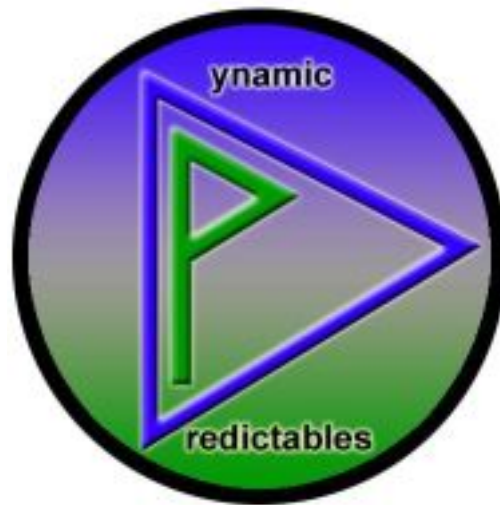


“AS ABOVE, SO BELOW” - THOTH

DYNAMIC PREDICTABLES from COLUMBIA, MISSOURI USA

PRESENTING TODAY: GREGG SUHLER

CLIMATE CHANGE: IMPLICATIONS, CONSEQUENCES, AND PREDICTABILITY--PLUS POLITICS



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.

Large, crosscutting problems often find themselves addressed through political processes. Climate seems to be archetypal large and crosscutting in its scientific and political dimensions.

Dealing with perceived climate problems often falls into either adaptation or aversion strategies.

1. Adaptation to local and regional climate changes stands to be improved through reliable climate predictions by way of improved planning and operations.

2. On aversion, accurately predicting climate with and without policy sensitive climate variables included 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.

Climate Changes. Climate Always Changes. Are the Rules Changing?

Affected areas: Environment, Natural Resources. Water and Hydrology. Agriculture, Energy, Transportation, Health, Infrastructure, Natural Disasters, Risk management.

Who is involved? Who are the stakeholders?

Economics: Climate touches directly or indirectly 15% of economy (the most industrialized countries) up to on order of 80% least industrialized countries.

What does science have to say? What does politics have to say? What are implications?
Let us look at history and then at most people's starting point with the United Nations IPCC.

IMPLICATIONS for Climate Change.

Warmer or Cooler. For Better or for Worse.

What can be learned through human history?

Warmer climates have generally favored human development. Cooler climates have been unfavorable.

In current times, internationally used measures of hardship including mortality related to extreme heat or to extreme cold find that cold causes on order 10 times as many problems as heat.

Within the last millenium,

- The Medieval Warm Period accompanied relative prospering of civilizations with some problems of spreading disease most notably the bubonic plague which had other cofactors. Evidence shows that major storm frequency and severity was less.
- The Little Ice Age was associated with more hardships directly related to cold. The frequency and severity of major storms was greater.

Not to oversimplify, there were other factors including volcanic activity, but the generalization seems to hold in the human record—cold has been more troublesome.

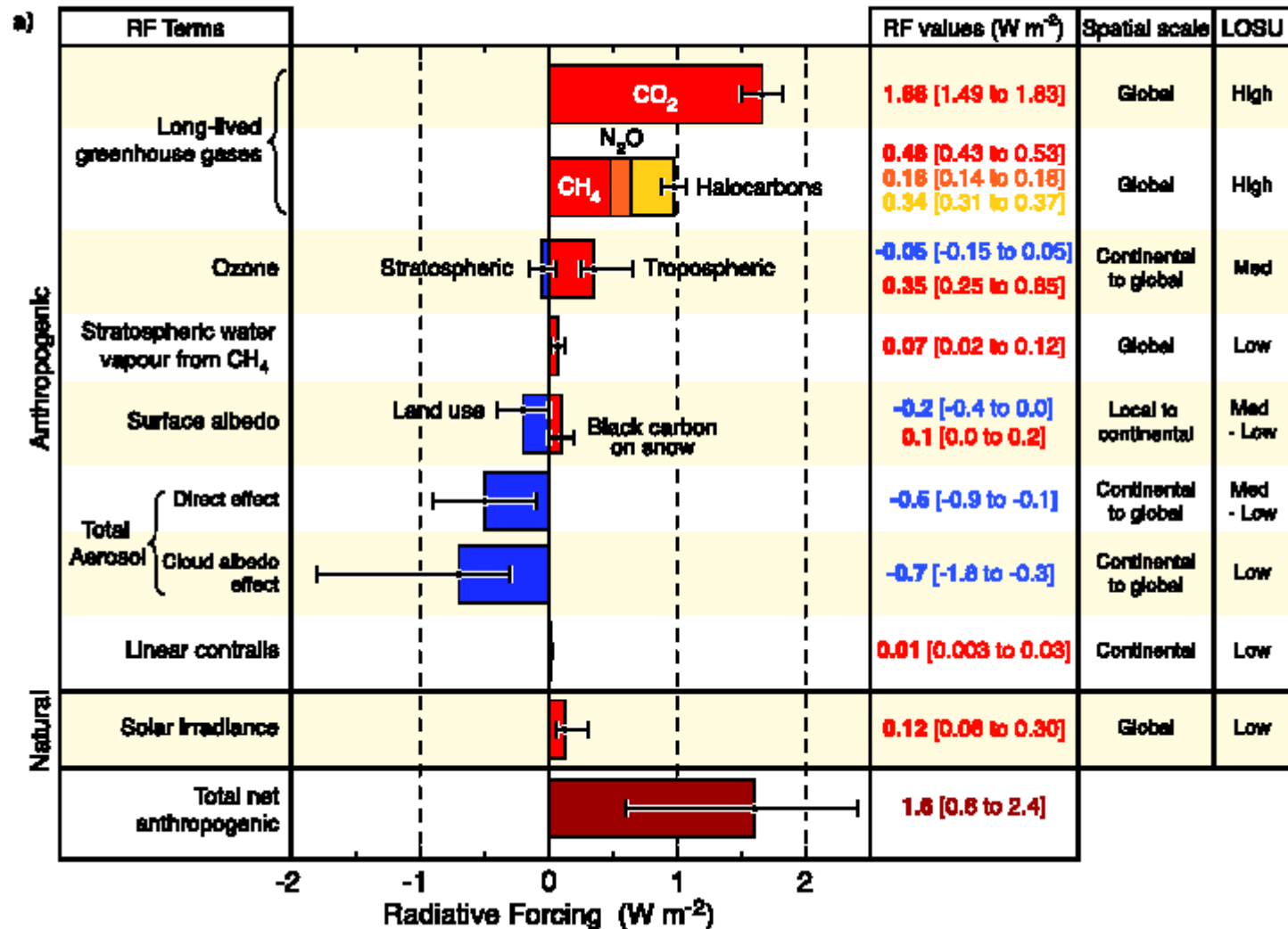
THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (IPCC)
Oslo, 12 Oct 07 - The Intergovernmental Panel on Climate Change and Albert Arnold (Al) Gore Jr. were awarded of the Nobel Peace Prize "for their efforts to build up and disseminate greater knowledge about man-made climate change, and to lay the foundations for the measures that are needed to counteract such change".

MANDATE

The IPCC was established to provide the decision-makers and others interested in climate change with an objective source of information about climate change. The IPCC does not conduct any research nor does it monitor climate related data or parameters. Its role is to assess on a comprehensive, objective, open and transparent basis the latest scientific, technical and socio-economic literature produced worldwide relevant to the understanding of the risk of human-induced climate change, its observed and projected impacts and options for adaptation and mitigation. IPCC reports should be neutral with respect to policy, although they need to deal objectively with policy relevant scientific, technical and socio economic factors. They should be of high scientific and technical standards, and aim to reflect a range of views, expertise and wide geographical coverage.

Source: IPCC_ar4_wg1_ts p32 LEVEL OF SCIENTIFIC UNDERSTANDING

GLOBAL MEAN RADIATIVE FORCINGS



©IPCC 2007: WG1-AR4

GLOBAL MEAN SURFACE TEMPERATURE ANOMALIES

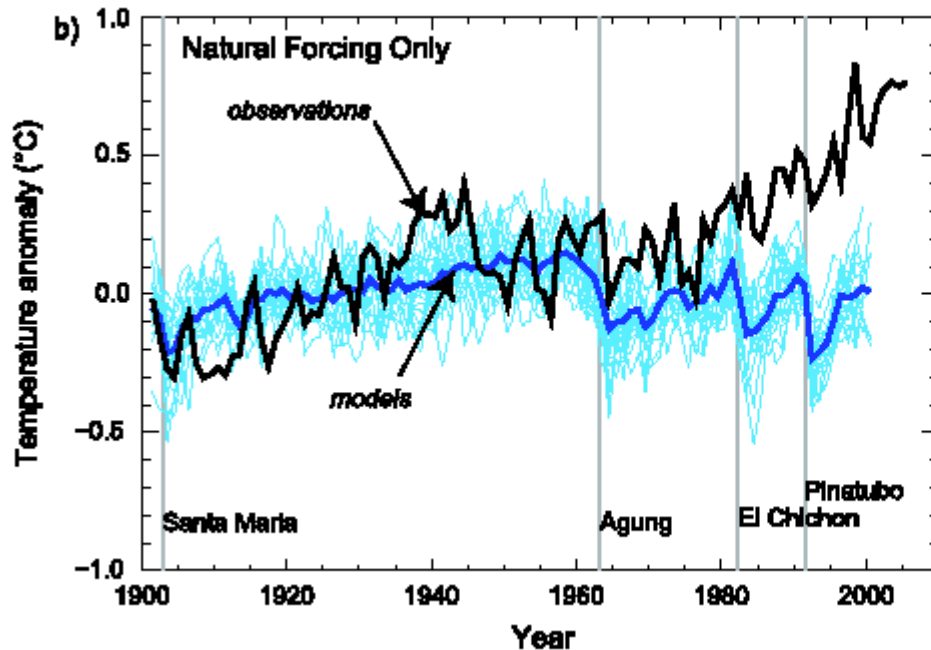
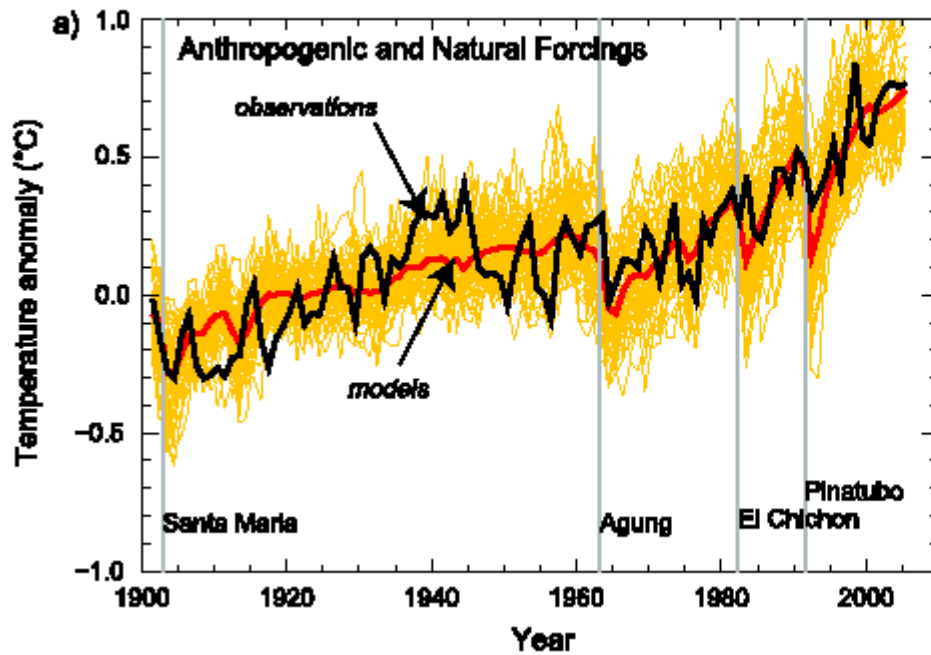


Figure TS.23. (a) Global mean surface temperature anomalies relative to the period 1901 to 1950, as observed (black line) and as obtained from simulations with both anthropogenic and natural forcings. The thick red curve shows the multi-model ensemble mean and the thin yellow curves show the individual simulations. Vertical grey lines indicate the timing of major volcanic events. (b) As in (a), except that the simulated global mean temperature anomalies are for natural forcings only. The thick blue curve shows the multi-model ensemble mean and the thin lighter blue curves show individual simulations. Each simulation was sampled so that coverage corresponds to that of the observations. [Figure 9.5]

Source: IPCC 4AR_wg1_ts p44

What if these IPCC assessments are wrong?

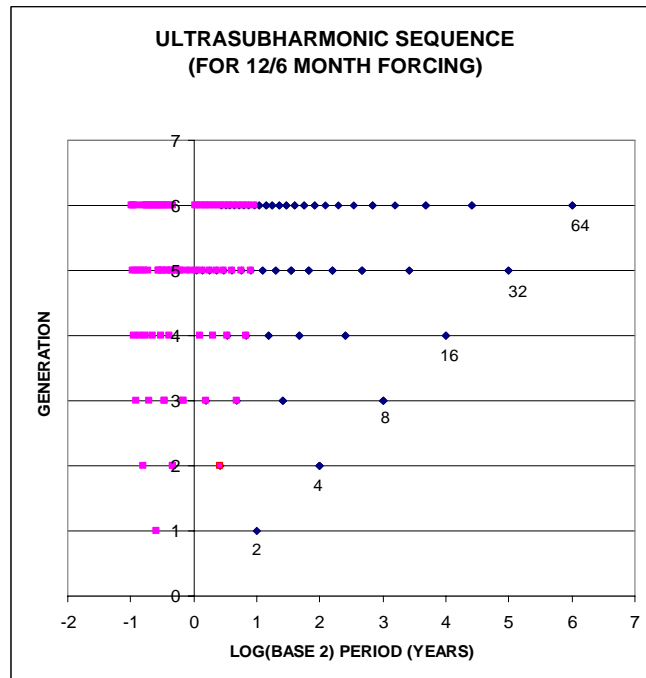
Specifically, what if natural climate dynamics can be shown to have greater explanatory power as evidenced through climate predictions?

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:

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

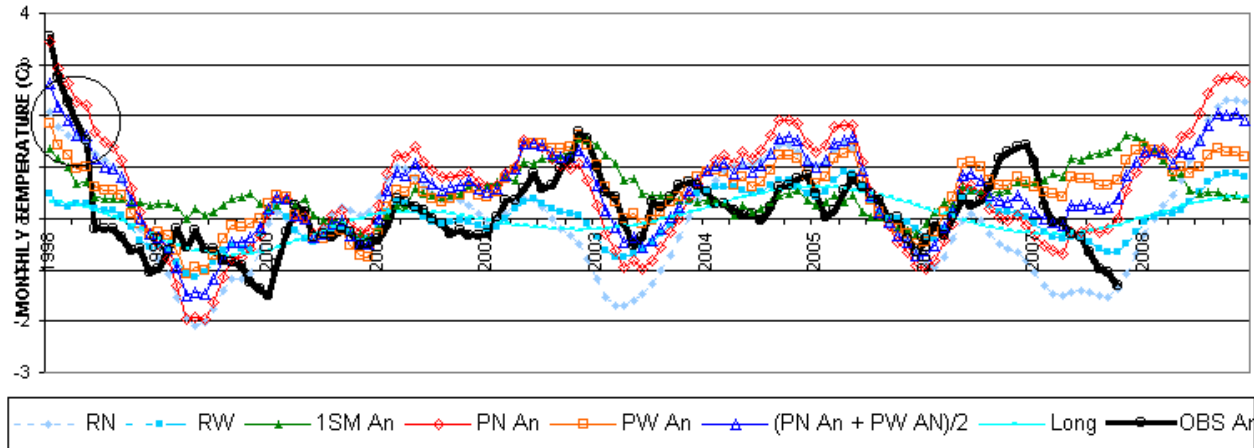
These are called ultrasubharmonic terms and are the basis of period-doubling among other effects. Such terms occur elsewhere in nonlinear physical systems and a literature exists dating from the early 1980s.

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

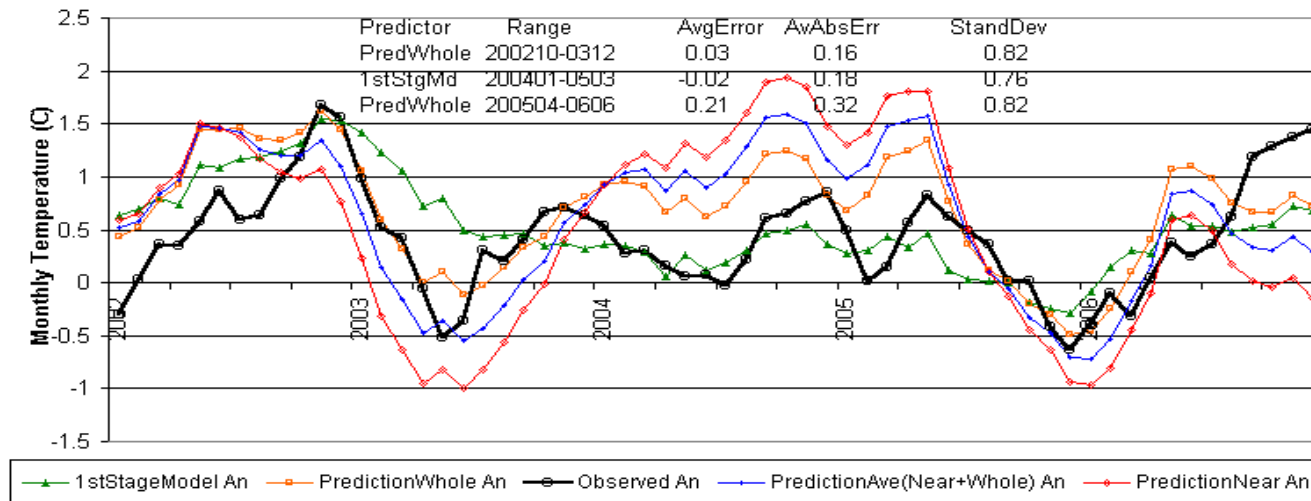


Nino3 Sea Surface Temperature (SST) anomaly for in the eastern Pacific (90W -150W , 5N-5S). For Japan and other east Asia a strongly warm El Nino in Eastern Pacific significantly favors long lead typhoon development moving to higher latitudes.

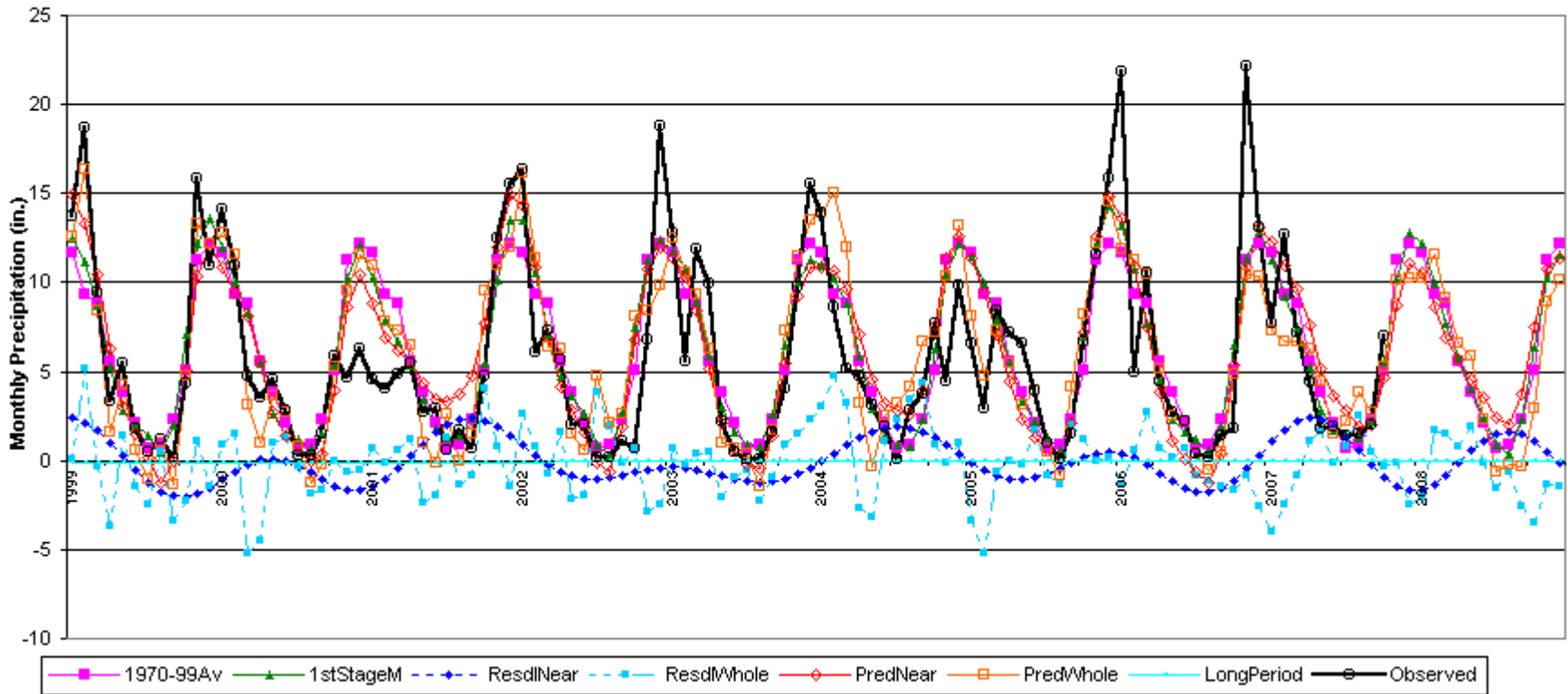
Nino3Anomaly (1950-79) Prediction DataEnd199804 by DynaPred



NINO3 ANomaly(1950-79Base) Temperature Prediction DataEnd199804 by DynaPred



ORegion ClimDiv01 (Coastal) Precipitation Prediction DataEnd200012 by DynaPred



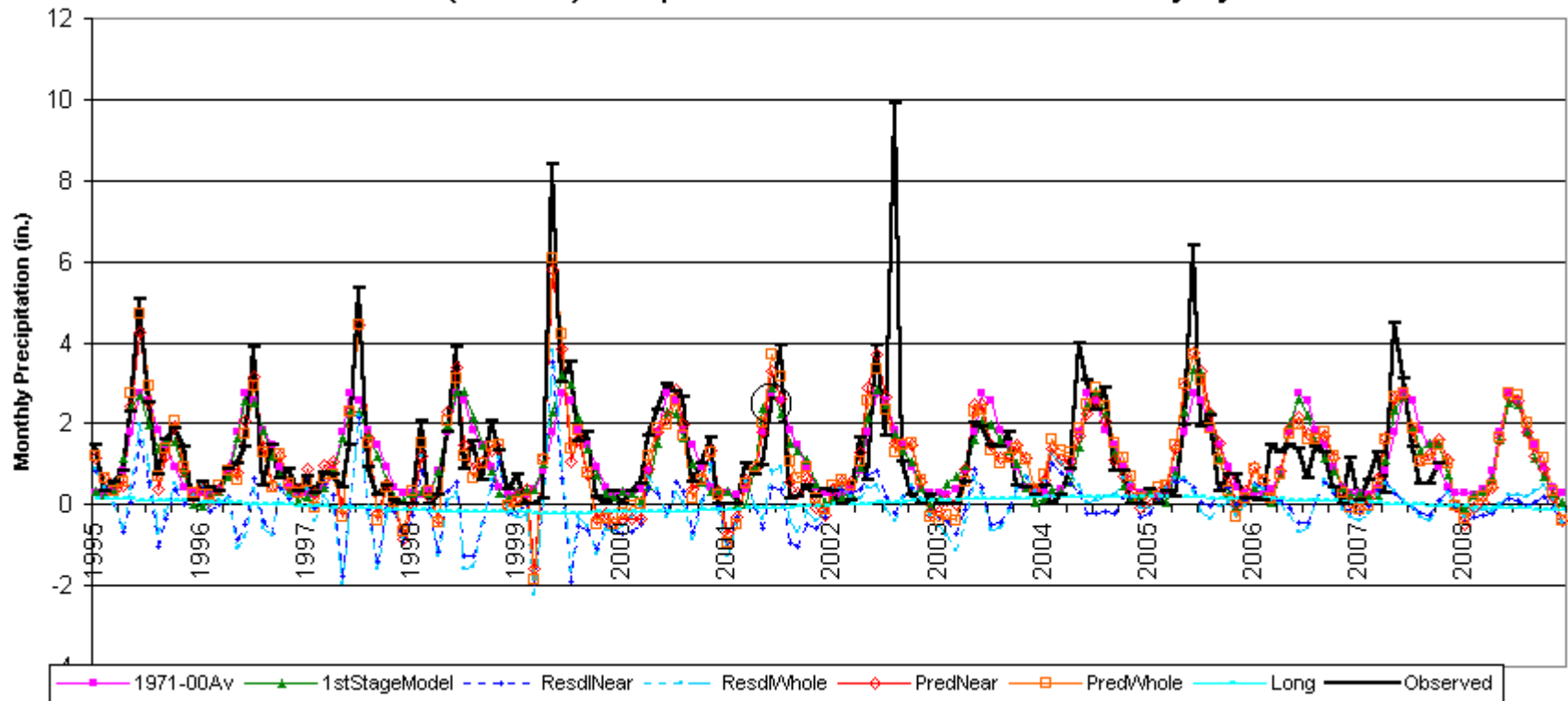
Regional Climate Prediction

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

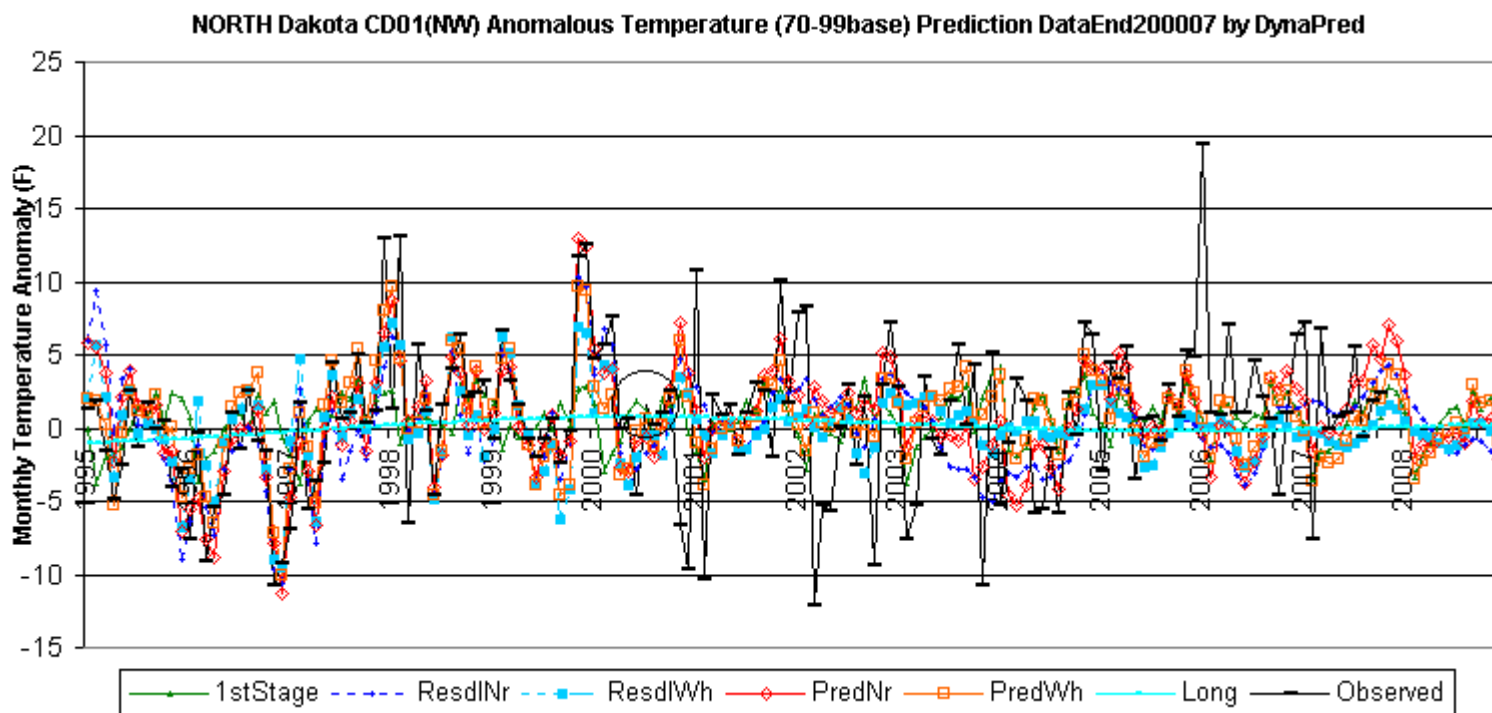
Sherwood 3N North Dakota precipitation records come from a US Canada border station. This prediction was made for a customer in January 2004. DataEnd was 200106 (pointer). This chart was first shown at a US National Weather Service Climate Services workshop in July 2004

Sherwood ND (c328047) Precipitation Prediction DataEnd200106 by DynaPred

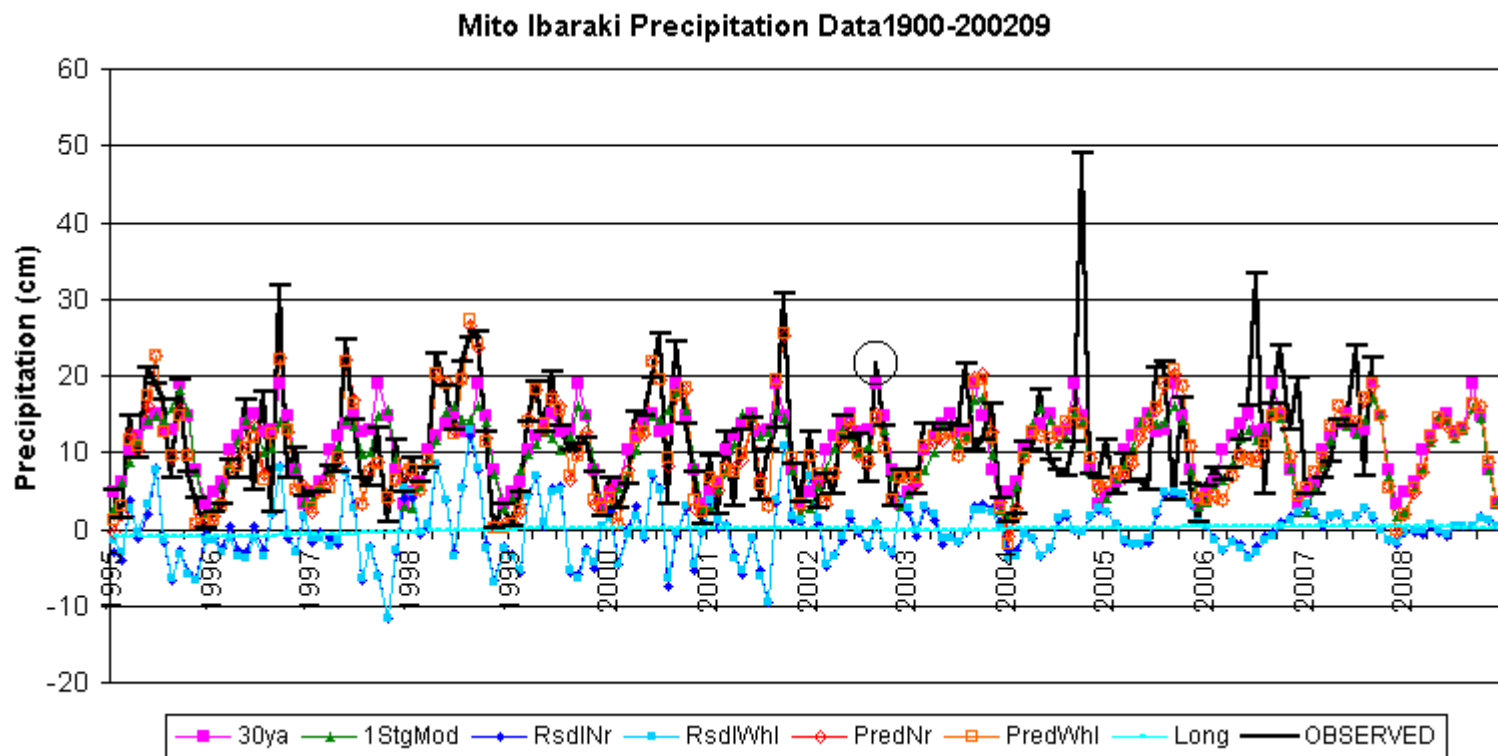


Temperature prediction for North Dakota Climate Division01 (Northwest).

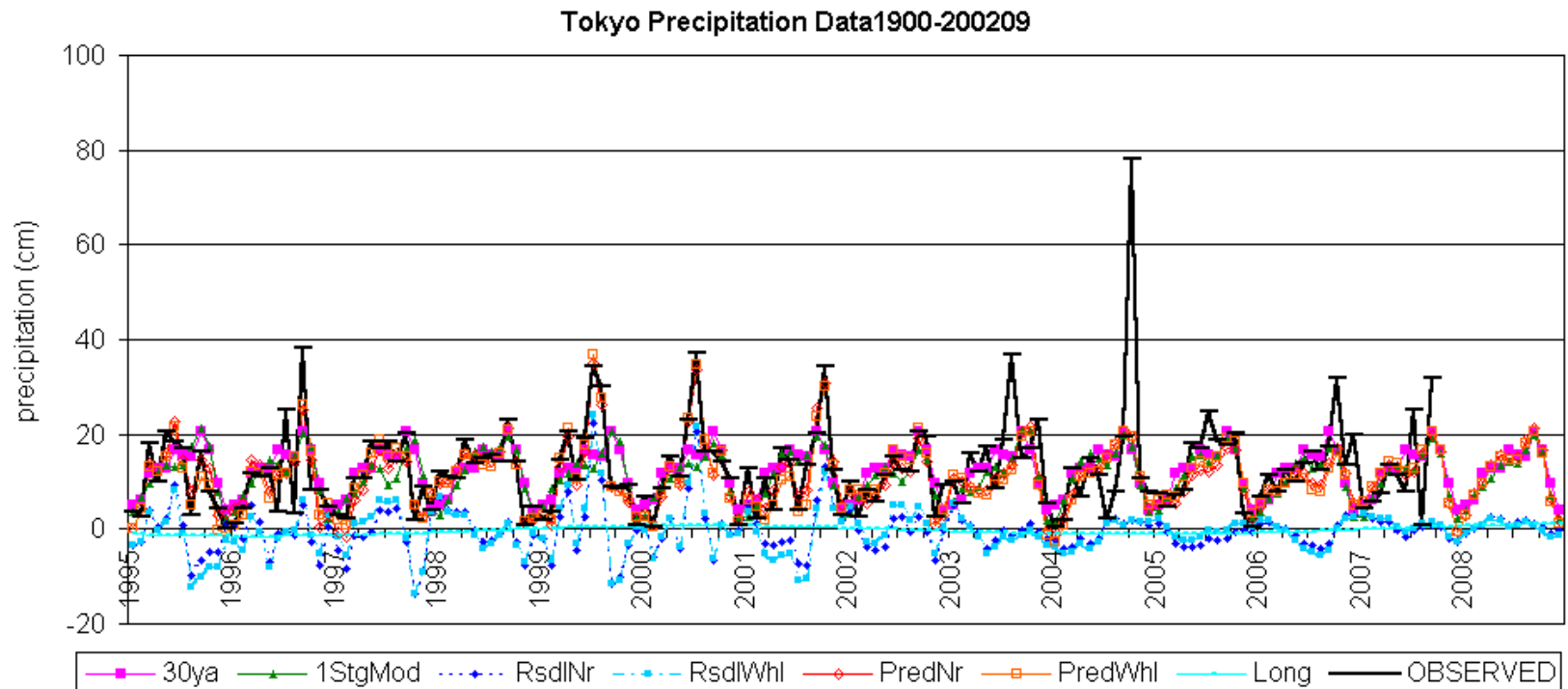
Prediction input data ended 200007. Note pattern proportionality and declining maximum temperature going into 2004. In 2004, freezing temperatures occurred in each month on the farm. Regional crop disaster hit much of North Dakota. 2008 predicts to be similar--note the sharp dip, lack of upside components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



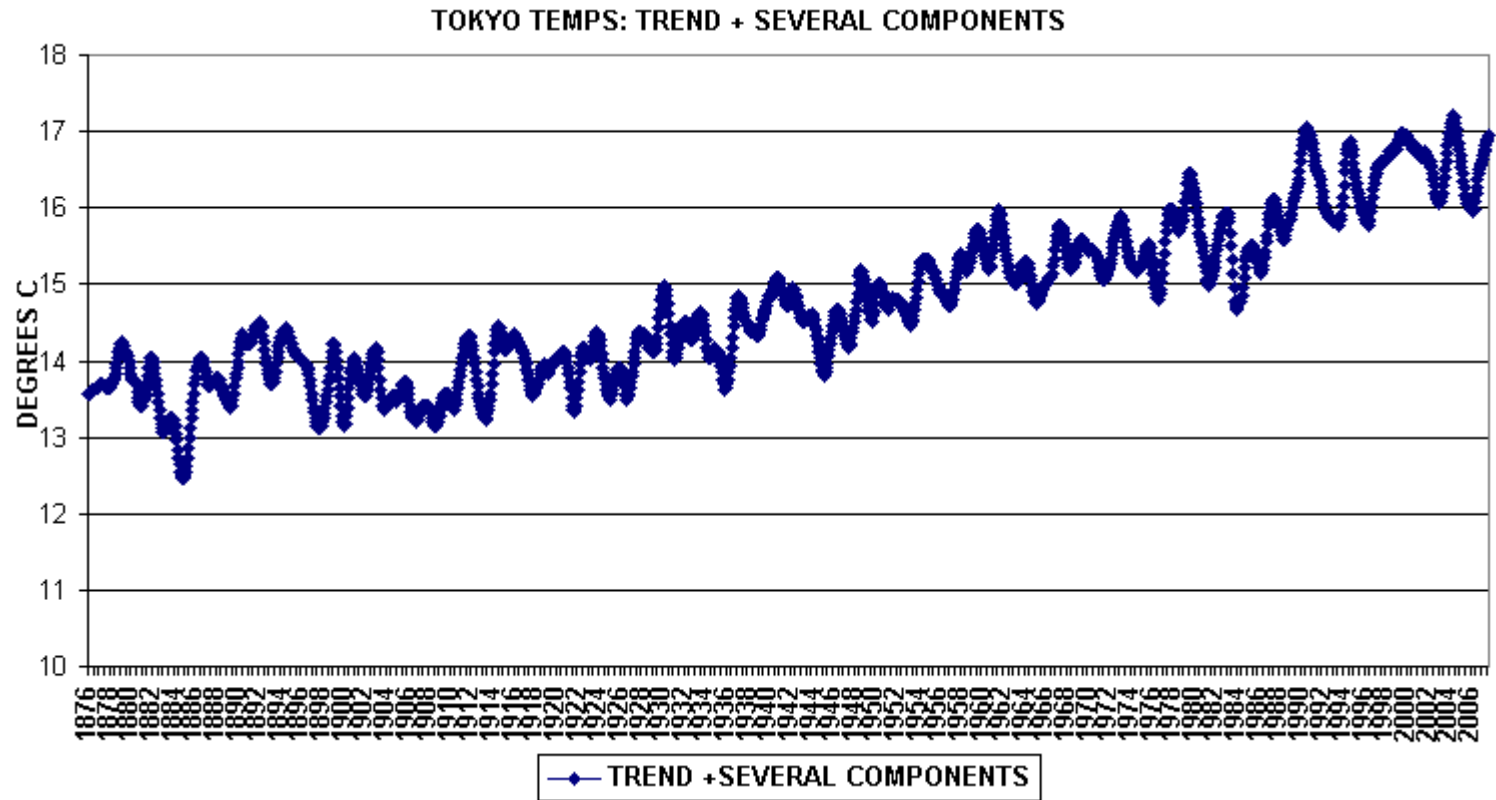
Mito Precipitation Prediction



Tokyo precipitation prediction



Tokyo Temperature historical



Comments and Observations

SCIENCE

Climate Prediction over decadal time frames is the geoscience equivalent of finding the dinosaur bones. Physical oscillating forced and responding systems exist and provide evidence at all time scales. Nonequilibrium dynamics and long reference time scales reflect the physical realities.

Short time frame equilibrium approaches have as starting points that longer time frames are irrelevant. Significant climate departures from long or short term averages scare people because of the way they view the way the world works. Of course GCMs were not scientifically intended to predict—they were integrative large scale research tools. But technically they shouldn't even be doing baseline and scenario analysis because the underlying system is interactively nonlinear from the start. However these short range models came to be preferred over the longer time frame realities.

POLICY

The IPCC was policy and government driven from the start—the mandate was to show evidence for and work toward solutions to manmade climate change. The system was flawed from concept if you wanted open inquiry. Most people want their science to ultimately be an honest broker in service to broader needs. After 20 years and hundred of millions and now billions of research dollars much more is known from geosciences. But the big policy outcome was written into the IPCCs 1998 mandate. The policy has some strengths. Based on best science isn't one.

Policy, continued

Simply speaking, if climate change is manmade, then aversion makes sense. If changing climate is natural, then adaptation makes more sense. Of course, reality is more complex than this corner solution characterization.

If aversion means geoengineering climate, then that is a pretty high calling. Being able to predict the outcome is another but reasonably high standard. The present altering advocates cannot predict the climate we have. Inquiry and study are appropriate, but the burden of proof for change properly resides with the advocates for change. Look at Sharon Begley's Newsweek article on Geoengineering last week. Think of what discussions are underway in Bali with the UN now taking up climate change at specifically government levels. Clive Crook in an August Financial Times piece called the IPCC the "Climate Science Steamroller". So now comes the "Climate Policy Steamroller"—maybe.

POLITICS

Politics has ways of bringing differing realities to the front. Despite the IPCC official science stamp, lots of other scientific understganding Walks into US Congressional offices with something to say about climate. Geological sciences show CO2 lagging not leading temperature by around 200 years and even significantly shorter time scales is but one example. Members of Congress tend to weigh heavily what their constituents say.

Politics occurs at national, federal, state and local levels in the US. At the federal level, the US Senate is likely to pass the Lieberman-Warner bill. If the House gets up a companion bill and passes it in time for a conferenceable bill to go to President Bush, it will almost receive a Veto in time to rally the environmental vote in 2008. Presuming a Democrat Wins the Presidency in 2008, something like Senator Sanders from Vermont is likely to pass and become law in 2009. In the meantime, state and local initiatives are becoming hotbeds of innovation. Stay tuned to Washington.

In the meantime, what of China, India and others? If you like US domestic politics, some say you will love China`s.