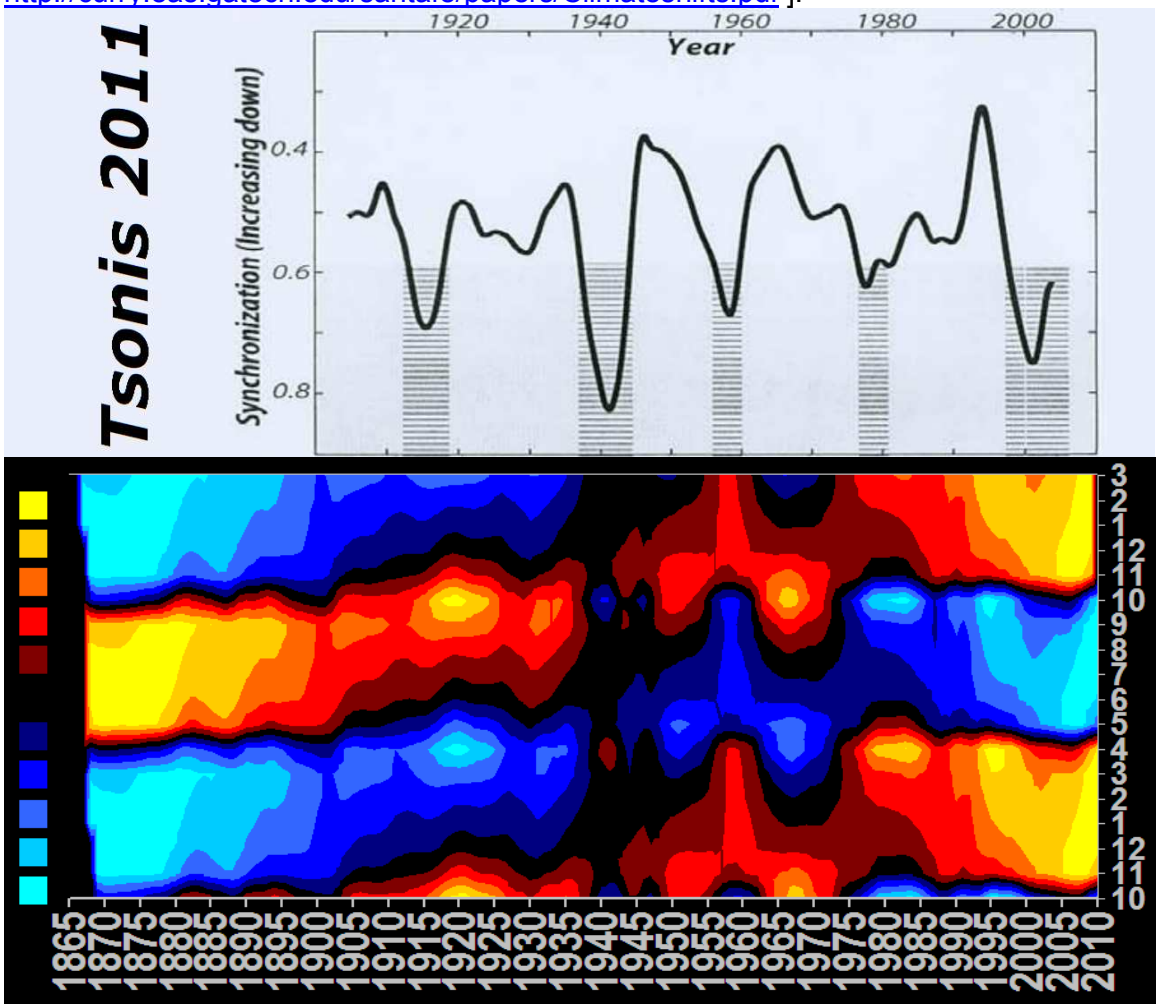
Solar-Terrestrial Resonance, Climate Shifts, & the Chandler Wobble Phase Reversal

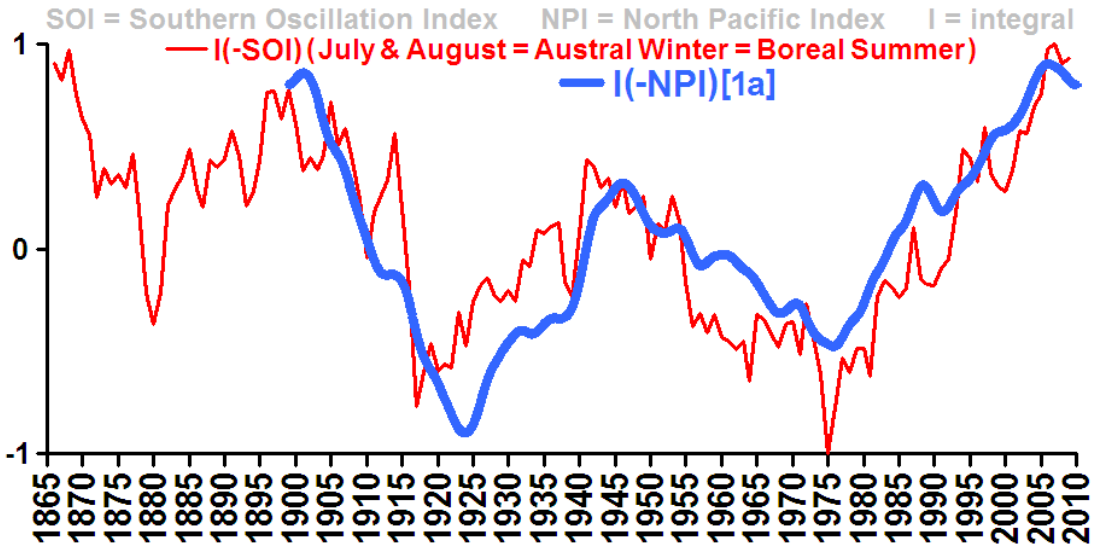
Paul L. Vaughan - March 24, 2012

Visual notes are volunteered informally as follow up on the question posed here:
http://wattsupwiththat.files.wordpress.com/2011/10/vaughn-sun-earth-moon-harmonies-beats-biases.pdf

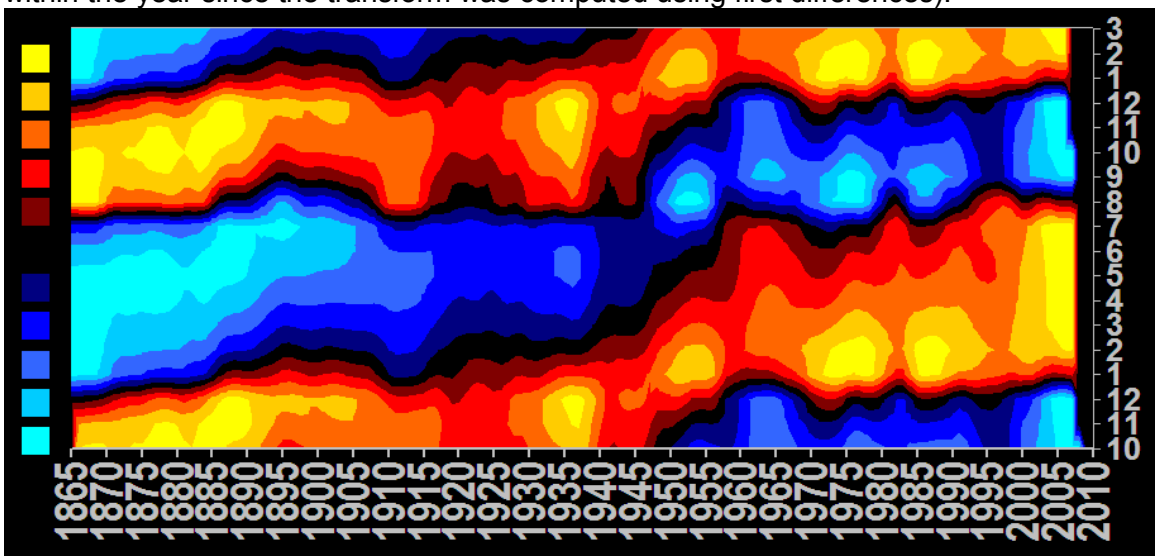
Tsonis' (2011) *"synchronization"* [top panel p.11 Santa Fe conference presentation http://curry.eas.gatech.edu/santafe/papers/Climateshifts.pdf]:



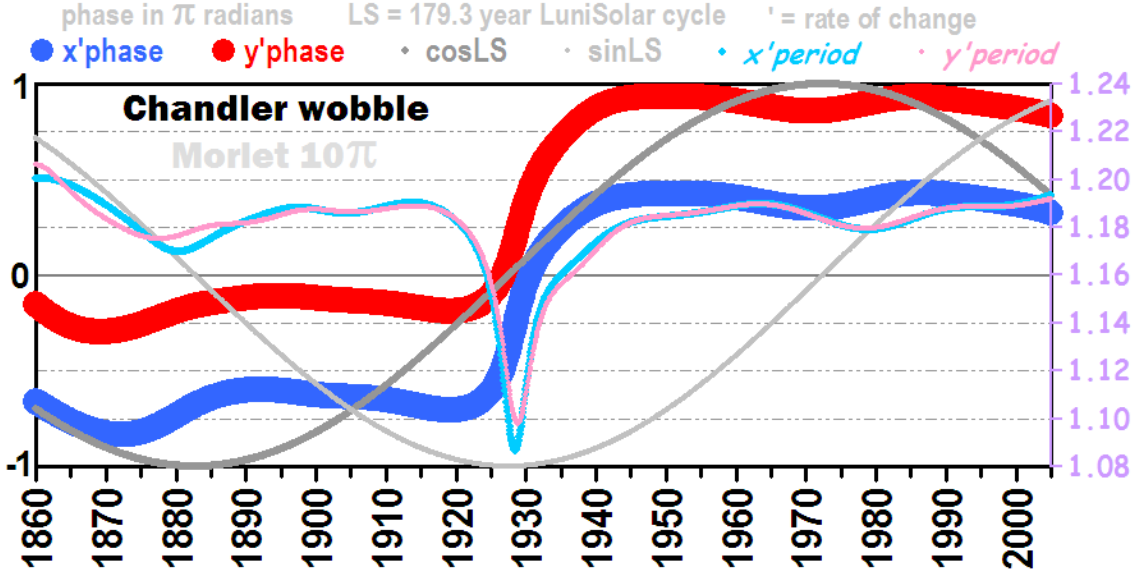
Seasonally normalized & accumulated geomagnetic aa index annual variation (robust across choice of wavelet & parameters).



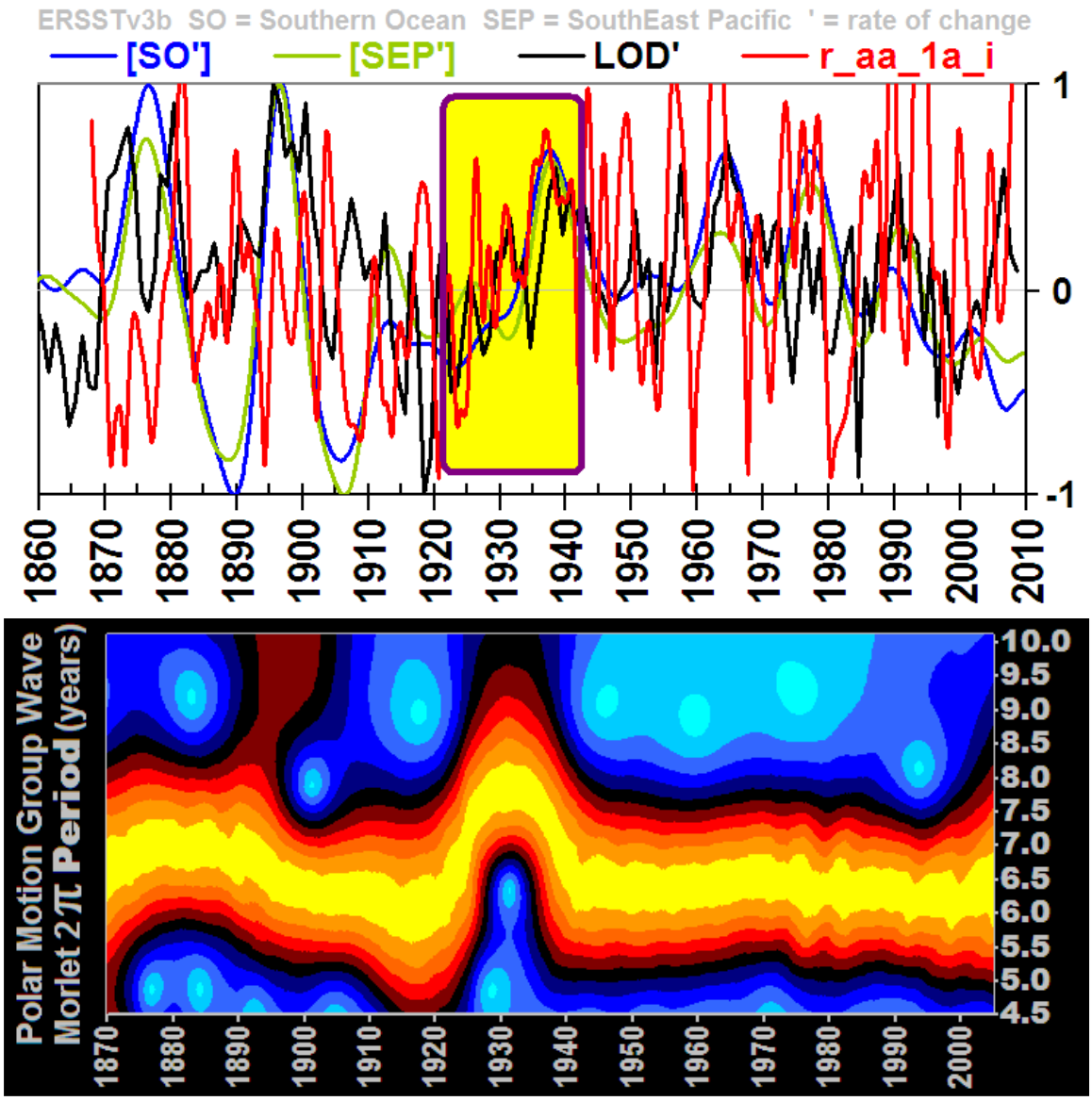
Analogous pattern for sunspot numbers (appearing shifted by a quarter-cycle (3 months) within the year since the transform was computed using first differences):



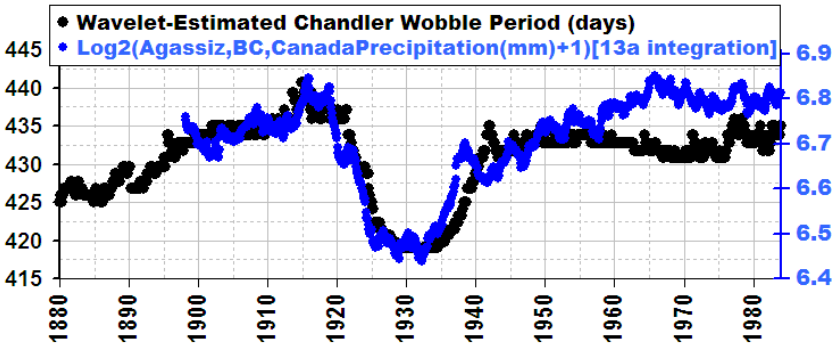
Note how the solstice-crossing aligns with the endpoints of the Chandler wobble phase reversal (thick red & blue lines):



~1920-1945 was an ephemeral period of especially tight coherence between rate of change of annual length of day (LOD'), Southern Ocean SST changes, and geomagnetic aa index annual-grain interannual-extent power:



The local pattern that initially drew my attention to the Chandler Wobble phase flip:



The time of year and the distribution of continents play primary roles in the terrestrial hydrologic cycle. Bear in mind that anomalies contain higher-moment annual cycles (e.g. variance, skew, kurtosis, etc.). Contrary to popular belief, anomalies don't "remove" the annual cycle, nor are they ideal physically (since they don't optimally indicate the phase of water & related energy transfers).

Here are some climatology animations, ordered strategically to encourage rediscovery of the big evaporative swing masked by anomalies:

1.	Net Surface Solar Radiation	http://i53.tinypic.com/2r5pw9k.png
2.	Precipitable Water	http://i52.tinypic.com/9r3pt2.png
3.	Zonal Wind Vertical Profile	http://i51.tinypic.com/34xouhx.png
4.	Near-Surface (850hPa) Wind	http://i52.tinypic.com/nlo3dw.png
5.	Evaporation Minus Precipitation	http://i43.tinypic.com/2isvynb.png
6.	Monthly Maximum of Daily Precipitation	http://i41.tinypic.com/34gasr7.png
7.	Column-integrated Water Vapor Flux with their Convergence	http://i51.tinypic.com/126fc77.png

Credit: Climatology animations have been assembled using JRA-25 Atlas [http://ds.data.jma.go.jp/gmd/jra/atlas/eng/atlas-tope.htm] images. JRA-25 long-term reanalysis is a collaboration of Japan Meteorological Agency (JMA) & Central Research Institute of Electric Power Industry (CRIEPI).

"Apart from all other reasons, the parameters of the geoid depend on the distribution of water over the planetary surface." — N.S. Sidorenkov

Terrestrial receptivity & response varies with the spatiotemporal phasing of stimulus. For those looking to mine the resonance vein further: Earth has other cycles. For example, Piers Corbyn mines higher-frequency resonance in his look-backs & forecasts. With resonance, continuous bulldozing isn't needed, just gentle well-timed & -placed swing pushes. (Economists take note.)

In cooperation with a broad multidisciplinary community, climate science needs to come to grips with the implications of the Chandler Flip & the '76 Shift for interpretation of spatiotemporally aggregated statistics. Ongoing paradoxical misinterpretations & patently untenable inferential assumptions are the fatal consequences of ignoring key lurking variables with major qualitative conditional impact. No climate model can possibly be correct until fundamental solar & lunisolar sources of variation are accurately & deeply understood.

Earth Orientation Parameters (EOP) uncompromisingly emphasize that solar-terrestrial relations don't work the way most (whether lay, academic, mainstream, eccentric, alarmist, skeptic - or whatever) have assumed. In a coupled oscillator spatiotemporal network synchronization framework, there are an infinite number of coupled terrestrial annual cycles. When Earth is thrown locally, regionally, or globally for hydrologic spatiotemporal flips, this isn't well-characterized by temperature anomalies. According to EOP, the synchronization illustrated in the Tsonis framework indicates global constraints of solar & lunisolar origin. This will be the subject of a more detailed article educationally emphasizing some of the nuts & bolts of complex wavelet methodology & interpretation.

Data

ftp://ftp.ngdc.noaa.gov/STP/SOLAR_DATA/SUNSPOT_NUMBERS/INTERNATIONAL/daily/RIDAILY.PLT
ftp://ftp.ngdc.noaa.gov/STP/SOLAR_DATA/RELATED_INDICES/AA_INDEX/aaindex