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戦略と可能性 人間・持続可能性・気候

著者	Gregg Suhler
雑誌名	「エコ・フィロソフィ」研究 別冊
号	2
ページ	171-176
発行年	2008-03
URL	http://id.nii.ac.jp/1060/00005239/

「戦略と可能性—人間・持続可能性・気候」

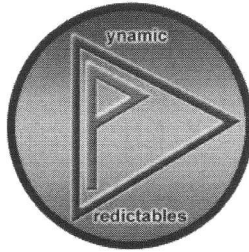
Gregg Suhler (Dynamic Predictable Ltd.代表、気象学)

"AS ABOVE, SO BELOW" - THOTH

DYNAMIC PREDICTABLES from COLUMBIA, MISSOURI

PRESENTING TODAY: GREGG SUHLER

STRATEGY and CAPACITY: HUMANS, SUSTAINABILITY, and CLIMATE



Strategy and Capacity: Humans, Sustainability, and Climate.
IR3S Conference, Mito, Ibaraki, Japan 20071201

Several presentations address sustainability through different frameworks beginning with honored values and respecting the ways of nature. The IR3S framework draws upon global, social and human systems and their associated natural sciences, social sciences and humanities to advance the quest for solving the world's problems. With numerous crosscutting characterizations possible, one framework that has operational applicability is to think in terms of strategy and capacity.

One fundamental planning tenet is that it is easier to change a strategy than it is to change a capacity. A corollary is that available and anticipateable capacity helps filter which strategies are deemed realistic or practical and with what costs and benefits.

That climate's realities might affect the material part of our lives seems intuitively obvious. From economic sciences, one finds that climate affects Gross Domestic Product at a level of about 15% in the most industrialized countries and at about 80% in the least developed countries. From social sciences, one thinks of such extreme events as the American 1930s Dust Bowl which in conjunction with the Depression dashed the hopes of people and altered land use paths. The ability to unravel the interconnectedness of all human events challenged the relatively new statistical sciences. Hence the disparaging term "Dust Bowl Empiricism" arose when causality first blurs then fails as statistical correlations generated the view that everything is connected to everything else but perhaps not in a knowable and useful way. The humanities reveal human culture as seeking order and less frequently justice in the workings of the rain and snow, heat and cold, the tempest's furies, and the underlying principles and spirits that guide them.

Politically, the very stability of societies still depends upon favorable enough harvests and underlying climate as nearby history witnesses these examples:

1. food riots, (Russia 1917),
2. Bengal Famine kills 4,000,000 undercuts core stability (British India 1943),
3. dynastic collapse at end of multidecadal drought (Ming 1644-5),
4. changing political power Indonesia (1998),
5. altered perception of competence and legitimacy New Orleans flood (2005)
6. Less dramatic but as consequential are the climate cofactors in the sweep of tropical and certain other epidemic diseases beginning with malaria.

Climate is ever-changing and its mark is left nearly everywhere. Fundamental forces and system responses drive Earth, being in a quite kinetic part of the universe, in complex yet well behaved ways. Dealing with perceived climate problems often falls into either aversion or adaptation strategies. Adaptation to local and regional climate changes stands to be improved through reliable climate predictions by way of improved planning and operations. On aversion, accurately predicting climate with and without policy sensitive climate variables embedded seems to be a reasonably high standard to meet before seriously setting about changing the actual climate itself, a recently suggested and actively explored approach.

However, maybe it makes sense to ask that we first demonstrate a capacity for climate understanding sufficient enough to predict accurately and reliably over decadal time frames at regional or better spatial scales.

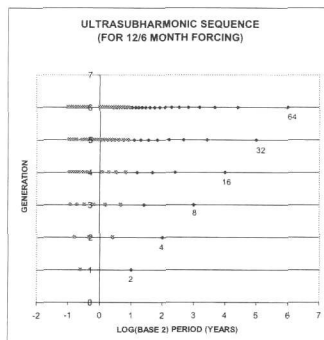
Climate behaves and predicts well enough over Nino3 region equatorial sea surface temperatures (SST), marine-coastal transition region (Oregon) and continental interior (Sherwood, North Dakota) site-specific USA precipitation at 5-10 years forward to suggest a relevant capacity exists to facilitate sustainability through better planning and operations. The above three prediction examples were shown at the AAAS2006 Annual Meeting symposium "El Nino Predictability", organized by this presenter. Underlying physics was also shared. Prediction examples to be shown at this sustainability conference include Mito in Ibaraki prefecture and Tokyo.

Let's examine a key principle of the physics involved. The Earth system is driven by the solar annual cycle. Almost all the energy is in the 12 month and 6 month period terms. It can be shown that the Earth system response favors possible solutions with oscillatory periods involving powers of 2 to the nth power years, i.e. 2, 4, 8, 16, 32, 64, 128....years. The more general form for all periods is:

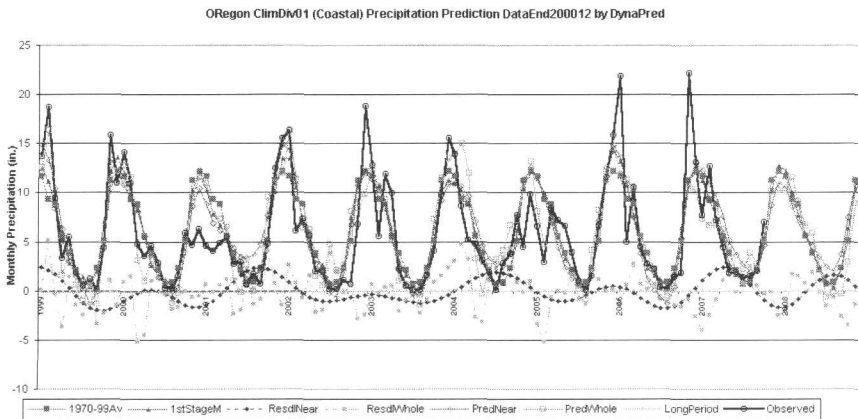
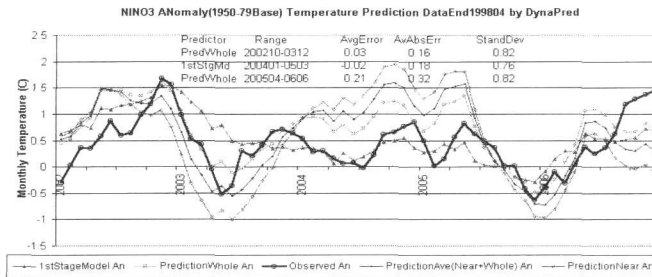
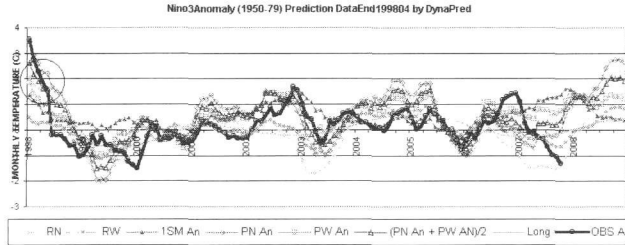
$$T(N, M) = \left[\frac{(2^N) * 12}{m} \right]_{N, m=1, 2, 3, \dots, M} \dots\dots\dots(8)$$

These are called ultrasubharmonic terms and are the basis of period-doubling among other effects. Such terms occur elsewhere in nonlinear physical systems and a literature exists dating from the early 1980s.

A feedback system exists such that the preferred, more readily sustainable periods occur as shown here out through the 6th generation:



Nino3 Sea Surface Temperature (SST) anomaly for in the eastern Pacific (90W-150W, 5N-5S). For Japan and other east Asia a strongly warm El Nino in Eastern Pacific significantly favors long lead typhoon development moving to higher latitudes.

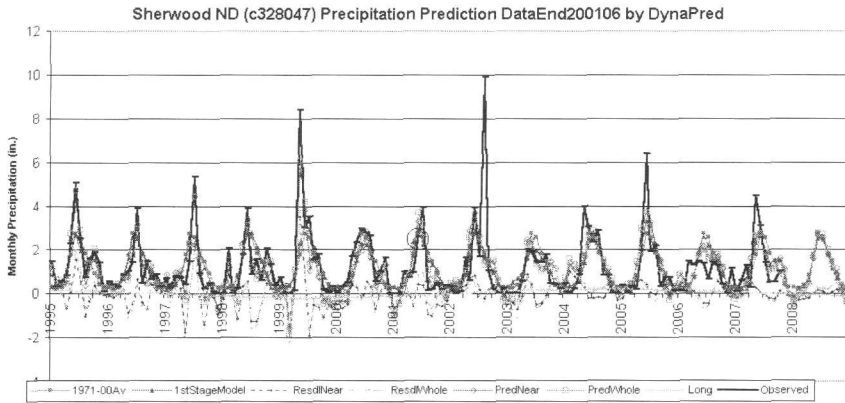


Regional Climate Prediction

Oregon Climate Division 01 (Coastal) precipitation prediction was done using data through 200012. This prediction was presented before the American Association of State Climatologists Annual Meeting in August 2001 and before the American Geophysical Union Fall Meeting in December 2002. Key features are catching the patterns for both the average year and extremes. This prediction turns 7 years old from January 2008. Note predicting the patterns for a coastal/ maritime transition in the US Pacific Northwest.

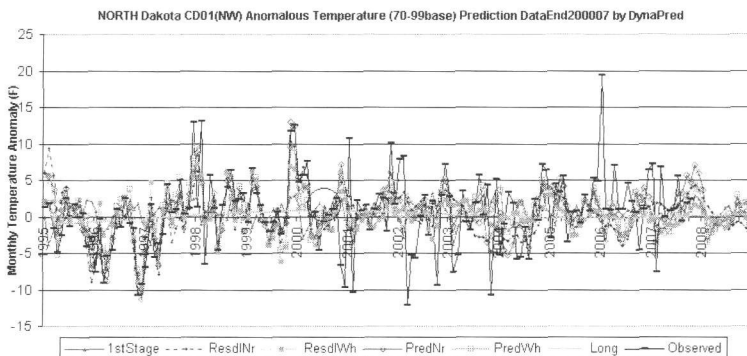
Site-Specific Prediction

Sherwood 3N North Dakota precipitation records come from a US Canada border station. This prediction was made for a customer in January 2004. DataEnd was 200106 (pointer). This chart was first shown at a US National Weather Service Climate Services workshop in July 2004



Temperature prediction for North Dakota Climate Division01 (Northwest).

Prediction input data ended 200007. Note pattern proportionality and declining maximum temperature going into 2004. In 2004, freezing temperatures occurred in each month on the farm. Regional crop disaster hit much of North Dakota. 2008 predicts to be similar--note the sharp dip, lack of upside components in first 7 months of 2008.



Predictability is but another tool to be used in Capacity's tool chest. It is a tool that offers foresight capability in mankind's workings within the environment. Predictability is a tool that stands to help all the other tools work a little better. Sustainability is a value, an approach, an ultimate measure as to the suitability of mankind's tenure on this Earth. Properly used climate predictability and its methods hold forth the prospect of broadened time reference frames for thoughtful, considered engagement of a major factor in this Earthly existence. Climate is a basic capacity component.

Systematic and careful evaluation of strategies and capacities is best examined through an honest broker process. Little room properly exists for science where the strength and effectiveness of advocacy outstrips the fundamental knowledge. However, such appears not to be the case today as science and politics try to first understand and then come to terms with global change in an ever more populated world.

The prediction capability demonstrated briefly here today calls into question many of the unsupported scientific assertions that go into the current Global Change debate. The science involved here is virtually all-natural climate dynamics but not as conventionally practiced. Such ought to be welcome news as mankind seeks good ways into the future.

However, this science might be inconvenient in the short run for the politics involved. Certainly the standard for knowing what you're talking about in climate is being raised, I think, to reasonably high levels considering what is at stake.

Strategies need to be considered with capacities. There's a new capacity to be considered when it comes to climate science and such sciences being put to service with other sciences.

It is an honor to be here learning and sharing with you.