

From: Tom Wigley <wigley@meeke.ucar.edu>
 To: dgm@lamont.ldgo.columbia.edu
 Subject: Re: Your help, please?
 Date: Mon, 12 Aug 1996 10:07:42 -0600 (MDT)
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Dear Doug,

In response to Jay Fein's e-mail re den-cen, here are some points (which may merely echo where you are already).

(1) Why study den-cen? Reason is: improve understanding of climate system to aid in detection and prediction. You should read Ch. 8 (detection) of IPCC WGI SAR in this regard.

(2) How to study den-cen? Models and observed data are equally important. Models (coupled O/AGCMs) can only give the internal component of variability, instrumental and paleodata give internal-plus-external.

(3) How useful are paleodata? I support the continued collection of such data, but I am disturbed by how some people in the paleo community try to oversell their product. A specific example is the ice core isotope record, which correlates very poorly with temperature on the annual to decadal timescale (and possibly also on the century timescale)--question, how do we ever demonstrate the usefulness or otherwise of ice core isotopes on this timescale?

There are other well known proxy data issues that need careful thought...

(a) Sedimentary records---dating. Are 14C-dated records of any value at all (unless wiggle matched)?

(b) Seasonal specificity---how useful is a proxy record that tells us about a single season (or only part of the year)?

(c) Climate variance explained by the proxy variable--close to zero for ice core isotopes, up to 50% for tree rings, somewhere in between for most other indicators. How valuable are such partially explained records in helping explain the past?

(d) Signal-to-noise problems---a key issue is, what role has external forcing had on climate over the past 10,000 years. There is a tendency to interpret observed changes as evidence of external forcing---usually unjustifiably. Few workers in the area realize that paleo interpretation has a detection aspect, just like interpreting the past 100+ years---only much more difficult. More work is needed on this.

(e) Frequency dependence of explained variance---the classic example here is tree rings, where it is exceedingly difficult to get out a credible low frequency (50+ year time scale) message. Work in this area could reap useful rewards.

(f) Coverage---what about den-cen data from the oceans? We need much

more of this, especially in regions that might provide insights into mechanisms (like NADW changes).

(4) Causes. Here, ice cores are more valuable (CO₂, CH₄ and volcanic aerosol changes). But the main external candidate is solar, and more work is required to improve the "paleo" solar forcing record and to understand how the climate system responds both globally and regionally to solar forcing.

I hope these very hasty ramblings are helpful

Cheers,
Tom

P.S. I've added Ben Santer, Tim Barnett, Ed Cook, Keith Briffa, Malcolm Hughes, Ray Bradley and Phil Jones to your mailing list.

On Thu, 8 Aug 1996, it was written:

> Dear Colleague:
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> Doug Martinson is the Chair of the NAS, Climate Research
> Committee's Dec-Cen panel. He and his Panelists are drafting a
> Decadal-Century Climate Variability Science Plan (a US CLIVAR
> contribution). Doug and his Panel are trying to get the broadest
> possible scientific input for this Plan. Doug's approach is one
> that I strongly endorse. In this regard he asked me to solicit
> your comments on highest priority science questions and asks also
> for some help regarding examples of published work that would be
> useful for the Plan.
>
> I know you are busy, but urge you to think about this and comment.
> Doug's committee meet in mid-September, so to be of most use to
> him, your comments should be received by the end of August.
>
> Please email to Doug with a cc to me.
>
> Doug Martinson: dgm@lamont.ldeo.columbia.edu
> Jay Fein: jfein@nsf.gov
>
> Thanks very much. Jay
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