

Preprocessing of spatial data on lakes within the PEP preprocessor

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- The preprocessor PEP
 - Available options
 - Operation of PEP
- Geodata input
 - Topography
 - Land use
 - Soil data
- Lake data
- Conclusions

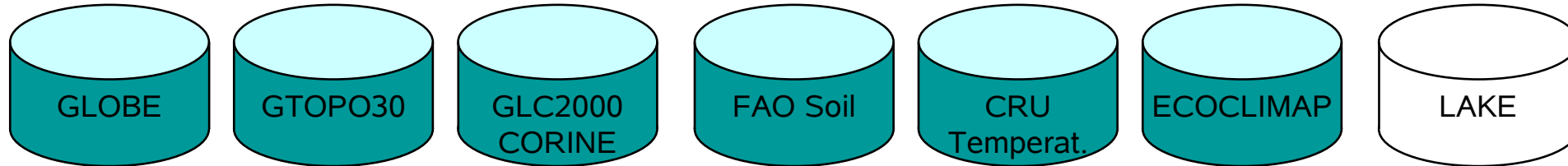
PEP (Preprocessor of time invariant input data for the COSMO-CLM model)

Questions in context of the FLake model

1. What data is required ?
2. How the data should be processed ?

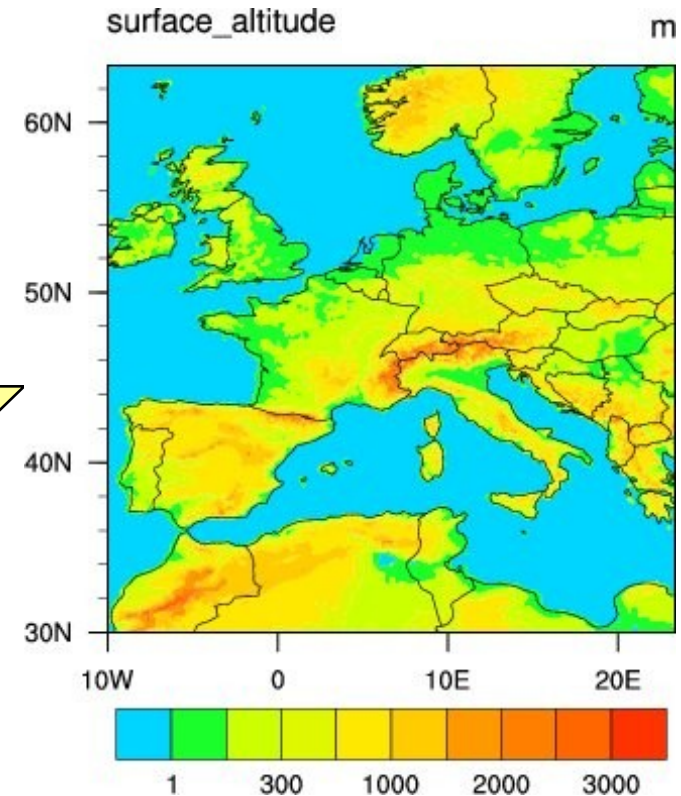
PEP Structure

INPUT (Geographical projection, NetCDF format)



Interpolation

Rotated coordinates
NetCDF data format



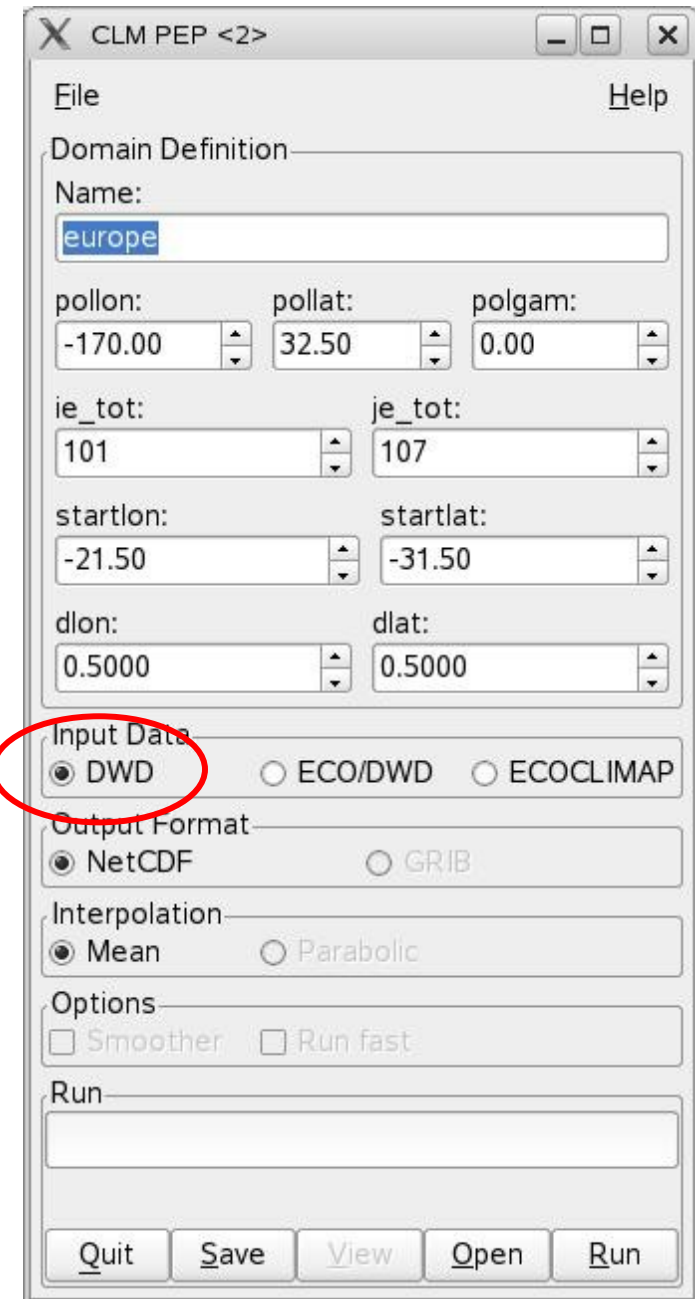
Example: $dx : 1667^\circ \times 0.1667^\circ$

Preprocessor PEP Version 0.5

Provision of time invariant boundary data:
Topography, vegetation, soils and others

- Option DWD (operational):
- Option ECO/DWD
 - monthly resolution of the vegetation parameters + FAO/DWD Soil
- Option ECOCLIMAP
 - Monthly resolution + FAO/STASGO Soil

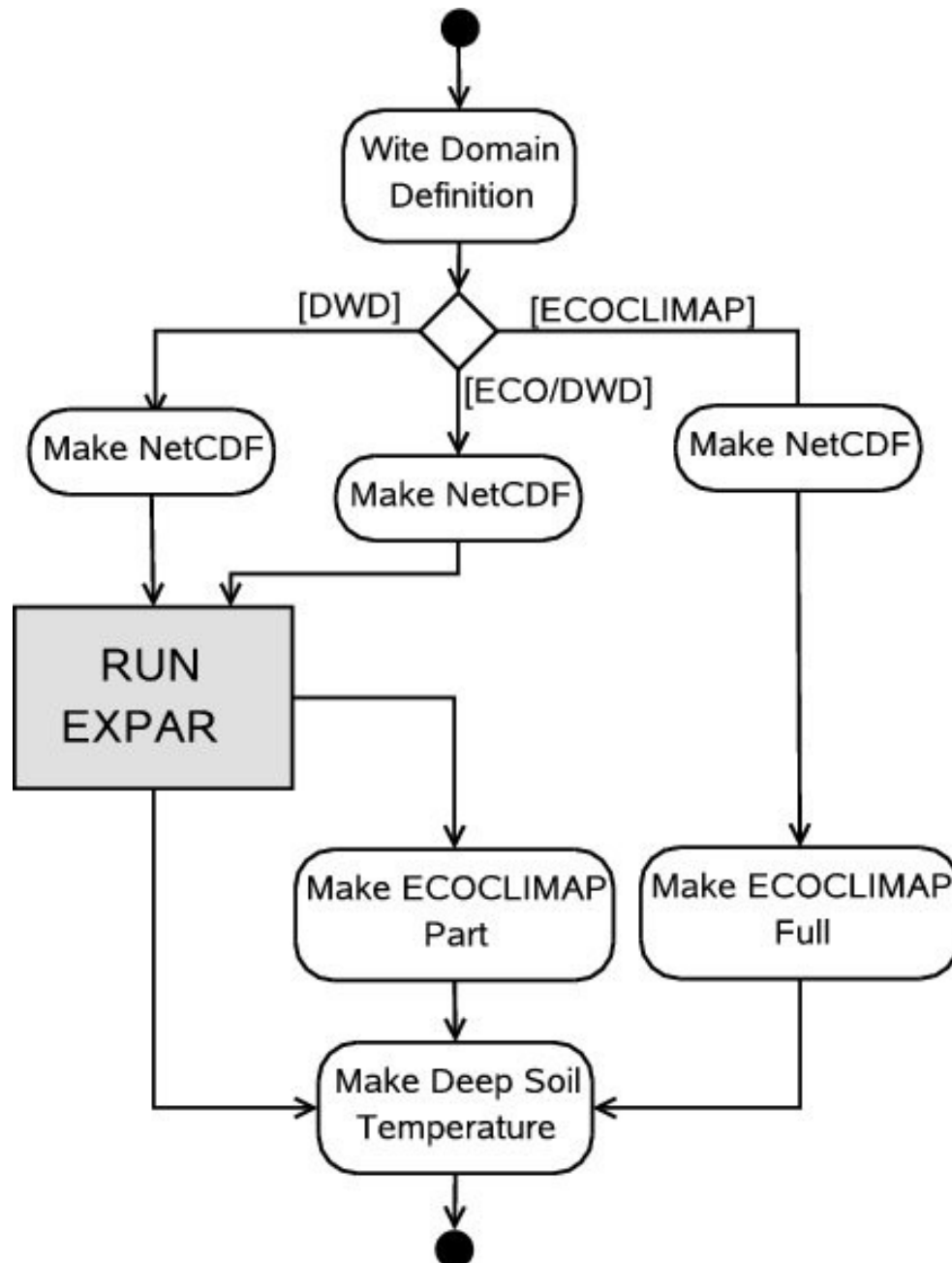
Requirements: Fortran Compiler,
NetCDF library, Perl, Perl-NetCDF,
PerlGTK2



The screenshot shows the CLM PEP <2> GUI with the following settings:

- Domain Definition:**
 - Name: europe
 - pollon: -170.00, pollat: 32.50, polgam: 0.00
 - ie_tot: 101, je_tot: 107
 - startlon: -21.50, startlat: -31.50
 - dlon: 0.5000, dlat: 0.5000
- Input Data:** DWD, ECO/DWD, ECOCLIMAP
- Output Format:** NetCDF, GRIB
- Interpolation:** Mean, Parabolic
- Options:** Smoother, Run fast
- Run:** (empty text box)

Buttons at the bottom: Quit, Save, View, Open, Run



In DWD Option Makefiles for

- PGF90
- GNU Fortran (Intel, AMD)
- GNU Fortran /Mac

Smiatek, Rockel and Schättler:
Meteorologische Zeitschrift, 2008
(in Englisch)

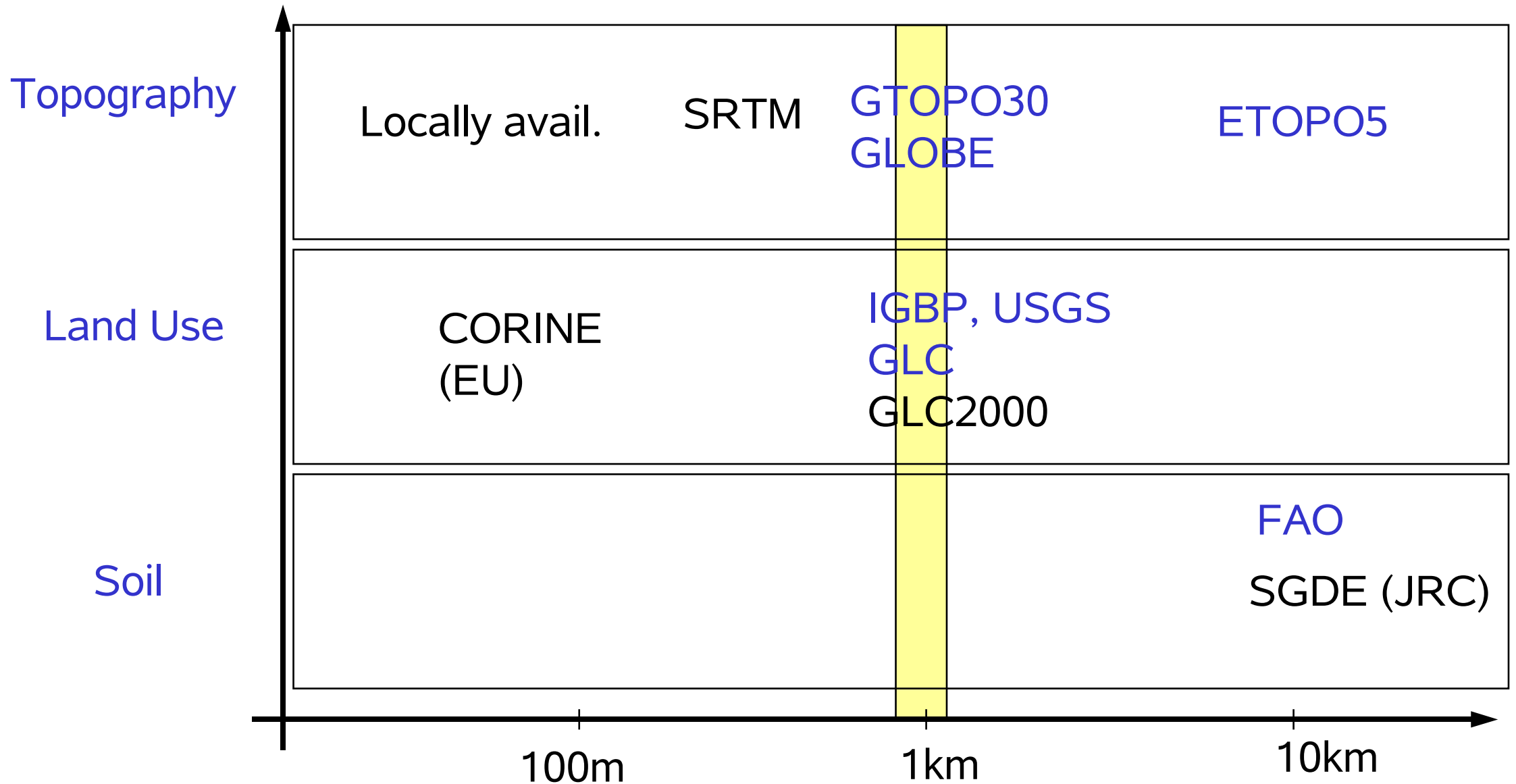
Available parameter data

Variable	Description	Unit	DWD	Option DWD/ ECOCLIMAP	ECO- CLIMAP
HSURF	Surface height	m	●	●	●
Z0	Surface roughness length	m	●		
Z0_VEG	Surface roughness length due to vegetation	m	○		
Z012	Monthly Surface roughness length	m		●	●
Z012_VEG	Monthly surface roughness length due to vegetation	m		●	●
LAI_MX	Leaf Area Index vegetation period		●		
LAI_MN	Leaf Area Index resting period		●		
LAI12	Leaf Area Index monthly values			●	●
LANDUSE	Land use category		○	●	●
FR_LAND	Land-sea fraction		●	●	●
FR_DECI	Fraction deciduous forest		●	●	●
FR_EVER	Fraction evergreen forest		●	●	●
FR_LAKE	Lake area fraction		○	●	●
PLCOV_MX	Vegetation area fraction vegetation period		●		
PLCOV_MN	Vegetation area fraction resting period		●		
PLCOV12	Monthly vegetation area fraction			●	●
ROOTDP	Root depth	m	●	●	●
SOILTYP	Soil texture		●	●	
SOILTYP	Soil texture 0 -30 cm				●
SOILTYP	Soil texture 30 -100cm				●
T_CL	Deep soil temperature	K	●	●	●
ALBEDO	Surface albedo			○	○
DEPTH_LK	Lake depth	m	○	○	○

System parameter data in COSMO-CLM

Parameter	Source	Status
Topography	GTOPO30 GLOBE	Very good
Land use	GLC2000 ECOCLIMAP CORINE	good
Soil Texture	FAO, STATSGO/FAO	poor
Lake-location	From land use	?
Lake-Parameter	Lake data set	?

Spatial resolution of the input data

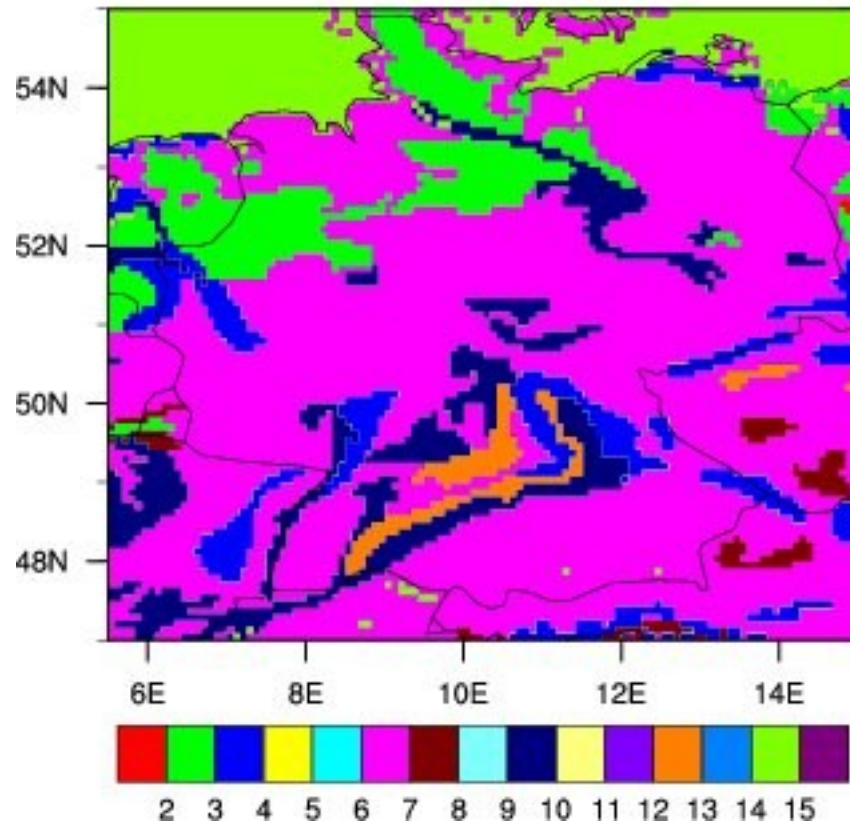


FAO/STATGO soil data

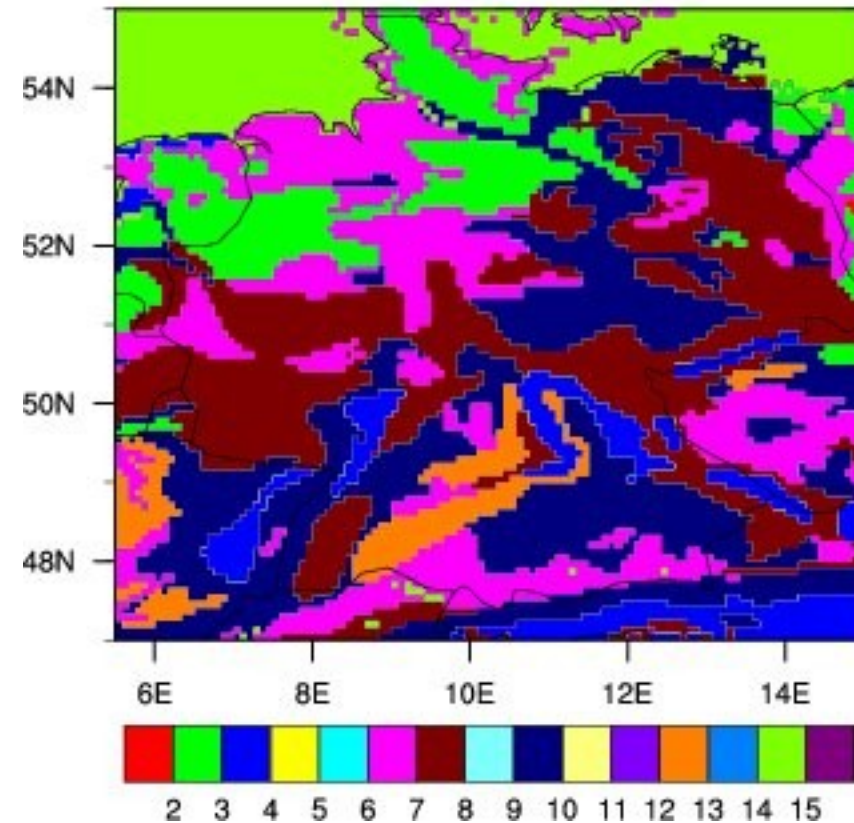
0 - 30cm depth

30 - 100 cm depth

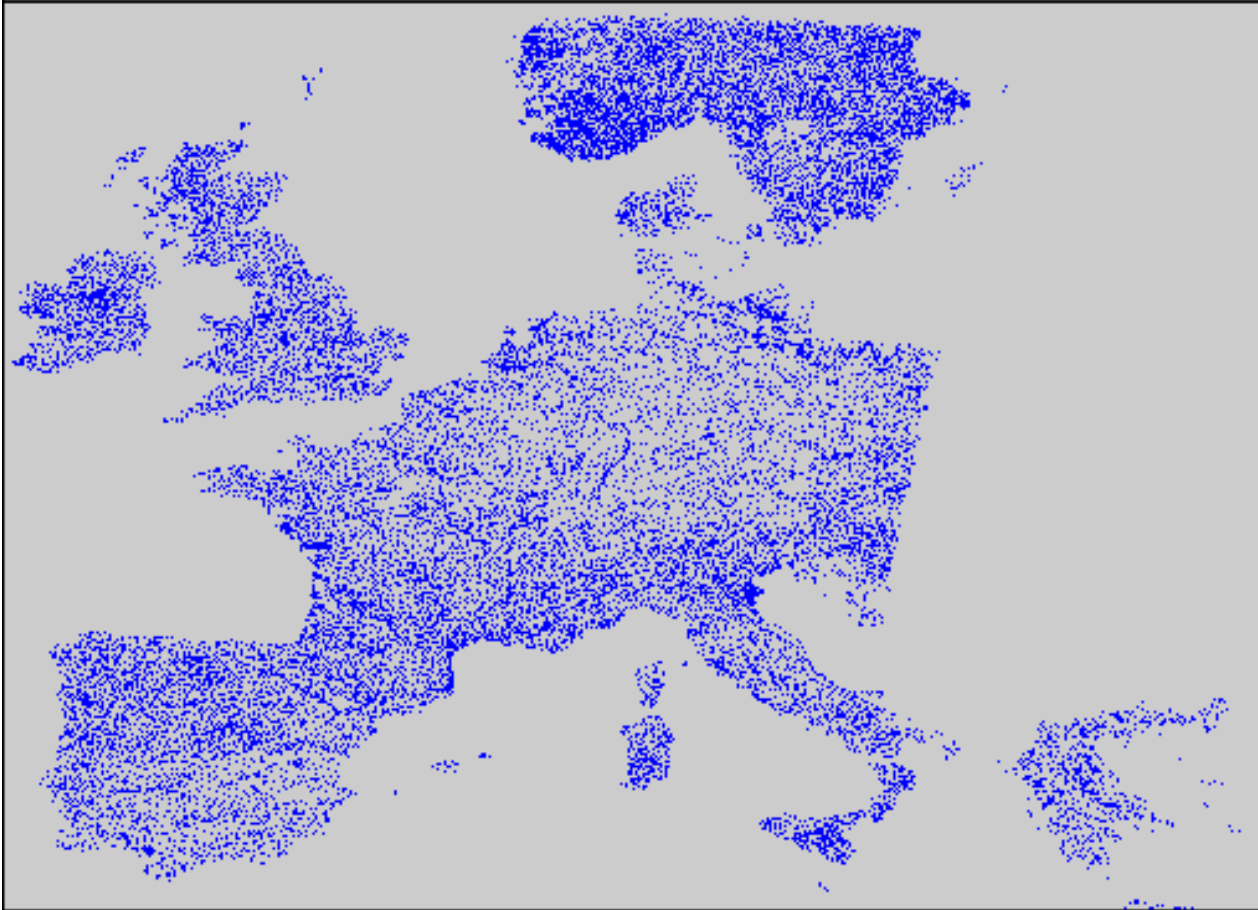
Soil texture category



Soil texture category



Water Patterns and Lake Boundaries of the European Community



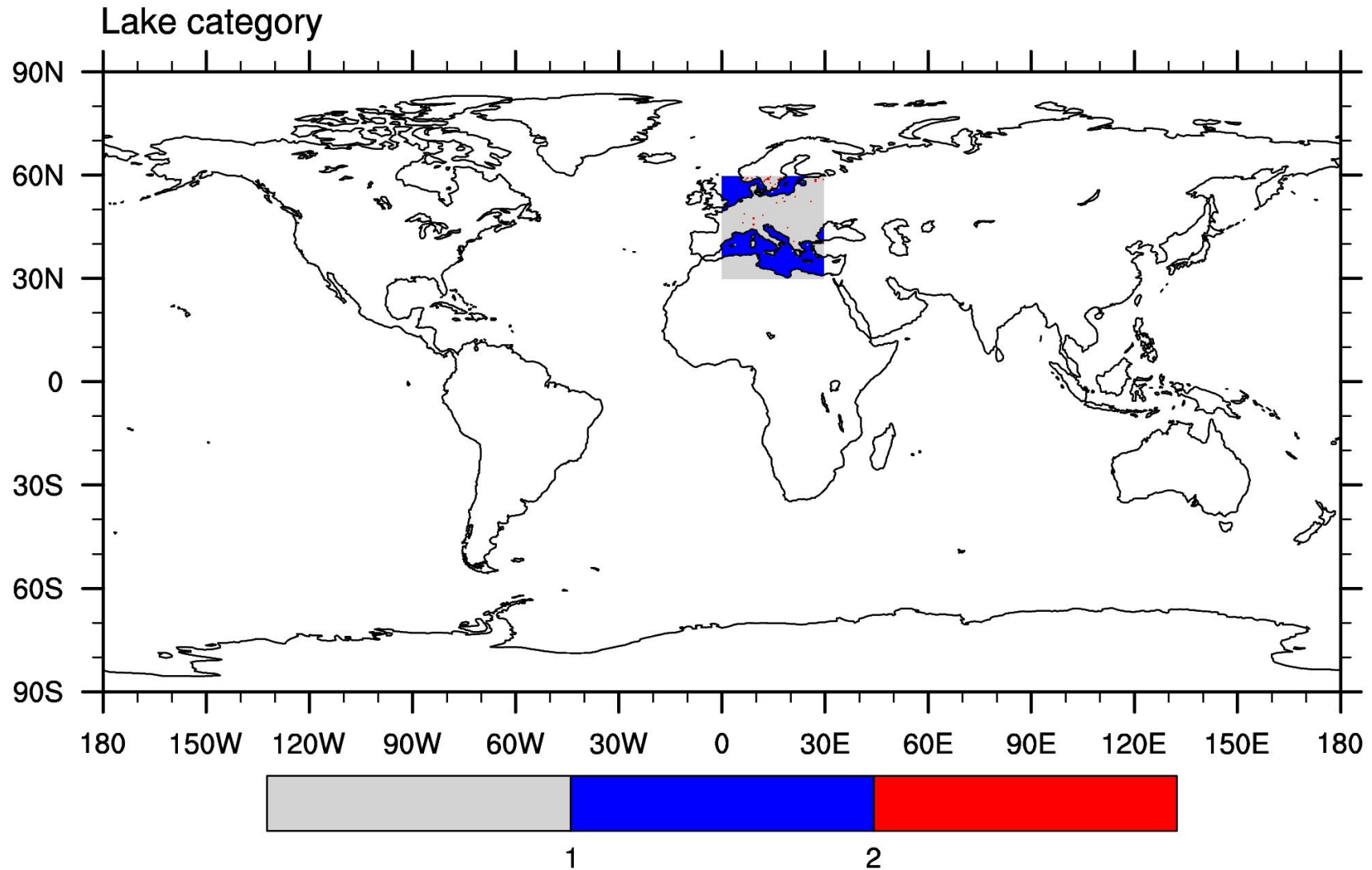
PROJECTION: Geographic
SOURCE: STATISTICAL OFFICE OF THE EUROPEAN COMMUNITIES
(EUROSTAT; LUX.)

- 500 000 natural Lakes
- 16 000 Area > 1 km²
- 24 Area > 400km²

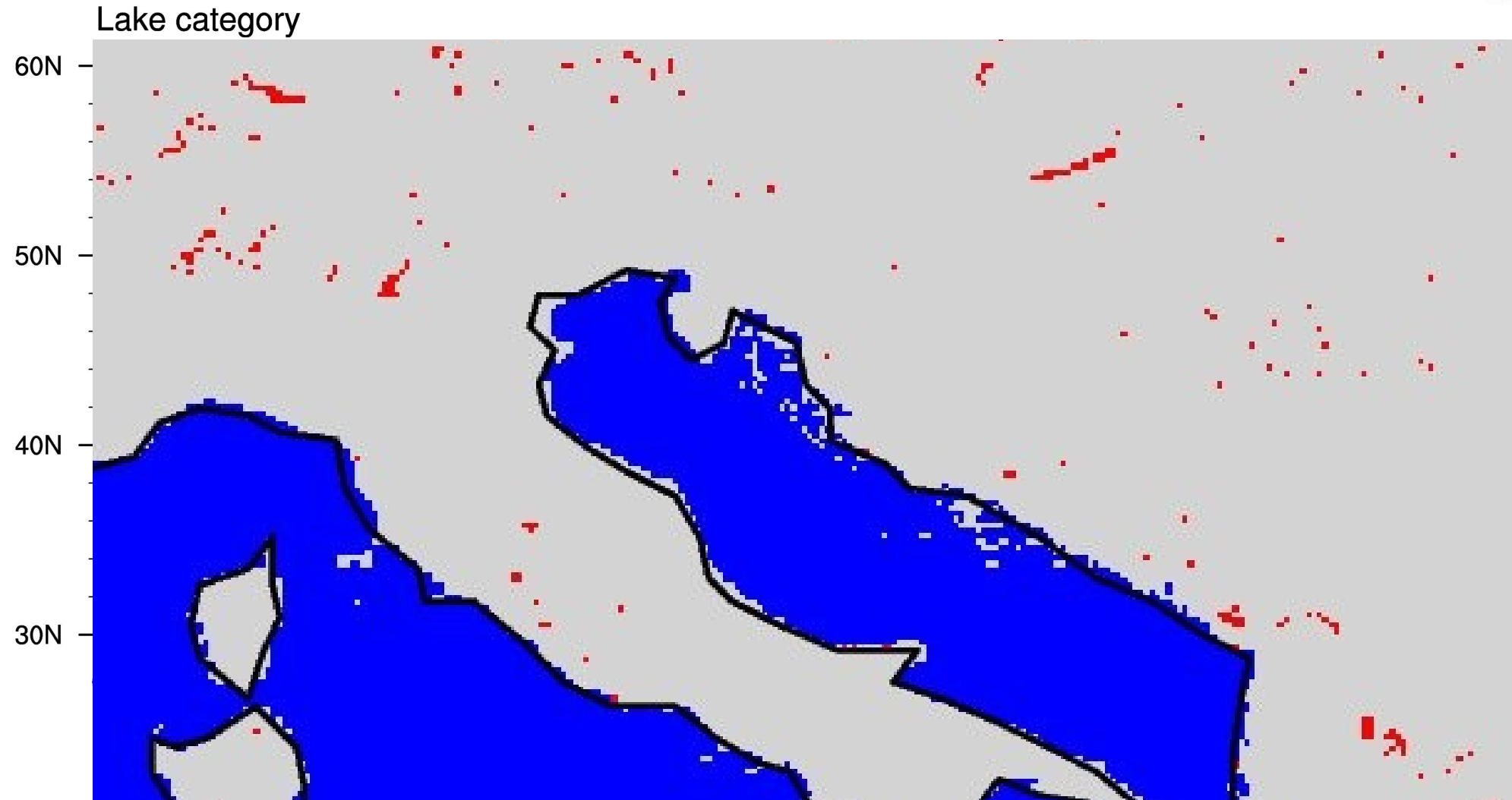
EEA Waterbase - Lakes

Model	Required data
FLake-Model	Location Lake depth Typical winds Optical parameters Sediment temperature

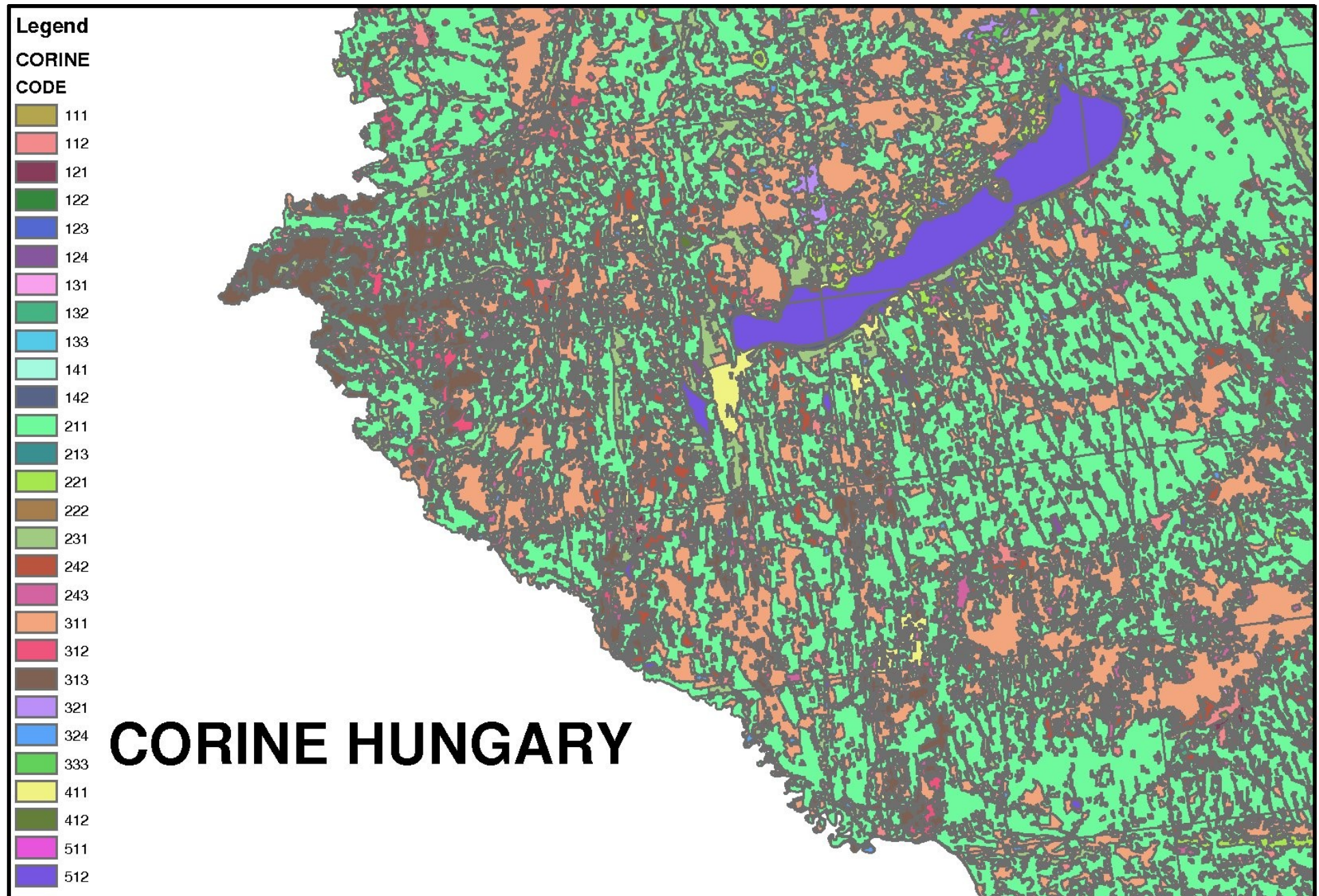
All PEP input in 30° by 30° tiles in NetCDF



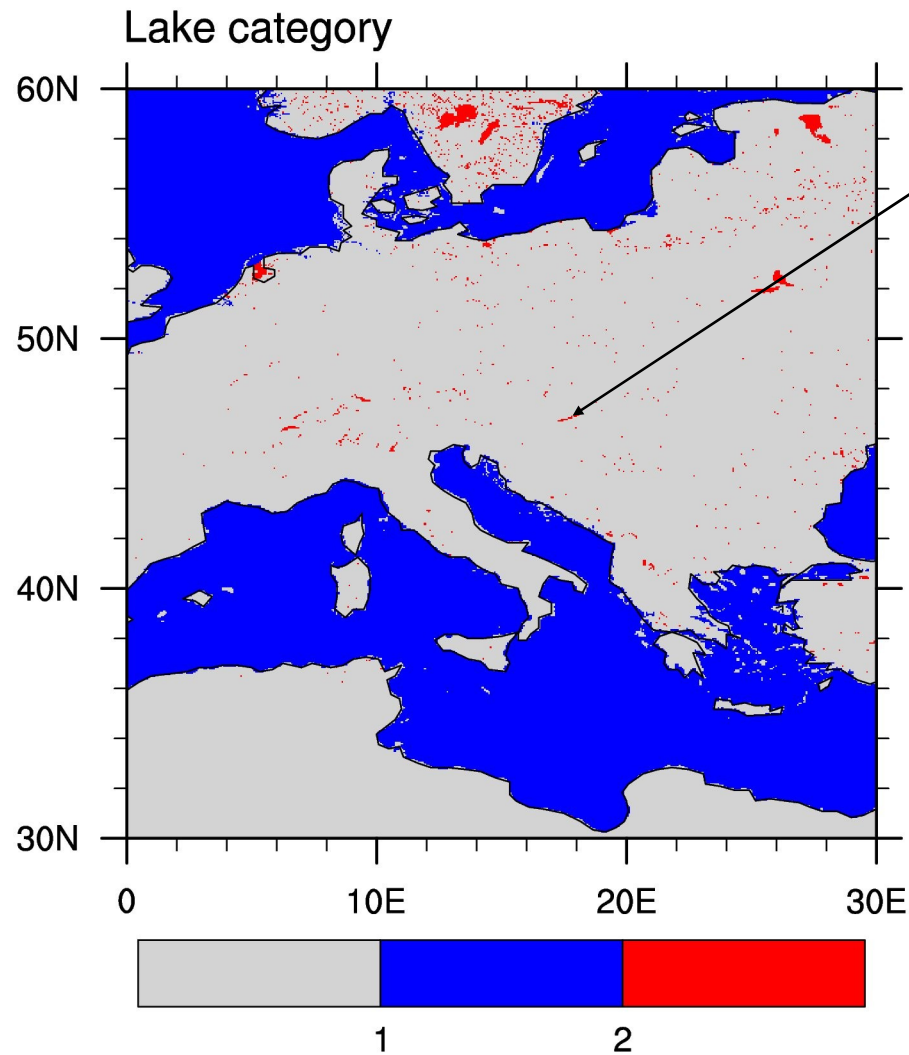
Inland waters tile: 030N000E (ECOCLIMAP)



Data with 30m resolution available



Inland waters tile: 030N000E



LakeDepthDataSet_v1p0

ID

- Location
- Area
- Depth
- ...
- ...

- Topography and vegetation data (Europe, USA) satisfactory
- More detailed data on soils required
- In the lake data base an ID required to link the data with the land use
- Special attention to the land use data processing required