

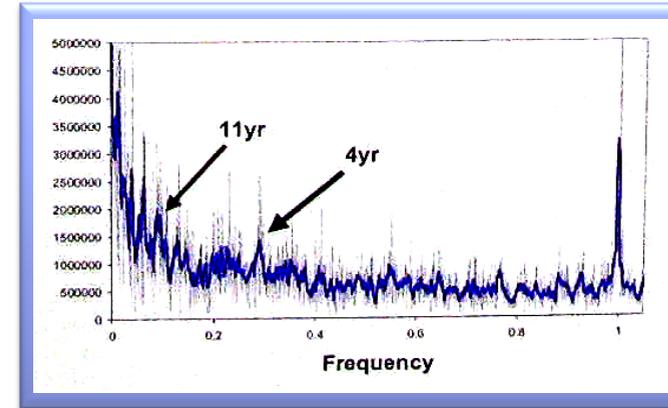
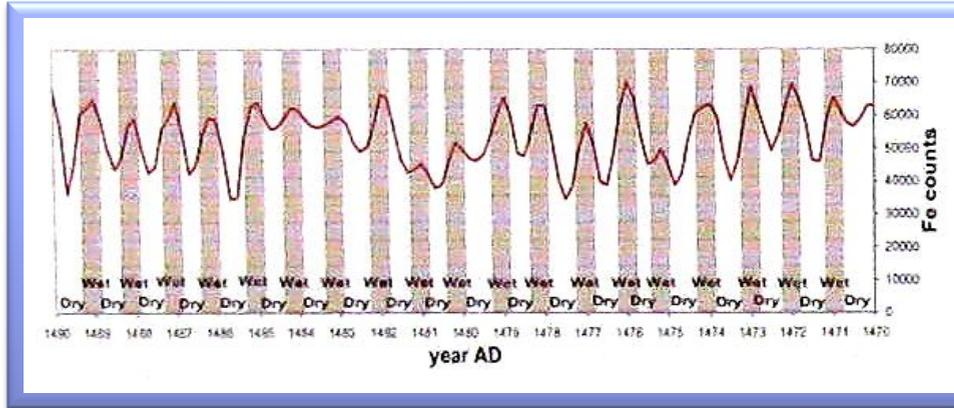
# El'gygytgyn

Climate history from a 3.6 million year old crater lake



Lake El'Gygytgyn is a crater lake situated in NE Siberia, having typical Arctic lake features. As it has most likely escaped continental glaciations since the time for the meteorite impact, it holds more than **3 million years** of paleo-climate data in the sediments. The 315 meters of sediment cores that were drilled and collected in 2008 and 2009 were XRF scanned in steps of 2 and 0.2 millimeters using the Itrax at University of Cologne, in an ICDP financed project.

# Seasonal variation in Lake Malawi



By doing high resolution XRF scanning of sediment cores from Lake Malawi (East Africa), prof. E.T. Brown et. al. were able to demonstrate **sub annual elemental profiles** showing the magnitude of rainy and dry seasons year by year for ~1200 years back. These regular annual variations shows distinct frequency peaks at 4 and 11 year periods, which suggest possible association with the ENSO and solar forcing, respectively. The “year AD” diagram profile shows the Fe profile over a period of years, the brown bars represent terrigenous layers, while the white bars represent diatom rich layers.

Many meters of cores from multiple holes have been scanned with the Itrax for a suite of elements including Fe, Ti, Si, K, Mn and more, with a lateral resolution of 0.2 millimeters.



*Read more:*

**Abrupt changes in tropical African climate linked to bipolar seesaw over the past 55,000 years**

E.T. Brown, T.C. Johnson, C.A. Scholz, A.S. Cohen, and J. W. King. GEOPHYSICAL RESEARCH LETTERS, Vol. 34, doi: 10.1029/GL031240, 2007

**East African megadroughts between 135 and 75 thousand years ago and bearing on early-modern humans origin**

Christopher A. Scholz et. Al. PNAS October 16 2007 vol 104. pp. 16416-16421.

# Late Pleistocene desiccation of lake Tana

Dr H. Lamb and co-workers from the University of Aberystwyth, Wales were able to obtain several hundreds of meter of lake sediment core from below lake Tana, the source of the blue Nile. The examination of one 96 meters long core holds a 17000 year long climate history, from the start of the last de-glaciation in northern Europe and North-America, over the ancient Egyptian Old Kingdom to present time. The core data indicate, among other things, a ~1000 year long mega drought starting 16.000 years ago, reducing lake Tana to a swamp, and subsequently drying out the Blue Nile. The event is believed to have been triggered when the monsoon was interrupted due to iceberg-laden melt-water flooding of the North Atlantic

The entire core was scanned with a resolution of 60 micrometers, recording chemistry as well as radiography.



Operating the piston corer on Lake Tana in October 2003.

# The Dead Sea Sediments

## Inbetween two climate zones

Sediments from the Dead Sea were drilled in a campaign funded by the International Continental Scientific Drilling Program, ICDP, in order to study the climate changes in the Middle East over the last ca 200 000 years.

Over 700 meters of core were collected, and the deepest hole was ~450 m. **Three hundred and fifty meters** were analyzed at the GFZ (German Research Center for Geosciences) with one millimeter steps and a one second per step exposure time with the Itrax Corescanner. Acceptable precision for a qualitative screening of the down-core distribution of selected elements was achieved with this short time of analysis per point. The scanning project ran from 7 am to 11 pm seven days a week **over only six weeks!** More about this project is found at

[http://www.icdp-online.org/front\\_content.php?idcat=825](http://www.icdp-online.org/front_content.php?idcat=825)

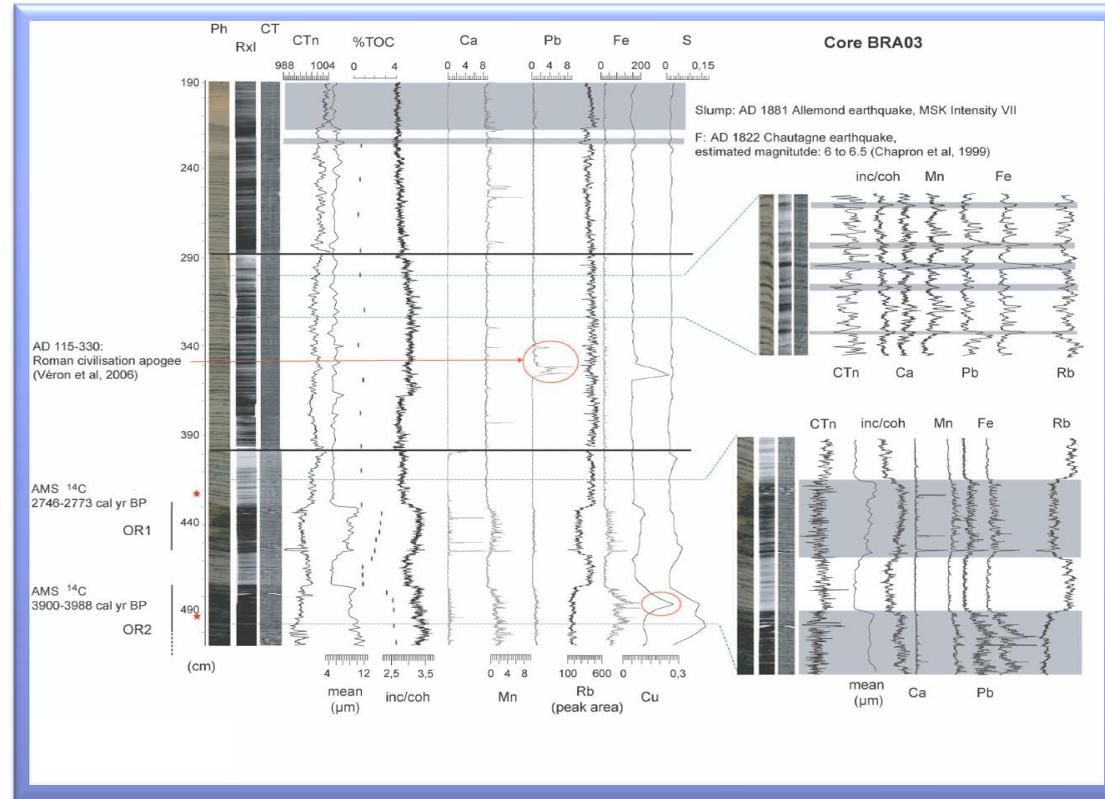


# Lake Bramant

## 4000 years of Alps cultural history



H. Guyard et al did high resolution Itrax XRF scans on finely laminated sediment cores from lake Bramant in the Grandes Rousses Massif in western France. The power spectrum from varve formations over 4000 years showed significant frequencies of 3-4, 7-8 and 24-25 years period in recent sediments while 30-50 years period frequency was detected in sediments 3000 years old. Anomalous high levels of various metals has been interpreted as signs of mining activities during Roman time, and also during early bronze age



*Read more: High-Altitude varve records of abrupt environmental changes and mining activity over the last 4000 years in the Western French Alps (lake Bramant, Grand Rousses Massif) Guyard H., Chapron E., St-Onge G., Anselmetti F.S., Arnaud F., Magand O., Francus P., Mélières M.-A. QUATERNARY SCIENCE REVIEW, v 26, I 19-21, p2644-2660*