

Understanding the processes behind isotope signals in paleoclimate archives, together with modern satellite measurements and atmospheric modelling

Various stable isotopic signals from natural archives are widely used to reconstruct the past climate, today we also have satellite measured and atmospheric modelled stable isotope, enable us to better understand the physical processes behind the isotopic signals. There are strong research interests among Bolin centre scientists on these activities. This workshop aims to exchanges ideas and establish collaboration between Bolin Centre and other international research groups. The workshop includes the presentations from guest speakers and Bolin scientists, as well as scientific question oriented discussions. We will address the following questions:

1. What is the best way to compare and use the various water isotope proxies and records?
2. What regions and time frames deserve special attention?
3. What are the main factors that controls tropical and extratropical water isotope dynamics? Do the subtropics have a problem?
4. How comparable are and $\delta^{18}\text{O}$ and δD records from various types of carriers (ice, lipids, forms, trees, speleothems) as well as from satellite measurements and atmospheric modelling?
5. What are the particular strengths and weakness of the various proxies? Where lie the main errors and uncertainties?
6. Can we come to a smart way of reconstructing d-excess?

Agenda

October 20, 2014, Monday morning

Högbom Hall, Geoscience building, Stockholm

09:00–09:10 Welcome

09:15–09:45 NEEM ice core from the water stable isotope fingerprint of summer 2012 atmospheric river event
Valérie Masson-Delmotte, LSCE, France

09:45–10:15 Satellite observation of water vapour isotopologues in the atmosphere
Stefan Lossow, IMK, Germany

10:15–10:45 Eliminating kinetic effects in isotope time series – an example from Siberian stalagmites
Sebastian Breitenbach, ETH Zurich

10:45–11:15 Coffee break

11:15–11:45 Greenhouse (Pliocene) ENSO – potential and pitfalls of single foram isotope analyses to reconstruct tropical interannual variability
Ulysses S. Ninnemann, Bjerknæs Center for Climate Research

11:45–12:15 D/H of alkenones as proxy for paleo sea surface salinity
Marcel van der Meer, Netherlands Institute of Sea Research

12:30–13:30 Lunch

(To be continued)

October 20, 2014, Monday afternoon, Room Y23

- 14:00–14:15 Climate variability signals in speleothem isotope (*Karin Holmgren, INK*)
14:15–14:30 Stable water isotopes in stratosphere retrieved from Odin satellite (*Qiong Zhang, INK*)
14:30–14:45 Using climate models to interpret the signals in proxy: 2 case-studies (*Francesco Pausat, MISU*)
14:45–15:00 Forward $\delta^{18}\text{O}$ -proxy modelling: on non-linearities in the point-to-gridcell gap (*Christophe Sturm, IGV*)
15:00–17:00 Discussion on question 1-3, with a coffee break in between

October 21, 2014, Tuesday morning

Ahlmann Hall, Geoscience building, Stockholm

- 09:30–10:00 Mechanistic models of tree growth to resolve apparent contradictions in reconstructions
Johannes Werner, University of Bergen
10:00–10:30 Towards isotope-enabled model evaluation using tree-ring proxies
Neil Loader, Swansea University, UK
10:30–11:00 Coffee break
11:00–11:30 From plants to pediments: hydrogen isotope systematics of leaf waxes in a temperate saltmarsh
Yvette Eley, University of East Anglia
11:30–12:00 Towards a mechanistic understanding of the environmental and plant physiological controls on leaf wax δD values and its significance for quantitative paleohydrology
Dirk Sachse, University of Potsdam
12:00–13:30 Lunch

October 21, 2014, Tuesday afternoon, Room Y23

- 14:00–14:15 Lake water isotope systematics in northern Sweden (*Gunhild Rosqvist, INK*)
14:15–14:30 Comparison of a Holocene leaf wax D/H record with other proxy data (*Elin Norström, IGV*)
14:30–14:45 Leaf wax and diatom-based D/H ratios as a tool to infer climate change during the last deglaciation
(*Francesco Muschitiello, IGV*)
14:45–15:00 A 2000 year leaf wax D/H - based paleohydrologic record from Thailand based on leaf wax D/H, and connections to other paleohydrological records (*Kweku Yamoah, IGV*)
15:00–17:00 Discussion on question 4-6, with a coffee break in between

18:30 Dinner

October 22, 2014, Wednesday, Room Y23

- 09:30 - 12:00 Final discussion, summary and conclusion of the workshop, highlights of workshop outcome and future collaboration
Afternoon, Individual discussions