Vinnepand, Mathias[1]; Zeeden, Christian[1]; Gosling, William[2]; Wonik, Thomas[1]; Paknia, Mohammad[1]; Noren, Anders[3]; Kück, Jochem[4]; Pierdominici, Simona[4]; Voigt, Silke[5]; Sadar-Abadi, Mehrdad[1]; Ulfers, Arne[1]; Danour, Sylvester[6]; Afrifa, Kweku[7]; Kaboth-Bahr, Stefanie[8]

Lake Bosumtwi – A million year record of hydro-climate oscillations in West Africa

[1]*Leibniz Institute for Applied Geophysics, Hannover, Deutschland;*
[2]*University of Amsterdam, Amsterdam, the Netherlands;*
[3]*University of Minnesota, Continental Scientific Drilling Facility, Minneapolis, USA;*
[4]*Deutsches GeoForschungsZentrum (GFZ) Potsdam, Potsdam, Germany;*
[5]*Goethe University Frankfurt, Frankfurt, Germany;*
[6]*Kwame Nkrumah University of Science and Technology, Kumasi, Ghana;*
[7]*University of York, York, United Kingdom;*
[8]*Freie Universitaet Berlin, Berlin, Germany;*
Mathias.Vinnepand@leibniz-liag.de

Situated within a 1.07 million-year-old meteorite crater, Lake Bosumtwi in Ghana stands as a pivotal location for comprehending fluctuations in the hydro-climatic situation in sub-Sahara West Africa. The region is highly sensitive to climate oscillations due to the movements of the tropical rain belt driven by atmospheric circulation leading to pronounced dry or wet conditions on seasonal to orbital scales. Consequently, Lake Bosumtwi is perfectly suited for studying movements of the ITCZ and possible effects of inter-hemispheric climate differences close to the tropical W-Atlantic. Recently, we have published a correlative age-depth model for this site that is underpinned by available published datings (^{14}C, OSL, U/Th) and cyclostratigraphy. Our correlative age-depth model bases on a sedimentary mechanism assuming increased in wash of soil material enriched in radiogenic K (^{40}K) from the (~ 100 m) steep crater rims into the Lake during moist interglacial periods and reduced input of soil material during stadials and possibly K-depleted input of dust. This variability in K is very similarly reflected in our natural gamma ray data (NGR, likely dominated by ^{40}K and its daughters in our case) that we determined in high resolution for the entire core and that we used for correlation to the Iberian Margin sea surface temperature stack. To best constrain our correlative age-depth model, we integrated our recently obtained palaeomagnetic data. The integration and comparison of the datasets indicates independent support for our model at the Brunhes-Matuyama boundary.
Rock magnetic parameters tend to also show glacial-interglacial variability. In addition, we extracted mean annual precipitation (MAP) reconstruction climate model data (PastClim package in R) that base on orbital parameters, CO_2 concentration and ice volume variation as main forcing functions. Our NGR data and the MAP model output are strikingly similar, especially in terms of amplitude. We interpret the Lake Bosumtwi record as driven by a combination of insolation and glacial-interglacial climate variably latest since the Mid-Brunhes transition.

Session: *DEUQUA Session: Terrestrial records of paleoenvironments and – climates*
Keywords: *Lake Bosumtwi; ICDP; African Climate Change; ITCZ-dynamics*