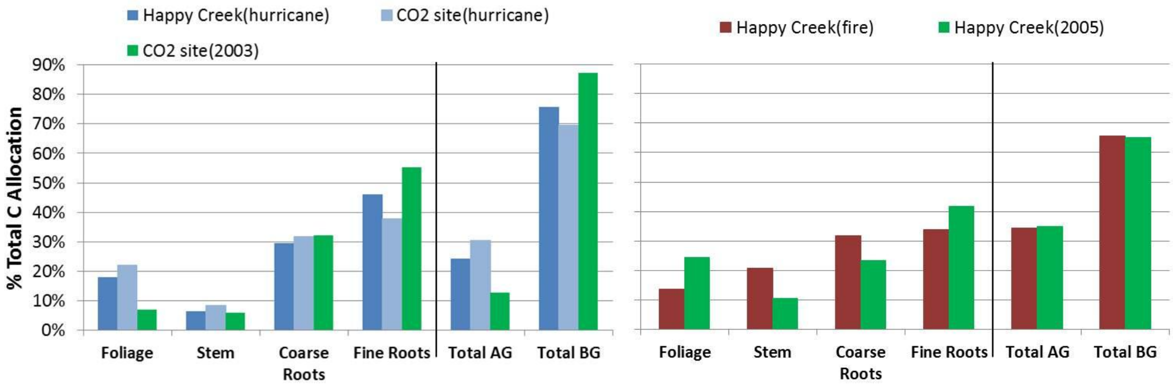

Figure 18. Comparison of modeled C allocation for recovery period and the same dates one year prior for hurricane disturbances (left) and fire disturbance (right).

The key difference in recovery allocation between the two types of disturbance is the destruction of stem mass during the fire event. Destruction of stems reduces the plant infrastructure for leaf development; therefore the plants need to invest more *C* to re-building stem mass during fire recovery in order to regain photosynthetic capacity (Figure 18).

The model overestimated speed of foliage recovery following hurricane disturbance at the CO_2 site in comparison to the observed recovery reported by Li et al. (2007). This indicates that availability of carbon resources was not the limiting factor for recovery, but that the model representation for recovery in this case is inadequate and suggests other limiting factors may restrict leaf recovery for disturbances out of phase with the normal phenological cycle. One possible explanation is that the limited nitrogen uptake model implemented here was unable to accurately capture uptake dynamics during the recovery period. During normal senescence, plants re-purpose a large fraction of leaf nitrogen for new growth (Chapin et al. 1990; Hungate et al. 2006), but the hurricane event precluded this recycling by transferring green leaf mass to the forest floor. Some of this nitrogen would become available through decomposition and mineralization (Couteaux et al. 1995), but not rapidly enough to be used during the recovery period. The nitrogen module also needs improvement for fire simulations. Fires combust large amounts of nitrogen from the soil surface (Alexis et al. 2006) and ecosystem soil *N* concentrations may require several years to recover to pre-burn levels (Schmalzer and Hinkle 1996). Such trends are not currently captured in this model.

For land managers, the disturbance results indicate a need to assess the complete life history of a stand, including local environmental variables (Menges and Hawkes 1998) and other forms of disturbance (e.g. wind or herbivory), in addition to fire, when making decisions regarding prescribed burns. Since disturbances can mobilize *C* from stable coarse root structures to ephemeral (i.e. combustible) aboveground pools, management seeking to optimize carbon sequestration may desire less frequent burns. However, this must also be weighed against needs for wildlife habitat (e.g. for the Florida Scrub Jay) which may require more frequent burns (Root 1998).

Future Development

As a first cut, this study demonstrates that the root:shoot balance approach can be applied, with reasonable results, to frequently disturbed systems, when adequately constrained. Of course, the use of observed *GPP* limits the ability to test the full capabilities of the approach, due to the decoupling of root and shoot activities. In order to further evaluate this modeling approach, this allocation model should be integrated with a mechanistic photosynthesis model (e.g. Farquhar et al. 1980) and would benefit from a more realistic treatment of nitrogen dynamics as mentioned above. Coupling with a photosynthesis model will extend model applicability, allowing users to play “what if” games regarding atmospheric CO2 concentrations and to calibrate the model for exploring species specific trends, like the different responses of *Q. geminate* W. and *Q. myrtifolia* S. growing under elevated CO_2 (Li et al. 1999; Seiler et al. 2009).

The model is necessarily a simplification of plant function and each process can be further developed. For example, fine root turnover is known to be affected by environmental conditions such as water, nutrient and substrate availability (Norby and Jackson 2000), therefore the rate constant used here can be replaced by a dynamic model to incorporate impacts of stress and substrate supply on root senescence. As mentioned previously, acorn production has been neglected in this study, since observed acorn mass on the OTC study ambient chambers was approximately 5 gC m^{-2} in 2001 (Stiling et al. 2004). However, allocation to acorn production may become more significant over time as production increases with aboveground stem size (Abrahamson and Layne 2002a). Inter-annual variability of acorn production is high. Abrahamson and Layne (2003) tracked acorn production in *Q. myrtifolia W.* and *Q. geminate S.* over 28 years (1969-1996) in several Florida scrub oak habitats, including a sand pine scrub system, and performed a multiple stepwise regression using a variety of environmental factors (i.e. temperature and water availability). Their best model for *Q. geminate S.* and *Q. myrtifolia W.* explained only 44% and 29% of acorn crop size variation, respectively. In addition, Abrahamson and Layne (2002b) found that acorn production ceased following fire, and recovery time to reach pre-burn production levels varied by species and plant size. These complex trends will need to be further explored in order to accurately model allocation to reproductive tissues. Given the strong sensitivity of model results to respiration, this formulation should be another focus of future efforts. For example, Atkin and Tjoelker (2003) demonstrated that Q10 values are themselves temperature dependent and proposed that respiration rates vacillate between being limited by enzyme activity and substrate availability, implying a need to account for carbohydrate concentration in the maintenance respiration equations. Also, in this model, *C:N* ratios are assumed constant, but studies show *C:N* values to fluctuate based on soil chemical composition and environmental conditions and are likely to increase under rising atmospheric CO_2 concentrations (Hungate et al. 2006, Lindroth 2010). Sensitivity analysis of model coefficients showed that increasing *C:N* increases growth and decreases respiration, which gives some insight into how the model will respond when applied to simulate elevated CO_2 conditions. The sensitivity perturbation of $frac_{oaks}$ also represents a preliminary application of the model to future climate scenarios, since photosynthesis commonly increases under elevated CO2 (Drake et al. 1997, Ainsworth and Long 2005). Coupling the allocation model with a full ecosystem model is a clear next step which will expand capabilities for exploring long-term carbon cycle questions and will be a valuable tool for assessing ecosystem response to rising atmospheric CO_2.

APPENDIX A: LIST OF MODEL PARAMETERS

Parameter	Description	Units	STELLA name	type
Main Module (Carbon)				
AC1	labile C available at to meet maintenance respiration demands and determine storage/remobilization	gC m^{-2}	AC1	variable
AC2	labile C available after maintenance respiration demands have been met	gC m^{-2}	AC2	variable
AC3	labile C available after growth demands have been met.	gC m^{-2}	AC3	variable
C_{br}	structural stem mass	gC m^{-2}	Branches	reservoir
C_{cr}	structural coarse root mass	gC m^{-2}	Coarse_Roots	reservoir
δ_{res}	C allocated to reserve pool	gC m^{-2} day^{-1}	Cres	flux
δ_{ss}	C allocated to soluble sugar pool	gC m^{-2} day^{-1}	Css	flux
$Decay_{Br}$	C losses from decay of stem/branch litter	gC m^{-2} day^{-1}	DecayBr	flux
$Decay_{Fo}$	C losses from decay of leaf litter	gC m^{-2} day^{-1}	DecayFo	flux
DOY_{grow}	day of the growing year	day	DOYgrow	counter
δ_{exud}	C losses as root exudates	gC m^{-2} day^{-1}	Exudates	flux
C_{fr}	structural fine root mass	gC m^{-2}	Fine_Roots	reservoir
f_{liveBr}	fraction living tissue in structural stem/branch mass	unitless	fliveBr	variable
f_{liveCR}	fraction living tissue in structural coarse root mass	unitless	fliveCR	variable
-	oven used in STELLA to segregate foliage growth between separate foliage cohorts	unitless	FoExpOv	oven (arrayed)
-	input to FoExpOv	unitless	FoExpOvIn	oven flux (arrayed)
-	exit from FoExpOv	unitless	FoExpOvOut	oven flux (arrayed)
$C_{foliage1}$	structural foliage mass of cohort 1	gC m^{-2}	Foliage[1]	reservoir (arrayed)
$C_{foliage2}$	structural foliage mass of cohort 2	gC m^{-2}	Foliage[2]	reservoir (arrayed)
$C_{foliageR}$	structural foliage mass of recovery cohort	gC m^{-2}	Foliage[R]	reservoir (arrayed)
-	oven used in STELLA to capture foliage mass at the end of leaf expansion for calculating turnover	gC m^{-2}	FoTOOv	oven (arrayed)
-	input to FoTOOv	gC m^{-2}	FoTOOvIn	oven flux (arrayed)
-	exit from FoTOOv	gC m^{-2}	FoTOOvOut	oven flux (arrayed)
C_{fo}	total foliage mass of all cohorts	gC m^{-2}	FoTotal	variable

Parameter	Description	Units	STELLA name	type
f_{oak}	fraction ecosystem biomass comprised by scrub oaks	unitless	fracOaks	constant
GEP	gross ecosystem production	$gC\ m^{-2}$	GEP	variable
GPP	gross primary production	$gC\ m^{-2}$	GPP	variable
R_g	C losses from growth respiration	$gC\ m^{-2}\ day^{-1}$	Grow_Resp	flux
δ_{Br}	C allocated to stem/branches growth	$gC\ m^{-2}\ day^{-1}$	growBr	flux
δ_{CR}	C allocated to coarse root growth	$gC\ m^{-2}\ day^{-1}$	growCR	flux
δ_{Fo}	C allocated to foliage growth	$gC\ m^{-2}\ day^{-1}$	growFo	flux (arrayed)
δ_{FR}	C allocated to fine root growth	$gC\ m^{-2}\ day^{-1}$	growFR	flux
-	time since last fire at start of simulation	days	InitialTSF	constant
LAI	leaf area index	$m^2\ m^{-2}$	LAI	variable
-	fraction of aboveground litter from foliage	unitless	LitFracFo	variable
Lit_{AGmax}	upper limit of aboveground litter accumulation	$gC\ m^{-2}$	LitterAGmax	variable
Lit_{br}	accumulated litter from stems	$gC\ m^{-2}$	LitterBr	reservoir
Lit_{fo}	accumulated litter from foliage	$gC\ m^{-2}$	LitterFo	reservoir
Lit_{AG}	total accumulated litter aboveground	$gC\ m^{-2}$	LitTotAG	variable
R_m	C losses from maintenance respiration	$gC\ m^{-2}\ day^{-1}$	Maint_Resp	flux
δ_{remob}	C remobilized from storage	$gC\ m^{-2}\ day^{-1}$	Remobilize	flux
$CP_{storage}$	storage reserve carbohydrate pool	$gC\ m^{-2}$	Reserves	reservoir
SLA	specific leaf area	$m^2\ gC^{-1}$	SLA	constant
CP_{ss}	Soluble sugar carbohydrate pool	$gC\ m^{-2}$	SolubleSugar	reservoir
TO_{BR}	C losses from stem/branch turnover	$gC\ m^{-2}\ day^{-1}$	TO_Br	flux
TO_{CR}	C losses from coarse root turnover	$gC\ m^{-2}\ day^{-1}$	TO_CR	flux
TO_{Fo}	C losses from foliage senescence	$gC\ m^{-2}\ day^{-1}$	TO_Fo	flux (arrayed)
-	total foliage turnover from all cohorts	$gC\ m^{-2}\ day^{-1}$	TO_FoTotal	variable
TO_{FR}	C losses from fine root turnover	$gC\ m^{-2}\ day^{-1}$	TO_FR	flux
λ_{CR}	coarse root turnover coefficient	unitless	TOcoeffCR	constant
λ_{FR}	fine root turnover coefficient	unitless	TOcoeffFR	constant
λ_{St}	stem/branch turnover coefficient	unitless	TOcoeffSt	constant
C_{Rt}	total structural root mass (fine and coarse)	$gC\ m^{-4}$	TotRoot	variable
C_{Sh}	total structural shoot mass (foliage and branches)	$gC\ m^{-3}$	TotShoot	variable
TSF	time since last fire	days	TSF	counter
<u>FoExpansion</u>				
-	length of foliage cohort life	days	Cohort_lifespan	constant

Parameter	Description	Units	STELLA name	type
-	switch used in foliage cohort scheme	unitless	Cohort_switch	variable
DOY_{TO}	day of year, shifted to align with turnover period	day	DOYturnover	counter
Fo_{def}	deficit of actual foliage mass to expected foliage mass	gC m^{-2}	Fo_def	variable
Fo_{exp}	expected foliage mass at any day during foliage expansion	gC m^{-2}	Fo_expand	variable
Fo_{opt}	expected structual foliage mass on any day	gC m^{-2}	Fo_opt	variable
Fo_{sen}	expected foliage mass at any day during foliage senescence	gC m^{-2}	Fo_senesce	variable
Fo_{TO}	calculated amount of foliage turnover for each cohort on a given day	gC m^{-2}	Fo_TO	variable (arrayed)
Fo_{max}	total maximum foliage structual mass based on allometry	gC m^{-2}	FoMax	variable
-	day of end of leaf senescence period	day	FoTO_Tend	constant
-	day of maxmum rate of leaf senescence	day	FoTO_Tmid	constant
t_e	day of end of leaf expansion period	day	LA_Tend	constant
t_m	day of maximum rate of leaf expansion	day	LA_Tmid	constant
Respiration				
RM_{demtot}	total maintenance respiration demands from all tissues	gC m^{-2}	DemMaintResp	variable
RM_{demBr}	maintenance respiration demand from stems	gC m^{-2}	DemRmBr	variable
RM_{demCR}	maintenance respiration demand from coarse roots	gC m^{-2}	DemRmCR	variable
RM_{demFo}	maintenance respiration demand from foliage	gC m^{-2}	DemRmFo	variable
RM_{demFR}	maintenance respiration demand from fine roots	gC m^{-2}	DemRmFR	variable
$frac_C$	carbon fraction of biomass	gC/gBiomass	fracC	constant
r_g	growth respiration coefficient	unitless	GrowRespCoeff	constant
$MeanT_{air}$	annual mean air temperature	°C	MeanTempAir	constant
pctNBr	percent nitrogen concentration in stem biomass	unitless	N Br	constant
pctNCR	percent nitrogen concentration in coarse root biomass	unitless	N CR	constant
pctNFo	percent nitrogen concentration in foliage biomass	unitless	N Fo	constant
pctNFR	percent nitrogen concentration in fine root biomass	unitless	N FR	constant
k_{Q10}	exponential coefficient to achieve specific Q10 relationship	unitless	Q10coeff	constant

Parameter	Description	Units	STELLA name	type
$r_{m,CR}$	empirical maintenance respiration coefficient for coarse roots	unitless	RMcoeffCR	constant
$r_{m,Fo}$	empirical maintenance respiration coefficient for foliage	unitless	RMcoeffFo	constant
$r_{m,FR}$	empirical maintenance respiration coefficient for fine roots	unitless	RMcoeffFR	constant
$r_{m,Br}$	empirical maintenance respiration coefficient for stems	unitless	RMcoeffSt	constant
-	Soil temperature at previous time step	°C	SoilTempT0	conveyor
-	input for soil temperature conveyor	unitless	STin	flux (conveyor)
-	output for soil temperature conveyor	unitless	STout	flux (conveyor)
T_{air}	Daily mean air temperature	°C	TempAir	variable (Input)
T_{soil}	Daily mean soil temperature	°C	TempSoil	variable
Nitrogen				
$C{:}N_{Br}$	C:N ratio for stems	$gC\ gN^{-1}$	C:N_Br	constant
$C{:}N_{CR}$	C:N ratio for coarse roots	$gC\ gN^{-1}$	C:N_CR	constant
$C{:}N_{Fo}$	C:N ratio for foliage	$gC\ gN^{-1}$	C:N_Fo	constant
$C{:}N_{FR}$	C:N ratio for fine roots	$gC\ gN^{-1}$	C:N_FR	constant
C:Nopt	optimal community C:N ratio	gC gN-1	CNTotOpt	variable
-	amount of N used for growth based on C allocation	$gN\ m^{-2}\ day^{-1}$	CNTotPart	variable
-	potential growth rate based on available N	$gC\ m^{-2}$	GrowNpot	variable
-	rate of N loss as turnover	$gN\ m^{-2}\ day^{-1}$	N TO	variable
n_{dem}	plant nitrogen demand	$gN\ m^{-2}\ day^{-1}$	Ndemand	variable
n_{grow}	nitrogen flux from reserve to structural N pool	$gN\ m^{-2}\ day^{-1}$	Ngrow	flux
n_{loss}	nitrogen lost to tissue turnover	$gN\ m^{-2}\ day^{-1}$	Nloss	flux
n_{remob}	N retranslocation flux to reserve pool during tissue senescence	$gN\ m^{-2}\ day^{-1}$	Nremob	flux
N_{res}	nitrogen reserve pool	$gN\ m^{-2}$	Nres	reservoir
-	maximum capacity of N reserve	$gN\ m^{-2}$	NresMax	variable
-	N reserve capacity coefficient	unitless	NresMaxCoeff	constant
-	N retranslocation from tissue senescence	$gN\ m^{-2}\ day^{-1}$	Nretrans	variable
f_{Nrtrn}	fraction of non-woody tissue N retranslocated during senescence	unitless	NrtrnsFracFo	constant
N_{str}	structural nitrogen	$gN\ m^{-2}$	Nstruct	reservoir
n_{sup}	potential nitrogen uptake from soil	$gN\ m^{-2}\ day^{-1}$	Nsup	variable

Parameter	Description	Units	STELLA name	type
γ_{sup}	soil nitrogen uptake coefficient	gN m^{-1}FR	NsupCoeff	constant
-	nitrogen uptake rate	gN m^{-2} day^{-1}	Nup	variable
n_{upt}	daily nitrogen uptake	gN m^{-2} day^{-1}	Nuptake	flux
n_{wup}	potential nitrogen uptake from water table	gN m^{-2} day^{-1}	Nwup	variable
γ_{wup}	water table nitrogen uptake coefficient	mmH_2O^{-1}	NwupCoeff	constant
SoilN	plant available soil N	gN m^{-2}	SoilN	constant
SRL	specific fine root length	m gC^{-1}FR	SRL	constant
WaterN	plant available N at water table	gN m^{-2}	WaterN	constant
Disturbance				
-	toggle to indicate disturbance day	unitless	Disturb	variable
-	fraction of on stem/branch mass loss due to disturbance	unitless	DisturbBr	constant
-	julian date of the disturbance	date	DisturbDay	constant
-	fraction of on foliage mass loss due to disturbance	unitless	DisturbFo	constant
-	julian date of simulation	date	JulDate	variable
-	day of recovery cohort turnover period	day	RecDOYTurnover	variable
-	expected foliage mass at any day during disturbance recovery	gC m^{-2}	RecFoExpand	variable
-	foliage demand to achieve expected mass during recovery	gC m^{-2}	RecFoExpDem	variable
-	input to recovery oven	gC m^{-2}	RecOvenIn	oven input
-	output from recovery oven	gC m^{-2}	RecOvenOut	oven output
-	number of days since start of recovery period	days	Recovery Counter	counter
-	day of end of recovery leaf expansion period	day	Recovery Tend	constant
-	day of maximum rate of recovery leaf expansion	day	Recovery Tmid	constant
-	oven used in STELLA to capture optimal foliage mass at disturbance date	gC m^{-2}	RecoveryOven	oven
-	toggle to indicate recovery phase	unitless	RecoveryPhase	variable
Partitioning				
AG_{dem}	C demand for aboveground growth	gC m^{-2}	AGdem	variable
DOY_{AGdorm}	starting day of aboveground no-growth season	day	AGdormantDOY	constant
Br:Fo	branches:foliage partitioning ratio	unitless	Br:Fo_coeff	constant
CR:FR	coarse root:fine root partitioning ratio	unitless	CR:FR_coeff	constant

Parameter	Description	Units	STELLA name	type
$Grow_C$	potential growth based on available C	gC m^{-2}	GrowC	variable
$Grow_N$	potential growth based on available N	gC m^{-2}	GrowN	variable
-	variable to reflect current growth phase	unitless	growPhase	variable
Growth	total C available for structural growth	gC m^{-2}	Growth	variable
Im	calculated imbalance for growth between water and assimilated carbon availability	unitless	Imbalance	variable
P	imbalance adjustment parameter	unitless	P	variable
p_{CR}	partitioning coefficient for coarse roots	unitless	partitionCR	variable
p_{Fo}	partitioning coefficient for foliage	unitless	partitionFo	variable
p_{FR}	partitioning coefficient for fine roots	unitless	partitionFR	variable
p_{Br}	partitioning coefficient for stems	unitless	partitionSt	variable
-	interim value for foliage partitioning coefficent	unitless	pFo	variable
-	interim value for fine root partitioning coefficent	unitless	pFR	variable
-	C available for growth used for coordination calculation	gC m^{-2}	pGrow	variable
τ	coordination time parameter	days	tau	constant
TO_{rateFo}	turnover rate of foliage	unitless	TOrateFo	variable
TO_{rateFR}	turnover rate of fine roots	unitless	TOrateFR	variable
Storage				
f_{Res}	fraction of GPP partitioned to reserve pool	unitless	fracRes	variable
$f_{Res,BL}$	baseline fraction of GPP partitioned to reserve pool	unitless	Fresbase	constant
k_{Rem}	reserve C remobilization rate constant	unitless	kRem	constant
$r_{max,Br}$	coefficient for calculating maximum reserve pool capacity for branches	unitless	RcoeffBr	constant
$r_{max,CR}$	coefficient forcalculating maximum reserve pool capacity for coarse roots	unitless	RcoeffCR	constant
$r_{max,Fo}$	coefficient for calculating maximum reserve pool capacity for foliage	unitless	RcoeffFo	constant
r_{maxFR}	coefficient for calculating maximum reserve pool capacity for fine roots	unitless	RcoeffFR	constant
Rmax	maximum capacity of reserve pool	gC m^{-2}	Rmax	variable
$ss_{max,Br}$	coefficient for maximum soluble sugar pool capacity for branches	unitless	SScoeffBr	constant

Parameter	Description	Units	STELLA name	type
$ss_{max,CR}$	coefficient for maximum soluble sugar pool capacity for coarse roots	unitless	SScoeffCR	constant
$ss_{max,Fo}$	coefficient for maximum soluble sugar pool capacity for foliage	unitless	SScoeffFo	constant
ss_{maxFR}	coefficient for maximum soluble sugar pool capacity for fine roots	unitless	SScoeffFR	constant
SS_{max}	maximum capacity of soluble sugar pool	gC m^{-2}	SSmax	variable
SS_{min}	minimum soluble sugar pool content	gC m^{-2}	Ssmin	variable
$SS_{overflow}$	fraction of GPP partitioned to reserve pool due to overflow of soluble sugar pool	unitless	SSoverflow	variable
<u>Water</u>				
-	number of active layers (debug)	unitless	ActiveLyrs	variable
θ_{av}	available soil water content for each soil layer	mm^3 mm^{-3}	AWCday	variable (arrayed)
-	available water content for layer (1,2,3)	mm	AWClyr	constant (arrayed)
-	water use distribution parameter	unitless	betaw	constant
-	soil bulk density	g cm^3	bulkdensity	constant
-	slope adjusted runoff curve number for AMC I	unitless	CN1slp	constant
-	runoff curve number for AMC II	unitless	CN2	constant
-	slope adjusted runoff curve number for AMC II	unitless	CN2slp	constant
-	runoff curve number for AMC III	unitless	CN3	constant
-	slope adjusted runoff curve number for AMC II	unitless	CN3slp	constant
-	runoff curve number for the current day	unitless	CNday	variable
-	soil cover index	unitless	COVsoil	variable
-	total aboveground biomass and residue	kg ha^{-1}	CV	variable
-	damping depth	mm	dd	variable
-	maximum damping depth	mm	ddmax	constant
-	damping depth scaling factor for impact of soil water	unitless	ddscale	variable
-	soil temperature depth factor	unitless	df	variable
-	Transpiration from layer (1,2,3)	mm day^{-1}	Ep lyr {1,2,3}	flux
-	adjustment parameter to allow transpiration from deeper soil layers	unitless	epco	constant
-	maximum daily transpiration	mm	Epmax	variable
-	maximum daily transpiration adjusted for soil evaporation	mm	Epmax'	variable
-	Evaporation from layer (1,2,3)	mm day^{-1}	Es lyr {1,2,3}	flux

Parameter	Description	Units	STELLA name	type
-	adjustment parameter to allow evaporation from deeper soil layers	unitless	esco	constant
-	maximum soil evaporation	mm	Esmax	variable
-	maximum soil evaporation adjusted for plant water use, etc.	mm	Esmax', Esmax'',Esmax''', Esmax''''	variable
-	evaporative demand for soil layer (1,2,3)	mm	Esoillyr	variable (arrayed)
-	evaporative demand for soil layer (1,2,3) adjusted for available water content	mm	Esoillyr'{1,2,3}	variable
-	evaporative demand for soil layer (1,2,3) adjusted for soil water content	mm	Esoillyr''{1,2,3}	variable
-	evaporative demand at soil depth z	mm	Esoilz	variable
-	canopy evapotranspiration	mm day^{-1}	EtCanopy	flux
-			etco	constant
-	soil evaporation adjustment coefficient	unitless	etco	constant
-	field capacity for layer (1,2,3)	mm	FClyr	constant (arrayed)
-	combined field capacity for all soil layers	mm	FCtotal	constant
-	soil field capacity (volumetric)	cm^3 cm^{-3}	FCvol	constant
-	initial abstraction term for runoff calculation	mm	Ia	variable
-	infiltration into top soil layer	mm day^{-1}	Infiltration	flux
-	canopy interception capacity	mm	InterceptCap	variable
-	depth of rain intercepted by the canopy	mm	Interception	variable
-	percolation out of soil layer (1,2,3)	mm day^{-1}	Perc{1,2,3}	flux
ET_p	daily potential evapotranspiration	mm day^{-1}	PET	variable
-	potential ET adjusted for canopy interception	mm day^{-1}	PET'	variable
-	soil porosity	cm^3 cm^{-3}	porosity	constant
-	surface runoff depth	mm	Qsurf	variable
Rain	daily rainfall	mm day^{-1}	Rainfall	flux
-	maximum rooting depth	mm	rootdepth	constant
-	surface runoff	mm day^{-1}	Runoff	flux
-	watershed retention parameter for AMC III	unitless	S3	constant
-	watershed retention parameter adjusted for soil water content	unitless	Sadj	constant
-	soil water content at saturation	mm	saturation	constant
-	watershed retention parameter value for the current day	unitless	Sday	constant

Parameter	Description	Units	STELLA name	type
-	average slope of terrain	$m^1 m^{-1}$	slope	constant
-	maximum value for watershed retention parameter	unitless	Smax	constant
-	total depth of all soil layers	mm	SoilDepthTotal	constant
-	thickness of soil layer (1,2,3)	mm	soillyrthickness	constant (arrayed)
-	total soil volume	mm^3	soilvol	constant
-	total soil water content adjusted by wilting point	mm	SW Q	variable
-	depth of soil water content in layer (1,2,3)	mm	SWClyr{1,2,3}	reservoir
-	total soil water content in all layers	mm	SWCtotal	variable
θ	volumetric soil water content of each soil layer	$mm^3 mm^{-3}$	SWCvollyr	variable (arrayed)
-	soil water content in layer (1,2,3) at current day for transpiration calcs	mm	SWplyr{1,2,3}	variable
-	soil water content in layer (1,2,3) at current day for evaporation calcs	mm	SWslyr{1,2,3}	variable
-	total actual transpiration	mm day^{-1}	TotEp	variable
-	total actual evaporation	mm day^{-1}	TotEs	variable
ET_a	total actual ET	mm day^{-1}	TotET	variable
-	depth of soil temperature	mm	Tsoildepth	constant
-	shape parameter for watershed retention parameter	unitless	w1	constant
-	shape parameter for watershed retention parameter	unitless	w2	constant
-	Depth of water stored in canopy	mm	WCcanopy	reservoir
-	wilting point for layer (1,2,3)	mm	WPlyr	constant (arrayed)
-	combined wilting point for all soil layers	mm	WPtotal	constant
-	soil wilting point (volumetric)	$cm^3 cm^{-3}$	WPvol	constant
-	plant uptake demand for layer (1,2,3)	mm	wuplyr{1,2,3}	variable
-	plant uptake demand for layer (1,2,3) adjusted for available water	mm	wuplyr{1,2,3}'	variable
-	plant uptake demand at depth z	mm	wupz	variable
-	ratio of soil temperature depth to damping depth	unitless	zd	variable

APPENDIX B: EXAMPLE MODEL CODE

```
##################################################################
##  The model was originally built in STELLA 9.0 (a graphics oriented software)
##  To enhance code readability, comments have been added (lines starting with “#”)
##      and equations have been grouped by process.
##  These equations were output from STELLA, but are not directly usable within
##      STELLA, as is.  To do so, the user will need to rebuild the model within STELLA.
##
##  The example code listed here was calibrated using the CO2 site parameters
##  For input variables for both test cases, see Appendix C
##################################################################


### Input variables (see Appendix C for input values)

DOYgrow = GRAPH(TIME)
GPP = GRAPH(TIME)
JulDate = GRAPH(TIME)
TempAir = GRAPH(TIME)
Rainfall = GRAPH(TIME)
PET = GRAPH(TIME)


### Carbon Reservoirs and Fluxes

## Stems
Branches(t) = Branches(t - dt) + (growBr - TO_Br) * dt
INIT Branches = 160
INFLOWS:
growBr = Growth*partitionBr
OUTFLOWS:
TO_Br = IF(Disturb=1)THEN(Branches*DisturbBr)ELSE(Branches*TOcoeffBr)

## Coarse Roots
Coarse_Roots(t) = Coarse_Roots(t - dt) + (growCR - TO_CR) * dt
INIT Coarse_Roots = 3300
INFLOWS:
growCR = Growth*partitionCR
OUTFLOWS:
TO_CR = TOcoeffCR*Coarse_Roots

## Fine Roots
Fine_Roots(t) = Fine_Roots(t - dt) + (growFR - TO_FR) * dt
INIT Fine_Roots = 450
INFLOWS:
```

```
growFR = Growth*partitionFR
OUTFLOWS:
TO_FR = TOcoeffFR*Fine_Roots

## Foliage (cohorts)
# Foliage cohort ovens (determines which cohort to grow)
FoExpOv[Cohorts](t) = FoExpOv[Cohorts](t - dt) + (FoExpOvIn[Cohorts] -
        FoExpOvOut[Cohorts]) * dt
INIT FoExpOv[Cohorts] = 0
INFLOWS:
FoExpOvIn[1] = IF(DOYgrow=365)AND(Foliage[1]>0)THEN(1)ELSE(0)
FoExpOvIn[2] = IF(DOYgrow=365)AND(Foliage[2]>0)THEN(2)ELSE(0)
FoExpOvIn[R] = IF(DOYgrow=365)AND(Foliage[R]>0)THEN(4)ELSE(0)
OUTFLOWS:
FoExpOvOut[Cohorts] = CONTENTS OF OVEN AFTER COOK TIME, ZERO
        OTHERWISE

# Foliage cohort reservoirs, inflow and outflow
Foliage[1](t) = Foliage[1](t - dt) + (growFo[1] - TO_Fo[1]) * dt
INIT Foliage[1] = 13
Foliage[2](t) = Foliage[2](t - dt) + (growFo[2] - TO_Fo[2]) * dt
INIT Foliage[2] = 0
Foliage[R](t) = Foliage[R](t - dt) + (growFo[R] - TO_Fo[R]) * dt
INIT Foliage[R] = 0
INFLOWS:
growFo[1] =
        IF(growPhase=0)THEN(0)ELSE(IF(CohortSwitch=0)OR(CohortSwitch=2)OR(Co
        hortSwitch=4)OR(CohortSwitch=6)THEN(partitionFo*Growth)ELSE(0))
growFo[2] =
        IF(growPhase=0)THEN(0)ELSE(IF(CohortSwitch=1)OR(CohortSwitch=5)THEN(
        partitionFo*Growth)ELSE(0))
growFo[R] = IF(growPhase=0)THEN(partitionFo*Growth)ELSE(0)
OUTFLOWS:
TO_Fo[1] =
        IF(Disturb=1)THEN(DisturbFo*Foliage[1])ELSE(IF(DOYturnover<=(FoTO_Tend+
        1))THEN(Fo_TO[1])ELSE(0))
TO_Fo[2] =
        IF(Disturb=1)THEN(DisturbFo*Foliage[2])ELSE(IF(DOYturnover<=(FoTO_Tend+
        1))THEN(Fo_TO[2])ELSE(0))
TO_Fo[R] =
        IF(Disturb=1)THEN(DisturbFo*Foliage[R])ELSE(IF(RecDOYTurnover<=(FoTO_T
        end+1))THEN(Fo_TO[R])ELSE(0))
FoToOv[Cohort](t) = FoToOv[Cohort](t - dt) + (FoToOvIn[Cohort] - FoToOvOut[Cohort])
        * dt
```

```
INIT FoToOv[Cohort] = 0
INFLOWS:

# Foliage turnover ovens (determines initial mass of cohort for turnover)
FoToOvIn[1] =
        IF(DOYgrow=LA_Tend)THEN(Foliage[1])ELSE(IF(Disturb=1)THEN(Foliage[1]*(1
        -DisturbFo))ELSE(0))
FoToOvIn[2] =
        IF(DOYgrow=LA_Tend)THEN(Foliage[2])ELSE(IF(Disturb=1)THEN(Foliage[2]*(1
        -DisturbFo))ELSE(0))
FoToOvIn[R] = IF(JulDate=DisturbDay+RecoveryTend)THEN(Foliage[R])ELSE(0)
OUTFLOWS:
FoToOvOut[1] =
        IF(FoToOvIn[1]>0)THEN(FoToOv[1])ELSE(IF(DOYturnover=FoTO_Tend+1)THE
        N(FoToOv[1])ELSE(0))
FoToOvOut[2] =
        IF(FoToOvIn[2]>0)THEN(FoToOv[2])ELSE(IF(DOYturnover=FoTO_Tend+1)THE
        N(FoToOv[2])ELSE(0))
FoToOvOut[R] = IF(JulDate=DisturbDay+Cohort_lifespan+1)THEN(FoToOv[R])ELSE(0)

### Aboveground Litter accumulation
LitterAG(t) = LitterAG(t - dt) + (TO_Br + TO_Fo[Cohorts] + TO_Fo[1] + TO_Fo[2] +
        TO_Fo[R] - DecayLit) * dt
INIT LitterAG = 250
INFLOWS:
TO_Br = IF(Disturb=1)THEN(Branches*DisturbBr)ELSE(Branches*TOcoeffBr)
TO_Fo[1] =
        IF(Disturb=1)THEN(DisturbFo*Foliage[1])ELSE(IF(DOYturnover<=(FoTO_Tend+
        1))THEN(Fo_TO[1])ELSE(0))
TO_Fo[2] =
        IF(Disturb=1)THEN(DisturbFo*Foliage[2])ELSE(IF(DOYturnover<=(FoTO_Tend+
        1))THEN(Fo_TO[2])ELSE(0))
TO_Fo[R] =
        IF(Disturb=1)THEN(DisturbFo*Foliage[R])ELSE(IF(RecDOYTurnover<=(FoTO_T
        end+1))THEN(Fo_TO[R])ELSE(0))
OUTFLOWS:
DecayLit = IF(LitterAG*2>LitterAGmax)THEN((LitterAG*2-LitterAGmax))ELSE(0)


## Non-Soluble Sugar Reservoir (Reserves)
Reserves(t) = Reserves(t - dt) + (Cres - Remobilize) * dt
INIT Reserves = 180
INFLOWS:
Cres = GPPoaks*fracRes
```

```
OUTFLOWS:
Remobilize = IF(growPhase<2)THEN(MAX(DemMaintResp-AC1,(Cres+Reserves-
        Rmax),(MIN(RemobMax)),AGdem-
        AC1))ELSE(IF(Reserves+Cres>Rmax)OR(DemMaintResp>AC1)THEN(MAX(Cre
        s+Reserves-Rmax,DemMaintResp-AC1))ELSE(0))

## Soluble Sugar reservoir
SolubleSugars(t) = SolubleSugars(t - dt) + (Css + Remobilize - Maint_Resp -
        Grow_Resp - growFo[Cohorts] - growFo[1] - growFo[2] - growFo[R] - growBr -
        growFR - growCR - Exudates) * dt
INIT SolubleSugars = 210
INFLOWS:
Css = GPPoaks*(1-fracRes)
Remobilize = IF(growPhase<2)THEN(MAX(DemMaintResp-AC1,(Cres+Reserves-
        Rmax),(MIN(RemobMax)),AGdem-
        AC1))ELSE(IF(Reserves+Cres>Rmax)OR(DemMaintResp>AC1)THEN(MAX(Cre
        s+Reserves-Rmax,DemMaintResp-AC1))ELSE(0))

## Outflows from Soluble sugar reservoir (maintenance respiration, growth
##  respiration, growth to structural tissues, exudates)
OUTFLOWS:
Maint_Resp = DemMaintResp
Grow_Resp = GrowRespCoeff*(Growth/(1-GrowRespCoeff))
growFo[1] =
        IF(growPhase=0)THEN(0)ELSE(IF(CohortSwitch=0)OR(CohortSwitch=2)OR(Co
        hortSwitch=4)OR(CohortSwitch=6)THEN(partitionFo*Growth)ELSE(0))
growFo[2] =
        IF(growPhase=0)THEN(0)ELSE(IF(CohortSwitch=1)OR(CohortSwitch=5)THEN(
        partitionFo*Growth)ELSE(0))
growFo[R] = IF(growPhase=0)THEN(partitionFo*Growth)ELSE(0)
growBr = Growth*partitionBr
growFR = Growth*partitionFR
growCR = Growth*partitionCR
Exudates = IF(AC3>SSmax)THEN(AC3-SSmax)ELSE(0)

## Available carbon hierarchy
AC1 = MAX(0,(Css+SolubleSugars-SSmin)*((Css+SolubleSugars-SSmin)/SSmin))
AC2 = AC1+Remobilize-Maint_Resp
AC3 = AC2-Grow_Resp-(growBr+growCR+growFo[1]+growFo[2]+growFo[R]+growFR)
fliveBr = IF(Branches<150)THEN(1)ELSE(2.1*Branches^-0.15)
fliveCR = IF(Coarse_Roots<150)THEN(1)ELSE(2.1*Coarse_Roots^-0.15)
FoTotal = Foliage[1]+Foliage[2]+Foliage[R]
GPPoaks = GEP*fracOaks
LAI = SLA*FoTotal+0.65
```

```
LitterAGmax = 10^(0.558*LOG10(TSF)+2.364)
TO_FoTotal = TO_Fo[1]+TO_Fo[2]+TO_Fo[R]
TotRoot = Coarse_Roots+Fine_Roots
TotShoot = Branches+FoTotal
TSF = (InitialTSF+COUNTER(1,10000))/365.25

# Input parameters (see Appendix A for descriptions)
TOcoeffBr = 0.00015
TOcoeffCR = 0.00007
TOcoeffFR = 0.0025
SLA = 0.011
fracOaks = 0.82
InitialTSF = 1550



### Disturbance Routine

# Input parameters
DisturbBr = 0
DisturbDay = 2453251
DisturbFo = 0.21

#Recovery Foliage Expansion
RecoveryOven(t) = RecoveryOven(t - dt) + (RecOvenIn - RecOvenOut) * dt
INIT RecoveryOven = 0
COOK TIME = varies
CAPACITY = 10000
FILL TIME = INF
INFLOWS:
RecOvenIn = IF(JulDate=DisturbDay)THEN(Fo_opt-FoTotal*(1-DisturbFo))ELSE(0)
OUTFLOWS:
RecOvenOut = CONTENTS OF OVEN AFTER COOK TIME, ZERO OTHERWISE
COOK TIME = RecoveryTend+1
Disturb = IF(JulDate=DisturbDay)THEN(1)ELSE(0)
RecDOYTurnover = IF(JulDate>DisturbDay+RecoveryTend)THEN(JulDate-
        (DisturbDay+RecoveryTend))ELSE(0)
RecFoExpand =
        IF(JulDate>DisturbDay)AND(JulDate<DisturbDay+RecoveryTend+1)THEN(Reco
        veryOven*(1+(RecoveryTend-RecoveryCounter)/(RecoveryTend-
        RecoveryTmid))*(RecoveryCounter/RecoveryTend)^(RecoveryTend/(RecoveryT
        end-RecoveryTmid)))ELSE(0)
```

```
RecFoExpDem =
        IF(Fo_opt>RecFoExpand+FoTotal)THEN(RecFoExpand)ELSE(MAX(0,Fo_opt-
        (RecFoExpand+FoTotal)))
RecoveryCounter = JulDate-DisturbDay
RecoveryPhase = IF(JulDate<DisturbDay+RecoveryTend)AND(JulDate>DisturbDay-
        1)THEN(1)ELSE(0)
RecoveryTend = LA_Tend
RecoveryTmid = 0.5*RecoveryTend

### Foliage Expansion Routine
# Input parameters
LA_Tend = 100
Cohort_lifespan = 400

#Foliage Expansion
CohortSwitch = FoExpOv[1]+FoExpOv[2]+FoExpOv[R]
DOYturnover = IF(DOYgrow>LA_Tend)THEN(DOYgrow-LA_Tend)ELSE(366-
        LA_Tend+DOYgrow-1)
Fo_def = IF(RecoveryPhase=1)THEN(MAX(0,RecFoExpDem))ELSE(MAX(0,Fo_opt-
        FoTotal))
Fo_exp =
IF(growPhase=0)THEN(RecFoExpand)ELSE(FoMax*(1+(LA_Tend-
        DOYgrow)/(LA_Tend-LA_Tmid))*(DOYgrow/LA_Tend)^(LA_Tend/(LA_Tend-
        LA_Tmid)))
Fo_opt =
        IF(DOYgrow>LA_Tend)THEN(Fo_senesce)ELSE(IF(Cohort_lifespan>366)AND(
        DOYgrow<Cohort_lifespan-366)THEN(Fo_exp+Fo_senesce)ELSE(Fo_exp))
FoMax = EXP(0.875*LOGN(Branches)+0.15)
LA_Tmid = 0.4*LA_Tend

# Foliage senescence
Fo_senesce =FoMax-(FoMax*(1+(FoTO_Tend-DOYturnover)/(FoTO_Tend-
        FoTO_Tmid))*(DOYturnover/FoTO_Tend)^(FoTO_Tend/(FoTO_Tend-
        FoTO_Tmid)))
Fo_TO[1] =
        IF(DOYturnover=(FoTO_Tend+1))AND((CohortSwitch=1)OR(CohortSwitch=3)O
        R(CohortSwitch=5)OR(CohortSwitch=7))THEN(Foliage[1])ELSE((FoToOv[1]*(1+(
        FoTO_Tend-DOYturnover)/(FoTO_Tend-
        FoTO_Tmid))*(DOYturnover/FoTO_Tend)^(FoTO_Tend/(FoTO_Tend-
        FoTO_Tmid)))-(FoToOv[1]*(1+(FoTO_Tend-(DOYturnover-1))/(FoTO_Tend-
        FoTO_Tmid))*((DOYturnover-1)/FoTO_Tend)^(FoTO_Tend/(FoTO_Tend-
        FoTO_Tmid))))
Fo_TO[2] =
        IF(DOYturnover=(FoTO_Tend+1))AND((CohortSwitch=2)OR(CohortSwitch=3)O
```

```
        R(CohortSwitch=6)OR(CohortSwitch=7))THEN(Foliage[2])ELSE((FoToOv[2]*(1+(
        FoTO_Tend-DOYturnover)/(FoTO_Tend-
        FoTO_Tmid))*(DOYturnover/FoTO_Tend)^(FoTO_Tend/(FoTO_Tend-
        FoTO_Tmid)))-(FoToOv[2]*(1+(FoTO_Tend-(DOYturnover-1))/(FoTO_Tend-
        FoTO_Tmid))*((DOYturnover-1)/FoTO_Tend)^(FoTO_Tend/(FoTO_Tend-
        FoTO_Tmid))))
Fo_TO[R] =
        IF(RecDOYTurnover=(FoTO_Tend+1))THEN(Foliage[R])ELSE((FoToOv[R]*(1+(
        FoTO_Tend-RecDOYTurnover)/(FoTO_Tend-
        FoTO_Tmid))*(RecDOYTurnover/FoTO_Tend)^(FoTO_Tend/(FoTO_Tend-
        FoTO_Tmid)))-(FoToOv[R]*(1+(FoTO_Tend-(RecDOYTurnover-1))/(FoTO_Tend-
        FoTO_Tmid))*((RecDOYTurnover-1)/FoTO_Tend)^(FoTO_Tend/(FoTO_Tend-
        FoTO_Tmid))))
FoTO_Tend = Cohort_lifespan-LA_Tend
FoTO_Tmid = 0.75*FoTO_Tend



### Nitrogen sub-model
#Input parameters
CN_Br = 100
CN_CR = 100
CN_Fo = 40
CN_FR = 100
NresMaxCoeff = 1.05
SoilN = 1.8
SRL = 54
NsupCoeff = 0.0000075
NrtrnsFrac = 0.27

# Nitrogen reservoirs
Nres(t) = Nres(t - dt) + (Nuptake + Nremob - Ngrow) * dt
INIT Nres = 0.02
INFLOWS:
Nuptake = IF(Nres+Nup<=NresMax)THEN(Nup)ELSE(MIN(NresMax-Nres,Nup))
Nremob = Nretrans
OUTFLOWS:
Ngrow = Growth*CNTotPart
Nstruct(t) = Nstruct(t - dt) + (Ngrow - Nloss - Nremob) * dt
INIT Nstruct = 15
INFLOWS:
Ngrow = Growth*CNTotPart
OUTFLOWS:
Nloss = N_TO
```

```
Nremob = Nretrans
CNTotOpt =
        IF(growPhase<2)THEN(0.5*CN_Fo+0.5*(CN_FR*(1/(1+CR:FR))+CN_CR*(CR:FR/(1+CR:FR))))ELSE(IF(growPhase<3)THEN(0.5*CN_Br+0.5*(CN_FR*(1/(1+CR:FR))+CN_CR*(CR:FR/(1+CR:FR))))ELSE(CN_FR*(1/(1+CR:FR))+CN_CR*(CR:FR/(1+CR:FR))))
CNTotPart =
        (partitionBr*1/CN_Br+partitionCR*1/CN_CR+partitionFo*1/CN_Fo+partitionFR*1/CN_FR)
GrowNpot = Nres*CNTotOpt
N_TO = TO_Br*1/CN_Br+TO_CR*1/CN_CR+TO_FoTotal*1/CN_Fo+TO_FR*1/CN_FR-Nretrans

# Nitrogen uptake
Ndem = IF(AC2/CNTotOpt<=Nres)THEN(0)ELSE(AC2/CNTotOpt-Nres)
NresMax = Nstruct*NresMaxCoeff
Nretrans =
        IF(Disturb=1)THEN(0)ELSE(TO_FoTotal*NrtrnsFrac*1/CN_Fo+TO_FR*NrtrnsFrac*1/CN_FR)
Nsup = SoilN*SWCvollyr[1]*NsupCoeff*Fine_Roots*SRL
Nup = MIN(Ndem,MAX(Nsup))


### Growth Partitioning
# Input parameters
AGdormantDOY = 184
tau = 5

# Partitioning to tissues (based on Reynolds and Chen 1996, Chen and Reynolds 1997)
AGdem = IF(growPhase>1)THEN(0)ELSE(Fo_def*(1+Br:Fo)/(1-GrowRespCoeff))
Br:Fo = IF(Fo_def>0)THEN(0.15)ELSE(Branches^0.125)
CR:FR = TO_CR/TO_FR
GrowC = GPPoaks
GrowN = GrowNpot
growPhase =
IF(RecoveryPhase=1)THEN(0)ELSE(IF(DOYgrow<LA_Tend)THEN(1)ELSE(IF(DOYgrow<AGdormantDOY)THEN(2)ELSE(3)))
Growth =
IF(growPhase<2)THEN(MAX(AGdem,MIN(AC2*(SSmax/SSmax),GrowN)*(1-GrowRespCoeff)))ELSE(MIN(AC2*(SSmax/SSmax),GrowN)*(1-GrowRespCoeff))
Imbalance = IF(pGrow=0)THEN(0)ELSE((GrowC-GrowN)/pGrow)
P = -Imbalance/tau
```

```
partitionBr =
        IF(growPhase>2)THEN(0)ELSE(IF(growPhase>1)THEN(pFo*(1+Br:Fo))ELSE(p
        Fo*Br:Fo))
partitionCR = IF(growPhase>2)THEN(CR:FR/(1+CR:FR))ELSE(CR:FR*pFR)
partitionFo = IF(growPhase>1)THEN(0)ELSE(pFo)
partitionFR = IF(growPhase>2)THEN(1/(1+CR:FR))ELSE(pFR)
pFo = IF(AGdem>0)THEN(MIN(1/(1+Br:Fo),MAX(1/(1+Br:Fo),AGdem*(1-
        Br:Fo)/Growth)))ELSE(MAX(0,MIN(1/(1+Br:Fo),(1/Fine_Roots+(((1+CR:FR)*(P+
        TOrateFo-TOrateFR))/pGrow))/((1+CR:FR)/FoTotal+(1+Br:Fo)/Fine_Roots))))
pFR = IF(AGdem>0)THEN(0)ELSE(MAX(0,MIN(1/(1+CR:FR),(1/FoTotal-
        (((1+Br:Fo)*(P+TOrateFo-
        TOrateFR))/pGrow))/((1+CR:FR)/FoTotal+(1+Br:Fo)/Fine_Roots))))
pGrow = MIN(GrowC,GrowN)
TOrateFo = IF(FoTotal=0)THEN(0)ELSE((TO_Fo[1]+TO_Fo[2]+TO_Fo[R])/(FoTotal))
TOrateFR = (TO_FR)/(Fine_Roots)


###  Respiration Routines
# Soil Temperature sub-model
SoilTempT0(t) = SoilTempT0(t - dt) + (STin - STout) * dt
INIT SoilTempT0 = 21.7
TRANSIT TIME = 1
INFLOW LIMIT = INF
CAPACITY = INF
INFLOWS:
STin = TempSoil
TempSoil = 0.8*SoilTempT0+(0.2)*(df*(MeanTempAir-TempAir)+TempAir)
OUTFLOWS:
STout = CONVEYOR OUTFLOW
MeanTempAir = 22

# Maintenance Respiration demand per tissue
DemMaintResp = DemRmBr+DemRmFo+DemRmCR+DemRmFR
DemRmBr = fliveBr*Branches*N_Br*RMcoeffBr*EXP(Q10coeff*TempAir)
DemRmCR = fliveCR*Coarse_Roots*N_CR*RMcoeffCR*EXP(Q10coeff*TempSoil)
DemRmFo = FoTotal*N_Fo*RM_coeffFo*EXP(Q10coeff*TempAir)
DemRmFR = Fine_Roots*N_FR*RM_coeffFR*EXP(Q10coeff*TempSoil)
N_Br = 100*fracC/CN_Br
N_CR = 100*fracC/CN_CR
N_Fo = 100*fracC/CN_Fo
N_FR = 100*fracC/CN_FR
fracC = 0.5
Q10coeff = 0.0863
RM_coeffFo = 0.0002
```

```
RM_coeffFR = 0.0002
RMcoeffBr = 0.0002
RMcoeffCR = 0.0002

# Growth Respiration coefficient
GrowRespCoeff = 0.2


## Storage routines (soluble (SS) and reserve/non-soluble sugars (R))
fracRes = MIN(MAX(SSoverflow,Fresbase),1)
Fresbase = 0.4
kRem = 0.01
RcoeffBr = 0.01
RcoeffCR = 0.106
RcoeffFo = 0.02
RcoeffFR = 0.01
RemobMax = kRem*(1-AC1/SSmax)*(Reserves+Cres)
RFrac = Reserves/Rmax
Rmax =
        Fine_Roots*RcoeffFR+FoTotal*RcoeffFo+Branches*RcoeffBr+Coarse_Roots*Rc
        oeffCR
SScoeffBr = 0.5*SScoeffFo
SScoeffCR = 0.08
SScoeffFo = 0.035
SScoeffFR = SScoeffBr
SSfrac = SolubleSugars/SSmax
SSmax =
        Fine_Roots*SScoeffFR+FoTotal*SScoeffFo+Branches*SScoeffBr+Coarse_Root
        s*SScoeffCR
SSmin = 0.5*SSmax
SSoverflow = IF(GPPoaks+SolubleSugars>SSmax)THEN((GPPoaks+SolubleSugars-
        SSmax)/GPPoaks)ELSE(0)


###  Water Balance Sub-Model
###  Based on Soil and Water Assessment Tool (SWAT; Neitsch et al. 2005)

# Canopy interception and storage
WCcanopy(t) = WCcanopy(t - dt) + (Rainfall - EtCanopy - Runoff - Infiltration) * dt
INIT WCcanopy = 0
INFLOWS:
OUTFLOWS:
EtCanopy =
        IF(PET<WCcanopy+Interception)THEN(PET)ELSE(WCcanopy+Interception)
```

```
InterceptCap = 0.2*LAI
Interception = IF(WCcanopy<InterceptCap)THEN(InterceptCap-WCcanopy)ELSE(0)
PET' = PET-EtCanopy

# Surface runoff and infiltration (SCS runoff curve number method)
Runoff = IF(Qsurf>Rainfall)THEN(Rainfall)ELSE(Qsurf)
Infiltration = Rainfall-Runoff-EtCanopy
AWClyr[SoilLayers] = FClyr[SoilLayers]-WPlyr[SoilLayers]
betaw = 10
bulkdensity = 1.5
CN1slp = CN2slp-(20*(100-CN2slp))/(100-CN2slp+EXP(2.533-0.0636*(100-CN2slp)))
CN2 = 32
CN2slp = (CN3-CN2)/3*(1-2*EXP(-13.86*slope))+CN2
CN3 = CN2*EXP(0.00673*(100-CN2))
CN3slp = CN2slp*EXP(0.00673*(100-CN2slp))
CNday = 25400/(Sadj+254)
COVsoil = EXP(-0.00005*CV)
CV = (TotShoot+LitterAG)/10
dd = ddmax*EXP(LOGN(500/ddmax)*((1-ddscale)/(1+ddscale))^2)
ddmax = 1000+(2500*bulkdensity/(bulkdensity+686*EXP(-5.63*bulkdensity)))
ddscale = SWCtotal/((0.356-0.144*bulkdensity)*SoilDepthTotal)
df = zd/(zd+EXP(-0.867-2.078*zd))
Ia = 0.2*Sday
porosity = 1-(bulkdensity/2.65)
Qsurf = IF(Rainfall>Ia)THEN((Rainfall-0.2*Sday)^2/(Rainfall+0.8*Sday))ELSE(0)
slope = 0.002
Smax = 25.4*(1000/CN1slp-10)
S3 = 25.4*(1000/CN3slp-10)
Sadj = Smax*(1-(SW_Q/(SW_Q+EXP(w1-w2*SW_Q))))
saturation = porosity*SoilDepthTotal
Sday = 25400/CNday-254
w1 = LOGN(FCtotal/(1-S3*Smax^-1)-FCtotal)+w2*FCtotal
w2 =(LOGN(FCtotal/(1-S3*Smax^-1)-FCtotal)-LOGN(saturation/(1-2.54*Smax^-1)-
        saturation))/(saturation-FCtotal)

# Soil water content reservoirs
SWClyr1(t) = SWClyr1(t - dt) + (Infiltration - Es_lyr1 - Ep_lyr1 - Perc1) * dt
INIT SWClyr1 = 40
INFLOWS:
Infiltration = Rainfall-Runoff-EtCanopy
OUTFLOWS:
Es_lyr1 = Esoillyr1'
Ep_lyr1 = MIN(wuplyr1',SWplyr1-WPlyr[1])
```

```
Perc1 = IF((SWClyr1+Infiltration-Es_lyr1-Ep_lyr1)>FClyr[1])THEN((SWClyr1+Infiltration-
        Es_lyr1-Ep_lyr1)-FClyr[1])ELSE(0)
SWClyr2(t) = SWClyr2(t - dt) + (Perc1 - Es_lyr2 - Ep_lyr2 - Perc2) * dt
INIT SWClyr2 = 10
INFLOWS:
Perc1 = IF((SWClyr1+Infiltration-Es_lyr1-Ep_lyr1)>FClyr[1])THEN((SWClyr1+Infiltration-
        Es_lyr1-Ep_lyr1)-FClyr[1])ELSE(0)
OUTFLOWS:
Es_lyr2 = Esoillyr2'
Ep_lyr2 = MIN(wuplyr2',SWplyr2-WPlyr[2])
Perc2 =
IF((SWClyr2+Perc1-Es_lyr2-Ep_lyr2)>FClyr[2])THEN((SWClyr2+Perc1-Es_lyr2-
        Ep_lyr2)-FClyr[2])ELSE(0)
SWClyr3(t) = SWClyr3(t - dt) + (Perc2 - Es_lyr3 - Ep_lyr3 - Perc3) * dt
INIT SWClyr3 = 12
INFLOWS:
Perc2 = IF((SWClyr2+Perc1-Es_lyr2-Ep_lyr2)>FClyr[2])THEN((SWClyr2+Perc1-
        Es_lyr2-Ep_lyr2)-FClyr[2])ELSE(0)
OUTFLOWS:
Es_lyr3 = Esoillyr3'
Ep_lyr3 = MIN(wuplyr3',SWplyr3-WPlyr[3])
Perc3 = IF((SWClyr3+Perc2-Es_lyr3-Ep_lyr3)>FClyr[3])THEN((SWClyr3+Perc2-
        Es_lyr3-Ep_lyr3)-FClyr[3])ELSE(0)


# Soil evaporation (Es) and Transpiration (Ep) algorithms
epco = 0
Epmax = IF(LAI>3.0)THEN(PET')ELSE(PET'*LAI/3)
Epmax' =
        IF(PET'<Esmax'''+Epmax)THEN(PET'*Epmax/(Esmax'''+Epmax))ELSE(Epmax)
esco = 1
Esmax = PET'*COVsoil
Esmax' = MIN(Esmax,(Esmax*PET'/(Esmax+Epmax+1E-10)))
Esmax'' = MAX(Esmax',0)
Esmax''' = IF(PET<Esmax''+Epmax)THEN(PET-Epmax)ELSE(Esmax'')
Esmax'''' =
        IF(PET'<Esmax'''+Epmax)THEN(PET'*Esmax'''/(Esmax'''+Epmax))ELSE(Esmax'''
        )
Esoillyr[1] = Esoilz[1]-0*esco
Esoillyr[2] = Esoilz[2]-Esoilz[1]*esco
Esoillyr[3] = Esoilz[3]-Esoilz[2]*esco
Esoillyr1 =IF(SWslyr1<FClyr[1])THEN(Esoillyr[1]*EXP(2.5*(SWslyr1-
        FClyr[1])/(AWClyr[1])))ELSE(Esoillyr[1])
Esoillyr1' = MIN(Esoillyr1,etco*(SWslyr1))
```

Esoillyr2 =IF(SWslyr2<FClyr[2])THEN(Esoillyr[2]*EXP(2.5*(SWslyr2-FClyr[2])/(AWClyr[2])))ELSE(Esoillyr[2])
Esoillyr2' = MIN(Esoillyr2,etco*(SWslyr2))
Esoillyr3 = IF(SWslyr3<FClyr[3])THEN(Esoillyr[3]*EXP(2.5*(SWslyr3-FClyr[3])/(AWClyr[3])))ELSE(Esoillyr[3])
Esoillyr3' = MIN(Esoillyr3,etco*(SWslyr3))
Esoilz[1] = Esmax''''*soillyrThickness[1]/(soillyrThickness[1]+EXP(2.374-0.00713*soillyrThickness[1]))
Esoilz[2] = Esmax''''*(soillyrThickness[1]+soillyrThickness[2])/((soillyrThickness[1]+soillyrThickness[2])+EXP(2.374-0.00713*(soillyrThickness[1]+soillyrThickness[2])))
Esoilz[3] = Esmax''''*(soillyrThickness[1]+soillyrThickness[2]+soillyrThickness[3])/((soillyrThickness[1]+soillyrThickness[2]+soillyrThickness[3])+EXP(2.374-0.00713*(soillyrThickness[1]+soillyrThickness[2]+soillyrThickness[3])))
etco = 0.8
FClyr[1] = FCvol[1]*soillyrThickness[1]
FClyr[2] = FCvol[2]*soillyrThickness[2]
FClyr[3] = FCvol[3]*soillyrThickness[3]
FCtotal = soillyrThickness[1]*FCvol[1]+soillyrThickness[2]*FCvol[2]+soillyrThickness[3]*FCvol[3]
FCvol[SoilLayers] = 0.15
rootdepth = 1000
SoilDepthTotal = soillyrThickness[1]+soillyrThickness[2]+soillyrThickness[3]
soillyrThickness[1] = 1000
soillyrThickness[2] = 300
soillyrThickness[3] = 400
SW_Q = SWCtotal-WPtotal
SWCtotal = SWClyr1+SWClyr3+SWClyr2
SWCvollyr[1] = SWClyr1/soillyrThickness[1]
SWCvollyr[2] = SWClyr2/soillyrThickness[2]
SWCvollyr[3] = SWClyr3/soillyrThickness[3]
SWplyr1 = SWslyr1-Es_lyr1
SWplyr2 = SWslyr2-Es_lyr2
SWplyr3 = SWslyr3-Es_lyr3
SWslyr1 = SWClyr1+Infiltration-WPlyr[1]
SWslyr2 = SWClyr2+Perc1-WPlyr[2]
SWslyr3 = SWClyr3+Perc2-WPlyr[3]
totEp = Ep_lyr1+Ep_lyr2+Ep_lyr3
totEs = Es_lyr1+Es_lyr2+Es_lyr3
totET = Es_lyr1+Es_lyr2+Es_lyr3+Ep_lyr1+Ep_lyr2+Ep_lyr3+EtCanopy
Tsoildepth = 100

```
WPlyr[1] = soillyrThickness[1]*WPvol[1]
WPlyr[2] = soillyrThickness[2]*WPvol[2]
WPlyr[3] = soillyrThickness[3]*WPvol[3]
WPtotal = soillyrThickness[1]*WPvol[1]+soillyrThickness[2]*WPvol[2]+soillyrThickness[3]*WPvol[3]
WPvol[SoilLayers] = 0.02
wuplyr1 = wupz[1]
wuplyr1' = IF(SWplyr1<AWClyr[1]*0.25)THEN(wuplyr1*EXP((5*(SWplyr1/(0.25*AWClyr[1])-1))))ELSE(wuplyr1)
wuplyr2 = wupz[2]-wuplyr1+(wuplyr1-wuplyr1')*epco
wuplyr2' = IF(SWplyr2<AWClyr[2]*0.25)THEN(wuplyr2*EXP((5*(SWplyr2/(0.25*AWClyr[2])-1))))ELSE(wuplyr2)
wuplyr3 = wupz[3]-wuplyr2+(wuplyr2-(wuplyr1'+wuplyr2'))*epco
wuplyr3' = IF(SWplyr3<AWClyr[3]*0.25)THEN(wuplyr3*EXP((5*(SWplyr3/(0.25*AWClyr[3])-1))))ELSE(wuplyr3)
wupz[1] = (Epmax'/(1-EXP(-betaw))*(1-EXP(-betaw*soillyrThickness[1]/rootdepth)))
wupz[2] = (Epmax'/(1-EXP(-betaw))*(1-EXP(-betaw*(soillyrThickness[1]+soillyrThickness[2])/rootdepth)))
wupz[3] =(Epmax'/(1-EXP(-betaw))*(1-EXP(-betaw*(soillyrThickness[1]+soillyrThickness[2]+soillyrThickness[3])/rootdepth)))
zd = Tsoildepth/dd
```

APPENDIX C: MODEL INPUT VARIABLES

CO2 Site Simulation

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2451639	4.92	3.25	0	21.75	15
2451640	5.07	4.52	0	14.18	16
2451641	5.41	4.55	0	15.29	17
2451642	5.92	4.63	0	19.77	18
2451643	6.58	5.04	0	23.79	19
2451644	5.32	3.91	0	13.82	20
2451645	5.24	3.73	0	16.33	21
2451646	6.04	3.99	0	21.76	22
2451647	5.9	2.54	0	20.34	23
2451648	5.93	4.33	0	22.99	24
2451649	2.42	1.03	0	19.37	25
2451650	5.42	3.02	0	22.14	26
2451651	5.98	5.27	0	22.47	27
2451652	6.89	5.83	11.9	24.06	28
2451653	6.5	5.69	0	22.04	29
2451654	6.4	5.58	0	19.7	30
2451655	6.68	5.62	0	21.56	31
2451656	7.2	5.85	0	23.91	32
2451657	6.47	5.4	0	20.81	33
2451658	6.25	5.08	0	19.85	34
2451659	7.46	5.25	0	25.74	35
2451660	6.67	5.15	17.8	24.96	36
2451661	6.03	5.44	0	19.63	37
2451662	6.47	5.36	0	19.98	38
2451663	6.81	5.03	0	21.41	39
2451664	6.43	5.41	3.3	23.27	40
2451665	6.63	5.8	0	21.19	41
2451666	5.61	4.95	0	23.27	42
2451667	6.18	5.63	0	23.94	43
2451668	6	6.05	0	21.42	44
2451669	6.09	5.81	0	24.75	45
2451670	5.98	5.77	0	24.12	46
2451671	5.12	4.07	1	23.05	47
2451672	6.27	5.96	0	23.5	48
2451673	6.21	5.72	17.5	23.06	49
2451674	5.55	4.62	52.6	23.94	50

Happy Creek Simulation

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2453097	6.51	4.27	0.00	15.66	12
2453098	6.75	3.99	0.00	15.81	13
2453099	6.69	4.15	0.00	15.54	14
2453100	7.07	4.20	0.00	17.51	15
2453101	6.78	4.27	0.00	16.21	16
2453102	6.77	4.15	0.00	17.77	17
2453103	6.94	4.38	0.00	21.23	18
2453104	6.89	3.96	0.30	22.42	19
2453105	7.08	4.75	0.00	22.09	20
2453106	7.52	5.37	0.00	21.78	21
2453107	6.73	4.37	13.70	23.01	22
2453108	5.25	3.16	10.80	22.37	23
2453109	5.56	2.57	0.00	22.01	24
2453110	6.61	4.43	0.00	14.04	25
2453111	6.80	4.37	0.00	14.27	26
2453112	6.90	4.18	0.00	16.61	27
2453113	7.24	4.80	0.00	19.85	28
2453114	7.26	5.04	0.00	20.08	29
2453115	7.31	5.15	0.00	20.38	30
2453116	7.33	5.01	0.00	18.99	31
2453117	6.70	4.35	0.00	21.56	32
2453118	6.60	5.18	0.00	22.73	33
2453119	6.79	4.99	0.00	22.72	34
2453120	7.49	5.78	0.00	22.32	35
2453121	7.18	5.32	0.00	23.41	36
2453122	7.19	4.62	0.00	24.04	37
2453123	4.97	1.95	6.00	20.24	38
2453124	7.32	5.29	0.00	19.63	39
2453125	7.93	4.43	0.30	23.28	40
2453126	5.75	3.88	0.00	24.11	41
2453127	6.48	6.08	0.00	25.20	42
2453128	7.20	6.06	0.00	25.38	43
2453129	4.96	1.90	19.90	22.55	44
2453130	8.36	5.36	0.10	20.57	45
2453131	7.52	5.38	0.00	19.06	46
2453132	7.32	5.48	0.00	20.93	47

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2451675	6.45	6.43	0	26.58	51	2453133	6.81	5.86	0.00	22.94	48
2451676	6.78	6.53	0	26.36	52	2453134	6.43	5.80	0.00	22.10	49
2451677	6.97	6.86	12.2	26.85	53	2453135	7.03	5.42	0.00	22.94	50
2451678	6.94	6.5	0	27.23	54	2453136	6.44	4.68	0.00	23.51	51
2451679	7	6.31	0.5	27.71	55	2453137	7.04	5.63	0.00	24.75	52
2451680	5.95	4.98	0	25.13	56	2453138	6.82	5.34	0.35	24.32	53
2451681	6.38	6.6	0	24.95	57	2453139	7.26	6.11	0.00	24.68	54
2451682	6.36	6.03	0	25.3	58	2453140	7.68	6.03	0.40	24.05	55
2451683	6.78	6.3	0	26.21	59	2453141	7.00	5.91	0.00	24.56	56
2451684	6.96	6.45	4.3	25.44	60	2453142	7.93	5.70	0.00	24.46	57
2451685	7.02	6.41	0	25.51	61	2453143	6.51	6.05	0.00	24.35	58
2451686	6.95	6.61	0	26.33	62	2453144	7.30	5.42	0.00	24.37	59
2451687	7.15	5.65	0	27.51	63	2453145	6.65	6.13	0.00	24.01	60
2451688	7.21	5.93	0	26.74	64	2453146	7.23	6.16	0.00	23.91	61
2451689	8	6.69	0	28.36	65	2453147	6.74	6.18	0.00	23.93	62
2451690	7.45	6.63	0	28.53	66	2453148	5.47	6.09	0.00	24.10	63
2451691	7.63	7.19	11.2	29.14	67	2453149	5.29	5.62	0.00	24.37	64
2451692	7.76	7.3	5.8	29.48	68	2453150	5.39	6.20	0.00	24.03	65
2451693	7.72	7.06	0	30.44	69	2453151	5.32	6.20	0.00	23.34	66
2451694	7.92	5.17	0	28.73	70	2453152	5.70	6.28	0.00	25.29	67
2451695	7.09	5.49	0	25.29	71	2453153	5.94	6.47	0.00	25.69	68
2451696	6.25	5.01	1	24.95	72	2453154	5.56	6.55	0.00	25.85	69
2451697	6.65	6.69	0	27.35	73	2453155	5.68	6.45	0.00	25.48	70
2451698	6.56	6.77	0	26.53	74	2453156	5.84	6.64	0.00	25.82	71
2451699	6.7	7.01	0	26.83	75	2453157	6.46	6.04	7.50	27.83	72
2451700	6.7	6.85	0	28.79	76	2453158	6.28	6.66	5.30	26.54	73
2451701	6.59	6.69	0	28.39	77	2453159	5.50	5.87	53.90	25.47	74
2451702	5.99	5.61	4.6	26.72	78	2453160	5.04	6.59	4.90	25.10	75
2451703	6.93	5.27	0.3	26.63	79	2453161	4.20	5.08	44.90	24.01	76
2451704	6.95	6.01	0	27.3	80	2453162	5.90	4.71	0.40	24.48	77
2451705	6.56	5.74	4.1	26.16	81	2453163	5.87	6.14	45.60	24.70	78
2451706	6.97	4.29	50.2	25.04	82	2453164	6.96	6.69	0.00	25.16	79
2451707	4.94	4.47	10.4	25.4	83	2453165	6.73	6.10	0.00	25.85	80
2451708	6.78	6.46	0.8	26.85	84	2453166	6.03	4.45	3.60	25.91	81
2451709	6.6	7.22	0	27.86	85	2453167	4.24	3.41	9.70	24.96	82
2451710	6.66	6.42	0	28.42	86	2453168	6.28	6.00	1.10	26.09	83
2451711	6.65	6.62	0	27.7	87	2453169	7.13	6.54	0.00	27.26	84
2451712	5.89	6.07	8.1	27.28	88	2453170	7.72	6.70	0.00	27.74	85

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2451713	5.24	5.02	44.4	27.21	89	2453171	7.81	5.76	0.00	27.19	86
2451714	7.11	7.09	2.3	29.39	90	2453172	7.53	6.67	0.00	26.61	87
2451715	7.58	6.72	0	28.34	91	2453173	8.12	6.28	0.00	26.77	88
2451716	7.13	7.12	0	28.59	92	2453174	7.95	6.38	0.00	26.54	89
2451717	7.13	7.14	2.8	28.31	93	2453175	5.85	4.97	42.90	27.04	90
2451718	7.13	6.88	0	28.45	94	2453176	6.48	5.64	3.10	27.36	91
2451719	4.85	2.77	0	25.71	95	2453177	5.87	5.19	29.00	26.77	92
2451720	3.31	2.87	0	23.91	96	2453178	5.95	6.74	19.70	26.09	93
2451721	5.66	3.56	0.5	24.82	97	2453179	7.00	6.39	1.30	26.88	94
2451722	6.1	3.02	0	26.54	98	2453180	7.63	6.89	0.00	28.08	95
2451723	4.52	2.98	2	24.94	99	2453181	6.74	6.97	0.00	27.97	96
2451724	6.27	5.04	0.8	26.54	100	2453182	6.91	6.75	0.00	27.99	97
2451725	6.3	5.12	0	26.59	101	2453183	6.48	5.76	54.90	26.95	98
2451726	5.49	3.12	1.5	25.8	102	2453184	5.50	5.26	2.90	26.00	99
2451727	6.97	4.62	0	26.9	103	2453185	6.82	6.48	0.00	27.04	100
2451728	7.83	6.55	0.8	26.06	104	2453186	7.71	6.86	0.00	27.00	101
2451729	7.98	6.66	0	27.4	105	2453187	7.88	6.41	0.00	27.14	102
2451730	7.94	6.24	0	27.9	106	2453188	7.02	6.10	0.00	27.22	103
2451731	7.36	6.84	0	27.24	107	2453189	6.41	5.29	0.20	26.85	104
2451732	8.02	6.49	0	29.37	108	2453190	7.14	6.22	0.60	26.49	105
2451733	7.02	4.51	0	28.43	109	2453191	7.01	6.49	0.00	27.10	106
2451734	7.33	6.44	0	27.48	110	2453192	7.44	6.42	0.00	27.13	107
2451735	6.76	5.7	0	27.91	111	2453193	6.65	5.93	0.00	27.73	108
2451736	7.26	6.58	0.8	26.46	112	2453194	4.45	3.66	2.50	25.10	109
2451737	7.36	7.01	0	28.02	113	2453195	7.23	6.36	0.00	26.65	110
2451738	6.69	5.41	0	28.26	114	2453196	7.81	6.32	0.00	27.85	111
2451739	6.13	4.28	0	26.92	115	2453197	7.79	6.61	0.00	27.99	112
2451740	7.73	5.78	0	28.61	116	2453198	4.51	3.18	20.80	25.16	113
2451741	6.84	3.49	0	27.05	117	2453199	7.04	6.21	0.10	26.53	114
2451742	7.78	6.2	0	28.2	118	2453200	7.87	6.43	0.00	28.53	115
2451743	8.35	6.97	0	30.54	119	2453201	8.14	6.48	1.50	29.08	116
2451744	8.15	6.61	0	29.73	120	2453202	6.24	4.65	13.60	27.15	117
2451745	8.23	6.83	0	28.27	121	2453203	6.90	4.75	2.00	26.69	118
2451746	8.56	6.63	18	30.22	122	2453204	6.58	4.77	3.80	26.85	119
2451747	6.48	5.86	0	27.13	123	2453205	7.53	4.35	0.90	26.71	120
2451748	5.71	3.83	0	25.77	124	2453206	6.09	3.85	3.80	25.47	121
2451749	5.83	5.53	0	26.23	125	2453207	4.47	2.40	9.20	24.84	122
2451750	4.27	3.46	0	24.38	126	2453208	7.56	5.87	0.00	25.59	123

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2451751	4.33	4.3	0	24.34	127	2453209	7.57	6.16	0.00	25.35	124
2451752	5	5.24	6.9	25.01	128	2453210	7.64	5.97	0.00	26.35	125
2451753	6.72	6.22	0.8	25.65	129	2453211	7.64	6.26	0.00	26.92	126
2451754	7.5	6.18	0	26.95	130	2453212	7.38	6.57	0.00	27.09	127
2451755	7.38	6.78	0	27.75	131	2453213	7.57	6.66	0.00	26.84	128
2451756	3.31	1.17	0	23.54	132	2453214	6.05	6.15	0.00	26.29	129
2451757	7.16	6.34	0	27.18	133	2453215	6.93	5.96	0.00	25.96	130
2451758	7.15	6.77	0	27.99	134	2453216	7.27	5.61	0.00	27.33	131
2451759	7.24	6.37	0	26.72	135	2453217	7.13	6.58	0.00	27.47	132
2451760	7.24	6.66	0	27.51	136	2453218	6.60	3.86	4.10	25.98	133
2451761	5.82	4.96	21.3	26.94	137	2453219	5.33	3.45	1.50	25.84	134
2451762	6.67	2.93	17	27.02	138	2453220	7.38	4.90	15.30	27.13	135
2451763	6.98	5.71	2.8	26.84	139	2453221	5.93	4.69	17.40	26.75	136
2451764	8.59	6.34	0	29.22	140	2453222	5.46	3.81	1.30	26.65	137
2451765	8.71	6.56	6.6	27.62	141	2453223	6.04	4.08	35.80	25.92	138
2451766	8.12	4.77	11.4	25.67	142	2453224	6.80	4.55	25.00	27.29	139
2451767	7.97	5.77	1.8	27.86	143	2453225	6.57	4.55	3.70	26.02	140
2451768	8.19	5.8	0	28.46	144	2453226	4.97	2.77	27.80	25.52	141
2451769	6.7	3.93	0	26	145	2453227	6.77	4.82	0.60	26.05	142
2451770	8.16	4.25	0	27.5	146	2453228	6.62	5.23	0.40	26.09	143
2451771	8.09	4.87	0	27.87	147	2453229	7.59	5.75	20.30	26.95	144
2451772	8.36	6.22	0	28.44	148	2453230	6.14	3.72	0.80	26.74	145
2451773	7.95	5.68	0	26.86	149	2453231	4.93	2.64	43.30	25.89	146
2451774	7.43	5.93	0	26.5	150	2453232	5.38	3.16	21.70	25.50	147
2451775	7.57	5.87	0	27.34	151	2453233	5.01	2.86	0.70	24.98	148
2451776	7.43	6.16	6.1	28.82	152	2453234	6.62	4.80	0.10	26.56	149
2451777	7.69	6.07	0	28.62	153	2453235	7.36	5.49	6.90	27.16	150
2451778	7.8	5.78	2	28.26	154	2453236	5.80	3.96	2.00	26.67	151
2451779	4.85	4.14	35.8	27.42	155	2453237	7.25	5.49	0.10	26.82	152
2451780	6.81	5.03	0	28.74	156	2453238	7.62	5.77	0.00	27.87	153
2451781	6.9	5.9	0	28.92	157	2453239	5.14	3.76	0.60	26.03	154
2451782	7.29	5.9	0	27.21	158	2453240	6.55	4.39	0.00	25.73	155
2451783	5.17	3.47	0	25.99	159	2453241	6.59	5.13	0.50	25.66	156
2451784	6.52	5.29	0	27.07	160	2453242	5.81	4.19	0.00	25.50	157
2451785	7.39	5.82	0	23.89	161	2453243	6.01	4.20	2.70	25.94	158
2451786	6.71	2.89	3.8	25.26	162	2453244	7.37	5.47	1.00	27.07	159
2451787	7.68	5.75	4.3	25.26	163	2453245	6.68	5.42	0.00	26.99	160
2451788	7.93	4.81	74.9	25.94	164	2453246	7.03	5.11	0.00	26.93	161

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2451789	7.11	5.77	0	26.62	165	2453247	6.97	5.14	1.30	27.22	162
2451790	6.57	5.66	0	28.38	166	2453248	6.64	5.35	6.50	26.79	163
2451791	6.63	4.93	0	28.86	167	2453249	6.74	5.23	0.00	27.96	164
2451792	6.85	5.75	0	29.06	168	2453250	7.00	5.81	0.80	27.53	165
2451793	4.24	3.19	0	25.32	169	2453251	7.66	5.78	3.60	28.15	166
2451794	6.03	4.9	2.3	26.57	170	2453252	7.70	5.67	0.00	28.75	167
2451795	4.82	3.99	0	25.92	171	2453253	3.99	1.55	22.35	26.57	168
2451796	6.71	5.01	2.3	27.42	172	2453254	2.15	0.50	171.96	25.13	169
2451797	1.57	1.38	6.1	25.81	173	2453255	5.71	2.83	0.00	27.80	170
2451798	6.76	5.51	0.8	28.21	174	2453256	6.90	4.78	0.00	27.76	171
2451799	6.51	4.93	14.5	27.6	175	2453257	6.34	5.09	6.86	26.90	172
2451800	7.03	5.06	54.1	26.58	176	2453258	5.37	3.67	12.45	26.30	173
2451801	6.79	5.34	9.1	26.57	177	2453259	7.21	5.32	1.02	27.00	174
2451802	7.28	5.13	0	25.83	178	2453260	7.26	5.41	0.25	26.80	175
2451803	7.63	4.58	44.2	27.88	179	2453261	6.04	4.60	0.25	26.16	176
2451804	4.92	1.3	0	25.07	180	2453262	6.25	4.31	3.30	26.89	177
2451805	1.62	0.91	0	22.51	181	2453263	5.00	2.38	0.00	27.33	178
2451806	7.08	4.7	31.5	26.12	182	2453264	6.40	4.55	0.00	27.96	179
2451807	4.56	2.82	13.5	25.25	183	2453265	7.25	5.42	0.00	28.41	180
2451808	6.65	4.17	43.2	28.59	184	2453266	7.04	4.70	8.38	27.87	181
2451809	7.02	4.61	3.3	28.81	185	2453267	6.96	5.09	0.00	26.50	182
2451810	3.34	1.37	0	26.99	186	2453268	6.38	4.61	5.90	25.67	183
2451811	7.26	4.44	4.1	28.43	187	2453269	5.64	3.42	18.50	25.87	184
2451812	7.16	4.5	0.3	27.55	188	2453270	5.07	1.99	3.20	25.87	185
2451813	7.8	5.04	16.3	27.68	189	2453271	6.66	4.42	0.00	26.71	186
2451814	7.52	4.98	16.5	27.66	190	2453272	6.91	4.53	0.00	26.69	187
2451815	4.68	3.38	1	26.22	191	2453273	6.41	4.28	0.00	26.45	188
2451816	4.48	2.83	0	26.1	192	2453274	4.94	1.91	9.80	26.52	189
2451817	6.16	4.05	4.6	25.48	193	2453275	3.70	0.82	83.90	25.58	190
2451818	5.89	3.78	0	26.14	194	2453276	6.75	4.19	0.00	27.17	191
2451819	5.1	3.28	0	25.12	195	2453277	6.96	4.70	0.00	27.10	192
2451820	6.15	3.45	7.1	26.01	196	2453278	6.49	4.29	0.00	26.29	193
2451821	3.63	1.07	5.3	25.03	197	2453279	5.97	3.94	0.00	26.45	194
2451822	3.69	1.97	3.3	24.36	198	2453280	5.97	4.25	0.00	26.59	195
2451823	5.85	4.78	2.5	25.41	199	2453281	5.99	4.67	0.00	26.46	196
2451824	6.45	3.74	10.7	25.61	200	2453282	6.00	4.43	0.00	25.90	197
2451825	5.99	4.42	25.9	25.72	201	2453283	5.95	4.02	0.00	25.69	198
2451826	5.83	3	7.9	24.87	202	2453284	4.77	3.23	2.79	24.81	199

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2451827	3.3	1.98	0	18.84	203	2453285	4.12	2.04	31.17	24.71	200
2451828	4.44	1.9	0	20.78	204	2453286	6.31	3.57	0.00	25.16	201
2451829	3.77	1.93	0	21.99	205	2453287	5.52	2.51	5.10	24.22	202
2451830	5.99	3.51	0	23.89	206	2453288	5.63	3.53	0.00	25.42	203
2451831	5.92	3.41	0	23.96	207	2453289	5.49	3.12	0.50	25.58	204
2451832	5.65	3.15	1	22.74	208	2453290	3.17	1.08	5.00	23.42	205
2451833	5.56	3.24	76.2	20.31	209	2453291	4.02	1.74	0.30	23.64	206
2451834	4.57	3.15	56.4	18.55	210	2453292	5.09	3.79	0.00	24.70	207
2451835	5.66	3.12	0.5	18.79	211	2453293	5.03	3.55	0.00	22.16	208
2451836	5.47	3.19	0	19.03	212	2453294	4.24	2.07	5.90	20.28	209
2451837	5.55	3.2	0	19.61	213	2453295	4.41	2.96	0.00	17.60	210
2451838	4.07	2.26	0	21.37	214	2453296	4.84	3.10	0.00	20.29	211
2451839	5.63	3.29	4.8	23.68	215	2453297	4.62	2.40	0.00	23.54	212
2451840	5.61	3.11	0	24.06	216	2453298	4.87	3.30	5.30	25.30	213
2451841	5.95	3.29	0	24.67	217	2453299	4.34	2.72	0.10	24.32	214
2451842	5.46	3.12	0	24.32	218	2453300	5.06	3.74	0.00	23.76	215
2451843	6.02	3.34	0	23.83	219	2453301	5.20	2.78	3.80	22.94	216
2451844	5.58	3.26	0	19.9	220	2453302	4.90	3.06	0.00	23.50	217
2451845	4.95	2.88	0	19.1	221	2453303	5.24	3.02	0.00	21.17	218
2451846	5.34	2.86	0	17.5	222	2453304	5.46	3.04	0.00	21.78	219
2451847	5.35	2.97	1.3	19.2	223	2453305	5.24	2.61	0.00	22.50	220
2451848	4.83	2.79	0	20.42	224	2453306	5.07	2.94	0.00	23.07	221
2451849	5.24	2.74	0	18.17	225	2453307	3.62	1.28	0.10	21.50	222
2451850	5.06	2.59	2.3	15.91	226	2453308	5.01	2.57	0.00	22.82	223
2451851	5.1	2.52	14.7	16.08	227	2453309	5.23	3.19	0.00	23.06	224
2451852	4.95	2.6	0	16.94	228	2453310	4.95	0.46	0.00	23.01	225
2451853	5.2	2.52	0	18.53	229	2453311	4.90	1.81	0.00	24.57	226
2451854	4.85	2.63	0	20.07	230	2453312	4.84	3.16	0.00	24.23	227
2451855	4.22	2.28	0	20.75	231	2453313	5.08	3.12	0.00	23.59	228
2451856	5.53	2.75	0	22.7	232	2453314	4.61	2.91	0.00	24.35	229
2451857	5.82	2.72	0	24.38	233	2453315	4.40	2.22	2.40	20.76	230
2451858	5.01	2.11	0	24.11	234	2453316	4.72	2.25	0.00	21.50	231
2451859	4.38	1.77	0	21.06	235	2453317	4.66	2.35	0.00	18.75	232
2451860	4.37	2.11	0	16.31	236	2453318	4.53	2.20	0.00	17.87	233
2451861	4.6	2.07	0.8	16	237	2453319	3.61	0.79	2.70	20.32	234
2451862	4.8	2.11	0.5	18.99	238	2453320	5.50	1.97	0.00	22.75	235
2451863	3.82	1.36	0.3	20.16	239	2453321	4.99	2.01	0.00	22.41	236
2451864	4.33	1.82	0	12.93	240	2453322	4.45	2.23	0.00	22.53	237

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2451865	4.71	1.96	0	16.19	241	2453323	4.81	2.08	0.00	22.37	238
2451866	4.99	2.28	0	21.55	242	2453324	5.49	2.21	0.60	23.22	239
2451867	4.57	1.94	0	20.61	243	2453325	5.52	2.15	0.00	22.24	240
2451868	5.13	2.25	0	22.16	244	2453326	4.95	2.14	1.40	20.44	241
2451869	1.88	0.62	16	14.57	245	2453327	5.24	1.92	0.00	19.18	242
2451870	3.99	1.35	6.9	10.2	246	2453328	4.68	1.39	0.00	17.93	243
2451871	4.25	1.29	0.8	6.43	247	2453329	4.96	1.83	0.20	19.32	244
2451872	3.65	1.23	6.9	9.73	248	2453330	4.43	2.11	0.00	20.69	245
2451873	3.06	1.06	2	18.12	249	2453331	4.24	1.86	0.00	19.90	246
2451874	3	1.3	4.6	23.14	250	2453332	4.45	1.72	0.10	19.76	247
2451875	1.86	0.84	0	18.46	251	2453333	4.60	2.00	0.20	21.47	248
2451876	3.95	1.62	0	14.49	252	2453334	4.06	1.97	0.00	23.39	249
2451877	3.54	1.33	0	15.04	253	2453335	4.39	2.12	0.90	20.44	250
2451878	2.95	0.93	0	15.8	254	2453336	4.05	1.57	0.00	14.30	251
2451879	3.91	1.57	0	12.92	255	2453337	4.59	1.38	2.90	21.16	252
2451880	3.88	1.57	0	14	256	2453338	3.77	1.92	0.00	18.38	253
2451881	3.71	1.73	0	13.97	257	2453339	4.17	1.75	0.00	18.61	254
2451882	2.83	1.15	0	14.67	258	2453340	4.34	1.38	0.00	21.70	255
2451883	2.7	0.8	0.8	12.56	259	2453341	4.31	1.77	0.00	21.93	256
2451884	3.26	1.3	0.3	11.06	260	2453342	3.59	1.03	0.00	19.76	257
2451885	3.26	1.23	0	12.44	261	2453343	3.95	1.32	0.00	14.42	258
2451886	2.91	0.89	0	14.18	262	2453344	3.41	0.80	0.00	12.90	259
2451887	3.64	1.35	0	15.8	263	2453345	4.56	1.50	0.00	16.33	260
2451888	3.67	1.67	0	15.84	264	2453346	4.27	1.55	0.00	19.93	261
2451889	4.03	1.92	0	17.84	265	2453347	4.45	1.60	0.00	22.66	262
2451890	3.47	1.48	0	19.78	266	2453348	4.78	2.05	0.00	22.01	263
2451891	3.03	1.12	0	20.42	267	2453349	4.12	1.86	0.25	23.01	264
2451892	4.02	2.12	1	22.58	268	2453350	3.25	1.15	8.64	20.90	265
2451893	4.38	2.05	0.3	23.06	269	2453351	3.57	1.24	0.00	15.09	266
2451894	3.77	1.55	0	20.34	270	2453352	3.34	1.13	0.00	9.91	267
2451895	4.19	1.79	0	23.06	271	2453353	3.99	1.29	0.00	14.48	268
2451896	3.36	1.18	17.3	17.24	272	2453354	3.65	1.01	0.00	11.35	269
2451897	3.29	1.14	43.4	12.15	273	2453355	3.29	0.81	0.00	9.55	270
2451898	1.89	0.69	0	9.75	274	2453356	2.66	0.46	0.70	16.28	271
2451899	2.04	0.59	0	2.18	275	2453357	3.77	1.05	0.30	15.74	272
2451900	2.55	0.64	0	8.6	276	2453358	4.07	1.22	2.40	15.39	273
2451901	2.88	0.95	0	12.3	277	2453359	3.43	1.17	0.00	12.50	274
2451902	3.25	0.96	0	17.42	278	2453360	2.24	0.93	0.00	5.44	275

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2451903	2.82	1.04	0	17.79	279	2453361	3.19	0.93	0.00	11.79	276
2451904	3.56	1.28	0	18.71	280	2453362	4.02	1.25	0.00	18.05	277
2451905	3	0.98	0	18.29	281	2453363	2.70	0.76	0.00	20.56	278
2451906	3.82	1.38	0	17.38	282	2453364	1.96	0.45	1.80	15.15	279
2451907	1.23	0.5	0	16.56	283	2453365	1.48	0.31	40.70	14.51	280
2451908	1.28	0.44	0	8.69	284	2453366	1.51	0.48	2.60	11.31	281
2451909	2.85	1.04	0	5.62	285	2453367	3.40	1.09	0.00	10.15	282
2451910	2.8	0.9	0	1	286	2453368	3.21	0.63	0.00	14.95	283
2451911	2.92	0.94	0	7.07	287	2453369	3.81	1.19	0.00	16.50	284
2451912	1.86	0.53	0	7.55	288	2453370	4.07	1.48	0.00	16.85	285
2451913	3.03	1.04	0	9.98	289	2453371	4.34	1.42	0.00	17.99	286
2451914	2.9	0.96	0	5.72	290	2453372	3.67	1.11	0.00	17.39	287
2451915	3.23	1.06	0	9.81	291	2453373	4.12	1.79	0.00	18.91	288
2451916	3.34	1.24	18	11.17	292	2453374	4.27	1.76	0.00	18.77	289
2451917	3.54	1.18	7.6	10.71	293	2453375	4.31	1.94	0.00	18.70	290
2451918	2.55	0.84	0	15.83	294	2453376	3.99	1.94	0.00	19.53	291
2451919	3.12	1.18	0.8	9.71	295	2453377	4.10	1.83	0.00	21.38	292
2451920	2.51	0.95	0	10.12	296	2453378	4.54	1.79	0.00	20.98	293
2451921	3.33	1.22	0	15.03	297	2453379	4.24	1.99	0.00	20.88	294
2451922	3.43	1.52	0	16.36	298	2453380	4.30	2.05	0.20	19.22	295
2451923	3.37	1.39	0	14.32	299	2453381	4.34	2.07	0.00	18.68	296
2451924	3.78	1.75	0	18.38	300	2453382	3.87	1.16	0.60	17.50	297
2451925	3.71	1.7	0	18.82	301	2453383	4.01	1.95	0.00	20.54	298
2451926	3.92	2.01	0	19.66	302	2453384	4.33	1.77	0.00	22.56	299
2451927	4	1.83	0	19.9	303	2453385	1.49	0.16	39.70	19.27	300
2451928	4.29	2.03	0	21.75	304	2453386	2.98	1.10	12.30	18.65	301
2451929	4.09	2.13	0.3	23.04	305	2453387	1.52	0.23	5.90	13.31	302
2451930	2.06	0.72	0	14.73	306	2453388	2.40	1.31	0.00	9.17	303
2451931	2.95	1.36	0	8.94	307	2453389	4.26	1.42	0.10	11.10	304
2451932	1.21	0.48	0	11.89	308	2453390	3.73	1.35	0.00	12.11	305
2451933	2.59	0.94	0	10.08	309	2453391	3.95	1.48	0.00	11.58	306
2451934	3.35	1.5	7.4	11.84	310	2453392	4.36	1.83	0.10	13.41	307
2451935	3.22	1.56	0	11.04	311	2453393	3.89	1.50	0.20	15.91	308
2451936	3.26	1.46	0	11.32	312	2453394	2.82	1.78	0.40	10.04	309
2451937	3.8	1.73	0	14.7	313	2453395	2.89	1.40	0.00	6.09	310
2451938	3.95	2.02	8.1	15.2	314	2453396	2.94	1.43	0.00	9.21	311
2451939	3.74	1.72	7.1	18.13	315	2453397	3.77	1.55	0.00	15.10	312
2451940	4.24	1.36	0.3	21.64	316	2453398	3.92	1.78	0.00	15.53	313

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2451941	4.05	1.58	12.7	22.42	317	2453399	1.62	0.18	1.70	16.48	314
2451942	3.17	1.21	0	19.67	318	2453400	3.93	1.57	0.00	18.01	315
2451943	1.9	0.66	0.8	16.26	319	2453401	4.40	2.10	0.00	16.90	316
2451944	0.92	0.54	0.3	14.37	320	2453402	3.90	2.16	0.00	12.07	317
2451945	2.3	0.68	0	14.69	321	2453403	4.14	1.71	0.00	14.70	318
2451946	3.78	1.69	0	14.55	322	2453404	2.71	0.79	0.70	15.08	319
2451947	3.77	2.02	0	13.85	323	2453405	4.30	2.10	0.20	16.74	320
2451948	4.55	2.27	0	17.28	324	2453406	2.63	2.00	0.40	11.19	321
2451949	4.19	2.41	0	19.59	325	2453407	2.20	0.93	0.00	11.94	322
2451950	4.85	2.57	0	18.11	326	2453408	4.80	1.94	0.00	15.87	323
2451951	5.2	2.85	0	24	327	2453409	3.84	1.30	0.00	15.57	324
2451952	4.71	2.53	0	20.64	328	2453410	4.73	2.10	0.00	15.85	325
2451953	3.74	2.04	0	19.6	329	2453411	4.16	2.70	0.20	16.23	326
2451954	4.02	2.37	0	20.32	330	2453412	4.65	2.02	0.00	17.05	327
2451955	4.53	3.01	0	22.63	331	2453413	3.22	2.06	0.00	8.07	328
2451956	5.01	2.95	0	23.26	332	2453414	2.73	1.92	0.00	9.07	329
2451957	4.62	3.05	0	23.9	333	2453415	3.08	2.14	0.00	12.19	330
2451958	4.26	2.05	0	21.91	334	2453416	4.08	2.31	0.00	17.42	331
2451959	4.49	2.72	0	21.08	335	2453417	4.82	2.88	0.00	18.39	332
2451960	4.85	2.67	0	20.05	336	2453418	4.68	3.03	0.00	19.81	333
2451961	4.27	1.94	0	20.18	337	2453419	5.05	2.99	0.00	18.83	334
2451962	4.74	3.05	0	21.33	338	2453420	4.39	2.79	0.00	13.51	335
2451963	4.91	3.04	0	22.15	339	2453421	4.39	2.52	0.00	15.07	336
2451964	4.37	1.91	0	19.97	340	2453422	4.33	2.52	0.10	16.28	337
2451965	2.14	1.29	0	21.51	341	2453423	4.57	2.87	0.00	19.56	338
2451966	4.89	3.52	0	24.92	342	2453424	4.74	2.61	0.00	18.83	339
2451967	4.82	3.07	0	24.56	343	2453425	4.53	2.74	0.10	19.31	340
2451968	4.88	3.81	9.6	24.91	344	2453426	3.98	1.63	0.00	20.29	341
2451969	5.4	3.69	0.3	26.21	345	2453427	3.10	1.01	0.30	17.35	342
2451970	5.04	3.46	0.3	23.38	346	2453428	4.38	2.69	0.10	18.13	343
2451971	4.81	3.75	0	24.42	347	2453429	2.22	0.32	31.40	19.71	344
2451972	5.61	3.83	0	26.51	348	2453430	4.28	3.13	0.00	19.48	345
2451973	1.99	1.36	0	20.44	349	2453431	3.94	3.07	0.00	14.85	346
2451974	3.97	3.24	0	13.29	350	2453432	3.35	3.03	0.00	9.66	347
2451975	3.75	2.89	0	11.76	351	2453433	1.41	0.41	5.00	8.71	348
2451976	3.71	2.87	0	10.23	352	2453434	3.81	3.03	0.90	12.31	349
2451977	3.34	2.96	0	14.63	353	2453435	3.68	2.95	0.10	13.93	350
2451978	4.49	2.83	0	19.02	354	2453436	3.72	3.09	0.00	15.26	351

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2451979	4.5	3.32	0	19.77	355	2453437	3.56	2.87	0.00	17.89	352
2451980	4.61	3.35	0	22.03	356	2453438	3.77	2.83	2.10	19.06	353
2451981	5.13	4.1	17	23.89	357	2453439	1.11	0.31	13.80	11.71	354
2451982	3.32	1.53	0	24.36	358	2453440	3.54	3.57	0.00	10.69	355
2451983	2.71	1.04	0	20.66	359	2453441	4.01	3.10	0.00	14.70	356
2451984	5.05	3.49	0	25.94	360	2453442	3.68	3.34	0.00	15.66	357
2451985	4.26	2.07	0	25.55	361	2453443	4.01	3.63	0.00	18.45	358
2451986	4.18	3.3	20.1	21.76	362	2453444	3.42	2.32	1.30	19.32	359
2451987	2.12	0.92	0	18.83	363	2453445	3.82	2.93	2.00	19.03	360
2451988	0.97	0.85	0	19.36	364	2453446	3.84	2.48	8.90	21.90	361
2451989	4.24	3.1	3	21.61	365	2453447	1.72	0.28	31.30	18.18	362
2451990	3.29	2.45	0.5	15.86	1	2453448	2.90	2.46	1.10	11.59	363
2451991	4.63	3.72	0	16.94	2	2453449	3.47	3.76	0.10	10.65	364
2451992	4.69	4.01	0	18.86	3	2453450	3.53	3.50	0.10	14.03	365
2451993	5.14	4	0.8	21.8	4	2453451	3.09	1.57	4.00	19.24	1
2451994	5.09	4.05	0.5	21.83	5	2453452	4.20	3.66	3.40	22.92	2
2451995	4.39	3.89	0	18.61	6	2453453	3.02	1.53	6.50	22.32	3
2451996	4.47	3.98	0	17.51	7	2453454	3.49	2.65	0.00	19.49	4
2451997	4.94	4.05	3.3	21.81	8	2453455	3.10	1.72	37.80	21.98	5
2451998	2.09	1.28	0	20.23	9	2453456	3.12	1.89	0.20	21.28	6
2451999	3.74	2.98	0	22.09	10	2453457	3.90	4.93	0.00	25.34	7
2452000	3.61	2.36	0	22.76	11	2453458	3.45	4.05	2.40	21.62	8
2452001	5.8	4.74	10.4	22.75	12	2453459	3.72	5.31	0.00	18.77	9
2452002	4.35	4.41	0	19.21	13	2453460	3.69	4.65	0.00	18.27	10
2452003	5.04	4.73	0	23.48	14	2453461	4.40	4.12	0.00	22.97	11
2452004	5.58	2.64	0	23.29	15	2453462	4.21	5.52	0.00	23.69	12
2452005	5.24	4.32	0	23.63	16	2453463	3.46	4.29	17.28	20.81	13
2452006	5.35	5.17	0	24.53	17	2453464	3.48	4.34	0.00	15.71	14
2452007	5.81	5.31	0	25.08	18	2453465	3.61	4.43	0.10	16.76	15
2452008	6.24	5.1	0	25.36	19	2453466	4.46	4.79	0.10	19.23	16
2452009	6.35	4.9	0	26.08	20	2453467	4.43	4.29	0.00	21.92	17
2452010	7.54	5.5	0	26.3	21	2453468	4.80	3.85	15.80	22.25	18
2452011	6.56	5.38	0	26.09	22	2453469	4.97	4.62	0.00	21.42	19
2452012	7.32	4.3	0	26.76	23	2453470	5.23	5.02	0.00	19.02	20
2452013	7.71	5.3	7.1	25.09	24	2453471	5.96	5.24	0.00	20.39	21
2452014	7.25	5.41	0	26.42	25	2453472	6.11	5.34	0.00	20.28	22
2452015	8.76	5	17	28.29	26	2453473	5.18	4.57	0.00	21.24	23
2452016	7.77	5.6	8.1	26.58	27	2453474	6.35	5.20	1.20	22.56	24

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2452017	7.39	5.05	0.3	24.45	28	2453475	5.58	3.64	0.00	17.43	25
2452018	5.41	4.43	0	16.73	29	2453476	6.45	4.23	0.00	16.39	26
2452019	5.7	4.22	0	18.88	30	2453477	7.15	4.83	0.00	16.68	27
2452020	5.72	3.4	0	20.81	31	2453478	4.87	4.86	0.00	17.60	28
2452021	6.74	4.11	0	23.76	32	2453479	7.63	5.11	0.00	17.73	29
2452022	7.39	5.63	0	25.58	33	2453480	7.05	5.28	0.20	18.18	30
2452023	7.15	5.41	0	24.81	34	2453481	6.28	4.21	0.00	19.36	31
2452024	7.54	5.79	0	26.53	35	2453482	6.96	5.08	0.00	19.07	32
2452025	7.8	3.87	0	24.04	36	2453483	7.01	5.45	0.00	20.66	33
2452026	6.36	5.05	3.6	21.82	37	2453484	5.98	3.70	0.70	19.97	34
2452027	6.74	4.59	0	23	38	2453485	6.86	5.17	0.00	16.62	35
2452028	7.06	4.2	0	22.3	39	2453486	6.39	4.49	0.00	15.46	36
2452029	6.81	3.33	0	22.88	40	2453487	5.92	4.35	11.60	20.73	37
2452030	3.1	1.62	0	20.89	41	2453488	6.17	4.18	0.40	20.68	38
2452031	6.37	4.3	0	23.07	42	2453489	7.01	5.64	0.10	18.46	39
2452032	7.55	5.7	0	25.4	43	2453490	6.21	5.57	0.00	20.47	40
2452033	2.34	1.48	0	20.74	44	2453491	7.41	5.58	0.00	23.15	41
2452034	8.11	5.69	0	24.96	45	2453492	5.95	2.20	0.00	22.08	42
2452035	8.01	5.89	0	24.93	46	2453493	8.88	4.95	0.00	21.76	43
2452036	7.97	5.9	0	25.86	47	2453494	9.23	5.58	2.00	21.92	44
2452037	7.47	4.55	0.8	24.62	48	2453495	4.34	1.32	22.80	21.29	45
2452038	7.29	4.98	0	24.29	49	2453496	5.63	2.13	0.20	21.72	46
2452039	8.36	5.6	0	24.96	50	2453497	6.32	2.46	0.00	18.28	47
2452040	7.85	4.68	0.5	24.17	51	2453498	8.80	5.34	0.00	19.02	48
2452041	6.53	3.5	0	22.7	52	2453499	7.96	5.23	0.00	20.89	49
2452042	8.05	5.99	0	24.39	53	2453500	7.96	5.76	0.00	21.61	50
2452043	7.93	5.89	0	25.67	54	2453501	8.30	5.64	0.00	22.02	51
2452044	9.15	6.26	0	26.56	55	2453502	6.35	4.07	2.90	21.16	52
2452045	8.01	6.04	0	27.09	56	2453503	8.02	5.85	0.10	21.65	53
2452046	9.17	6.24	0.5	29.27	57	2453504	8.61	5.67	0.00	22.11	54
2452047	9.33	6.4	0	29.92	58	2453505	8.34	5.71	0.00	23.29	55
2452048	8.93	6	0	25.69	59	2453506	7.55	5.51	0.00	22.16	56
2452049	8.96	6.16	0	27.86	60	2453507	8.09	6.29	0.00	23.14	57
2452050	9.48	5.09	0	27.58	61	2453508	8.44	5.55	0.00	23.83	58
2452051	8.47	6.52	0	29.26	62	2453509	8.74	6.31	0.00	23.97	59
2452052	8.03	5.98	0	28.81	63	2453510	9.31	5.60	1.70	23.90	60
2452053	6.47	4.3	0	26.44	64	2453511	7.98	6.21	0.00	23.31	61
2452054	8.33	6.33	0	26.25	65	2453512	6.51	4.31	23.20	23.19	62

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2452055	7.58	5.47	0	27.24	66	2453513	6.92	6.16	2.70	23.58	63
2452056	8.4	6.17	0	27.25	67	2453514	7.54	6.33	0.00	24.49	64
2452057	9.39	6.78	0	30.2	68	2453515	7.31	4.33	0.80	24.64	65
2452058	7.25	4.41	0	25.47	69	2453516	8.57	5.83	0.00	23.41	66
2452059	8.46	5.8	0	28.15	70	2453517	7.90	4.32	0.00	22.32	67
2452060	7.92	6.66	0	28.61	71	2453518	8.45	5.92	0.00	24.13	68
2452061	8.3	6.95	0	29.52	72	2453519	7.99	6.05	0.00	25.86	69
2452062	6.24	3.6	0	26.18	73	2453520	8.91	6.85	0.00	24.61	70
2452063	8.82	6.05	0	29.05	74	2453521	8.42	6.49	0.00	26.86	71
2452064	8.93	6.5	0	29.87	75	2453522	4.32	2.00	21.20	23.71	72
2452065	8.58	6.69	0	30.57	76	2453523	2.53	1.46	35.30	23.21	73
2452066	7.74	6.75	0	30.62	77	2453524	5.26	3.12	2.00	23.97	74
2452067	8.38	6.43	10.2	29.59	78	2453525	4.34	1.81	26.40	23.47	75
2452068	6.36	5.31	8.9	27.41	79	2453526	5.60	3.21	1.10	24.49	76
2452069	5.92	4.41	0	26.82	80	2453527	6.62	4.05	6.80	24.62	77
2452070	7.44	7.06	0	29.81	81	2453528	7.73	6.34	0.30	24.80	78
2452071	7.04	5.24	0	27.69	82	2453529	7.24	5.64	0.00	25.88	79
2452072	7.91	6.03	0	28.16	83	2453530	6.66	6.46	3.80	26.50	80
2452073	8.96	6.43	29.7	29.29	84	2453531	5.62	3.17	1.80	25.99	81
2452074	8.86	6.21	0	30.29	85	2453532	5.79	2.97	0.00	26.34	82
2452075	7.32	5.86	0	28.66	86	2453533	4.91	3.38	20.80	25.88	83
2452076	6.28	5.36	0	27.31	87	2453534	6.47	5.72	0.00	26.52	84
2452077	8.75	6.44	0	28.84	88	2453535	7.95	7.26	0.00	26.56	85
2452078	7.89	6.41	0.3	28.22	89	2453536	8.16	6.79	0.00	26.13	86
2452079	7.21	6.83	0.3	28.05	90	2453537	5.91	4.74	14.20	25.69	87
2452080	8.24	5.49	0	28.69	91	2453538	6.77	5.15	2.00	25.78	88
2452081	6.62	4.99	0	26.88	92	2453539	7.70	5.40	0.30	26.66	89
2452082	7.66	6.51	0	28.82	93	2453540	8.44	5.92	0.00	26.54	90
2452083	6.57	4.44	0	26.48	94	2453541	7.07	5.59	3.80	25.49	91
2452084	5.54	3.24	0	25.11	95	2453542	7.69	4.24	0.00	24.85	92
2452085	4.26	3.62	5.8	25.64	96	2453543	6.85	3.82	1.00	25.00	93
2452086	8.48	6.05	1.3	27.72	97	2453544	4.77	2.70	1.70	24.19	94
2452087	7.91	6.21	0	29.11	98	2453545	6.77	3.73	0.80	24.61	95
2452088	5.76	3.19	0	26.78	99	2453546	4.05	1.89	33.30	23.89	96
2452089	3.94	1.55	0.3	24.83	100	2453547	6.31	4.88	3.00	26.10	97
2452090	7.75	6.02	78.5	29.22	101	2453548	7.33	6.56	0.00	27.83	98
2452091	8.36	6.3	10.4	29.44	102	2453549	6.51	4.00	0.70	26.82	99
2452092	8.15	6.77	12.2	30.16	103	2453550	7.47	4.99	0.00	26.67	100

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2452093	9.04	6.96	0	30.53	104	2453551	6.37	4.03	1.40	25.97	101
2452094	9.44	6.87	0	30.91	105	2453552	5.83	4.35	36.00	25.44	102
2452095	8.15	6.13	0	29.21	106	2453553	6.39	4.96	3.90	26.65	103
2452096	6.39	4.61	0	27.12	107	2453554	6.55	5.28	5.30	27.48	104
2452097	6.54	5.23	0	27.93	108	2453555	5.84	5.58	1.90	27.41	105
2452098	8.83	6.91	0	30.21	109	2453556	7.13	6.84	0.00	27.91	106
2452099	7.48	5.36	9.9	28.39	110	2453557	7.97	6.35	0.00	28.21	107
2452100	7.8	4.26	0	27.63	111	2453558	8.15	6.82	0.00	28.18	108
2452101	8.19	4.56	0.5	29.33	112	2453559	7.07	5.36	0.00	28.28	109
2452102	7.45	4.88	0	28.66	113	2453560	6.90	6.29	2.29	28.33	110
2452103	4.04	3.19	0	26.85	114	2453561	7.10	4.24	0.00	27.94	111
2452104	5.16	3.7	2.5	27.48	115	2453562	4.51	2.36	14.99	27.13	112
2452105	5.37	3.81	18	27.21	116	2453563	7.08	6.07	0.00	27.63	113
2452106	5.82	1.94	0	26.42	117	2453564	7.32	6.03	0.00	27.08	114
2452107	9.33	6.27	1.8	30.1	118	2453565	7.14	5.71	0.00	27.53	115
2452108	6.88	4.92	4.6	26.8	119	2453566	7.16	6.13	0.00	27.82	116
2452109	7.88	6.47	0	29.12	120	2453567	6.80	6.65	7.11	28.10	117
2452110	8.33	6.18	0	28.88	121	2453568	7.40	6.93	2.79	27.79	118
2452111	6.57	4.43	0	27.72	122	2453569	8.93	6.61	0.00	27.73	119
2452112	6.26	4.13	0	26.96	123	2453570	7.73	6.80	0.00	27.91	120
2452113	6.23	4.41	16.5	29.21	124	2453571	7.65	6.65	0.00	28.18	121
2452114	7.44	3.26	52.6	27.12	125	2453572	7.70	6.66	0.00	27.97	122
2452115	8.9	6.01	3.3	27.93	126	2453573	8.77	6.61	0.00	27.65	123
2452116	7.64	6.47	47.8	30.21	127	2453574	7.72	6.72	0.00	27.73	124
2452117	7.36	6.17	2	28.39	128	2453575	4.92	5.47	0.00	27.42	125
2452118	8.86	6.08	24.1	27.63	129	2453576	7.32	6.82	8.64	27.58	126
2452119	9.27	6.7	0	29.33	130	2453577	7.18	6.64	0.00	26.86	127
2452120	9.4	6.57	0	28.66	131	2453578	7.51	6.30	0.00	26.56	128
2452121	9.3	6.69	0	26.85	132	2453579	7.59	6.50	0.00	27.92	129
2452122	4.67	2.15	0	27.48	133	2453580	7.18	6.79	0.00	28.17	130
2452123	4.91	1.53	0	27.21	134	2453581	6.29	6.70	0.00	28.40	131
2452124	2.33	1	0	26.42	135	2453582	7.11	6.86	0.00	26.95	132
2452125	3.95	1.37	0.3	29.33	136	2453583	6.17	6.44	9.40	27.33	133
2452126	6.54	4.33	0	28.66	137	2453584	3.98	2.84	0.00	25.85	134
2452127	6.05	3.12	0.5	29.21	138	2453585	6.33	5.73	3.05	26.48	135
2452128	7.31	5.27	0.3	27.12	139	2453586	5.22	4.64	2.54	26.40	136
2452129	7.89	5.17	0.5	27.93	140	2453587	6.95	6.39	1.27	27.23	137
2452130	8.75	6.68	0	30.21	141	2453588	5.01	4.24	0.00	25.60	138

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2452131	7.55	5.42	0	28.39	142	2453589	6.54	6.43	6.86	26.30	139
2452132	9.16	6.42	0	27.63	143	2453590	5.81	5.37	0.00	25.30	140
2452133	9.15	5.84	0	29.33	144	2453591	6.06	6.52	9.40	26.83	141
2452134	8.99	6.08	0.5	28.66	145	2453592	5.13	5.76	0.00	26.54	142
2452135	9.71	5.95	0.5	26.85	146	2453593	6.49	6.09	13.21	27.90	143
2452136	9.2	5.6	0	27.48	147	2453594	5.02	4.21	9.40	27.23	144
2452137	7.64	4.24	0.8	27.21	148	2453595	5.32	6.06	0.00	26.85	145
2452138	7.64	5.44	0	26.42	149	2453596	7.10	6.42	0.00	27.31	146
2452139	5.87	3.42	0	30.1	150	2453597	4.92	4.13	0.00	26.44	147
2452140	7.78	6.26	0	26.8	151	2453598	7.36	6.38	0.00	27.60	148
2452141	8.19	6.23	0	29.12	152	2453599	6.76	6.20	0.00	28.49	149
2452142	7.82	5.42	0	28.88	153	2453600	6.70	6.27	0.00	28.69	150
2452143	7.48	4.3	0	27.72	154	2453601	6.81	6.19	0.00	28.10	151
2452144	7.97	5.64	0	26.74	155	2453602	7.15	5.12	0.00	28.63	152
2452145	8.7	6.01	0.8	30.31	156	2453603	7.23	6.09	0.00	27.87	153
2452146	9.09	5.65	0	29.44	157	2453604	6.65	4.84	11.68	27.29	154
2452147	9.15	5.68	0	28.4	158	2453605	7.17	5.89	0.00	28.12	155
2452148	9.28	5.33	0	28.62	159	2453606	5.70	5.50	15.49	27.96	156
2452149	9.68	5.58	0.8	29.41	160	2453607	6.37	6.13	0.76	28.14	157
2452150	9.39	5.75	0	29.44	161	2453608	6.35	5.22	0.76	28.02	158
2452151	9.19	5.72	0	26.74	162	2453609	6.76	5.73	5.33	28.43	159
2452152	7.75	5.61	0	30.31	163	2453610	7.17	6.10	0.00	28.91	160
2452153	7.55	5.19	0	29.44	164	2453611	6.51	5.40	0.00	28.78	161
2452154	5.83	4.49	0	28.4	165	2453612	7.52	6.29	0.00	29.15	162
2452155	5.98	4.75	2.8	28.62	166	2453613	6.48	5.68	0.00	28.25	163
2452156	7.42	5.54	0	29.41	167	2453614	5.32	4.64	0.25	26.53	164
2452157	7.3	5.22	0	29.44	168	2453615	6.14	4.01	38.61	26.69	165
2452158	5.53	3	24.6	27.9	169	2453616	6.76	5.59	0.51	27.54	166
2452159	3.84	2.41	50.3	26.34	170	2453617	5.98	5.51	0.00	28.15	167
2452160	3.1	2.45	40.1	24.71	171	2453618	7.15	5.50	0.00	28.25	168
2452161	5.5	3.78	2	25.98	172	2453619	6.57	3.84	0.00	27.40	169
2452162	4.32	1.95	0	25.17	173	2453620	3.60	2.49	0.25	26.28	170
2452163	3.71	4.08	7.6	25.64	174	2453621	3.22	1.25	39.37	25.58	171
2452164	2.19	1.86	0.3	24.64	175	2453622	1.96	0.11	16.26	25.55	172
2452165	0.67	1.13	0	23.64	176	2453623	3.28	1.88	15.24	25.43	173
2452166	1.94	1.05	0	23.09	177	2453624	6.54	5.31	15.75	26.05	174
2452167	2.91	1.24	0	23.87	178	2453625	6.07	5.32	0.00	25.89	175
2452168	3.78	1.75	0	22.77	179	2453626	5.21	5.04	0.00	25.73	176

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2452169	6.69	4.73	0	24.63	180	2453627	6.30	5.24	0.00	26.26	177
2452170	7.06	4.99	0.3	25.34	181	2453628	5.96	4.62	0.00	26.16	178
2452171	7.97	4.92	46.7	26.56	182	2453629	6.87	4.98	0.00	25.83	179
2452172	6.15	4.19	0	26.74	183	2453630	6.17	4.95	0.00	26.19	180
2452173	7.03	3.62	4.6	27.86	184	2453631	6.39	5.01	0.00	25.83	181
2452174	7.24	4.44	0	28.47	185	2453632	6.21	5.16	0.00	25.63	182
2452175	7	4.43	0	27.99	186	2453633	6.11	5.00	0.00	27.60	183
2452176	7.24	4.91	26.4	28.02	187	2453634	4.69	3.21	4.32	27.21	184
2452177	7.18	4.62	0	28.28	188	2453635	2.32	0.73	14.99	26.00	185
2452178	5.23	2.97	0	25.37	189	2453636	2.74	1.78	1.27	26.49	186
2452179	6.15	2.48	0	26.03	190	2453637	5.23	4.12	7.37	27.53	187
2452180	5.64	1.4	14.5	25.35	191	2453638	5.76	4.92	0.00	26.90	188
2452181	5.01	1.61	3.3	24.63	192	2453639	5.96	4.27	31.50	26.47	189
2452182	2.32	0.9	0	22.12	193	2453640	5.78	3.97	0.00	25.82	190
2452183	5.77	2.95	6.9	24.57	194	2453641	5.91	4.07	0.00	25.52	191
2452184	6.37	3.7	1	20.18	195	2453642	4.95	4.32	23.11	24.97	192
2452185	5.98	3.36	10.2	20.6	196	2453643	5.97	4.57	1.02	25.03	193
2452186	6.5	3.81	0	21.36	197	2453644	5.98	4.62	0.00	25.98	194
2452187	6.56	3.96	31.7	22.8	198	2453645	6.71	4.77	0.00	27.56	195
2452188	6.7	3.49	32.8	24.1	199	2453646	6.26	4.46	0.76	27.27	196
2452189	8.1	4.25	0	26.71	200	2453647	6.62	4.57	14.22	27.18	197
2452190	6.08	3.29	0	24.42	201	2453648	5.33	1.99	2.79	26.05	198
2452191	5.84	2.42	0	26.05	202	2453649	5.35	2.97	13.72	26.19	199
2452192	6.24	3.27	0	25.81	203	2453650	5.04	2.72	1.78	25.87	200
2452193	6.11	3.01	0	25.86	204	2453651	5.47	2.62	7.87	25.82	201
2452194	6.72	3.68	0	26.7	205	2453652	6.39	4.05	0.51	26.02	202
2452195	6.89	3.63	0	26.15	206	2453653	6.16	3.76	30.48	25.95	203
2452196	6.11	3.24	0	25.68	207	2453654	6.49	4.33	0.00	26.12	204
2452197	6.47	2.95	0	26.71	208	2453655	5.86	3.82	16.76	25.97	205
2452198	6.23	3.55	0	24.95	209	2453656	5.71	3.62	22.35	25.47	206
2452199	6.74	2.11	0	24.88	210	2453657	5.98	3.08	54.36	25.16	207
2452200	5.89	1.9	0	21.57	211	2453658	4.99	2.54	19.30	24.64	208
2452201	6.27	2.62	0	24.11	212	2453659	6.02	3.87	1.02	24.56	209
2452202	5.64	2.45	0	25.3	213	2453660	5.87	3.64	0.00	22.44	210
2452203	6.29	3.32	0	25.88	214	2453661	5.96	3.57	0.00	21.98	211
2452204	1.82	0.75	2	24.85	215	2453662	6.04	3.59	0.00	22.68	212
2452205	4.29	2.12	0.3	22.59	216	2453663	5.61	3.25	0.00	24.97	213
2452206	5.55	2.52	0	24.35	217	2453664	6.04	3.44	0.00	26.30	214

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2452207	5.83	3.13	0	25.09	218	2453665	5.92	2.21	0.00	24.95	215
2452208	5.03	2.1	0	24.79	219	2453666	5.91	2.26	0.00	24.84	216
2452209	4.96	1.99	0.5	20.5	220	2453667	6.21	2.54	15.24	25.02	217
2452210	4.45	1.95	10.7	14.09	221	2453668	3.35	0.55	101.09	19.84	218
2452211	4.06	1.63	0	18.12	222	2453669	4.62	2.49	140.46	13.04	219
2452212	4.37	1.09	0	21.35	223	2453670	4.78	2.29	0.00	13.70	220
2452213	5.68	2.8	0	22.67	224	2453671	4.95	2.32	0.00	16.70	221
2452214	6.32	2.06	0.5	23.3	225	2453672	5.19	2.66	0.00	18.78	222
2452215	6.3	2.97	0	23.95	226	2453673	5.03	2.40	0.00	20.35	223
2452216	4.33	1.89	0	23.68	227	2453674	4.15	1.38	0.00	20.92	224
2452217	6.16	3.12	0	24.93	228	2453675	4.67	1.73	26.67	21.95	225
2452218	4.64	1.58	0	23.67	229	2453676	5.47	1.65	0.00	20.51	226
2452219	2.47	0.69	0	22.28	230	2453677	5.79	2.93	19.81	21.03	227
2452220	5.05	1.58	0	20.5	231	2453678	6.31	2.72	0.00	22.20	228
2452221	4.89	2.23	0	17.31	232	2453679	5.78	2.81	0.00	21.32	229
2452222	5.15	2.25	0	16.41	233	2453680	5.74	2.92	0.00	21.32	230
2452223	5.08	2.3	0	17.24	234	2453681	5.91	2.33	0.00	22.52	231
2452224	5.19	2.3	0	16.89	235	2453682	5.87	1.69	0.00	22.98	232
2452225	5.08	2.29	0	16.82	236	2453683	5.66	2.82	0.00	22.77	233
2452226	4.42	1.3	0	18.01	237	2453684	6.05	2.83	0.00	21.64	234
2452227	1.73	0.71	0	19.92	238	2453685	5.49	2.55	0.00	20.34	235
2452228	1.95	0.66	0	20.48	239	2453686	5.49	2.29	0.00	20.77	236
2452229	3.92	1.6	0	21.44	240	2453687	5.85	2.32	0.00	21.66	237
2452230	3.61	1.2	0	20.65	241	2453688	5.33	2.15	0.25	21.98	238
2452231	5.3	2.04	0	23.19	242	2453689	5.04	2.09	0.25	21.53	239
2452232	5.1	2.05	0	22.45	243	2453690	5.51	2.12	0.00	22.70	240
2452233	3.43	1.04	0	20.41	244	2453691	5.07	2.29	1.02	22.35	241
2452234	4.99	2.13	0	21.06	245	2453692	4.37	1.58	0.00	18.97	242
2452235	5.12	2.11	0.5	19.64	246	2453693	4.54	1.08	0.25	21.35	243
2452236	4.57	2.01	0	21.19	247	2453694	4.75	1.43	0.76	22.46	244
2452237	5.19	2.11	0	22.76	248	2453695	5.21	1.25	3.05	22.63	245
2452238	4.55	1.56	0	23.54	249	2453696	5.09	1.99	0.25	21.91	246
2452239	5.06	2.17	0	22.74	250	2453697	4.21	1.96	0.00	14.36	247
2452240	4.69	2.07	0	21.8	251	2453698	3.70	1.51	0.00	10.84	248
2452241	4.59	2.09	21.8	21.83	252	2453699	4.46	1.56	0.00	17.35	249
2452242	4.2	1.58	0	21.98	253	2453700	4.49	1.95	0.00	18.01	250
2452243	4.61	1.63	0	23.14	254	2453701	4.72	1.93	0.00	18.64	251
2452244	5.3	1.98	0	22.91	255	2453702	4.94	1.74	0.00	21.74	252

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2452245	5.14	2	0	20.95	256	2453703	4.27	0.99	1.52	22.45	253
2452246	5	2.07	0	20.94	257	2453704	2.50	0.35	4.83	21.21	254
2452247	5.09	1.61	0	22.14	258	2453705	4.16	1.82	1.27	16.23	255
2452248	4.53	1.48	0	23.41	259	2453706	3.84	1.45	0.00	11.64	256
2452249	4.76	1.6	0	23.97	260	2453707	3.43	1.38	0.00	10.82	257
2452250	4.77	1.87	0	24.26	261	2453708	3.84	1.49	0.00	13.81	258
2452251	3.84	1.45	0	23.11	262	2453709	3.76	1.64	0.00	17.21	259
2452252	4.67	1.97	0	24.18	263	2453710	4.16	1.61	0.00	19.58	260
2452253	4.97	1.96	0	24.02	264	2453711	2.98	1.14	0.00	18.02	261
2452254	4.82	1.39	0	24.51	265	2453712	1.90	0.56	0.76	20.22	262
2452255	4.89	2.13	0	23.64	266	2453713	1.66	0.28	36.07	19.09	263
2452256	4.88	1.96	7.4	23.72	267	2453714	3.38	0.87	21.59	19.70	264
2452257	4.63	1.73	2.8	23.06	268	2453715	3.77	1.62	3.05	17.31	265
2452258	5.22	2.06	5.1	25.04	269	2453716	1.70	0.35	0.00	12.53	266
2452259	4.84	1.86	0	23.88	270	2453717	3.36	1.18	1.52	10.63	267
2452260	4.19	1.51	0	24.44	271	2453718	3.72	1.30	0.00	10.78	268
2452261	4.2	1.65	0	23.54	272	2453719	3.03	0.76	0.00	14.52	269
2452262	4.13	1.61	0	19.8	273	2453720	3.70	1.38	0.00	19.50	270
2452263	4	1.43	0	17	274	2453721	3.61	1.55	0.00	15.64	271
2452264	4	1.29	0.8	15.68	275	2453722	1.92	0.32	0.25	20.07	272
2452265	4.09	1.19	0	15.14	276	2453723	2.41	0.50	2.29	17.98	273
2452266	3.9	1.19	0	17.97	277	2453724	2.74	1.00	0.00	16.14	274
2452267	4.24	1.09	0	21.64	278	2453725	3.52	1.31	0.00	15.49	275
2452268	3.97	1.18	0	19.52	279	2453726	3.72	1.21	0.00	11.82	276
2452269	2.34	0.32	0	14.6	280	2453727	3.52	1.19	0.00	10.75	277
2452270	3.05	0.99	0	10.53	281	2453728	4.38	1.25	0.00	11.16	278
2452271	2.65	0.65	0	9.34	282	2453729	4.46	1.10	0.00	16.48	279
2452272	3.51	1.13	0	13.67	283	2453730	4.12	1.00	0.00	17.38	280
2452273	4.72	1.4	13.2	19.37	284	2453731	4.44	1.50	0.00	11.64	281
2452274	4.24	1.17	0	16.09	285	2453732	3.64	1.19	0.00	10.09	282
2452275	1.91	0.37	0	16.87	286	2453733	3.65	1.26	0.00	13.15	283
2452276	3.77	1.27	0	13.49	287	2453734	4.40	1.45	0.00	16.46	284
2452277	0.47	0.42	0	16.06	288	2453735	3.88	1.50	0.00	12.21	285
2452278	1.92	0.52	0	10.08	289	2453736	4.80	1.44	0.00	16.87	286
2452279	1.59	0.67	0	5.74	290	2453737	3.89	1.86	0.00	18.66	287
2452280	3.17	0.65	0.3	12	291	2453738	4.52	1.87	0.00	21.92	288
2452281	3.58	0.74	0	17.72	292	2453739	4.18	1.92	0.00	20.54	289
2452282	2.6	0.85	0	10.81	293	2453740	3.79	1.70	0.00	14.44	290

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2452283	2.71	1.13	0	6.68	294	2453741	3.64	1.64	0.00	15.54	291
2452284	1.69	1.17	4.6	7.94	295	2453742	3.13	1.56	0.00	10.99	292
2452285	2.85	1.31	0	11.98	296	2453743	2.58	1.20	0.00	6.12	293
2452286	3.49	1.43	0	13.95	297	2453744	2.14	1.19	0.00	8.56	294
2452287	4	1.43	0	16.4	298	2453745	3.26	1.39	0.00	12.92	295
2452288	3.36	1.55	1.8	14.39	299	2453746	3.87	1.60	0.00	18.14	296
2452289	0.88	0.47	0	17.66	300	2453747	3.38	1.45	0.00	18.93	297
2452290	2.39	1.15	0	17	301	2453748	4.04	2.08	0.00	17.89	298
2452291	3.7	1.6	0	15.42	302	2453749	3.08	1.53	0.00	19.06	299
2452292	4.07	1.39	0.3	18.75	303	2453750	3.01	1.78	0.00	12.69	300
2452293	4.35	1.82	0.3	18	304	2453751	2.50	1.22	0.00	7.87	301
2452294	4.27	1.93	0	19.25	305	2453752	3.06	1.34	0.00	13.96	302
2452295	4.05	1.34	0	20.84	306	2453753	3.48	1.72	0.00	18.02	303
2452296	4.88	2.14	11.4	22.57	307	2453754	2.80	1.66	0.25	12.72	304
2452297	3.21	1.33	0	22.22	308	2453755	3.14	1.27	0.00	14.33	305
2452298	4.8	2.77	11.7	23.99	309	2453756	3.01	1.32	0.00	19.25	306
2452299	4.82	2.51	0	23.43	310	2453757	3.89	2.11	0.00	21.44	307
2452300	5.17	2.57	0	23.3	311	2453758	3.80	2.43	0.00	21.48	308
2452301	4.21	1.57	0	21.09	312	2453759	3.59	2.11	0.25	21.90	309
2452302	4.08	1.21	0	20.62	313	2453760	3.28	1.89	0.00	20.59	310
2452303	4.53	1.79	0	22.1	314	2453761	3.36	2.04	0.00	14.47	311
2452304	4.87	2.62	0	22.17	315	2453762	3.29	1.72	0.00	15.26	312
2452305	4.38	2.67	0	23.3	316	2453763	3.08	1.49	0.00	16.58	313
2452306	4.61	2.98	0	24.01	317	2453764	3.28	1.84	0.00	18.57	314
2452307	4.04	2.26	4.3	22.3	318	2453765	3.26	1.98	0.00	19.60	315
2452308	4.49	2.57	0	21.04	319	2453766	1.99	1.10	1.02	19.06	316
2452309	4.72	2.44	0	19.43	320	2453767	3.45	2.26	6.60	13.71	317
2452310	4.44	1.94	2.3	14.59	321	2453768	3.23	1.98	0.00	15.32	318
2452311	3.94	1.25	0	15.65	322	2453769	3.25	2.20	0.00	23.04	319
2452312	4.43	2.29	2.8	19.26	323	2453770	0.78	0.26	15.49	20.67	320
2452313	3.02	1.02	0	20.37	324	2453771	0.86	0.41	17.78	19.04	321
2452314	4.1	2.15	0	12.78	325	2453772	2.95	2.20	0.00	14.88	322
2452315	4.48	1.83	0	19.13	326	2453773	3.28	2.02	0.00	14.14	323
2452316	3.59	1.45	0	22.03	327	2453774	3.82	2.11	0.00	18.87	324
2452317	4.07	2.6	0	17.12	328	2453775	3.59	2.17	0.00	14.52	325
2452318	4.28	1.44	0	17.21	329	2453776	3.42	1.94	0.00	16.36	326
2452319	2.9	0.95	0	15.51	330	2453777	3.64	1.92	0.00	16.70	327
2452320	3.78	1.46	0	15.26	331	2453778	3.59	1.79	19.05	18.65	328

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2452321	4.78	2.79	0	19.09	332	2453779	2.30	2.06	4.57	9.20	329
2452322	3.33	1.12	0	17.33	333	2453780	2.04	1.86	0.00	7.74	330
2452323	4.3	2.5	0	14.79	334	2453781	2.32	1.87	0.00	10.65	331
2452324	4.17	2.24	0	15.67	335	2453782	3.44	2.07	0.00	16.10	332
2452325	4.23	2.37	0	19.1	336	2453783	3.16	1.70	0.25	17.89	333
2452326	4.9	2.11	0	21.71	337	2453784	4.42	2.90	0.00	20.91	334
2452327	5.43	3.12	0	23.46	338	2453785	0.00	3.14	0.00	23.58	335
2452328	0.5	0.87	0	19.71	339	2453786	0.18	1.56	0.00	20.19	336
2452329	0.69	0.78	0	16.74	340	2453787	0.41	2.52	0.00	20.63	337
2452330	4.3	2.73	0	14.37	341	2453788	0.67	2.86	0.00	23.92	338
2452331	4.6	2.9	19.3	16.11	342	2453789	0.88	2.86	0.00	23.94	339
2452332	5.06	3.09	0	18.46	343	2453790	1.23	3.37	0.00	26.70	340
2452333	3.82	2.94	0	13.35	344	2453791	0.69	0.53	0.76	21.54	341
2452334	3.47	2.35	0	8.97	345	2453792	1.26	2.14	0.00	23.50	342
2452335	3.12	1.51	0	17.38	346	2453793	1.19	2.02	3.05	19.24	343
2452336	3.58	2.4	0	22.82	347	2453794	1.98	2.97	6.60	17.70	344
2452337	4.14	1.83	0	24.82	348	2453795	2.29	3.03	0.00	16.54	345
2452338	1.3	1.04	0	12.42	349	2453796	2.14	3.32	0.00	16.04	346
2452339	3.56	2.49	5.3	12.59	350	2453797	2.78	3.40	0.00	19.70	347
2452340	5.01	3.01	0	19.78	351	2453798	2.45	3.70	0.00	19.18	348
2452341	4.59	1.56	0	18.59	352	2453799	2.06	3.65	0.00	16.00	349
2452342	5.16	4.1	0	20.79	353	2453800	2.05	3.72	0.00	14.88	350
2452343	5.22	3.64	0	21.98	354	2453801	2.31	3.36	0.00	17.40	351
2452344	5.43	3.26	0	19.51	355	2453802	1.82	3.41	0.00	15.29	352
2452345	4.84	4.12	0	21.06	356	2453803	1.99	3.54	0.00	14.90	353
2452346	4.71	2.38	0	22	357	2453804	2.22	2.86	0.00	18.27	354
2452347	5.38	4.19	0	22.81	358	2453805	2.57	3.01	0.00	21.03	355
2452348	4.35	4.16	1.3	18.94	359	2453806	2.74	3.33	0.00	21.50	356
2452349	5.17	4.23	3.3	21.3	360	2453807	2.84	4.23	0.00	22.17	357
2452350	5.55	4.45	0	24.74	361	2453808	3.03	4.09	0.00	22.52	358
2452351	5.44	4.87	0	24.01	362	2453809	3.35	3.85	0.00	23.86	359
2452352	5.3	4.71	0	24.17	363	2453810	2.18	4.42	0.00	17.50	360
2452353	4.66	4.31	1.5	23.32	364	2453811	2.43	4.10	0.00	16.62	361
2452354	5.6	4.49	92.7	25.17	365	2453812	2.45	3.93	0.00	18.70	362
2452355	5.22	3.4	0.5	24.47	1	2453813	2.23	4.38	0.00	18.02	363
2452356	4.54	4.63	0	19.98	2	2453814	2.47	3.89	0.00	18.82	364
2452357	4.66	3.71	0	19.31	3	2453815	3.22	4.03	0.00	22.14	365
2452358	4.43	4.4	0	20.82	4	2453816	3.38	4.02	0.00	24.03	1

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2452359	4.76	4.55	0	23.34	5	2453817	2.11	4.85	4.83	18.43	2
2452360	5.11	5.17	0	24.21	6	2453818	2.39	3.10	0.00	19.85	3
2452361	4.75	4.08	0	22.76	7	2453819	1.81	4.11	0.00	16.25	4
2452362	4.73	5.1	0	21.79	8	2453820	1.75	4.33	0.00	11.61	5
2452363	4.99	4.81	0	22.63	9	2453821	1.76	3.78	0.00	11.76	6
2452364	5.24	5.2	56.4	25.19	10	2453822	2.01	3.74	0.00	13.57	7
2452365	5.8	4.49	8.4	24.92	11	2453823	2.44	3.87	0.00	15.73	8
2452366	5.21	3.76	1.5	24.38	12	2453824	2.54	4.20	0.00	18.37	9
2452367	4.72	3.76	0	24.6	13	2453825	2.66	4.01	0.00	19.18	10
2452368	4.63	2.89	0	23.77	14	2453826	3.02	4.82	0.00	19.97	11
2452369	4.8	4.72	0	22.05	15	2453827	2.35	4.76	0.00	20.44	12
2452370	5.41	3.79	0	21.34	16	2453828	2.69	5.06	0.00	21.18	13
2452371	5.27	4.6	0	20.23	17	2453829	2.86	5.02	0.00	22.14	14
2452372	5.52	4.41	0	22.2	18	2453830	1.90	4.44	0.00	20.09	15
2452373	5.25	4.35	0	23.14	19	2453831	2.36	4.82	0.00	18.19	16
2452374	6	5.07	0	24.55	20	2453832	2.47	4.77	0.00	19.66	17
2452375	5.59	5.44	0	24.25	21	2453833	2.95	4.90	0.00	23.00	18
2452376	5.76	3.69	0	23.87	22	2453834	3.51	5.04	0.00	24.88	19
2452377	2.99	2.01	0	21.81	23	2453835	1.55	3.35	41.40	20.11	20
2452378	6.01	4.13	0	24.11	24	2453836	1.97	4.87	0.00	20.89	21
2452379	4.82	3.92	0	22.96	25	2453837	2.39	3.90	0.00	20.76	22
2452380	6.28	4.59	0	23.24	26	2453838	2.26	4.45	0.00	21.20	23
2452381	6.44	5.27	0	24.67	27	2453839	2.35	4.87	0.00	21.04	24
2452382	7.14	5.96	0	25.55	28	2453840	2.60	5.35	0.00	18.85	25
2452383	7.4	5.83	0	24.53	29	2453841	3.01	5.36	0.00	20.94	26
2452384	7.07	5.85	0	23.54	30	2453842	3.29	5.47	0.00	22.12	27
2452385	8.09	5.67	0	24.72	31	2453843	3.23	5.33	0.00	23.52	28
2452386	8.53	5.61	0	26.42	32	2453844	2.51	4.66	0.00	22.84	29
2452387	8.16	5.9	0	26.79	33	2453845	3.12	5.76	0.00	24.25	30
2452388	8.05	5.75	0	24.63	34	2453846	3.06	6.10	0.00	23.46	31
2452389	7.35	5.03	0	25.61	35	2453847	2.92	5.88	0.00	23.25	32
2452390	8.1	5.77	0	26.36	36	2453848	2.42	4.55	11.94	23.19	33
2452391	8.18	5.96	0	25.96	37	2453849	3.00	5.46	19.81	23.01	34
2452392	8	5.88	3.3	26.37	38	2453850	3.52	5.79	0.00	24.91	35
2452393	8.23	5.44	0	26.07	39	2453851	3.16	5.91	0.00	23.73	36
2452394	8.59	5.3	0	26.27	40	2453852	3.50	5.56	0.00	25.00	37
2452395	7.09	6.13	0	26.01	41	2453853	3.31	5.86	0.76	24.38	38
2452396	8.13	6.13	45.7	27.97	42	2453854	2.95	5.78	1.27	22.43	39

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2452397	8.22	6.49	5.8	27.51	43	2453855	2.79	4.59	0.00	22.40	40
2452398	7.82	6.55	0	27.94	44	2453856	2.39	4.07	0.00	21.20	41
2452399	7.9	6.55	19.3	28.36	45	2453857	5.45	5.49	0.00	21.21	42
2452400	9.12	6.17	0	26.74	46	2453858	5.84	5.52	0.00	20.92	43
2452401	7.36	5.53	0	26.58	47	2453859	6.62	5.53	0.00	21.02	44
2452402	7.46	5.96	0	26.37	48	2453860	4.47	6.08	0.00	23.17	45
2452403	7.32	6.24	6.1	26.78	49	2453861	5.22	6.11	0.00	22.40	46
2452404	7.22	6.05	0	26.53	50	2453862	6.11	6.18	0.00	24.20	47
2452405	7.32	6.24	0	27.27	51	2453863	6.41	6.08	0.00	24.39	48
2452406	7.03	6.18	0	27.24	52	2453864	6.14	5.96	0.00	24.50	49
2452407	7.08	6.07	1	27.15	53	2453865	3.56	4.98	1.02	23.19	50
2452408	7.73	6.02	0	27.66	54	2453866	4.50	4.96	0.00	24.57	51
2452409	5.96	3.66	0	24.31	55	2453867	4.28	3.49	0.00	24.34	52
2452410	7.81	5.42	0	24.92	56	2453868	5.25	6.22	3.56	21.65	53
2452411	7.9	4.02	0	26.16	57	2453869	5.74	5.74	0.00	20.03	54
2452412	5.7	5.01	0	26.24	58	2453870	6.50	5.91	0.00	23.19	55
2452413	7.65	6.31	0	28.09	59	2453871	5.79	6.14	0.00	23.57	56
2452414	2.52	1.51	0	23.1	60	2453872	1.16	1.22	7.62	20.10	57
2452415	6.57	4.15	0	23.52	61	2453873	4.72	5.91	16.26	20.33	58
2452416	6.13	2.56	0	22.76	62	2453874	6.23	5.74	0.00	21.57	59
2452417	7.04	5.27	0	24.01	63	2453875	6.78	5.87	0.00	24.04	60
2452418	7.91	6.32	2	25.05	64	2453876	6.72	6.39	0.00	24.57	61
2452419	7.52	5.92	0	24.99	65	2453877	6.76	6.25	0.00	25.19	62
2452420	8.35	5.02	0	23.75	66	2453878	5.57	3.76	0.00	24.78	63
2452421	7.75	5.74	2	25.28	67	2453879	4.16	2.79	0.00	24.49	64
2452422	8.04	5.95	0	27.03	68	2453880	5.94	4.61	0.00	24.83	65
2452423	8.27	6.33	0	26.41	69	2453881	5.74	5.07	0.00	24.58	66
2452424	8.47	6.1	0.8	26.06	70	2453882	5.47	6.29	0.00	24.29	67
2452425	7.62	5.94	2.8	26.61	71	2453883	6.12	6.57	3.81	24.85	68
2452426	5.17	3.75	0	24.65	72	2453884	6.07	6.81	0.00	26.15	69
2452427	7.82	6.64	0	26.4	73	2453885	5.98	6.57	0.00	25.45	70
2452428	8.11	6.64	2.5	28.11	74	2453886	6.60	6.64	0.00	24.71	71
2452429	8.07	7	0.3	29.71	75	2453887	6.66	6.54	0.00	25.36	72
2452430	8.31	5.29	0	28.9	76	2453888	4.53	6.98	9.14	25.60	73
2452431	8.39	6.12	0	28.4	77	2453889	3.14	6.02	1.27	25.73	74
2452432	7.88	6.47	0	28.05	78	2453890	5.52	6.21	11.43	26.68	75
2452433	5.22	3.42	0	25.78	79	2453891	3.82	4.62	0.00	24.06	76
2452434	4.63	4.17	12.7	25.25	80	2453892	4.91	5.72	4.83	24.95	77

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2452435	8.33	6.65	5.6	27.16	81	2453893	5.20	6.51	0.00	24.63	78
2452436	8.09	6.06	0	27.29	82	2453894	5.19	6.20	0.00	23.92	79
2452437	6.99	5.45	46.5	27.13	83	2453895	5.25	6.26	0.00	26.01	80
2452438	8.26	6.1	37.6	27.77	84	2453896	4.71	6.46	0.00	26.60	81
2452439	7.93	6.04	0	27.64	85	2453897	5.45	6.41	0.00	27.36	82
2452440	7.57	5.7	0	27.62	86	2453898	3.92	4.66	0.00	25.50	83
2452441	7.59	4.46	12.2	27.16	87	2453899	1.87	1.33	4.57	24.73	84
2452442	6.79	3.43	11.7	26.96	88	2453900	3.61	3.86	21.84	25.80	85
2452443	5.03	3.5	14	24.51	89	2453901	4.81	5.20	12.19	26.44	86
2452444	3.83	2.52	2.8	24.16	90	2453902	4.92	6.79	2.79	26.24	87
2452445	4.09	2.08	0	25.31	91	2453903	5.01	7.08	0.00	25.98	88
2452446	4.56	2.67	0	24.88	92	2453904	5.06	6.79	0.00	25.63	89
2452447	4.48	2.86	12.7	24.12	93	2453905	2.63	2.78	0.51	24.47	90
2452448	1.36	1.4	0.8	23.2	94	2453906	5.41	7.07	59.44	26.00	91
2452449	4.47	3.69	0	25.16	95	2453907	4.56	7.03	0.00	25.81	92
2452450	4.69	2.77	0	24.48	96	2453908	4.77	6.89	0.00	26.31	93
2452451	5.7	2.99	0	24.76	97	2453909	5.35	7.05	0.00	26.17	94
2452452	4.16	2.19	0	24.31	98	2453910	5.16	6.76	1.02	25.68	95
2452453	6.12	3.31	0	25.65	99	2453911	5.33	5.89	0.00	25.71	96
2452454	6.87	4.84	0	26.52	100	2453912	4.80	6.41	0.25	25.57	97
2452455	7.1	5.02	0	27.19	101	2453913	3.53	3.00	13.21	23.97	98
2452456	3.12	2.26	0	24.95	102	2453914	4.69	4.88	6.35	25.20	99
2452457	7.01	4.37	0	25.17	103	2453915	4.03	6.47	8.13	25.50	100
2452458	6.35	4.93	0.5	24.91	104	2453916	4.45	5.47	9.14	25.19	101
2452459	8.69	5.86	0	26.95	105	2453917	5.48	6.56	0.00	25.86	102
2452460	4.24	3.32	0	25.58	106	2453918	5.65	5.79	0.00	26.12	103
2452461	6.42	3.95	0.3	25.68	107	2453919	4.78	3.93	0.00	26.12	104
2452462	8.16	6.19	2	26.71	108	2453920	5.77	6.95	0.00	26.75	105
2452463	9.1	6.39	4.3	27.88	109	2453921	6.07	6.82	0.00	26.26	106
2452464	5.72	3.75	0	26.08	110	2453922	6.23	6.73	0.76	26.35	107
2452465	4.24	1.27	1.3	26.68	111	2453923	5.68	4.49	0.76	26.24	108
2452466	6.57	4.66	0.3	26	112	2453924	3.88	3.36	0.00	24.21	109
2452467	7.91	5.65	0	26.8	113	2453925	6.43	5.91	104.14	25.05	110
2452468	4.57	2.76	3	26	114	2453926	5.51	5.77	0.00	24.88	111
2452469	7.77	5.52	0	27.06	115	2453927	5.95	5.52	7.62	25.85	112
2452470	9.23	6.58	0	29.66	116	2453928	4.74	4.60	8.38	25.61	113
2452471	8.24	6.46	0	29.15	117	2453929	5.03	5.53	6.10	26.80	114
2452472	8.9	6.64	0	30.22	118	2453930	5.24	6.69	1.02	27.42	115

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2452473	9.35	7.2	0	30.04	119	2453931	5.77	6.67	0.00	27.47	116
2452474	9.97	7.04	24.4	29.26	120	2453932	6.31	6.80	0.00	27.01	117
2452475	9.96	6.77	0	29.6	121	2453933	6.21	6.55	0.00	27.57	118
2452476	6.8	4.1	4.1	27.79	122	2453934	4.21	3.95	0.00	25.84	119
2452477	4.13	3.33	19.6	25.08	123	2453935	4.07	4.34	0.00	25.74	120
2452478	6.89	4.3	5.3	26.37	124	2453936	6.13	5.71	0.00	26.54	121
2452479	8.38	5.49	2.5	29.27	125	2453937	5.37	4.65	0.00	25.96	122
2452480	7.96	5.93	0	29.73	126	2453938	4.72	5.67	0.00	25.03	123
2452481	8.39	6.62	0	29.9	127	2453939	5.89	6.01	0.00	26.15	124
2452482	8.78	6.57	0.5	29.59	128	2453940	4.94	5.66	0.00	25.85	125
2452483	9.11	6.8	0	29.68	129	2453941	4.49	5.06	53.59	25.50	126
2452484	9.25	5.44	0	28.89	130	2453942	5.68	6.94	24.38	26.43	127
2452485	8.97	6.51	0	28.88	131	2453943	4.83	5.80	0.00	26.70	128
2452486	9.51	6.1	0	28.68	132	2453944	4.79	3.93	0.00	26.44	129
2452487	8.25	6.11	0	28.38	133	2453945	5.02	5.31	0.51	26.62	130
2452488	5.64	3.41	14	27.2	134	2453946	5.59	6.16	0.00	27.04	131
2452489	3.31	2.2	3.8	25.08	135	2453947	5.53	5.73	0.00	27.23	132
2452490	5.77	4.34	23.9	25.64	136	2453948	5.47	4.21	0.25	26.21	133
2452491	8.61	5.98	3.6	27.77	137	2453949	5.77	6.47	0.76	26.63	134
2452492	8.38	6.51	13.2	27.91	138	2453950	5.88	6.12	0.00	27.11	135
2452493	9.13	6.3	1.5	29.89	139	2453951	6.34	6.52	0.00	27.62	136
2452494	7.23	4.83	0	28.09	140	2453952	5.76	6.27	0.00	26.83	137
2452495	6.43	3.11	0	25.83	141	2453953	5.63	6.29	0.00	26.54	138
2452496	8.27	4.74	0	27.22	142	2453954	5.45	6.65	0.00	26.70	139
2452497	7.6	4.59	0	28.42	143	2453955	6.09	6.67	0.00	27.32	140
2452498	5.11	2.54	0	27.07	144	2453956	5.09	6.59	0.00	26.93	141
2452499	5.75	4.76	0	26.95	145	2453957	5.76	6.39	0.00	26.80	142
2452500	4.96	3.61	0	26.04	146	2453958	5.32	6.52	0.00	26.74	143
2452501	7.34	6.38	0	27.79	147	2453959	6.36	6.33	0.00	28.46	144
2452502	7.46	5.25	0	29	148	2453960	6.12	6.52	0.00	28.30	145
2452503	7.87	6.18	20.3	29.66	149	2453961	4.83	5.07	0.00	26.00	146
2452504	6.81	6.57	10.2	29.51	150	2453962	4.80	6.20	34.54	26.53	147
2452505	8.71	6.29	20.8	29.27	151	2453963	5.55	5.93	0.00	25.88	148
2452506	7.35	5.74	2.6	28.19	152	2453964	5.78	6.24	0.00	25.46	149
2452507	5.61	3.8	0.7	26.39	153	2453965	5.02	4.74	0.00	26.30	150
2452508	8.59	6.12	27	27.48	154	2453966	4.74	3.34	0.00	25.81	151
2452509	5.35	3.42	6.5	26.52	155	2453967	4.63	3.92	0.00	26.43	152
2452510	7.36	5.18	0	27.03	156	2453968	4.98	6.18	0.00	26.74	153

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2452511	8.31	5.8	0	27.67	157	2453969	5.17	5.18	0.00	26.67	154
2452512	9.21	5.81	0	28.44	158	2453970	4.71	5.58	5.08	26.32	155
2452513	6.92	5.02	0	27.1	159	2453971	4.73	5.54	0.25	25.94	156
2452514	5.92	4.01	0	27.04	160	2453972	3.20	3.05	11.43	24.84	157
2452515	6.51	4.6	0	26.81	161	2453973	2.86	3.07	3.30	24.31	158
2452516	5.65	5.32	0	26.59	162	2453974	4.18	5.00	59.69	24.94	159
2452517	7.6	5.46	0	27.92	163	2453975	4.69	5.16	52.32	25.81	160
2452518	7.62	4.85	0	28.46	164	2453976	5.01	6.25	0.00	27.87	161
2452519	8.38	5.66	0	28.3	165	2453977	5.54	6.13	0.00	27.79	162
2452520	8.44	5.49	0	28.46	166	2453978	2.38	2.03	0.00	25.25	163
2452521	8.78	5.84	0	28.47	167	2453979	4.40	4.18	0.00	26.84	164
2452522	4.21	1.82	0	26.26	168	2453980	6.51	4.36	0.25	26.17	165
2452523	6.29	3.93	0	27.57	169	2453981	6.18	5.72	2.03	25.28	166
2452524	7.58	5.13	5.8	27.88	170	2453982	7.14	5.84	68.83	25.60	167
2452525	8.13	5.06	1.5	28.72	171	2453983	6.31	5.11	0.00	25.37	168
2452526	8.53	5.09	4	28.93	172	2453984	6.93	5.33	0.00	25.80	169
2452527	8.3	5.57	0	28.27	173	2453985	6.39	4.95	0.00	26.28	170
2452528	8.83	5.19	0	28.12	174	2453986	5.13	3.88	0.00	24.51	171
2452529	5.14	1.28	0	26.91	175	2453987	7.27	5.44	60.20	25.67	172
2452530	6.42	1.73	0	27.29	176	2453988	7.13	5.73	0.00	26.10	173
2452531	7.8	3.66	7	29.59	177	2453989	7.48	5.11	0.00	26.24	174
2452532	7.95	4.11	22.8	29.3	178	2453990	7.55	5.71	0.00	26.65	175
2452533	6.77	3.37	16.9	28.89	179	2453991	7.00	4.62	0.51	26.41	176
2452534	8.26	4.95	11.9	28.6	180	2453992	6.63	4.32	0.00	26.29	177
2452535	8.72	5.2	0	28.36	181	2453993	6.62	4.00	0.00	25.44	178
2452536	7.99	5.37	0	27.97	182	2453994	7.20	5.57	18.03	25.92	179
2452537	7.54	5.2	0	28.91	183	2453995	7.67	5.46	0.00	26.33	180
2452538	7.54	4.21	0	28.56	184	2453996	8.34	5.40	0.00	25.63	181
2452539	7.89	4.61	0	28.66	185	2453997	6.71	5.23	0.00	26.51	182
2452540	7.98	4.64	0	28.53	186	2453998	6.39	4.64	0.00	26.06	183
2452541	7.56	4.34	0	28.05	187	2453999	6.42	4.04	19.56	24.51	184
2452542	5.89	3.26	0	27.85	188	2454000	7.85	4.83	0.00	24.73	185
2452543	6.87	4.14	1.3	28.88	189	2454001	7.09	4.95	0.00	25.88	186
2452544	7.09	4.64	25.4	29.67	190	2454002	7.14	4.51	0.00	26.09	187
2452545	8.33	4.2	0	29.19	191	2454003	5.41	3.78	0.25	26.53	188
2452546	7.94	5.08	0	28.49	192	2454004	6.77	4.57	0.00	26.79	189
2452547	7.56	3.89	1.8	27.99	193	2454005	4.76	2.56	13.21	24.69	190
2452548	7.08	4.66	25.1	28.95	194	2454006	6.47	3.41	40.39	25.23	191

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2452549	6.98	3.49	6.2	28.55	195	2454007	7.87	4.04	0.00	23.20	192
2452550	6.84	4.18	0	28.06	196	2454008	7.04	4.39	0.00	23.04	193
2452551	7.01	4.51	0	28.04	197	2454009	7.44	3.80	0.00	24.44	194
2452552	7.65	4.28	2	26.71	198	2454010	6.16	4.20	0.00	24.52	195
2452553	7.46	4.55	0	25.73	199	2454011	5.73	4.31	0.00	25.12	196
2452554	7.41	4.32	0	25.54	200	2454012	6.25	4.11	0.00	26.08	197
2452555	7.38	3.75	0	25.98	201	2454013	6.36	4.27	0.00	25.63	198
2452556	7.18	3.83	0	26.23	202	2454014	5.81	3.73	4.57	25.08	199
2452557	7.15	3.95	0	26.67	203	2454015	5.85	4.27	0.00	22.94	200
2452558	7.78	3.6	0	27.99	204	2454016	6.67	4.09	0.00	23.46	201
2452559	7.24	4.04	0	28.63	205	2454017	6.30	3.86	5.59	22.85	202
2452560	6.76	4.01	0	27.69	206	2454018	5.60	3.92	0.00	21.03	203
2452561	5.86	3.34	0	26.7	207	2454019	6.01	3.82	0.00	20.79	204
2452562	5.33	2.53	0	25.66	208	2454020	5.60	3.01	0.00	21.63	205
2452563	6.33	3.76	0	26.25	209	2454021	5.72	3.64	0.00	23.92	206
2452564	6.45	3.57	0	23.35	210	2454022	5.06	3.15	0.00	23.45	207
2452565	6.24	3.22	0	20.54	211	2454023	5.87	3.70	0.00	22.03	208
2452566	6.32	3.14	0	20.66	212	2454024	6.19	3.26	0.00	21.88	209
2452567	6.88	3.11	0	21.85	213	2454025	5.75	2.69	0.00	22.81	210
2452568	6.67	2.33	0	23.26	214	2454026	4.77	2.74	0.00	24.80	211
2452569	7.09	3.27	0	25.95	215	2454027	5.74	3.27	0.00	25.29	212
2452570	6.5	3.5	0	25.57	216	2454028	5.13	3.85	0.00	26.49	213
2452571	6.58	3.49	0	25.43	217	2454029	5.00	3.92	0.00	26.16	214
2452572	6.59	2.81	0	25.67	218	2454030	5.16	4.07	0.00	25.14	215
2452573	6.19	3.67	0	24.9	219	2454031	5.11	3.80	0.00	26.04	216
2452574	6.53	3.13	0	25.43	220	2454032	5.40	2.89	0.00	21.06	217
2452575	6.39	3.3	0	24.72	221	2454033	3.99	2.34	0.00	13.23	218
2452576	6.41	3.04	0	25.9	222	2454034	4.35	2.42	0.00	14.98	219
2452577	7.19	3.62	0	27.66	223	2454035	5.68	2.45	0.00	18.86	220
2452578	5.13	2.15	0	25.83	224	2454036	4.92	2.35	0.00	23.88	221
2452579	5.58	2.52	0	23.16	225	2454037	4.19	2.65	6.35	20.53	222
2452580	4.93	1.3	0	22.71	226	2454038	4.85	2.73	14.22	17.19	223
2452581	5.83	2.81	2.3	20.62	227	2454039	6.16	2.62	0.00	20.97	224
2452582	5.86	2.61	10.9	20.51	228	2454040	5.18	2.94	0.00	22.95	225
2452583	6.57	2.74	0	23.26	229	2454041	2.83	0.93	16.00	23.09	226
2452584	5.97	2.78	3	24.89	230	2454042	4.14	2.61	57.91	22.13	227
2452585	4.95	2.25	25.7	23.77	231	2454043	3.70	1.83	0.00	22.13	228
2452586	5.55	2.35	0	16.98	232	2454044	4.76	2.64	0.51	22.13	229

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2452587	5.69	2.12	0	21.29	233	2454045	4.75	2.75	0.00	22.13	230
2452588	5.85	1.92	0	21.71	234	2454046	3.59	1.85	0.00	22.13	231
2452589	6.2	2.57	0	25.03	235	2454047	2.55	0.94	3.56	22.13	232
2452590	5.81	2.84	0	26	236	2454048	4.24	2.70	0.25	22.13	233
2452591	5.87	2.98	0	25.85	237	2454049	4.37	2.33	0.00	22.13	234
2452592	4.96	2.25	0	19.13	238	2454050	5.15	2.33	0.00	22.13	235
2452593	5.4	1.74	0	18.31	239	2454051	4.99	2.33	0.00	22.13	236
2452594	4.33	1.05	0	20.89	240	2454052	4.70	1.82	0.00	22.13	237
2452595	1.48	0.56	0	20.76	241	2454053	4.35	2.01	0.00	16.00	238
2452596	2.43	0.99	0	15.65	242	2454054	4.11	1.97	0.00	16.41	239
2452597	4.63	1.53	0	12.49	243	2454055	4.67	2.25	0.00	21.63	240
2452598	5.55	1.15	0	18.01	244	2454056	3.32	1.37	1.02	21.45	241
2452599	5.83	1.58	0.3	21.48	245	2454057	3.29	2.06	0.00	12.92	242
2452600	4.57	1.6	0	21.95	246	2454058	3.41	1.73	0.00	12.52	243
2452601	4.68	1.88	0	18.91	247	2454059	3.35	1.63	0.00	13.16	244
2452602	4.27	1.54	0	11.91	248	2454060	2.56	1.44	0.00	10.20	245
2452603	4.66	1.49	0	15.07	249	2454061	2.04	1.13	0.00	8.44	246
2452604	5.4	1.73	0	18.25	250	2454062	2.46	1.37	0.00	9.19	247
2452605	4.98	1.55	0	17.79	251	2454063	2.88	1.53	0.00	12.37	248
2452606	4.73	1.76	0	17.33	252	2454064	3.13	1.63	0.00	15.59	249
2452607	5.3	1.58	0	16.24	253	2454065	3.74	1.48	0.00	18.95	250
2452608	4.67	1.37	0	11.46	254	2454066	4.98	2.15	0.00	19.82	251
2452609	4.28	1.18	0	14.13	255	2454067	4.96	1.82	0.51	20.46	252
2452610	4.49	1.45	0	15.43	256	2454068	5.16	2.11	1.27	21.68	253
2452611	4.41	1.44	0	12.63	257	2454069	3.94	1.47	4.83	22.38	254
2452612	4.54	1.37	0	14.12	258	2454070	3.62	2.02	4.57	23.02	255
2452613	4.51	1.41	25.9	20.92	259	2454071	4.19	2.01	0.00	24.08	256
2452614	5.01	1.92	0.3	23.35	260	2454072	4.17	1.63	0.25	22.60	257
2452615	0.65	0.53	0	15.54	261	2454073	4.72	1.78	0.00	20.91	258
2452616	4.66	1.38	0	18.15	262	2454074	2.70	1.64	0.51	17.74	259
2452617	4.97	1.32	1	18.63	263	2454075	3.86	1.52	0.00	18.00	260
2452618	0.73	0.51	0	19.5	264	2454076	4.19	1.28	0.00	18.27	261
2452619	2.65	1.06	0	20.12	265	2454077	3.62	1.35	0.00	16.51	262
2452620	4.58	1.89	0	19.52	266	2454078	2.73	0.88	0.00	14.13	263
2452621	2.37	0.56	0	18.3	267	2454079	4.13	1.13	0.00	16.92	264
2452622	1.32	0.51	0	20.88	268	2454080	4.57	1.26	0.00	18.39	265
2452623	3.47	0.61	0	14.71	269	2454081	5.15	1.30	0.00	19.95	266
2452624	4.13	0.97	0	10.11	270	2454082	3.77	1.23	0.00	19.57	267

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2452625	3.71	1.15	0	10.22	271	2454083	1.40	0.51	6.60	19.82	268
2452626	4.66	1.19	2.8	13.59	272	2454084	1.53	0.51	0.51	19.13	269
2452627	4.39	1.49	0	17.7	273	2454085	3.42	1.19	17.53	18.67	270
2452628	5.05	1.43	1	19.79	274	2454086	3.08	0.99	0.00	19.13	271
2452629	2.66	0.93	0	19.16	275	2454087	5.24	1.73	0.00	20.81	272
2452630	4.02	1.23	0	11.02	276	2454088	5.39	1.87	0.00	20.61	273
2452631	4.47	1.06	0	12.92	277	2454089	4.78	1.75	0.00	19.90	274
2452632	4.8	1.44	0	15.53	278	2454090	4.93	1.33	0.00	20.80	275
2452633	4.49	1	0	22.87	279	2454091	4.43	1.41	0.00	21.87	276
2452634	4.65	1.58	0.3	17.12	280	2454092	2.51	1.20	0.00	23.25	277
2452635	3.85	1.1	3.6	10.12	281	2454093	3.37	1.84	5.59	21.45	278
2452636	4.09	1.1	2	12.56	282	2454094	2.60	1.18	9.65	22.25	279
2452637	4.13	1.17	0	10.33	283	2454095	1.93	0.60	0.00	22.33	280
2452638	3.03	1.21	0	10.08	284	2454096	0.28	0.42	16.00	15.54	281
2452639	4.43	1.33	0	13.02	285	2454097	1.97	1.16	0.00	9.34	282
2452640	3.77	1.3	0	22.03	286	2454098	3.88	0.92	0.00	17.80	283
2452641	5.02	1.9	0.3	20.88	287	2454099	5.01	1.35	0.00	21.60	284
2452642	4.96	1.88	0	18.09	288	2454100	4.73	1.73	0.25	21.97	285
2452643	4.25	1.27	24.4	15.8	289	2454101	3.80	2.07	1.02	22.37	286
2452644	3.4	1.23	0	8.08	290	2454102	3.49	0.92	0.00	21.82	287
2452645	3.43	1.3	0	10.14	291	2454103	1.98	0.80	0.00	18.50	288
2452646	3.94	1.41	0	13.11	292	2454104	4.07	1.70	1.78	21.95	289
2452647	3.96	1.27	0	9.78	293	2454105	3.88	1.91	0.00	22.20	290
2452648	2.67	1.26	0	10.12	294	2454106	3.74	1.46	0.00	22.91	291
2452649	4.15	1.51	0	15.35	295	2454107	3.93	2.07	0.00	22.83	292
2452650	4.48	1.38	0	17.85	296	2454108	4.26	2.31	0.00	22.96	293
2452651	4.45	1.65	0	13.95	297	2454109	3.83	1.84	0.00	21.53	294
2452652	4.55	1.36	0	12.58	298	2454110	3.69	1.49	0.00	12.61	295
2452653	3.16	0.65	0	15.59	299	2454111	3.56	1.30	0.00	12.36	296
2452654	4.14	1.37	0.8	12.03	300	2454112	3.66	1.31	0.00	19.07	297
2452655	3.94	1.45	16.3	10.68	301	2454113	3.85	1.60	0.00	21.02	298
2452656	4.63	1.43	13.5	14.91	302	2454114	3.93	1.78	0.00	21.55	299
2452657	3.67	1.37	0.3	12.67	303	2454115	3.85	2.15	3.05	20.14	300
2452658	4.02	1.2	0	7.41	304	2454116	3.87	1.76	0.25	20.21	301
2452659	4.2	1.28	0	7.95	305	2454117	4.09	2.06	0.00	21.31	302
2452660	4.6	1.41	0	11.35	306	2454118	2.99	1.39	0.51	19.70	303
2452661	4.76	1.63	0	14.37	307	2454119	2.24	0.75	8.64	18.10	304
2452662	4.63	1.59	0	17.79	308	2454120	3.64	2.16	5.59	15.72	305

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2452663	3.86	1.33	0	14.12	309	2454121	3.84	1.88	0.00	13.31	306
2452664	1.93	0.61	0	3.03	310	2454122	4.10	1.82	0.00	19.51	307
2452665	4.39	1.27	0	9.44	311	2454123	3.67	1.67	4.32	21.71	308
2452666	4.47	1.6	0	12.88	312	2454124	2.76	1.58	4.06	16.29	309
2452667	4.35	1.58	0	10.58	313	2454125	1.82	0.58	0.00	14.48	310
2452668	4.2	1.41	0	13.7	314	2454126	1.95	0.68	17.27	9.79	311
2452669	4.84	1.76	0	15.84	315	2454127	3.88	1.65	8.89	10.87	312
2452670	5.18	2.07	0	16.56	316	2454128	3.58	1.77	0.00	16.03	313
2452671	5.05	2.26	0	16.36	317	2454129	3.03	1.78	2.54	15.98	314
2452672	4.37	1.96	0	14.06	318	2454130	3.50	1.62	0.51	6.43	315
2452673	4.43	2.02	0	13.28	319	2454131	3.01	0.92	0.00	8.08	316
2452674	4.67	1.94	0	16.59	320	2454132	2.92	1.71	0.00	11.22	317
2452675	4.58	1.2	0	19.6	321	2454133	4.58	1.76	0.00	18.64	318
2452676	4.32	1.62	0	15.45	322	2454134	2.85	1.01	2.54	21.19	319
2452677	4.98	1.94	0	17.64	323	2454135	1.66	0.55	21.59	13.59	320
2452678	2.89	0.83	0	19.42	324	2454136	3.70	1.00	6.10	14.02	321
2452679	2.52	0.58	8.9	13.93	325	2454137	1.60	0.53	0.25	12.27	322
2452680	0.51	0.54	0	15.64	326	2454138	4.60	1.95	0.00	10.47	323
2452681	4.55	1.5	0	19.56	327	2454139	4.91	2.11	0.00	12.69	324
2452682	4.04	2.48	9.1	13.64	328	2454140	4.74	2.27	0.00	12.84	325
2452683	4.21	2.14	0.8	13.02	329	2454141	4.86	2.33	0.00	14.32	326
2452684	4.18	2.15	0	12.4	330	2454142	5.04	2.09	0.00	14.76	327
2452685	4.43	1.89	0	15.8	331	2454143	5.34	1.84	0.00	13.70	328
2452686	5.22	2.67	0	22.36	332	2454144	2.30	0.67	1.27	18.14	329
2452687	5.05	2.67	0	22.96	333	2454145	4.28	2.08	4.32	18.35	330
2452688	4.75	2.8	0.3	20.85	334	2454146	5.77	3.11	8.64	19.11	331
2452689	4.37	2.7	0	14.53	335	2454147	2.75	1.59	0.00	10.65	332
2452690	5.01	2.56	0	17.66	336	2454148	4.42	2.08	0.25	8.89	333
2452691	4.61	2.61	0	21.84	337	2454149	4.33	2.10	0.00	7.28	334
2452692	4.55	2.98	0	23.42	338	2454150	4.56	2.06	0.76	8.41	335
2452693	5.23	3.04	0	24.76	339	2454151	4.33	2.27	0.00	8.63	336
2452694	4.4	3.09	29.5	18.15	340	2454152	4.57	2.47	0.00	12.65	337
2452695	4.97	3.03	41.1	16.99	341	2454153	6.20	2.89	0.00	16.63	338
2452696	5.48	2.46	2.5	19.9	342	2454154	6.60	3.12	0.00	17.35	339
2452697	5.38	3.54	0	20.72	343	2454155	4.81	3.05	0.00	14.73	340
2452698	5.5	2.16	0	23.69	344	2454156	5.76	2.79	0.00	17.12	341
2452699	2.67	1.09	0	19.48	345	2454157	5.27	2.59	0.00	20.20	342
2452700	4.69	2.26	0	23.08	346	2454158	5.31	2.43	0.00	20.01	343

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2452701	3.78	1.49	0	22.99	347	2454159	5.95	3.36	11.18	20.55	344
2452702	3.39	0.92	0	17.41	348	2454160	6.85	3.75	0.00	19.86	345
2452703	3.28	1.52	0	21.08	349	2454161	3.21	2.70	0.00	21.85	346
2452704	5.05	3.58	1.3	24.43	350	2454162	3.52	2.94	2.03	22.48	347
2452705	5.69	3.99	0	25.83	351	2454163	1.64	1.47	2.54	15.73	348
2452706	5.68	3.07	0	23.33	352	2454164	3.09	3.76	0.76	14.44	349
2452707	3.49	1.55	0	21.91	353	2454165	2.97	3.26	0.00	11.38	350
2452708	4.49	2.58	0	22.62	354	2454166	2.62	3.16	0.00	12.00	351
2452709	6	4.09	0	18.81	355	2454167	3.45	2.83	0.00	16.04	352
2452710	5.19	3.81	0.3	21.09	356	2454168	3.55	3.38	0.00	17.29	353
2452711	6.41	3.3	0	22.71	357	2454169	4.84	3.62	0.00	18.61	354
2452712	6.07	4.09	0.3	25.29	358	2454170	4.34	3.68	0.00	18.39	355
2452713	6.07	3.77	1.3	19.1	359	2454171	4.66	3.93	0.00	18.58	356
2452714	4.74	3.59	0	21.53	360	2454172	5.54	3.85	0.00	18.67	357
2452715	5.14	2.74	0	20.43	361	2454173	5.07	3.85	0.00	19.55	358
2452716	4.75	2.86	0	21.95	362	2454174	4.22	3.23	0.00	21.43	359
2452717	4.95	3.42	0	22.34	363	2454175	4.80	3.69	0.00	22.17	360
2452718	6.67	4.54	0	27.26	364	2454176	4.46	3.40	9.65	21.67	361
2452719	6.7	4.3	0	27.75	365	2454177	3.06	4.32	0.00	13.26	362
2452720	4.04	2.21	0	24.68	1	2454178	2.95	3.75	0.00	13.25	363
2452721	5.79	4.13	1.8	24.77	2	2454179	2.02	1.05	0.00	17.05	364
2452722	0.84	0.77	0	16.96	3	2454180	3.16	2.49	1.27	18.62	365
2452723	5.62	3.94	0	20.39	4	2454181	4.29	3.43	1.02	19.89	1
2452724	6.24	4.01	0	21.64	5	2454182	6.21	4.29	0.00	21.72	2
2452725	5.26	3.44	0	23.19	6	2454183	6.00	4.62	0.00	22.02	3
2452726	5.8	3.27	0.8	24.17	7	2454184	5.72	4.61	0.00	20.30	4
2452727	5.47	4.8	0	22.35	8	2454185	5.57	4.79	0.00	19.84	5
2452728	5.4	4.5	0	21.74	9	2454186	6.61	4.70	0.00	22.91	6
2452729	3.16	1.78	0	18.74	10	2454187	6.07	3.90	0.00	22.16	7
2452730	4.31	3.81	0	11.25	11	2454188	5.28	5.06	0.00	21.86	8
2452731	4.71	3.66	0	13.5	12	2454189	5.22	4.64	0.00	20.82	9
2452732	5.67	4.13	20.6	16.85	13	2454190	3.39	2.49	1.27	19.92	10
2452733	5.13	4.05	0.3	20.03	14	2454191	3.92	4.92	2.79	20.81	11
2452734	5.06	4.35	0	22.32	15	2454192	5.02	4.90	0.00	21.34	12
2452735	6.5	4.67	0.3	23.61	16	2454193	5.15	4.81	0.00	22.18	13
2452736	5.5	5.05	0	24.65	17	2454194	4.96	5.08	0.00	22.71	14
2452737	6.23	5.49	0	26.19	18	2454195	5.35	4.62	0.00	22.00	15
2452738	7.27	4.93	0	25.27	19	2454196	5.75	4.42	0.00	19.83	16

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2452739	5.65	3.33	0	23.54	20	2454197	3.80	4.58	0.51	16.74	17
2452740	5.61	3.68	0	16.69	21	2454198	3.33	4.28	0.00	12.74	18
2452741	6.22	3.94	0	15.57	22	2454199	2.92	3.63	0.00	12.71	19
2452742	6.88	4.39	0	19.15	23	2454200	3.22	2.14	0.25	14.70	20
2452743	6.56	4.79	11.2	19.9	24	2454201	3.39	1.45	1.02	19.55	21
2452744	7.35	4.97	0.5	20.01	25	2454202	4.54	5.32	4.32	22.60	22
2452745	7.79	4.76	4.3	21.08	26	2454203	4.75	5.02	10.16	22.65	23
2452746	8.55	4.65	0	22.71	27	2454204	6.58	5.63	0.00	20.96	24
2452747	8.05	5.46	0	21.48	28	2454205	4.24	5.51	0.00	23.68	25
2452748	6.95	4.42	0	22.87	29	2454206	3.47	3.21	1.78	21.37	26
2452749	6.79	4.67	0	21.98	30	2454207	3.82	4.67	27.18	14.40	27
2452750	7.63	5.27	0	23.03	31	2454208	4.93	4.58	0.00	17.32	28
2452751	7.13	5.27	0	22.44	32	2454209	5.95	3.91	0.00	19.58	29
2452752	7.77	4.88	0	24.61	33	2454210	6.12	5.14	0.51	19.48	30
2452753	8.12	4.49	0	20.44	34	2454211	6.42	5.14	0.00	19.23	31
2452754	6.93	4.63	0	21.82	35	2454212	6.31	4.86	0.00	21.17	32
2452755	6.08	4.12	0	24.16	36	2454213	6.05	5.36	0.00	20.81	33
2452756	6.79	3.54	0	22.22	37	2454214	5.65	5.18	0.00	20.16	34
2452757	8.18	5.74	1.3	23.06	38	2454215	6.42	5.26	0.00	20.61	35
2452758	8.79	5.91	0	23.46	39	2454216	5.57	5.36	0.00	22.61	36
2452759	8.92	5.21	0	23.37	40	2454217	4.95	5.54	0.00	23.58	37
2452760	6.88	3.69	0	23.98	41	2454218	4.75	5.60	0.00	24.56	38
2452761	6.1	2.24	0	22.29	42	2454219	7.15	4.65	0.00	21.83	39
2452762	8.5	5.08	0	23.86	43	2454220	6.87	5.96	0.00	20.66	40
2452763	8.72	5.55	0	25.06	44	2454221	5.92	5.51	0.00	21.70	41
2452764	8.86	5.96	0	23.95	45	2454222	5.68	5.68	0.00	21.83	42
2452765	8.16	6.04	0	26.79	46	2454223	5.57	5.46	0.00	21.38	43
2452766	8.34	5.72	0	26.52	47	2454224	5.79	5.45	0.00	23.69	44
2452767	9.62	5.84	0	26.47	48	2454225	5.56	5.79	0.00	24.25	45
2452768	8.44	5.67	0	26.47	49	2454226	5.10	6.02	0.00	23.95	46
2452769	9.11	6.06	0	26.9	50	2454227	4.65	4.49	2.03	22.53	47
2452770	9.23	5.62	0	27.2	51	2454228	5.97	4.69	15.49	19.70	48
2452771	9.44	6.1	0	27.29	52	2454229	6.63	4.35	0.00	19.25	49
2452772	9.38	5.77	0	26.79	53	2454230	5.34	3.99	0.00	22.25	50
2452773	8.16	6.12	0	23.96	54	2454231	5.04	3.33	0.25	21.47	51
2452774	7.26	5.71	0	23.44	55	2454232	5.05	4.32	4.57	22.53	52
2452775	8.86	4.88	10.2	26.17	56	2454233	5.34	5.99	1.27	22.69	53
2452776	9.34	5.66	0	26.74	57	2454234	5.05	5.86	0.00	23.10	54

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2452777	7.4	5.49	0	27	58	2454235	3.50	1.99	5.33	21.55	55
2452778	8.48	5.66	7.9	26.77	59	2454236	7.26	5.65	37.34	23.12	56
2452779	7.89	6.35	0	26.22	60	2454237	5.61	5.10	0.00	22.78	57
2452780	8.63	5.77	18.8	24.97	61	2454238	6.04	5.79	0.00	22.34	58
2452781	7.51	5.99	0	25.6	62	2454239	5.24	5.55	0.25	22.94	59
2452782	5.66	3.75	0.3	23.68	63	2454240	6.89	5.05	0.00	23.63	60
2452783	7.06	2.43	1.3	23.36	64	2454241	7.14	5.46	0.00	22.66	61
2452784	7.76	5.21	0	24.43	65	2454242	7.87	5.87	0.00	21.80	62
2452785	8.74	6.21	0	25.71	66	2454243	7.14	6.00	0.00	23.78	63
2452786	8.9	6.21	0	25.96	67	2454244	6.81	5.83	0.00	24.51	64
2452787	8.26	6.31	0	26.04	68	2454245	6.46	6.07	2.03	23.78	65
2452788	7.93	4.74	0	24.84	69	2454246	6.65	4.95	3.30	23.28	66
2452789	7.34	6.13	0	24.81	70	2454247	6.04	6.03	0.00	23.62	67
2452790	8.1	5.76	0	25.55	71	2454248	6.09	5.14	0.25	23.57	68
2452791	8.15	6.29	2.5	26.87	72	2454249	5.72	5.99	0.00	24.36	69
2452792	8.85	5.63	2.5	27.44	73	2454250	6.08	5.84	0.00	24.47	70
2452793	7.96	5.19	0	25.66	74	2454251	5.96	6.19	0.00	24.24	71
2452794	6.02	4.48	0	24.42	75	2454252	4.80	4.39	0.00	24.42	72
2452795	4.06	2.42	0	24.26	76	2454253	3.78	3.18	0.25	22.98	73
2452796	8.08	4.61	0	25.52	77	2454254	4.00	4.59	115.32	25.02	74
2452797	8.83	6.08	0.3	26.39	78	2454255	5.49	6.73	0.76	25.44	75
2452798	6.45	4.54	0	25.5	79	2454256	5.47	6.72	0.00	26.74	76
2452799	8.15	5.1	1.3	26.19	80	2454257	5.57	6.57	0.00	26.71	77
2452800	6.34	3.5	33	25.01	81	2454258	3.47	3.02	0.76	23.99	78
2452801	7.72	5.9	0	26.2	82	2454259	4.44	6.01	1.52	25.34	79
2452802	9.5	6.61	1.5	26.94	83	2454260	5.53	5.32	1.52	24.62	80
2452803	7.81	6.42	1.5	26.44	84	2454261	4.72	6.71	0.00	25.46	81
2452804	8.51	6.89	0	26.57	85	2454262	4.78	5.70	0.00	26.43	82
2452805	9.25	6.65	4.1	27.65	86	2454263	4.98	5.54	12.95	25.59	83
2452806	8.83	6.15	3.6	27.05	87	2454264	4.89	4.46	0.00	23.18	84
2452807	8.63	5.11	4.1	27.41	88	2454265	4.55	5.14	2.03	22.94	85
2452808	9.04	5.63	0.3	26.88	89	2454266	4.81	6.16	13.97	23.09	86
2452809	7.38	4.56	17.3	26.27	90	2454267	5.62	5.98	0.00	23.99	87
2452810	4.9	2.34	46	24.55	91	2454268	6.10	6.17	0.00	25.06	88
2452811	2.87	1.73	14	24.08	92	2454269	5.85	6.66	0.00	24.99	89
2452812	6.06	3.69	1.8	24.83	93	2454270	5.74	6.72	0.00	25.32	90
2452813	2.49	1.48	10.9	23.68	94	2454271	4.78	5.32	0.76	25.28	91
2452814	9.35	6.08	37.8	25.06	95	2454272	5.30	5.64	0.00	25.96	92

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2452815	9.52	6.12	1	24.4	96	2454273	5.64	4.48	0.76	26.01	93
2452816	9.8	5.42	3.8	25.2	97	2454274	5.97	5.93	0.00	25.73	94
2452817	9.13	6.31	0.3	25.34	98	2454275	5.60	6.58	0.00	25.92	95
2452818	9.92	6.17	15.7	25.6	99	2454276	5.48	6.43	0.00	26.84	96
2452819	6.64	3.81	0	25.34	100	2454277	6.09	5.28	0.00	26.89	97
2452820	7.26	5.01	0	25.85	101	2454278	5.91	6.44	0.00	26.91	98
2452821	8.91	5.91	0	27.79	102	2454279	5.62	6.57	0.00	27.18	99
2452822	9.15	6.2	14	27.74	103	2454280	4.55	5.41	0.00	26.48	100
2452823	8.48	5.12	0	26.66	104	2454281	4.15	4.51	0.25	25.35	101
2452824	7.49	5.05	7.1	25.63	105	2454282	5.96	5.82	9.40	26.66	102
2452825	10.32	6.22	0	26.63	106	2454283	5.72	6.17	0.00	26.27	103
2452826	9.91	6.16	5.8	27.59	107	2454284	5.57	5.10	0.00	25.19	104
2452827	10.18	6.32	0.3	27.98	108	2454285	5.58	4.80	1.52	24.41	105
2452828	10.28	5.22	0	27.89	109	2454286	6.15	5.13	7.87	25.48	106
2452829	10.61	5.83	0	27.72	110	2454287	3.29	1.94	1.27	24.16	107
2452830	9.53	6.76	11.2	27.38	111	2454288	5.24	5.44	24.38	25.87	108
2452831	9.46	6.72	0.3	27.66	112	2454289	6.09	6.10	4.57	26.20	109
2452832	8.77	5.16	6.6	27.63	113	2454290	6.31	6.51	2.03	27.50	110
2452833	7.07	3.38	0	26.68	114	2454291	5.66	6.74	0.00	28.43	111
2452834	8.1	4.91	37.1	26.84	115	2454292	5.29	4.94	1.52	27.88	112
2452835	6.22	3.71	4.6	26.65	116	2454293	5.39	4.54	0.25	27.34	113
2452836	4.76	2.94	0	24.79	117	2454294	6.03	6.84	7.11	27.93	114
2452837	7.94	4.24	0	25.25	118	2454295	4.95	5.29	0.00	26.06	115
2452838	7.57	5.07	0	25.75	119	2454296	5.93	5.42	28.19	26.05	116
2452839	9.9	6.41	17.5	27.5	120	2454297	5.60	6.29	1.02	26.45	117
2452840	6.68	4.04	0	25.54	121	2454298	6.33	7.02	35.05	26.81	118
2452841	8.55	5.54	0	26.68	122	2454299	5.98	6.81	0.00	28.14	119
2452842	8.37	5.88	15.5	26.24	123	2454300	6.09	6.51	0.00	28.17	120
2452843	7.41	4.39	0	25.4	124	2454301	4.47	3.61	0.00	26.76	121
2452844	8.09	5.76	5.6	25.92	125	2454302	6.68	6.20	0.00	27.24	122
2452845	8.61	6.09	0	25.54	126	2454303	4.03	3.28	0.00	25.28	123
2452846	6.25	4.72	0	24.59	127	2454304	6.78	5.57	0.76	25.36	124
2452847	9.18	6.55	0	25.28	128	2454305	5.70	4.90	0.00	25.56	125
2452848	9.76	6.45	0	26.95	129	2454306	5.80	4.09	0.00	24.58	126
2452849	9.12	6.47	0	25.99	130	2454307	6.30	5.48	35.56	25.38	127
2452850	8.71	5.95	0	26.4	131	2454308	6.72	6.35	3.56	26.61	128
2452851	7.53	5.67	0	25.18	132	2454309	4.92	4.16	0.00	25.51	129
2452852	8.68	5.99	0	25.28	133	2454310	5.54	4.73	2.54	24.75	130

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2452853	6.99	4.55	2	25.61	134	2454311	5.98	5.49	9.14	25.83	131
2452854	7.87	6.05	1.3	26.15	135	2454312	6.68	6.31	0.00	27.53	132
2452855	5.45	3.71	30	25.15	136	2454313	3.70	2.74	0.76	25.33	133
2452856	8.17	5.82	19.8	25.9	137	2454314	5.28	4.63	30.73	24.96	134
2452857	7.48	5.53	3.6	25.7	138	2454315	4.34	2.49	4.57	25.02	135
2452858	5.96	4.29	1.8	25.29	139	2454316	5.79	6.14	11.68	28.18	136
2452859	5.15	3.63	0	25.21	140	2454317	6.09	6.45	0.00	28.50	137
2452860	6.33	3.99	2	25.55	141	2454318	5.66	6.20	0.00	27.57	138
2452861	5.14	3.46	0.8	24.82	142	2454319	6.69	6.18	0.00	28.32	139
2452862	6.61	3.63	0	25.12	143	2454320	6.02	6.07	0.00	28.62	140
2452863	5.28	2.67	1.3	24.52	144	2454321	6.40	6.29	0.00	28.52	141
2452864	8.37	5.98	2.8	26.48	145	2454322	5.73	6.64	0.00	28.69	142
2452865	8.13	6	9.1	26.28	146	2454323	5.72	6.51	0.00	29.07	143
2452866	7.14	4.62	22.1	25.77	147	2454324	5.21	6.36	0.00	29.23	144
2452867	6.42	3.45	0	25.54	148	2454325	5.39	6.49	0.00	27.83	145
2452868	8.8	6.14	0	26.06	149	2454326	5.28	6.32	0.00	27.64	146
2452869	8.8	5.75	0	27.32	150	2454327	6.31	6.32	0.00	27.84	147
2452870	6.97	4.48	4.3	26.4	151	2454328	5.87	6.24	0.00	26.93	148
2452871	4.39	3.17	0	24.41	152	2454329	5.47	6.12	0.00	27.76	149
2452872	6.03	3.5	0	24.5	153	2454330	5.74	6.06	0.00	25.63	150
2452873	6.66	3.45	41.7	25.41	154	2454331	5.40	5.94	0.00	26.55	151
2452874	6.36	3.5	0	26.29	155	2454332	5.07	6.09	0.00	28.86	152
2452875	5.82	3.11	17.8	24.88	156	2454333	5.10	6.31	0.00	28.80	153
2452876	8.32	5.56	2	25.48	157	2454334	4.91	6.25	0.00	28.75	154
2452877	8.21	5.81	0	26.74	158	2454335	5.43	5.87	0.00	26.90	155
2452878	8.64	5.59	0	27.13	159	2454336	4.99	3.20	0.00	25.54	156
2452879	8.24	6	4.3	27.13	160	2454337	4.63	5.76	2.29	26.99	157
2452880	7.18	4.56	24.6	26.64	161	2454338	5.05	5.86	0.25	26.77	158
2452881	7.65	5.85	8.9	27.46	162	2454339	4.64	5.94	0.76	26.55	159
2452882	7.33	5.7	0.5	27.65	163	2454340	4.96	5.70	0.76	27.29	160
2452883	8.99	5.68	0	28.27	164	2454341	4.92	6.01	0.00	27.42	161
2452884	7.59	5.19	0	27.24	165	2454342	4.94	5.80	0.00	26.75	162
2452885	7.29	4.56	0	26.14	166	2454343	5.36	5.74	0.00	26.78	163
2452886	7.16	4.12	0	26.52	167	2454344	4.47	4.45	0.00	26.00	164
2452887	5.31	3.44	4.3	25.57	168	2454345	4.20	4.22	4.57	26.08	165
2452888	5.29	3.09	0	25.33	169	2454346	4.62	5.15	28.96	25.44	166
2452889	6.01	2.89	26.7	25.79	170	2454347	6.31	5.74	7.37	26.13	167
2452890	6.24	3.49	1.5	24.58	171	2454348	5.63	5.44	7.37	26.61	168

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2452891	6.96	4.3	0	24.1	172	2454349	5.24	4.50	8.89	26.27	169
2452892	7.13	4.35	1.3	24.61	173	2454350	6.53	5.47	1.78	28.24	170
2452893	7.35	5.15	0.8	25.56	174	2454351	6.18	5.28	0.00	27.57	171
2452894	7.14	4.93	0	24.28	175	2454352	6.51	5.19	0.00	26.81	172
2452895	7.39	4.94	0	24	176	2454353	5.02	5.48	0.00	26.55	173
2452896	7.69	4.99	0	24.5	177	2454354	4.42	5.33	0.00	25.95	174
2452897	7.93	5.18	0	24.91	178	2454355	4.74	4.33	0.00	26.02	175
2452898	6.85	4.73	8.4	24.57	179	2454356	4.55	5.06	0.00	26.12	176
2452899	7.08	4.4	6.1	25.62	180	2454357	5.60	5.19	0.00	26.71	177
2452900	3.79	2.31	0	24.39	181	2454358	4.87	5.32	0.00	26.80	178
2452901	6.82	4.54	0	25.35	182	2454359	5.68	4.86	0.00	26.85	179
2452902	7.22	4.04	0	26.4	183	2454360	5.41	5.51	0.00	27.20	180
2452903	6.84	3.94	3	27	184	2454361	4.71	3.41	0.00	24.84	181
2452904	7.23	4.73	1	27.6	185	2454362	3.13	2.19	46.23	24.18	182
2452905	7.06	4.19	0	27.23	186	2454363	3.32	2.23	16.51	23.44	183
2452906	6.24	2.15	0	26.23	187	2454364	4.79	5.01	57.91	26.35	184
2452907	7.3	4.26	6.1	25.92	188	2454365	5.12	4.59	1.52	26.84	185
2452908	5.34	3.34	1	25.26	189	2454366	4.80	2.85	25.65	25.59	186
2452909	4.71	2.34	0	23.45	190	2454367	4.97	3.17	0.00	25.89	187
2452910	3.7	2.48	0	24.42	191	2454368	6.08	4.79	6.86	27.17	188
2452911	4.71	2.45	7.6	24.89	192	2454369	5.90	4.42	0.00	26.95	189
2452912	2.84	0.87	0	23.75	193	2454370	5.03	3.70	16.26	24.79	190
2452913	5.63	2.35	0	25.22	194	2454371	5.30	4.72	0.00	24.92	191
2452914	3.42	1.34	0.8	23.78	195	2454372	5.35	4.86	0.00	25.49	192
2452915	6.82	2.39	0.8	23.5	196	2454373	4.80	3.30	0.00	26.27	193
2452916	6.01	2.66	0	24.01	197	2454374	5.26	3.91	2.79	26.05	194
2452917	6.9	3.91	0	24.14	198	2454375	5.39	3.01	0.25	25.76	195
2452918	7.31	4.11	0	23.9	199	2454376	4.76	3.10	32.51	26.12	196
2452919	7.25	4.1	0	24.93	200	2454377	6.06	4.06	7.87	26.64	197
2452920	6.77	3.8	0	24.27	201	2454378	5.86	4.12	0.00	26.79	198
2452921	6.8	4.07	0	24.59	202	2454379	5.71	2.82	1.78	26.91	199
2452922	6.53	4.01	0	24.2	203	2454380	6.56	4.24	4.06	27.21	200
2452923	5.11	1.87	0	23.75	204	2454381	5.52	3.99	7.87	26.70	201
2452924	5.56	2.35	16.3	24.79	205	2454382	6.19	4.34	0.00	26.88	202
2452925	6.16	2.93	0	25.83	206	2454383	5.48	4.48	0.00	25.66	203
2452926	6.08	3.48	0	26.4	207	2454384	5.73	3.64	0.00	24.34	204
2452927	6.66	3.76	0	26.41	208	2454385	5.60	3.58	0.00	24.04	205
2452928	5.88	3.72	35.1	21.27	209	2454386	5.33	3.99	0.00	23.55	206

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2452929	6.48	2.42	0.3	23.18	210	2454387	5.67	3.52	0.00	23.44	207
2452930	4.81	1.33	0	24.22	211	2454388	5.66	3.58	0.00	24.89	208
2452931	6.57	3.5	0	22.6	212	2454389	5.83	3.62	0.00	25.87	209
2452932	3.38	0.86	0	23.19	213	2454390	5.54	3.45	0.51	25.68	210
2452933	6.31	2.14	0	23.29	214	2454391	5.88	3.26	0.00	25.39	211
2452934	6.6	3.54	0	22.77	215	2454392	5.12	3.43	0.76	25.28	212
2452935	6.05	3.35	2.3	22.95	216	2454393	4.80	3.56	2.03	26.02	213
2452936	5.88	3.31	0	21.42	217	2454394	4.96	2.22	6.60	23.82	214
2452937	6.88	2.86	0	21.53	218	2454395	3.57	1.74	0.25	25.23	215
2452938	6.63	2.81	14.5	25.06	219	2454396	5.16	3.15	12.70	26.60	216
2452939	6.66	2.99	0	24.81	220	2454397	5.09	3.76	1.27	26.78	217
2452940	6.26	3.23	0	24.53	221	2454398	4.80	3.04	0.00	25.25	218
2452941	4.9	1.6	0	24.86	222	2454399	2.85	1.10	0.51	20.47	219
2452942	5.45	2.59	0	20.12	223	2454400	3.78	1.30	4.32	23.38	220
2452943	5.77	2.61	0	23.93	224	2454401	5.07	2.54	12.19	24.31	221
2452944	5.91	2.39	0.5	24.9	225	2454402	4.85	3.19	2.29	24.71	222
2452945	5.79	2.84	0	24.94	226	2454403	3.68	1.06	15.49	23.50	223
2452946	5.72	3.11	0.3	25.18	227	2454404	5.00	1.85	20.57	24.31	224
2452947	4.41	2.86	0	25.44	228	2454405	5.07	3.06	20.32	24.64	225
2452948	4.61	2.36	0	26.01	229	2454406	4.42	2.79	1.27	24.55	226
2452949	3.27	2.32	0	25.08	230	2454407	4.20	2.48	2.79	23.10	227
2452950	2.42	1.17	4.1	23.12	231	2454408	6.07	2.61	0.00	18.32	228
2452951	5.31	2.69	0.3	23.33	232	2454409	5.29	2.40	0.00	16.66	229
2452952	5.2	2.73	0	23.58	233	2454410	5.50	2.33	0.00	16.70	230
2452953	4.01	1.74	0	23.57	234	2454411	5.67	2.24	0.00	17.23	231
2452954	5.32	2.66	0	24.61	235	2454412	5.39	2.22	0.00	17.20	232
2452955	5.59	2.52	0	24.14	236	2454413	5.46	2.16	0.00	17.25	233
2452956	5.52	2.66	0	22.9	237	2454414	5.55	2.15	0.00	15.93	234
2452957	5.53	2.31	0	21.38	238	2454415	5.44	2.04	0.00	15.04	235
2452958	4.93	1.87	3.6	20.04	239	2454416	5.97	2.00	0.00	18.25	236
2452959	4.9	1.88	0	18.94	240	2454417	5.57	2.27	0.00	20.35	237
2452960	4.35	1.73	0	19.93	241	2454418	5.53	2.39	0.00	19.54	238
2452961	4.93	2.06	23.6	21.81	242	2454419	4.98	2.44	0.00	19.27	239
2452962	5.1	1.91	9.4	24.71	243	2454420	4.71	2.25	0.00	19.49	240
2452963	2.04	0.76	0	20.9	244	2454421	4.14	1.84	0.00	11.17	241
2452964	4.81	2	0	16.7	245	2454422	5.21	1.62	0.00	13.90	242
2452965	4.3	1.75	0	17.37	246	2454423	4.04	1.46	0.00	17.12	243
2452966	5.04	1.87	0	18.93	247	2454424	5.39	2.14	0.00	19.72	244

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2452967	4.69	1.86	1	19.4	248
2452968	4.67	1.99	0	20.72	249
2452969	5.02	1.61	0	19.98	250
2452970	5.6	1.94	0	21.01	251
2452971	4.51	2.03	0	21.89	252
2452972	5.17	2.07	0	22.01	253
2452973	3.16	1.3	0	9.9	254
2452974	4.53	0.92	0	13.33	255
2452975	4.13	1.51	0	14.6	256
2452976	4.36	1.46	0	16.78	257
2452977	4.59	1.53	0	20.48	258
2452978	4.59	1.92	0	21.38	259
2452979	2.99	1.12	0	18.74	260
2452980	3.39	1.26	7.4	10.77	261
2452981	4.11	1.2	3.6	10.77	262
2452982	4.45	1.3	0	13.17	263
2452983	3.72	1.2	0	16.76	264
2452984	2.74	0.86	53.3	19.1	265
2452985	3.61	1.39	26.4	10.79	266
2452986	4.25	1.31	0.3	13.45	267
2452987	4.46	1.23	7.6	18.21	268
2452988	1.18	0.55	20.1	18.7	269
2452989	4.08	1.25	0	12.03	270
2452990	4.18	1.4	0	19.54	271
2452991	2.48	1	0	14.69	272
2452992	3.04	1.11	0	9.25	273
2452993	3.58	1.05	0	10.29	274
2452994	2.83	0.98	0.3	7.08	275
2452995	2.94	0.78	10.9	10.94	276
2452996	4.09	0.92	0	15.07	277
2452997	3.47	1.02	0	17.3	278
2452998	4.29	1.58	0	17.33	279
2452999	3.69	1.28	16.5	11.52	280
2453000	4.13	1.3	15.7	13.91	281
2453001	4.3	1.36	0	14.83	282
2453002	3.25	0.92	0	18.1	283
2453003	4.15	1.19	0	20.12	284
2453004	4.93	1.44	0	19.55	285
2454425	5.62	2.24	0.00	20.79	245
2454426	4.37	1.79	0.00	19.18	246
2454427	3.65	1.16	0.00	20.52	247
2454428	4.00	1.54	0.00	18.51	248
2454429	4.37	1.87	0.00	19.25	249
2454430	3.94	1.80	2.29	21.79	250
2454431	4.37	2.25	0.00	23.70	251
2454432	4.39	2.19	0.00	22.41	252
2454433	4.15	1.68	0.25	22.12	253
2454434	2.86	2.39	0.51	21.33	254

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2453005	5.08	1.72	0	19.54	286						
2453006	4.27	1.61	57.2	18.17	287						
2453007	5.01	1.69	25.9	19.26	288						
2453008	4.36	1.87	0	19.08	289						
2453009	4.35	2.05	0	20.92	290						
2453010	4.48	1.8	0	20.63	291						
2453011	3.34	1.33	0	16.61	292						
2453012	3.64	1.31	0	13.21	293						
2453013	3.94	1.31	0	13.07	294						
2453014	3.03	0.97	0	15.42	295						
2453015	3.28	1.27	0	10.75	296						
2453016	3.79	1.24	0	11.59	297						
2453017	3.98	1.39	0	11.63	298						
2453018	4	1.35	0	10.63	299						
2453019	3.89	1.43	0	11.63	300						
2453020	4.3	1.55	1.3	14.57	301						
2453021	3.89	1.6	0	12.47	302						
2453022	3.99	1.18	0	16.06	303						
2453023	2.62	1.14	0	17.96	304						
2453024	2.84	1.16	0	16.08	305						
2453025	3.63	1.61	0	11.03	306						
2453026	4.04	1.6	0	12.67	307						
2453027	4.01	1.61	0	13.57	308						
2453028	3.88	1.5	0	9.92	309						
2453029	4.23	1.58	0	11.53	310						
2453030	4.62	1.64	0	15.45	311						
2453031	4.07	1.51	0	20.24	312						
2453032	3.74	1.97	0	20.1	313						
2453033	3.07	1.61	0	8.8	314						
2453034	3.85	1.58	0	10.52	315						
2453035	3.24	1	0	13.74	316						
2453036	1.96	0.74	0	14.06	317						
2453037	3.34	1.35	0	17.95	318						
2453038	4.17	2.19	0.3	17.03	319						
2453039	3.28	1.31	0	13.32	320						
2453040	4.38	2.21	0	16.41	321						
2453041	3.77	2.02	0	21.36	322						
2453042	4.45	2.6	0	22.74	323						

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2453043	3.62	1.47	0	17.6	324						
2453044	3.17	1.32	0	10.91	325						
2453045	4.28	1.69	0	17.87	326						
2453046	4.81	2.24	4.3	16.53	327						
2453047	4.45	1.98	0	18.42	328						
2453048	4.78	2.77	0	21.99	329						
2453049	3.3	1.37	0	15.68	330						
2453050	2.83	0.92	0	17.92	331						
2453051	4.35	2.08	0	18.93	332						
2453052	4.13	2.59	0	12.66	333						
2453053	1.89	0.59	8.9	11.82	334						
2453054	3.59	2.12	2	8.28	335						
2453055	3.69	2.17	0	10.67	336						
2453056	4.34	1.85	0	14.88	337						
2453057	4.88	2.52	0	20.15	338						
2453058	4.59	3.19	0.3	16.65	339						
2453059	4.72	2.65	24.6	18.73	340						
2453060	2.53	0.97	0	19.47	341						
2453061	1.8	0.72	0	17.41	342						
2453062	2.56	1.48	0	14.36	343						
2453063	1.12	0.5	0	8.46	344						
2453064	4.09	2.31	0	11.02	345						
2453065	4.87	2.25	10.9	16.48	346						
2453066	3.53	2.61	3	19.77	347						
2453067	4.57	2.93	2.5	20.51	348						
2453068	4.57	3.71	0.3	20.84	349						
2453069	4.48	2.93	6.9	21.82	350						
2453070	4.95	3.4	0	23.05	351						
2453071	5.38	4.1	0	23.36	352						
2453072	4.76	2.81	0.3	22.94	353						
2453073	4.19	3.64	1.8	15.67	354						
2453074	4.68	2.98	5.8	15.14	355						
2453075	3.74	3.19	0	12.65	356						
2453076	4.14	3.09	0.3	13.1	357						
2453077	4.36	3.17	0	15.16	358						
2453078	4.55	3.56	0	16.86	359						
2453079	4.12	3.69	0	18.82	360						
2453080	3.92	2.79	0	21.77	361						

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2453081	2.47	1.37	0	21.32	362						
2453082	4.36	4.02	25.4	18.58	363						
2453083	4.79	3.93	0.5	18.35	364						
2453084	4.31	4.12	0.3	19.33	365						
2453085	4.37	3.93	9.7	20.24	366						
2453086	4.68	4.24	10.2	19.87	1						
2453087	3.87	3.33	0	16.27	2						
2453088	3.94	3.42	24.4	17.56	3						
2453089	3.65	2.57	0.3	19.03	4						
2453090	4.01	3.3	0	20.06	5						
2453091	4.42	4.37	0	21.04	6						
2453092	4.31	4.24	1.8	21.45	7						
2453093	4.42	4.73	0	19.23	8						
2453094	4.07	3.87	0	18.09	9						
2453095	3.61	4.02	1.5	18.8	10						
2453096	4.56	4.29	0	20.87	11						
2453097	3.53	4.28	0	15.76	12						
2453098	3.56	4.01	0	16.04	13						
2453099	3.63	4.17	0	15.98	14						
2453100	3.81	4.22	0	17.86	15						
2453101	3.68	4.28	0	16.43	16						
2453102	3.76	4.13	0	17.92	17						
2453103	4.45	4.39	0	21.13	18						
2453104	4.69	3.97	0	22.34	19						
2453105	4.54	4.74	14	22.02	20						
2453106	4.4	5.38	0	22.07	21						
2453107	4.48	4.4	0.3	22.87	22						
2453108	3.55	3.17	0	22.24	23						
2453109	3.9	2.56	0	21.95	24						
2453110	4.47	4.43	0	14.28	25						
2453111	4.73	4.37	0	14.29	26						
2453112	4.91	4.18	0	16.49	27						
2453113	5.84	4.8	0	19.94	28						
2453114	5.89	5.01	0	19.99	29						
2453115	6.17	5.14	0	20.32	30						
2453116	6	5.01	0	18.92	31						
2453117	5.57	4.31	0	21.36	32						
2453118	6.04	5.19	0	22.59	33						

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2453119	6.47	4.99	0	22.86	34						
2453120	7.16	5.77	0	22.15	35						
2453121	6.54	5.28	2.3	23.38	36						
2453122	6.42	4.65	14.5	23.87	37						
2453123	3.72	1.97	0	20.22	38						
2453124	6.77	5.28	0	19.72	39						
2453125	7.82	4.41	0	23.19	40						
2453126	4.42	3.85	0	24	41						
2453127	6.01	6.09	1.5	24.99	42						
2453128	6.67	6.08	7.3	25.18	43						
2453129	4.01	1.9	0	22.46	44						
2453130	7.08	5.37	0	20.26	45						
2453131	6.92	5.38	0	18.63	46						
2453132	7.66	5.47	0	21.12	47						
2453133	7.06	5.86	0	23.21	48						
2453134	6.56	5.8	0	22.3	49						
2453135	7.41	5.4	0	23.25	50						
2453136	6.57	4.67	0	23.52	51						
2453137	7.4	5.61	0	24.84	52						
2453138	6.05	5.29	0	24.41	53						
2453139	7.27	6.09	0	24.46	54						
2453140	7.71	6	0	24.04	55						
2453141	7.57	5.87	0	24.55	56						
2453142	8.23	5.69	0	24.56	57						
2453143	6.97	6.03	0	24.53	58						
2453144	7.73	5.38	0	24.38	59						
2453145	7.58	6.08	0	23.82	60						
2453146	7.53	6.16	0	23.9	61						
2453147	7.58	6.17	0.1	23.92	62						
2453148	7.11	6.08	0	24.05	63						
2453149	7.26	5.58	13.3	24.42	64						
2453150	6.96	6.19	0.1	24.1	65						
2453151	7.52	6.2	0	23.2	66						
2453152	7.84	6.28	0	25.21	67						
2453153	8.08	6.47	0	25.73	68						
2453154	7.65	6.56	0	25.94	69						
2453155	7.36	6.48	1.8	25.36	70						
2453156	7.35	6.64	0.1	25.82	71						

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2453157	6.7	6.05	0	27.74	72						
2453158	6.75	6.66	18	26.69	73						
2453159	5.37	5.86	5	25.32	74						
2453160	6.04	6.57	28.8	24.95	75						
2453161	4.51	5.08	7.8	23.84	76						
2453162	6.4	4.73	0.3	24.24	77						
2453163	6.8	6.14	16.5	24.6	78						
2453164	7.71	6.68	6.5	24.94	79						
2453165	7.54	6.07	11	25.66	80						
2453166	5.9	4.42	0	25.84	81						
2453167	4.33	3.41	0	24.8	82						
2453168	6.88	5.98	0.7	25.83	83						
2453169	7.93	6.57	0	27.13	84						
2453170	9.18	6.69	0	27.66	85						
2453171	8.09	5.75	0	27.06	86						
2453172	8.37	6.65	0	26.5	87						
2453173	9.78	6.25	0	27.21	88						
2453174	9.74	6.37	38.6	26.75	89						
2453175	5.8	5.01	7.3	26.9	90						
2453176	6.75	5.66	8.7	27.13	91						
2453177	6.29	5.27	36.8	26.6	92						
2453178	6.6	6.73	12.8	25.95	93						
2453179	7.54	6.37	0.5	26.64	94						
2453180	8.73	6.9	0	27.89	95						
2453181	8.78	6.97	0	27.91	96						
2453182	8.59	6.76	0	27.85	97						
2453183	7.04	5.69	0	26.91	98						
2453184	6.53	5.24	2.6	25.83	99						
2453185	7.8	6.48	20.5	26.91	100						
2453186	8.82	6.86	1.2	26.85	101						
2453187	8.92	6.41	0	26.91	102						
2453188	8.64	6.1	1.8	27.24	103						
2453189	6.8	5.27	0.5	26.81	104						
2453190	7.99	6.23	2.9	26.35	105						
2453191	8.33	6.47	0.8	27.06	106						
2453192	8.49	6.41	0	27.09	107						
2453193	7.65	5.95	1.7	27.81	108						
2453194	5.03	3.7	0.7	25.24	109						

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2453195	7.75	6.34	1.1	26.67	110						
2453196	8.58	6.32	0	27.9	111						
2453197	8.87	6.62	0	27.94	112						
2453198	5.07	3.18	0.1	25.33	113						
2453199	7.61	6.18	0	26.24	114						
2453200	8.88	6.42	0	28.37	115						
2453201	8.41	6.5	0	28.95	116						
2453202	7.12	4.65	0	27.15	117						
2453203	7.12	4.73	0	26.44	118						
2453204	6.99	4.76	3.9	26.7	119						
2453205	7.32	4.33	0.7	26.63	120						
2453206	5.79	3.84	0.9	25.4	121						
2453207	4.64	2.38	3.7	24.77	122						
2453208	7.99	5.86	1.3	25.49	123						
2453209	8.92	6.2	0.1	25.48	124						
2453210	8.53	5.96	0	26.33	125						
2453211	8.37	6.25	0	27.03	126						
2453212	8.67	6.56	0	27.49	127						
2453213	8.67	6.65	0	26.73	128						
2453214	6.76	6.14	0.3	26.27	129						
2453215	7.33	5.9	2.1	25.79	130						
2453216	8.31	5.55	0.1	27.32	131						
2453217	8.7	6.57	0	27.37	132						
2453218	7.53	3.85	1.8	25.93	133						
2453219	5.52	3.48	0	25.8	134						
2453220	8.25	4.91	13.6	27.1	135						
2453221	5.89	4.7	40.5	26.62	136						
2453222	5.9	3.84	0.3	26.58	137						
2453223	5.8	4.1	24.8	25.76	138						
2453224	6.57	4.6	17.1	27.12	139						
2453225	6.51	4.51	8.2	25.95	140						
2453226	3.53	2.78	21.2	25.54	141						
2453227	6.85	4.77	0	25.98	142						
2453228	7.45	5.19	9.6	26.11	143						
2453229	7.34	5.76	0	26.97	144						
2453230	5.85	3.74	6.9	26.54	145						
2453231	4.42	2.63	4.2	25.8	146						
2453232	5.24	3.17	0	25.48	147						

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2453233	4.6	2.89	0	24.9	148						
2453234	6.99	4.83	0	26.42	149						
2453235	7.67	5.44	0	27.01	150						
2453236	6.04	3.96	4.1	26.58	151						
2453237	8.12	5.52	1.6	26.75	152						
2453238	7.32	5.75	2.5	27.85	153						
2453239	5.38	3.78	0	26.19	154						
2453240	7.79	4.38	11.3	25.66	155						
2453241	7.47	5.11	0.1	25.59	156						
2453242	7.19	4.18	0	25.48	157						
2453243	6.93	4.21	0	25.91	158						
2453244	8.45	5.48	0	26.95	159						
2453245	7.38	5.4	7.1	27	160						
2453246	8.56	5.13	0	26.94	161						
2453247	8.08	5.15	0.4	27.31	162						
2453248	6.3	5.32	0.1	26.71	163						
2453249	6.59	5.24	0	28.11	164						
2453250	9.33	5.78	6.4	29.3	165						
2453251	9.44	5.77	0	28.58	166						
2453252	9.38	5.67	1.2	29.16	167						
2453253	2.98	1.55	4.7	25.46	168						
2453254	1.41	0.51	21.1	24.43	169						
2453255	4.85	2.84	0	27.89	170						
2453256	6.16	4.77	0	28.36	171						
2453257	5.18	5.1	0	26.33	172						
2453258	4.63	3.69	0	26.1	173						
2453259	6.07	5.3	0	26.7	174						
2453260	6.26	5.39	0	26.81	175						
2453261	5.11	4.61	0.1	26.14	176						
2453262	5.4	4.27	0.1	26.86	177						
2453263	4.29	2.38	0.1	27.33	178						
2453264	5.13	4.49	12.1	27.95	179						
2453265	4.97	5.42	50.5	28.42	180						
2453266	5.45	4.7	0	27.86	181						
2453267	6.14	5.09	0	26.78	182						
2453268	5.38	4.58	3.2	25.38	183						
2453269	4.19	3.42	0.1	25.77	184						
2453270	4.52	1.97	0	25.88	185						

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2453271	5.85	4.44	0	26.69	186						
2453272	5.85	4.53	3	26.61	187						
2453273	5.62	4.28	12.6	26.33	188						
2453274	4.33	1.9	2.4	26.46	189						
2453275	2.65	0.82	6.1	25.75	190						
2453276	5.75	4.2	0.2	27.09	191						
2453277	5.67	4.69	9.5	27.13	192						
2453278	5.42	4.33	7.3	26.25	193						
2453279	4.18	3.93	89.3	26.51	194						
2453280	4.03	4.24	0	26.62	195						
2453281	4.27	4.67	24.7	26.47	196						
2453282	4.63	4.42	0	25.9	197						
2453283	4.41	3.98	0	25.7	198						
2453284	3.84	3.17	0	24.84	199						
2453285	2.74	2.05	0.1	24.84	200						
2453286	5.49	3.55	0.1	25.28	201						
2453287	4.01	2.51	0.1	24.41	202						
2453288	4.76	3.53	0	25.66	203						
2453289	3.92	3.11	0	25.62	204						
2453290	1.81	1.1	11.7	23.71	205						
2453291	2.87	1.75	0.5	23.86	206						
2453292	4.82	3.78	0	24.81	207						
2453293	4.65	3.56	0	22.1	208						
2453294	4.2	2.08	0	20.71	209						
2453295	4.49	2.96	0	17.91	210						
2453296	4.7	3.1	0	19.99	211						
2453297	4.07	2.42	0	24	212						
2453298	4.5	3.31	0	25.43	213						
2453299	3.33	2.72	0	24.29	214						
2453300	4.55	3.73	0	23.66	215						
2453301	4.84	2.79	0	22.59	216						
2453302	4.73	3.03	0	23.27	217						
2453303	5.02	3.02	0	20.75	218						
2453304	5.52	3.04	0	21.6	219						
2453305	4.81	2.6	0	22.27	220						
2453306	5.29	2.93	0	22.89	221						
2453307	3.36	1.3	2.7	21.53	222						
2453308	4.6	2.54	0	22.87	223						

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2453309	4.64	3.19	0	23.03	224						
2453310	4.87	0.46	0	23.17	225						
2453311	4.34	1.8	0.2	24.64	226						
2453312	3.67	3.14	9.4	24.66	227						
2453313	4.42	3.12	0	23.5	228						
2453314	4.49	2.9	8	24.34	229						
2453315	4.43	2.19	31.8	20.69	230						
2453316	4.64	2.25	0	20.84	231						
2453317	4.94	2.35	0	18.83	232						
2453318	4.45	2.2	1.2	17.65	233						
2453319	2.24	0.79	0	20.47	234						
2453320	5.29	1.97	0	22.73	235						
2453321	3.55	2	0	22.67	236						
2453322	3.32	2.24	0	22.54	237						
2453323	3.6	2.08	0	22.28	238						
2453324	4.5	2.2	0	23.29	239						
2453325	5.04	2.14	0	22.32	240						
2453326	4.78	2.14	0.1	20.2	241						
2453327	4.35	1.91	0	18.74	242						
2453328	3.38	1.4	3	17.77	243						
2453329	4.4	1.84	0	19.46	244						
2453330	3.9	2.11	0	20.81	245						
2453331	4.12	1.86	0	19.89	246						
2453332	3.48	1.71	0	19.82	247						
2453333	3.94	2	0	21.6	248						
2453334	3.98	1.98	0	23.38	249						
2453335	4.67	2.12	0	20.98	250						
2453336	4.2	1.57	0	13.83	251						
2453337	3.52	1.39	0	20.28	252						
2453338	4.2	1.92	0	18.16	253						
2453339	4.07	1.74	0	17.89	254						
2453340	3.56	1.37	0	21.35	255						
2453341	4.45	1.77	0	21.98	256						
2453342	3.61	1.04	0	19.89	257						
2453343	4.54	1.32	1.3	14.38	258						
2453344	3.75	0.79	1.4	13.45	259						
2453345	4.69	1.5	0	16.4	260						
2453346	3.95	1.55	0	20.15	261						

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2453347	4.15	1.59	0	22.59	262						
2453348	4.22	2.04	0	22.12	263						
2453349	3.52	1.86	5.8	22.94	264						
2453350	2.92	1.16	0	21.03	265						
2453351	3.92	1.24	0	15.54	266						
2453352	3.81	1.13	0	9.97	267						
2453353	3.96	1.3	33.6	14.88	268						
2453354	3.99	1.01	0	11.44	269						
2453355	3.15	0.81	0.7	9.34	270						
2453356	2.12	0.46	3.2	16	271						
2453357	3.78	1.05	0	15.72	272						
2453358	4.27	1.22	0	15.37	273						
2453359	4	1.18	0	13.09	274						
2453360	3.19	0.93	0	5.91	275						
2453361	3.22	0.92	0.9	11.76	276						
2453362	3.36	1.26	1.9	18.14	277						
2453363	2.88	0.76	0.1	20.65	278						
2453364	1.43	0.45	0	15.21	279						
2453365	0.81	0.31	0	14.4	280						
2453366	1.44	0.48	0	11.55	281						
2453367	3.78	1.09	0	9.81	282						
2453368	2.98	0.63	0	14.75	283						
2453369	3.94	1.2	0	16.08	284						
2453370	3.9	1.48	0	16.56	285						
2453371	3.87	1.43	0	17.85	286						
2453372	3.47	1.1	0.2	17.18	287						
2453373	4.03	1.8	0	18.53	288						
2453374	4.29	1.76	0.1	18.06	289						
2453375	3.96	1.94	0	18.37	290						
2453376	3.32	1.95	0	19.68	291						
2453377	3.98	1.82	0	21.3	292						
2453378	3.68	1.79	0	21.22	293						
2453379	4.11	1.98	0	20.94	294						
2453380	4.53	2.05	1.1	19.44	295						
2453381	4.29	2.07	0	18.59	296						
2453382	3.52	1.15	0	17.48	297						
2453383	3.22	1.94	0.2	21.04	298						
2453384	3.78	1.79	0.1	22.85	299						

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2453385	0.61	0.16	0.1	19.23	300						
2453386	3.33	1.1	0.1	18.64	301						
2453387	1.07	0.24	0	13.21	302						
2453388	3.62	1.31	0.1	9.04	303						
2453389	4.05	1.42	7.9	10.88	304						
2453390	3.8	1.33	1.9	12.14	305						
2453391	4.24	1.48	0	12.04	306						
2453392	4.33	1.83	0	13.63	307						
2453393	4.29	1.51	0.2	15.93	308						
2453394	3.58	1.78	0	9.92	309						
2453395	3.69	1.4	0	6.14	310						
2453396	3.18	1.42	0	9.77	311						
2453397	3.88	1.54	0	15.28	312						
2453398	4.14	1.77	26.4	15.56	313						
2453399	1.4	0.18	0	16.58	314						
2453400	3.13	1.56	0	17.98	315						
2453401	4.23	2.09	1.1	16.79	316						
2453402	4.51	2.16	20.3	11.97	317						
2453403	5.32	1.7	27.1	14.44	318						
2453404	2.58	0.78	0.1	15.16	319						
2453405	3.93	2.12	0.2	16.67	320						
2453406	3.71	1.99	0.1	11.13	321						
2453407	3.45	0.94	0.1	12.02	322						
2453408	4.79	1.93	0	15.93	323						
2453409	4.54	1.3	1.9	15.8	324						
2453410	4.87	2.12	0	16	325						
2453411	4.08	2.71	0	16.19	326						
2453412	4.55	1.99	0.1	17.2	327						
2453413	3.88	2.06	0	8.67	328						
2453414	3.76	1.92	0	9.57	329						
2453415	2.91	2.14	0	12.37	330						
2453416	3.98	2.3	4.2	17.28	331						
2453417	4.33	2.87	0.2	18.44	332						
2453418	4.69	3.03	0	20.11	333						
2453419	5.12	3.01	0	19.06	334						
2453420	5.22	2.8	0	13.24	335						
2453421	4.55	2.52	0	14.6	336						
2453422	3.67	2.52	0	16.9	337						

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2453423	4.67	2.88	0	19.5	338						
2453424	4.5	2.61	0	19.28	339						
2453425	4.2	2.75	0.1	19.34	340						
2453426	4.18	1.63	29.9	20.31	341						
2453427	2.78	1.01	27.1	17.49	342						
2453428	4.63	2.71	1	18.34	343						
2453429	1.65	0.31	0	19.84	344						
2453430	4.35	3.13	0	19.44	345						
2453431	4.39	3.06	0	14.89	346						
2453432	3.69	3.03	0	9.59	347						
2453433	1.1	0.41	0	9.09	348						
2453434	4.77	3.03	0	12.05	349						
2453435	4.33	2.95	0	14.37	350						
2453436	4.28	3.09	0	15.57	351						
2453437	4.07	2.86	0	18.07	352						
2453438	3.8	2.83	0	19.1	353						
2453439	0.87	0.32	0	11.58	354						
2453440	4.12	3.56	0	10.9	355						
2453441	4.08	3.1	0.1	15.12	356						
2453442	4.17	3.34	0	16.19	357						
2453443	4.32	3.63	0	18.7	358						
2453444	3.06	2.31	0	19.5	359						
2453445	3.9	2.91	0.2	19.17	360						
2453446	3.9	2.47	0	21.95	361						
2453447	0.95	0.28	9	18.22	362						
2453448	3.62	2.48	0	11.49	363						
2453449	4.07	3.75	0	10.66	364						
2453450	4.06	3.5	0	14.22	365						
2453451	2.47	1.57	0	19.38	1						
2453452	4.05	3.65	0	22.86	2						
2453453	2.73	1.52	0	22.39	3						
2453454	3.52	2.66	0	19.68	4						
2453455	2.99	1.72	0	22.06	5						
2453456	2.69	1.9	0.4	21.36	6						
2453457	4.46	4.93	1.4	25.44	7						
2453458	3.81	4.04	0	21.58	8						
2453459	4.04	5.3	0	18.79	9						
2453460	4.15	4.63	0.9	18.72	10						

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2453461	4.1	4.11	0	23.05	11						
2453462	5.77	5.52	0	24.41	12						
2453463	4.71	4.28	0	21.33	13						
2453464	5.41	4.34	0	16.22	14						
2453465	4.2	4.43	0	16.8	15						
2453466	4.38	4.79	0	19.42	16						
2453467	3.6	4.27	0	22.6	17						
2453468	4.51	3.88	0	22.86	18						
2453469	4.72	4.54	0	22.12	19						
2453470	4.56	5.01	0.3	20.09	20						
2453471	5.17	5.23	0	20.78	21						
2453472	5.53	5.33	0	20.72	22						
2453473	5.24	4.61	13.7	22.05	23						
2453474	6.13	5.2	10.8	23.27	24						
2453475	5.09	3.66	0	18.45	25						
2453476	5.39	4.28	0	16.87	26						
2453477	6.29	4.84	0	17.49	27						
2453478	5.68	4.87	0	18.1	28						
2453479	6.88	5.1	0	17.61	29						
2453480	6.67	5.29	0	18.24	30						
2453481	6.69	4.16	0	19.35	31						
2453482	6.93	5.06	0	19.24	32						
2453483	6.61	5.43	0	20.78	33						
2453484	6.55	3.71	0	20.61	34						
2453485	6.57	5.17	0	17.29	35						
2453486	5.71	4.53	0	16.8	36						
2453487	5.37	4.37	0	21.15	37						
2453488	6.1	4.21	0	21.05	38						
2453489	6.32	5.63	6	18.34	39						
2453490	5.76	5.56	0	20.55	40						
2453491	6.55	5.6	0.3	23.77	41						
2453492	5.52	2.2	0	22.68	42						
2453493	8.62	4.91	0	22.53	43						
2453494	7.93	5.56	0	22.3	44						
2453495	2.67	1.33	19.9	21.88	45						
2453496	5.44	2.11	0.1	22.33	46						
2453497	5.3	2.46	0	18.71	47						
2453498	7.86	5.34	0	19.46	48						

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2453499	7.81	5.24	0	21.83	49						
2453500	7.84	5.75	0	22.68	50						
2453501	8.49	5.64	0	22.75	51						
2453502	6	4.07	0	21.57	52						
2453503	8.16	5.81	0	21.65	53						
2453504	7.96	5.6	0.4	22.26	54						
2453505	8.13	5.67	0	24.16	55						
2453506	7.33	5.48	0.4	22.93	56						
2453507	7.68	6.27	0	23.58	57						
2453508	7.62	5.52	0	24.59	58						
2453509	7.77	6.3	0	24.61	59						
2453510	7.74	5.56	0	24.7	60						
2453511	6.78	6.22	0	23.87	61						
2453512	6.31	4.27	0	23.71	62						
2453513	7.3	6.14	0	24.31	63						
2453514	7.64	6.31	0	25.39	64						
2453515	7.4	4.34	0	25.55	65						
2453516	8.3	5.83	0	24.15	66						
2453517	7.67	4.27	0	23.31	67						
2453518	8.56	5.89	0	25.32	68						
2453519	8.6	6.12	0	26.62	69						
2453520	9.05	6.85	0	25.8	70						
2453521	8.88	6.47	0	27.71	71						
2453522	3.27	2.02	0	24.2	72						
2453523	2.68	1.46	7.5	23.51	73						
2453524	5.63	3.1	5.3	24.33	74						
2453525	2.8	1.8	53.9	23.76	75						
2453526	5.26	3.24	4.9	24.78	76						
2453527	6.09	4.04	44.9	25.09	77						
2453528	7.3	6.28	0.4	25.5	78						
2453529	7.97	5.61	45.6	26.45	79						
2453530	6.66	6.5	0	26.91	80						
2453531	5.42	3.13	0	26.58	81						
2453532	6.27	2.95	3.6	26.91	82						
2453533	4.16	3.36	9.7	26.32	83						
2453534	5.61	5.7	1.1	26.89	84						
2453535	7.54	7.22	0	27.32	85						
2453536	8.78	6.78	0	26.54	86						

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2453537	6.31	4.79	0	26.34	87
2453538	7.15	5.15	0	26.61	88
2453539	8.42	5.41	0	27.47	89
2453540	9.15	5.95	0	27.1	90
2453541	7.85	5.58	42.9	26.09	91
2453542	7.46	4.21	3.1	25.01	92
2453543	6.56	3.81	29	25.65	93
2453544	4.31	2.73	19.7	24.45	94
2453545	6.82	3.76	1.3	25.15	95
2453546	3.47	1.88	0	24.23	96
2453547	6.39	4.83	0	26.95	97
2453548	7.49	6.55	0	28.58	98
2453549	6.31	4.05	54.9	27.36	99
2453550	6.92	4.97	2.9	27.19	100
2453551	5.93	4.07	0	26.36	101
2453552	5.61	4.32	0	26.04	102
2453553	7.51	4.92	0	27.41	103
2453554	7.33	5.36	0	28.21	104
2453555	6.9	5.67	0.2	28.04	105
2453556	7.55	6.78	0.6	28.49	106
2453557	8.37	6.34	0	28.91	107
2453558	9.1	6.8	0	29.02	108
2453559	7.98	5.25	0	29.2	109
2453560	7.64	6.26	2.5	29.06	110
2453561	7.4	4.23	0	28.42	111
2453562	4.17	2.39	0	27.67	112
2453563	6.99	6.11	0	28.28	113
2453564	8.51	5.99	20.8	27.77	114
2453565	7.36	5.72	0.1	27.86	115
2453566	7.99	6.11	0	28.56	116
2453567	7.05	6.6	1.5	28.78	117
2453568	8.09	6.94	13.6	28.6	118
2453569	9.83	6.58	2	28.93	119
2453570	8.44	6.77	3.8	29.07	120
2453571	8.37	6.64	0.9	29.14	121
2453572	8.17	6.66	3.8	28.73	122
2453573	8.81	6.6	9.2	28.25	123
2453574	8.01	6.68	0	28.29	124

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2453575	6.24	5.46	0	28.21	125						
2453576	8.79	6.76	0	28.43	126						
2453577	8.31	6.6	0	26.98	127						
2453578	7.93	6.26	0	27.21	128						
2453579	8.04	6.44	0	28.8	129						
2453580	7.13	6.79	0	28.8	130						
2453581	7.44	6.69	0	29.13	131						
2453582	6.85	6.86	0	27.53	132						
2453583	6.54	6.46	0	28.15	133						
2453584	4.01	2.82	4.1	26.1	134						
2453585	6.68	5.68	1.5	27	135						
2453586	6.46	4.54	15.3	26.81	136						
2453587	7.6	6.37	17.4	28.04	137						
2453588	5.35	4.13	1.3	26.09	138						
2453589	7.86	6.4	35.8	26.96	139						
2453590	6.49	5.37	25	26.01	140						
2453591	6.76	6.53	3.7	27.56	141						
2453592	6.09	5.76	27.8	27.32	142						
2453593	7.62	6.1	0.6	28.62	143						
2453594	5.39	4.19	0.4	27.72	144						
2453595	6.4	6.06	20.3	27.47	145						
2453596	8.65	6.41	0.8	28.01	146						
2453597	5.93	4.16	43.3	27.1	147						
2453598	8.54	6.39	21.7	28.6	148						
2453599	8.09	6.2	0.7	29.34	149						
2453600	7.86	6.28	0.1	29.58	150						
2453601	8.12	6.15	6.9	28.89	151						
2453602	7.83	5.11	2	29.6	152						
2453603	7.65	6.1	0.1	28.44	153						
2453604	6.76	4.84	0	27.75	154						
2453605	7.8	5.89	0.6	29.12	155						
2453606	7.12	5.52	0	28.64	156						
2453607	7.44	6.11	0.5	28.69	157						
2453608	6.78	5.13	0	28.41	158						
2453609	5.8	5.75	2.7	29.07	159						
2453610	6.2	6.11	1	29.41	160						
2453611	6.16	5.44	0	29.36	161						
2453612	6.97	6.29	0	29.77	162						

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2453613	7.52	5.63	1.3	29.02	163						
2453614	5.52	4.66	6.5	27.5	164						
2453615	6.35	3.99	0	27.62	165						
2453616	6.67	5.59	0.8	28.09	166						
2453617	7.43	5.44	3.6	28.25	167						
2453618	7.82	5.49	0	28.85	168						
2453619	7.47	3.77	22.4	27.76	169						
2453620	4.54	2.49	172	26.57	170						
2453621	3.18	1.27	0	25.74	171						
2453622	0.34	0.11	0	25.63	172						
2453623	2.48	1.91	6.9	25.79	173						
2453624	5.07	5.29	12.4	26.89	174						
2453625	8.29	5.33	1	26.52	175						
2453626	7.86	5.03	0.3	26.44	176						
2453627	8.25	5.26	0.3	27.11	177						
2453628	7.35	4.65	3.3	26.64	178						
2453629	8.23	4.96	0	26.12	179						
2453630	8.36	4.94	0	26.88	180						
2453631	8.47	5.03	0	26.38	181						
2453632	8.06	5.15	8.4	26.33	182						
2453633	7.18	5	0	28.46	183						
2453634	5.87	3.2	5.9	27.78	184						
2453635	1.88	0.72	18.5	26.38	185						
2453636	3.02	1.81	3.2	26.84	186						
2453637	6.11	4.12	0	28.15	187						
2453638	6.89	4.9	0	27.93	188						
2453639	7.12	4.29	0	27.61	189						
2453640	5.86	3.96	9.8	26.33	190						
2453641	7.07	4.1	83.9	26.18	191						
2453642	5.84	4.28	0	25.21	192						
2453643	6.62	4.54	0	25.35	193						
2453644	6.14	4.61	0	26.44	194						
2453645	6.66	4.77	0	28.27	195						
2453646	6.97	4.48	0	28.07	196						
2453647	6.85	4.54	0	27.78	197						
2453648	5.05	1.95	0	26.47	198						
2453649	4.96	3.04	0	26.68	199						
2453650	3.85	2.71	2.8	26.25	200						

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2453651	3.93	2.59	31.2	26.13	201						
2453652	5.56	4.06	0	26.81	202						
2453653	6.04	3.77	5.1	26.29	203						
2453654	6.74	4.33	0	26.42	204						
2453655	5.83	3.76	0.5	26.53	205						
2453656	5.73	3.57	5	26.04	206						
2453657	6.28	3.09	0.3	25.68	207						
2453658	5.09	2.54	0	24.95	208						
2453659	7.09	3.87	0	24.23	209						
2453660	6.73	3.64	5.9	21.3	210						
2453661	6.43	3.57	0	21.45	211						
2453662	6.36	3.59	0	21.81	212						
2453663	5.77	3.2	0	24.94	213						
2453664	5.54	3.45	5.3	26.87	214						
2453665	4.99	2.2	0.1	25.13	215						
2453666	5.86	2.27	0	25.25	216						
2453667	4.8	2.54	3.8	25.46	217						
2453668	1.59	0.56	0	20	218						
2453669	5.74	2.49	0	13.26	219						
2453670	5.61	2.3	0	13.83	220						
2453671	5.49	2.31	0	16.87	221						
2453672	5.45	2.66	0	18.83	222						
2453673	5.58	2.39	0.1	20.46	223						
2453674	4.58	1.37	0	21.21	224						
2453675	5.18	1.71	0	21.87	225						
2453676	4.8	1.64	0	20.54	226						
2453677	5.64	2.92	0	21.54	227						
2453678	5.45	2.72	0	21.74	228						
2453679	5.2	2.8	0	20.56	229						
2453680	5.39	2.93	0	20.1	230						
2453681	4.89	2.33	2.4	22.63	231						
2453682	5.04	1.69	0	22.83	232						
2453683	5.72	2.81	0	22.36	233						
2453684	5.41	2.83	0	21.05	234						
2453685	5.73	2.55	2.7	20.18	235						
2453686	5.06	2.3	0	20.94	236						
2453687	5.49	2.32	0	21.49	237						
2453688	5.29	2.15	0	21.5	238						

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2453689	4.6	2.11	0	21.67	239						
2453690	4.7	2.13	0.6	22.87	240						
2453691	4.28	2.28	0	22.29	241						
2453692	4.26	1.61	1.4	19.3	242						
2453693	3.29	1.09	0	21.58	243						
2453694	3.68	1.44	0	22.92	244						
2453695	3.69	1.26	0.2	23.12	245						
2453696	4.34	1.99	0	22.35	246						
2453697	4.68	1.96	0	14.85	247						
2453698	3.89	1.51	0.1	10.84	248						
2453699	4.65	1.55	0.2	17.7	249						
2453700	4.37	1.95	0	17.57	250						
2453701	4.82	1.93	0.9	17.12	251						
2453702	4.13	1.76	0	21.88	252						
2453703	3.5	0.98	2.9	23.2	253						
2453704	1.14	0.35	0	21.4	254						
2453705	3.97	1.82	0	16.06	255						
2453706	3.8	1.45	0	11.52	256						
2453707	3.78	1.38	0	10.8	257						
2453708	3.85	1.5	0	13.51	258						
2453709	4.14	1.64	0	17.28	259						
2453710	4.53	1.6	0	19.64	260						
2453711	3.3	1.14	0	18.51	261						
2453712	1.82	0.55	0	20.63	262						
2453713	1.32	0.28	0	19.12	263						
2453714	3.01	0.89	0	20.19	264						
2453715	4.68	1.63	0.3	17.57	265						
2453716	1.69	0.36	8.6	12.91	266						
2453717	3.74	1.18	0	11.12	267						
2453718	3.9	1.3	0	11.22	268						
2453719	3.03	0.77	0	14.67	269						
2453720	4.25	1.38	0	19.71	270						
2453721	3.94	1.56	0	15.89	271						
2453722	1.51	0.32	0.7	20.31	272						
2453723	2.09	0.5	0.3	18.46	273						
2453724	2.63	1.01	2.4	16.54	274						
2453725	4.81	1.31	0	15.68	275						
2453726	4.53	1.21	0	11.84	276						

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2453727	4.35	1.19	0	10.83	277						
2453728	5.2	1.25	0	10.98	278						
2453729	4.68	1.1	0	16.65	279						
2453730	4.51	1	1.8	17.72	280						
2453731	4.52	1.5	40.7	12.07	281						
2453732	4.51	1.19	2.6	9.95	282						
2453733	4.41	1.26	0	12.93	283						
2453734	4.01	1.45	0	16.77	284						
2453735	4.01	1.5	0	12.41	285						
2453736	4.79	1.44	0	16.85	286						
2453737	5.05	1.86	0	22.7	287						
2453738	6.11	1.86	0	26.64	288						
2453739	5.24	1.91	0	24.47	289						
2453740	5.06	1.7	0	18.47	290						
2453741	5.5	1.64	0	20.39	291						
2453742	4.38	1.56	0	15.86	292						
2453743	3.63	1.21	0	10.74	293						
2453744	2.9	1.19	0	9.63	294						
2453745	4.81	1.39	0	14.01	295						
2453746	5.24	1.61	0.2	19.44	296						
2453747	5.44	1.46	0	23.2	297						
2453748	5.92	2.08	0.6	20.86	298						
2453749	4.32	1.54	0	21.38	299						
2453750	4.32	1.79	0	17.24	300						
2453751	3.88	1.22	39.7	12.87	301						
2453752	4.53	1.35	12.3	18.53	302						
2453753	5.63	1.72	5.9	21.69	303						
2453754	3.77	1.67	0	14.92	304						
2453755	4.25	1.28	0.1	15.78	305						
2453756	4.51	1.32	0	22	306						
2453757	5.22	2.14	0	26.38	307						
2453758	5.73	2.42	0.1	26.31	308						
2453759	4.73	2.12	0.2	25.77	309						
2453760	5.55	1.91	0.4	26.22	310						
2453761	4.94	2.04	0	19.42	311						
2453762	5.08	1.71	0	20.57	312						
2453763	4.55	1.48	0	20.2	313						
2453764	4.9	1.84	0	22.5	314						

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2453765	4.87	1.97	1.7	23.65	315
2453766	3.24	1.1	0	22.63	316
2453767	4.66	2.25	0	17.93	317
2453768	4.65	1.98	0	15.32	318
2453769	4.67	2.2	0	23.04	319
2453770	0.93	0.27	0.7	20.67	320
2453771	1.05	0.41	0.2	19.04	321
2453772	4.22	2.2	0.4	14.88	322
2453773	4.72	2.01	0	14.14	323
2453774	5.54	2.1	0	18.87	324
2453775	5.19	2.17	0	14.52	325
2453776	4.93	1.95	0	16.36	326
2453777	5.27	1.92	0.2	16.7	327
2453778	5.18	1.79	0	18.65	328
2453779	3.24	2.06	0	9.2	329
2453780	2.85	1.86	0	7.74	330
2453781	3.26	1.87	0	10.65	331
2453782	4.97	2.07	0	16.1	332
2453783	4.54	1.72	0	17.89	333
2453784	6.45	2.92	0	20.91	334
2453785	6.74	3.14	0	23.58	335
2453786	4.3	1.57	0	20.19	336
2453787	5.09	2.51	0	20.63	337
2453788	5.81	2.86	0.1	23.92	338
2453789	5.64	2.86	0	23.94	339
2453790	6.62	3.34	0	26.7	340
2453791	1.91	0.53	0.1	21.54	341
2453792	4.23	2.15	0	23.5	342
2453793	3.1	2.03	0.3	19.24	343
2453794	5.67	2.97	0.1	17.7	344
2453795	6	3.04	31.4	16.54	345
2453796	6.03	3.32	0	18.1	346
2453797	7.35	3.4	0	21.89	347
2453798	6.16	3.68	0	23.68	348
2453799	6.21	3.68	5	19.61	349
2453800	5.49	3.72	0.9	18.6	350
2453801	6.2	3.36	0.1	21.04	351
2453802	5.18	3.41	0	19.16	352

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2453803	5.49	3.53	0	18.31	353						
2453804	4.82	2.87	2.1	20.17	354						
2453805	4.83	3.02	13.8	22.62	355						
2453806	5.41	3.35	0	23.37	356						
2453807	5.27	4.23	0	25.96	357						
2453808	5.89	4.1	0	25.84	358						
2453809	7.41	3.82	0	29.67	359						
2453810	6.09	4.4	1.3	21.63	360						
2453811	5.62	4.11	2	20.03	361						
2453812	5.88	3.93	8.9	22.88	362						
2453813	6.63	4.38	31.3	23.75	363						
2453814	6.13	3.84	1.1	22.58	364						
2453815	6.26	4.03	0.1	26.9	365						
2453816	7.75	4.03	0.1	29.2	1						
2453817	5.15	4.86	4	23.12	2						
2453818	4.67	3.03	3.4	23.28	3						
2453819	4.71	4.1	6.5	20.8	4						
2453820	4.49	4.33	0	16.18	5						
2453821	4.33	3.79	37.8	16.73	6						
2453822	4.3	3.74	0.2	15.93	7						
2453823	4.52	3.85	0	18.84	8						
2453824	5.44	4.19	2.4	23.06	9						
2453825	5.05	4.01	0	22.44	10						
2453826	5.46	4.82	0	24.04	11						
2453827	4.11	4.75	0	20.54	12						
2453828	4.26	5.05	0	21.43	13						
2453829	4.17	5.03	17.3	22.45	14						
2453830	4.48	4.43	0	20.05	15						
2453831	3.96	4.82	0.1	18.45	16						
2453832	3.33	4.76	0.1	19.94	17						
2453833	4.17	4.88	0	23	18						
2453834	5.34	5.02	15.8	24.9	19						
2453835	3.38	3.31	0	20.2	20						
2453836	4.33	4.88	0	20.82	21						
2453837	4.08	3.89	0	20.69	22						
2453838	4.6	4.4	0	21.13	23						
2453839	4.38	4.87	0	21.02	24						
2453840	4.64	5.34	1.2	18.89	25						

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2453841	4.58	5.36	0	21.3	26						
2453842	5.21	5.47	0	22.65	27						
2453843	5.79	5.33	0	23.82	28						
2453844	5.68	4.67	0	23.11	29						
2453845	5.96	5.72	0	24.34	30						
2453846	5.75	6.1	0.2	23.83	31						
2453847	5.24	5.87	0	23.34	32						
2453848	4.78	4.53	0	23.07	33						
2453849	5	5.46	0	23.3	34						
2453850	5.91	5.81	0.7	25.28	35						
2453851	5.98	5.9	0	23.9	36						
2453852	5.6	5.58	0	25.12	37						
2453853	6.05	5.85	11.6	24.5	38						
2453854	5.74	5.77	0.4	21.58	39						
2453855	5.85	4.6	0.1	21.91	40						
2453856	6.49	4.07	0	20.58	41						
2453857	6.7	5.46	0	20.03	42						
2453858	6.3	5.52	0	19.81	43						
2453859	6.17	5.53	0	20.98	44						
2453860	6.37	6.08	2	23.77	45						
2453861	6.89	6.1	22.8	23.5	46						
2453862	7.11	6.18	0.2	24.77	47						
2453863	6.62	6.09	0	24.61	48						
2453864	7.45	5.92	0	24.65	49						
2453865	5.4	5.01	0	23.57	50						
2453866	5.22	4.92	0	24.95	51						
2453867	5.7	3.5	0	24.4	52						
2453868	5.93	6.22	2.9	21.84	53						
2453869	6.13	5.74	0.1	20.88	54						
2453870	6.27	5.92	0	23.41	55						
2453871	6.88	6.14	0	24.23	56						
2453872	2.14	1.21	0	20.26	57						
2453873	5.77	5.9	0	20.61	58						
2453874	6.65	5.73	0	22.24	59						
2453875	7.09	5.88	0	24.33	60						
2453876	6.38	6.39	1.7	24.96	61						
2453877	6.47	6.24	0	25.36	62						
2453878	6.94	3.76	23.2	24.96	63						

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2453879	5.58	2.8	2.7	24.85	64						
2453880	6.22	4.59	0	25.16	65						
2453881	5.75	5.06	0.8	24.95	66						
2453882	5.36	6.26	0	24.56	67						
2453883	6.68	6.57	0	25.01	68						
2453884	5.9	6.81	0	26.47	69						
2453885	6.73	6.5	0	25.19	70						
2453886	5.96	6.59	0	24.64	71						
2453887	6.34	6.51	0	25.38	72						
2453888	5.57	6.96	21.2	25.77	73						
2453889	5.74	5.93	35.3	25.92	74						
2453890	7.11	6.21	2	26.63	75						
2453891	6.3	4.67	26.4	24.38	76						
2453892	6.39	5.8	1.1	25.34	77						
2453893	6.36	6.49	6.8	24.48	78						
2453894	5.7	6.19	0.3	24	79						
2453895	5.69	6.27	0	26.46	80						
2453896	6.53	6.47	3.8	26.89	81						
2453897	6.55	6.4	1.8	27.44	82						
2453898	5.04	4.6	0	25.64	83						
2453899	2.51	1.33	20.8	24.93	84						
2453900	5.31	3.87	0	25.75	85						
2453901	6.76	5.17	0	26.59	86						
2453902	6.87	6.8	0	26.71	87						
2453903	7.34	7.03	14.2	26.17	88						
2453904	7.73	6.72	2	26.02	89						
2453905	3.21	2.77	0.3	24.57	90						
2453906	6.55	7.05	0	26.2	91						
2453907	7.58	7.04	3.8	26.25	92						
2453908	7.51	6.91	0	26.69	93						
2453909	7.19	7.05	1	26.64	94						
2453910	7.16	6.74	1.7	26.04	95						
2453911	7.33	5.87	0.8	25.81	96						
2453912	6.74	6.36	33.3	25.78	97						
2453913	4	3.03	3	23.84	98						
2453914	5.62	4.96	0	25.18	99						
2453915	6.33	6.49	0.7	25.82	100						
2453916	5.45	5.45	0	25.06	101						

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2453917	7.82	6.55	1.4	26.25	102						
2453918	7.23	5.69	36	26.66	103						
2453919	5.89	3.91	3.9	26.95	104						
2453920	7.15	6.92	5.3	27.28	105						
2453921	7.21	6.8	1.9	26.77	106						
2453922	6.95	6.72	0	26.5	107						
2453923	6.2	4.49	0	26.39	108						
2453924	2.11	3.31	0	24.26	109						
2453925	5.61	5.92	0	26.1	110						
2453926	6.18	5.79	2.3	25.16	111						
2453927	7.06	5.5	0	25.72	112						
2453928	5.19	4.63	15	25.7	113						
2453929	5.24	5.47	0	26.79	114						
2453930	6.47	6.69	0	27.59	115						
2453931	6.38	6.64	0	27.72	116						
2453932	7.46	6.79	0	27.08	117						
2453933	7.83	6.53	7.1	27.65	118						
2453934	4.66	3.97	2.8	26.04	119						
2453935	5.46	4.44	0	25.8	120						
2453936	7.52	5.56	0	26.55	121						
2453937	6.45	4.6	0	25.82	122						
2453938	5.92	5.67	0	25.24	123						
2453939	7.13	5.96	0	26.29	124						
2453940	5.59	5.63	0	25.91	125						
2453941	4.13	5.02	0	25.39	126						
2453942	6.48	6.94	8.6	27.02	127						
2453943	6.44	5.8	0	27.04	128						
2453944	6.07	3.93	0	26.5	129						
2453945	6.83	5.28	0	26.61	130						
2453946	6.97	6.16	0	27.3	131						
2453947	7.97	5.77	0	27.33	132						
2453948	7.08	4.24	0	26.17	133						
2453949	7.79	6.47	9.4	26.65	134						
2453950	8.26	6.13	0	27.67	135						
2453951	7.99	6.51	3	28.34	136						
2453952	7.25	6.28	2.5	27.35	137						
2453953	7.42	6.27	1.3	27.14	138						
2453954	7.42	6.64	0	27.36	139						

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2453955	7.54	6.65	6.9	27.82	140						
2453956	7.37	6.6	0	27.75	141						
2453957	7.55	6.38	9.4	27.11	142						
2453958	7.3	6.52	0	27.29	143						
2453959	7.39	6.37	13.2	28.67	144						
2453960	6.43	6.56	9.4	28.71	145						
2453961	5.53	5.06	0	26.19	146						
2453962	5.9	6.15	0	26.48	147						
2453963	6.52	5.96	0	25.83	148						
2453964	7.23	6.24	0	25.7	149						
2453965	6.56	4.73	0	26.07	150						
2453966	5.45	3.36	0	25.93	151						
2453967	5.37	3.89	0	26.49	152						
2453968	5.92	6.18	0	26.84	153						
2453969	6.6	5.22	0	26.93	154						
2453970	5.46	5.62	11.7	26.35	155						
2453971	5.76	5.55	0	26.16	156						
2453972	3.36	3.02	15.5	24.92	157						
2453973	2.73	3.12	0.8	24.36	158						
2453974	4.64	5.05	0.8	25.07	159						
2453975	5.63	5.11	5.3	25.93	160						
2453976	5.97	6.25	0	28.06	161						
2453977	6.69	6.11	0	27.76	162						
2453978	2.34	2.03	0	25.25	163						
2453979	5.03	4.16	0	26.84	164						
2453980	5.63	4.33	0.3	26.12	165						
2453981	6.14	5.7	38.6	25.39	166						
2453982	7.03	5.82	0.5	25.74	167						
2453983	5.35	5.07	0	25.34	168						
2453984	6.67	5.35	0	25.68	169						
2453985	6.19	4.92	0	26.32	170						
2453986	4.89	3.85	0.3	24.47	171						
2453987	6.26	5.46	39.4	25.62	172						
2453988	6.63	5.73	16.3	25.98	173						
2453989	6.87	5.11	15.2	26.23	174						
2453990	6.86	5.7	15.7	26.64	175						
2453991	6.19	4.71	0	26.97	176						
2453992	5.84	4.39	0	26.66	177						

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2453993	5.4	4.01	0	25.52	178						
2453994	7	5.57	0	25.92	179						
2453995	6.85	5.44	0	26.33	180						
2453996	6.76	5.38	0	25.63	181						
2453997	7.05	5.23	0	26.51	182						
2453998	6.09	4.61	0	26.06	183						
2453999	5.79	4.01	0	24.51	184						
2454000	6.82	4.83	4.3	24.73	185						
2454001	6.77	4.95	15	25.88	186						
2454002	6	4.55	1.3	26.09	187						
2454003	5.02	3.75	7.4	26.53	188						
2454004	6.53	4.6	0	26.79	189						
2454005	4.41	2.6	31.5	24.69	190						
2454006	6.27	3.4	0	25.23	191						
2454007	6.55	4.06	0	23.2	192						
2454008	6.07	4.4	23.1	23.04	193						
2454009	6.5	3.83	1	24.44	194						
2454010	6.56	4.19	0	24.52	195						
2454011	6.17	4.3	0	25.12	196						
2454012	6.69	4.11	0.8	26.08	197						
2454013	5.93	4.25	14.2	25.63	198						
2454014	5.63	3.69	2.8	25.08	199						
2454015	5.26	4.27	13.7	22.94	200						
2454016	6.93	4.09	1.8	23.46	201						
2454017	5.83	3.84	7.9	22.85	202						
2454018	5.52	3.92	0.5	21.03	203						
2454019	5.17	3.82	30.5	20.79	204						
2454020	6.08	3.01	0	21.63	205						
2454021	6.62	3.65	16.8	23.9	206						
2454022	5.49	3.14	22.4	23.45	207						
2454023	5.98	3.71	54.4	22.03	208						
2454024	5.59	3.25	19.3	21.88	209						
2454025	6.09	2.68	1	22.81	210						
2454026	5.39	2.75	0	24.8	211						
2454027	6.44	3.26	0	25.29	212						
2454028	5.83	3.86	0	26.49	213						
2454029	5.91	3.95	0	26.16	214						
2454030	5.84	4.07	0	25.14	215						

Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow	Julian Date	GEP (gC/day)	PET (mm/day)	Rainfall (mm/day)	Air Temp (°C)	DOY grow
2454031	4.99	3.8	0	26.04	216						
2454032	5.13	2.88	0	21.06	217						
2454033	4.85	2.36	15.2	13.23	218						
2454034	4.33	2.42	101.1	14.98	219						
2454035	5.34	2.45	140.5	18.86	220						
2454036	4.72	2.34	0	23.88	221						
2454037	4.66	2.63	0	20.53	222						
2454038	4.84	2.73	0	17.19	223						
2454039	4.99	2.62	0	20.97	224						
2454040	5.35	2.93	0	22.95	225						
2454041	2.72	0.94	26.7	23.09	226						

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