2 KYR PROJECT MEETING
SAN FRANSICO, 13 DECEMBER 2007

Notes by Caleb Schiff

Attending: M Abbott, J Briner, FS Hu, K Hughen, D Kaufman, G Miller, D Porinchu, L Anderson, J Anderson, C Amman, K Gajewski, A Geirsdottir, N Koc, K Kreutz, M Loso, G Wiles, R Wilson, Y Axford, B Bird, T Cook, M Peros, H Roop, N Rolland, C Schiff, D Schneider, E Thomas, E Osterberg, Y Wang

Intro by DK. DK provided a project summary. He provided the number of lakes and PI's involved in the project. He highlighted the "driving questions" of the project. Next, he gave the timeline. Promised 20 new records by Spring 2008.

N Koc: Introduction of PAGES working group: reconstructing and synthesizing the past 2 millennia. Hoping to do a circum-arctic reconstruction. Goal: look at whole-scale changes and regional differences. What are the spatial and temporal changes? The working group is open to all with knowledge or data. First meeting will be after the Arctic Workshop, 2008. The meeting will be on Saturday, March 8th, 2008.

Where do we have gaps in arctic data?
Might segway into acquiring funds for needed areas of research.

Back to DK: Goals of the meeting

-Review regional summaries
-Discuss procedures for integrating records
-Discuss plans for climate modeling experiments and data-model comparisons
-Revisit project wrap-up plan

Regions – Alaska and Yukon, Central Canada, High Arctic, NW North Atlantic

Alaska Summary (DK)

14 records mostly along the 60th parallel
10 lakes (5 new), 2 ice cores, GOA tree rings, mountain glacier expansion index
Lakes: 3 varves, 3 isotopes, 2 BSi, 1 diatom taxa, 1 chironomid taxa
Others: 2 isotopes, 1 tree-ring width,

-For the AK summary, we will likely have to accept multidecadal resolution because they are the only records that extend to 2 ka
-DK highlighted each record from AK. His figure was structured so temperature driven records are at the top and precipitation records on the bottom.
-Broadly speaking, the error of the chronologies is likely +/- 100 yr.
-M Loso inquired about Lonnie Thompson's ice core data. These data are not presently available but will be investigated by Caspar.
-Next, DK looked at records from farther west. DK suggests, at first pass, to include all records so we do not "cherry-pick" records. Latter screening will inevitable reduce the number of records.
-L. Anderson suggested to include Tangle Up lake record.
-FS Hu also has some isotope data from the north. They are likely not controlled by temperature.

Central Canada Summary (David P)

All cores go back 2000 yr
All are temperature records
All are subcentennial
Pollen, chironomid, or BSi records.

Red vales in summary figure are above average temperature and blue values are below average temperature.

Taking out the S41 temperature record, data from these sites suggest late 20th warming, LIA, and synchronous MWP warming.

-FS Hu "Have you calibrated BSi?" S41 BSi correlates to NH temperature, but is only constrained by 4 points. Counts on S41 chironomids are in question and the counts need to be re-examined.
-Tree-ring sites from Jacoby might be of use.
-R.Wilson might have longer tree-ring records but needs o check with D-Arrigo
-Miller questioned the use of reservoir effects; are the ages based on macrofossil 14C ages?

High Canadian Arctic (Tim Cook)

9 sites
7 lakes, 2 ice cores
6 are new records
Good range north to south and a mix of inland and coastal sites
All records have been normalized for comparison

Varved records lack good correlation with met data. Varved records are fairly constant while other records have more variability.

He questioned the chronologies of the records? Should they be adjusted based on wiggle matching?

For the 1000 yr compilation, each record was normalized. He followed the Briffa model for this compilation, the Warm record in early record. Middle of the record shows mostly average values. The last 100 yr show a positive warming trend.

There was some confusion about how/why the compilation was made.

Wilson suggests using a smoothing technique that is 4 times the sample resolution.
DK – the question of normalization is an important one. If we select a 500 yr sampling window, the average will likely be skewed by the LIA. Stacking requires a common time window.
Hughen – how many records have been screened for anomalous varves? He suggests using the techniques by Lamoureux.
Miller – Each record is affected by landscape changes.
DK – Suggests we should move along and that each record needs to stand on its own. How will we pull together all the records?

Baffin Island (Jason Briner)

-1 ice core (Penny ice cap)
-Multiple lake records (3 varved lakes, 3 biological proxy records)
-2 moraine records (1 dated by lichens, 1 by 14C)
-Hughen – there is another varved, 2000 yr record

-Overall trends: Overall cooling during the 2000 yr period. The first 1000 years of record is warmer than the latter. The Holocene Thermal Maximum is warmer than any times during this period. No strong MWP. LIA began between 13 and 15th century. It ended around the 20th century. Post LIA warming is 1-2 C.

Iceland (Miller)

Asking too much of the data. The Baffin ice cap data is the most unambiguous data from the region. It marks the LIA max of the area and the retreat record. Onset of ice cap formation begins around 1250 AD.

-3 unpublished records. 2 nonglacial lake and 1 glacial lake.

-Haukadalsvatn not based on 14C, but tephrochronology and 210Pb.

-BSi and TOC are the main proxies. TOC delivered to lake by hillslope processes. Cold times kill off vegetation, making the land more susceptible to erosion. C:N and d13C support the landscape instability hypothesis. Anderson argues that the BSi and TOC records are dilution records due to high amounts of minerogenic dominated systems.

-BSi is argued to be presented as flux because dissolution occurs during diagenesis.

-HVT Lake (glacial lake) – Good IRD record. IRD only occurs during LIA.

-BSi and TOC are low.

-Varved record, but no correlation to met data. Varves tell of the efficient of erosion (work of glacier)… is not due to summer temperature conditions.

Stora HVT Lake – Steady BSi decline which is matched with C:N record. BSi likely reflects primary productivity. Chironomid temperatures follow BSi record as well.

Take homes: A stable warm 1st millennium
Modest centennial cold perturbations around 600 and 900 AD
Stable MWP 1000-1250 AD
Early LIA perturbation around 1300 AD
Two LIA pulses at late 1500s and early 1800
20th century warming has higher rate of change relative to 1st millennium

BSi discussion

Flux or no flux?

If constant sed rate, then flux is good (e.g. Hallet Lake)

FS Hu – BSi curves should be in context of other data.

Anderson – Chronologies are not good enough to calculate flux, but they are good enough for climate reconstructions?

Chronologies

DK – Weight records if their chronologies are better.

Greenland (Anderson)

-6 records from west Greenland

-He wonders what the controls are on the proxies.

-Argues that the records presented are oversimplified.

-Proxies like BSi and TOC are filtered through the catchment.

-DK – calibration is required for confident reconstructions. Quality control is best left to the individual workers and reviewers.

-Caspar – on the modeling side, we can run hypotheses and produce conditions that are reasonable. Can we take the results of simulations to explain the proxy data? We should focus on times when there are changes in the records. Are the changes driven by anything that can be modeled?

Approach to integrating records

-Ideally, spatially weighted, annually resolved numerical temp. reconstructions.
-Realistically, composite based on multi-decadal normalized indices
-Emphasis is now on synchronous of records and changes

DK showed the AK/Yukon data compilation using the Osborn and Briffa technique for synthesis. DK also suggests binning the data. Analogous to a 100 yr smoothing technique. Major features show up, but bin selection is subjective.
DK showed a Monte Carlo technique as well. The stacked Monte Carlo record preserves similar shifts from the other two techniques. This method incorporates noise so tests the robustness of the record.

Modeling (D. Schneider)

Runs completed: Tropical volcanoes (3 perturbations), pre industrial control runs
Future runs: high-latitude volcanoes, 1250 to 1300 AD, 3 ensembles
Next 6 months: Full forcing for the warm period… 850 to 1300 AD, one simulation
Solar-forcing sensitivity, solar max at 900 to 1000 AD, 3 ensembles
Sea-ice sensitivity, circulation patterns in high and low sea ice- extremes

What's missing?

What about the cold period centered at 600 AD
What about solar min?
Fully forced transient millennial simulation
More data analysis of modeling results: length of growing season, length of melt season, …

Focused questions:

-Spatial extent of temp. anomalies (e.g. MWP). (Otto-Bliesner et al., 2006 provides one example of this method) – Need to decide on hinge points of climate models.
Caspar – Also, the seasonal trends are important. If the signal is only driven by summer, for example, we should be modeling those conditions.
-How do the spatial patterns compare to 20th century
Caspar – Is there something on a hemisphere scale that is coherent? This requires compilation of the records. No one record is accurate enough of conditions.

Where to go from here (DK)

AGU meant to be a steppingstone towards completion that would be done at 2008 Arctic Workshop (AW).

Datasets should be in publishable form by AW. Those records would be included in compilation. Is this viable?
David P – What if paper is rejected and not published… will it be in synthesis?
DK – Its ok to bring a submitted, but not necessarily accepted, record to AW.
DK – How do we combine regional summaries? Open to suggestions on how to do so.
Miller – We need to first see the data to know how to distribute and synthesize.
Caspar – Greater communication and feedback would be helpful to determine which records should be accepted.
David P. – What do we bring to the AW? What more do you need than the figures presented?
DK – A database of the records, including assessment of chronology, the proxy interpretation, and a discussion. Identify times of change in the regional records.
Miller – Do we need individual and synthesis papers?
Many comments and worries that each region will not have enough data to stand on its own.
Miller – Need to start the request for a volume. The leading paper of the volume will be the synthesis.
DK – How do you feel about using J of Paleolim?
L. Anderson – AAAR?
DK plans to approach J of Paleolim editors.