

Nong Thale Pron – a key site from southern Thailand for studying monsoon variability during the past 15000 years

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Background

Studies of marine sediments, cave speleothems, annually laminated corals, and tree rings from the Asian monsoon region have added considerable knowledge to our understanding of the factors that control decadal to millennial-scale monsoon variability in the past. In contrast, the spatial and temporal pattern of sub-millennial scale monsoon variability and its impact on land cover in SE Asia are still unresolved. This shortcoming stems from the fact that temporally well-resolved paleo-environmental studies are missing from large parts of SE Asia, especially from Thailand. Given that global and regional climate models are increasingly using terrestrial paleo- data to test their performance, past changes in land cover are therefore important variables to better understand feedbacks between different Earth systems.

We obtained multiple sediment cores from Lake Nong Thale Pron (Figs. 1 and 2) in southern Thailand (8° 10'N, 99°23'E; 380 m.asl) using a Russian corer. The small lake of Nong Thale Pron is a sinkhole that developed in the calcareous bedrock.

This project forms part of the Thailand Monsoon Project and aims to reconstruct lake status changes and to evaluate whether these changes are linked to known shifts in summer monsoon intensity and variability.

Methods

AMS ¹⁴C dates on terrestrial plant material and Bayesian age modeling allow us to constrian the chronology of the sequence. The proxy analyses employed in this study are: XRF core scanning, loss-on-ignition (LOI), CNS elemental and isotopic analyses.

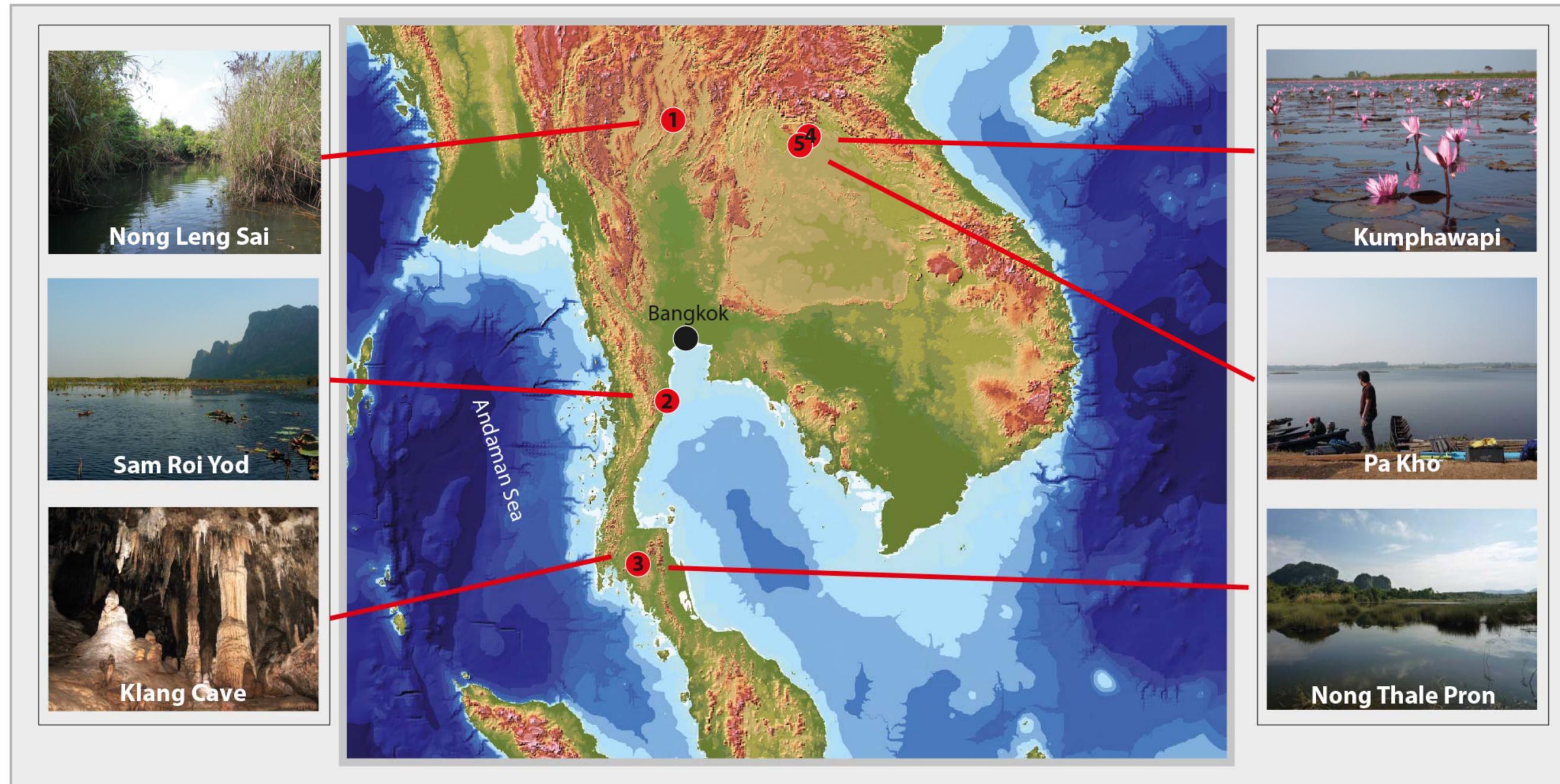


Figure 1: Location of the sites in Thailand that form part of the Thailand Monsoon Project.



Figure 2: Fieldwork at Nong Thale Pron in southern Thailand. Fieldwork was carried out in January 2011 and December 2012. We retrieved several overlapping sequences from this site. The whole sediment sequence has a length of 8.5 m.

Publications related to the Thailand Monsoon Project

Chabangborn, A. and Wohlfarth, B.: Climate over mainland Southeast Asia 15-5 ka BP. In press, *Journal of Quaternary Science*.

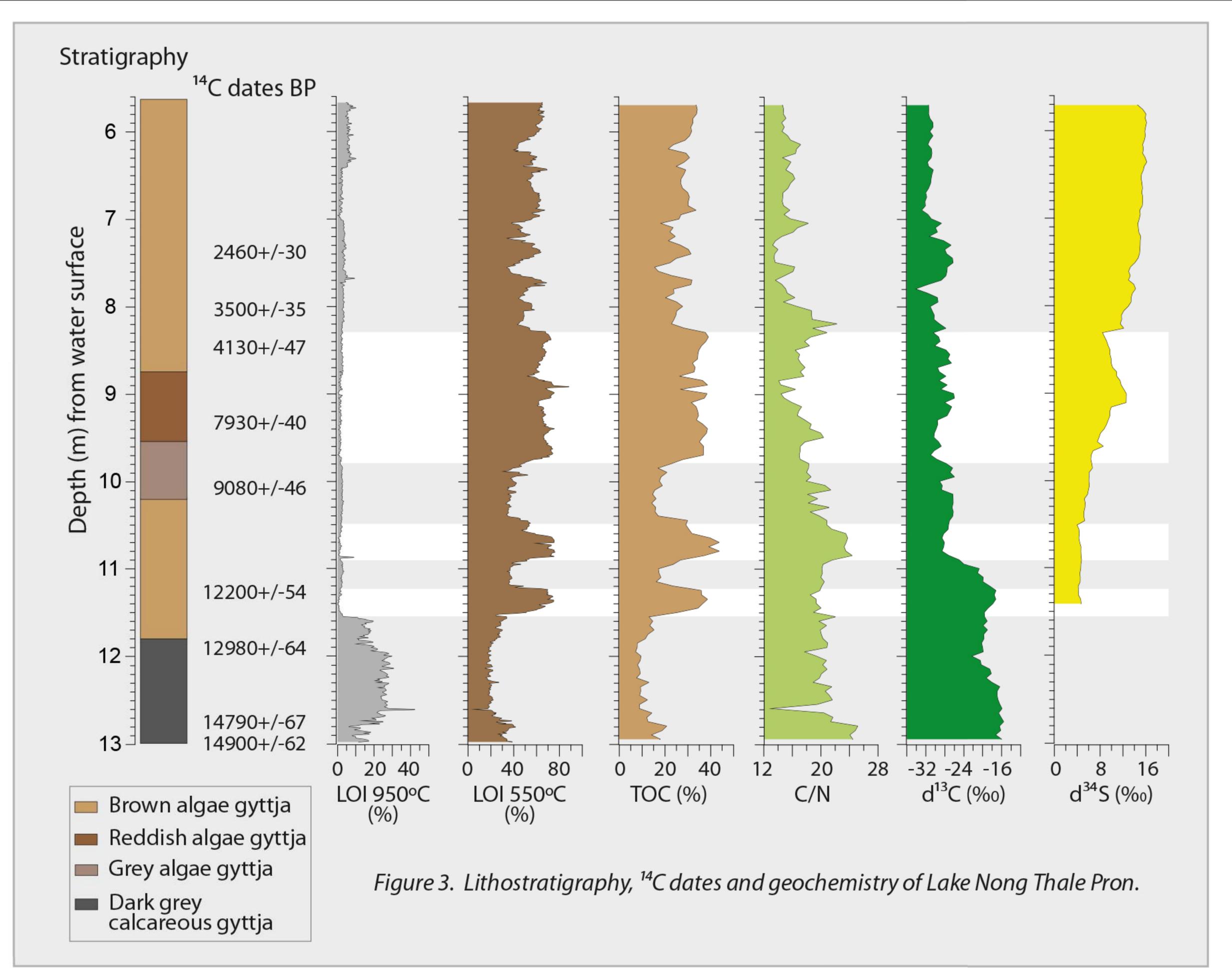
Chawchai, S., Kylander, M., Chabangborn, A. and Wohlfarth, B.: An example of XRF core scanning based proxies for organic rich lake sediments. *The Holocene* (in revision).

Chabangborn, A., Brandefelt, J. and Wohlfarth, B. (2013): The Asian monsoon climate during the Last Glacial Maximum: palaeo-data – model comparisons. Boreas, 43, 220-242.

Chawchai, S., Chabangborn, A., Kylander, M., Löwemark, L., Mörth, C.-M., Blaauw, M., Klubseang, W., Reimer, P. J., Fritz, S. C. and Wohlfarth, B. (2013): Lake Kumphawapi – an archive of Holocene paleoenvironmental and paleoclimatic changes in northeast Thailand. *Quaternary Science Reviews*, 68, 59-75.

Wohlfarth, B., Klubseang, W., Inthongkaew, S., Fritz, S. C., Blaauw, M., Reimer, P. J., Chabangborn, A., Löwemark, L. and Chawchai, S. (2012): Natural and anthropogenic

environmental changes in Northeast Thailand reconstructed from a Holocene tropical wetland. Global Planetary Change, 92-93, 148-161.



Preliminary results

- (1) Sequence covers the past 15000 years
- (2) The geochemical variables show pronounced shifts
- (3) Terrestrial derived organic matter dominates between 15000 and ca. 9000 ¹⁴C years BP
- (4) Aquatic organic material dominates between 9000 and 2000 ¹⁴C years BP

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Under the Eyes of the Buddha I – Traveling North: http://www.youtube.com/user/GeologicalSciences Under the Eyes of the Buddha II – Traveling South: http://vimeo.com/36974808

Under the Eyes of the Buddha III – in White Coats: https://www.youtube.com/watch?v=Vel9dP_DXO0