From: Chick Keller <ckeller@igpp.ucsd.edu>
To: "Michael E Mann" <mann@virginia.edu>, <rbradley@geo.umass.edu>, "Phil Jones" <p.jones@uea.ac.uk>, <k.briffa@uea.ac.uk>, tom crowley <tom@ocean.tamu.edu>, "Jonathan Overpeck" <jto@u.arizona.edu>, Tom Wigley <wigley@ucar.edu>, Mike MacCracken <mmaccrac@usgcrp.gov>
Subject: Some thoughts on climate change proxy temperatures in the last 1,000 yrs
Date: Fri, 2 Mar 2001 15:54:57 -0800

<x-rich>Folks,

Two points here:

1. I read with some consternation Wally Broecker's latest piece in Science (23Feb. 2001). First you can all take up some other topic since Wally says only Boreholes and treeline changes are accurate enough to do low frequency trends. What does he mean by "only two proxies can yield temperatures that are accurate to 0.5°C"? and do you agree that tree rings and sediments, etc are not sufficiently accurate to exhibit correct low frequency trends?

2. Here are some references to recent Holocene time-frame records you probably have seen, but just in case... I found them interesting without knowing how good or representative they are.

Surprisingly they were given me by one who cited them as examples of evidence for a MWP and LIA. I read them differently but they caused me to consider one question I hadn't heard discussed (see below).

Based just on these four, one comes to the following tentative conclusions and observations:

Conclusions:

*MWP was a generally warm time interspersed with coolings and not well synchronized hemispherically or globally.

*LIA was global and capable of better (but not completely) synchronized large amplitude variations

*20th Cent. was the only time when all records agree (tree ring problems with CO2?)

MIGHT THIS RELATIVE UNIFORMITY BE USED AS A CHARACTERISTIC OF 20TH CENTU WARMING THAT SETS IT APART FROM PREVIOUS CLIMATE CHANGES?

*Borehole inversion is too smoothed to be of much use but it does indicate a larger temp amplitude if it weren't smoothed. ~1.5°C

And this brings up my question. How one averages these records.

One way would be to note that the temperature amplitude (1000 - 1950) for each is ~1.5°C. Thus you could conclude that hemispheric/global climate varied ay over a degree Celcius (although with regional differences)

Another way would be to average the records. The resulting temperature amplitude would be smaller because extremes would cancel since variability is large and each region's extremes occur at different times.

Thus, if people simply looked at several records they would get the impression that temperature variations were large, ~1.5°C. Imagine their surprise when they see that the ensemble averages you publish have much smaller amplitude.

Comparison of amplitudes is given below (although difficult to do since amplitude depends on averaging so these are very approximate).

Approximate Temperature Amplitudes for period 1000-1950

Mann et al 1999	~0.5
Jones et al 1998	~0.8
Crowley and Lowery	???
Briffa 2000	???
Dahl, Jensen	~1.5
Huang, et al	~0.8 (500 yrs only)
Overpeck et al	~1.3 (400 yrs, polar only)
Bradley & Jones(93)	~0.7 (600 yrs only)

(Not surprising that the contrarians take great exception to Michael's small amplitude.)

<bold><underline>This is important in the current debate even, it would appear, with people like Wally.</underline></bold> I have been looking for what the real issue is between researchers like yourselves and skeptical scientists. Politics and agendas aside, I think it is close to this.

Anyone looking at the records gets the impression that the temperature amplitude for many individual records/sites over the past 1000 years or so is often larger than 1°C. They thus recognize that natural variability is unlikely to generate such large changes unless the sun is having more effect than direct forcing, or there is some fortuitous but detectable combination of forcings. And they see this as evidence that the 0.8°C or so temperature rise in the 20th century is not all that special.

The community, however, in making ensemble averages gets a much smaller amplitude ~0.5°C. which they say shows that reasonable combinations of solar direct plus volcanos and internal variability with the help of THC can indeed explain this AND the 20th century warming is unique.

Thus, the impass--one side pointing to large temperature variations in many records around the globe and the other saying "yes, but not synchronous and so averaged hemispherically no big deal.

But, just replying that lack of synchronous events (sometimes by a few decades) is the reason might not be enough. It seems to me that we must go one step further. We must address the question: what forcings can generate large amplitude temperature variations over hundreds of years, regional though they may be (and, could these occur at different

times in different regions due to shifting heat inertia patterns)? If we can't do this, then there might be something wrong with our rationale that the average is low amplitude even though many regions see high amplitude. This may be the nubbin of the disagreement, and until we answer it, many careful scientists will decide the issue is still unsettled and that indeed climate in the past may well have varied as much or more than in the last hundred years.

(Also, I note that most proxy temperature records claim timing errors of +-50 years or so. What is the possibility that records are cancelling each other out on variations in the hundred year frame due simply to timing errors? as in hitting or missing C&L's triple warming peak 1000-1200 AD)

Regards,

Referendes to proxy temp records

<excerpt>(1) Bodri, L. and V.Cermak Climate change of the last millennium inferred from borehole temperatures: Regional patterns of climatic changes in the Czech Republic - Part III, Global and Planetary Change, 21, 225-235. 1999

As with other borehole data the record is incredibly smoothed. It has essentially three warming features.

from 1000 to after 1500 there is a broad warming pulse;

1550-1750 cooling

1750-1850 warming

1850-1900 cooling

1900-1950? rapid warming <underline>Total amplitude ~1°C (1.5°C if not smoothed?)

</underline>

I don't know what to make of the more than 500 year warming pulse. Most records show warming either in the 1100's or 1200's but usually not both.

The rest of the record looks reasonable given the smoothing.

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</excerpt>(2) Filippi , M.L., Lambert, P., et al, Climatic and anthropogenic influence on the stable isotope record from bulk carbonates and ostracodes in Lake Neuchatel, Switzerland during the last two millenia, Jour. of Paleolimnology, 21, 19-34, 1999

<excerpt> Graph actually begins at 805 AD (all dates are advertised as +-50 yrs)

Starts out warm but already cooling which it does till about 1150.

warms till 1242, second peak 1298 then cools to minimum at 1500

warms significantly to 1600 then cools to about half of 1500 max and essentially stays that way till 1850 when cools to 1500 level again and immediately rebounds

into 1950s and still warming. <underline>Total amplitude ~2.5°C</underline>

</excerpt>(3) Naurzbaev, M.M. and E.A.Vaganov,Variation of early summer and annual temperature in east Taymir and Putoran (Siberia) over the last two millennia inferred from tree rings, JGR 105, 7317-7326, 2000

Interesting record.

<excerpt>moderately cool 800-950,

rapid warming to max 1000 dip ~1050, recovers till ~1180

cools fast to minimum ~1250,

</excerpt> warms to max ~1400

cools to 1450 slight cooling till 1700

<excerpt>warms to ~1780

rapid cooling to ~1830

rapid warming till ~1930 <underline> Total Amplitude ~1.5°C</underline>

</excerpt>(4) Wilson, A.T., Hendy, C.H. and Reynolds, C.P., Short-term climate change

and New Zealand temperatures during the last millennium, Nature 1979,

<excerpt> 315-317,

Used stalagmites (delta 18 O proxy)

</excerpt> This is a strange record, but the authors compare it favorably with the

<excerpt> central England record.

1100 starts and warms in two pulses one at 1250, min at 1300, big max at 1400, followed by dive to minimum 1450

rises to max 1500

drops to min 1600

rises a bit 1700 and into 1850

drops to minor min1880 rises after that <underline> Total Amplitude ~1.5°C</underline>

STRANGE RECORD

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Charles. "Chick" F. Keller,

IGPP.SIO.UCSD - Attn: Chick Keller

9500 Gilman Drive

La Jolla, CA 92093-0225

(858) 822-1510 office

(858) 456-9002 home

Is the noticeable increase in surfers off Scripps Beach a possible

indication of global warming?

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