

Bernd WÜNNEMANN. 2014. Salt Lakes in China: Challenges for Reconstructing Ecological and Climate Variations. *Acta Geologica Sinica* (English Edition), 88(supp. 1): 199-200.

Salt Lakes in China: Challenges for Reconstructing Ecological and Climate Variations

Bernd WÜNNEMANN^{1,2}

1 School of Geographic and Oceanographic Sciences, Nanjing University, Nanjing 210093, China;

2 Institute of Geographical Science, Freie Universität Berlin, 12249 Berlin, Germany

1 Introduction

Studies on lakes have become an important concern for many scientists since it is well known that lakes can monitor detailed information about ecological, hydrological and sedimentary cycles which can be attributed to climate change and non-climatic processes (Coleman et al., 2007; Wünnemann et al., 2010; Dietze et al., 2012, 2013; Zhang et al., 2013). Lakes in general cannot be considered as isolated systems for reconstructing their histories through time. Instead, interactions with their

catchments are required to decipher complex patterns of process-response behavior in a certain system. They strongly depend on the local geological setting, lake shape, basin morphology, elevation and exposition to climatic parameters, such as wind trajectories and strength, rainfall and seasonal temperature variations. Reconstructing their evolution through time by using multi proxy records still suffer from reliable chronologies for each individual system which is, however, the backbone for enabling regional scale or even global tele-connections in terms of climate influence. This is one of the major challenges, still

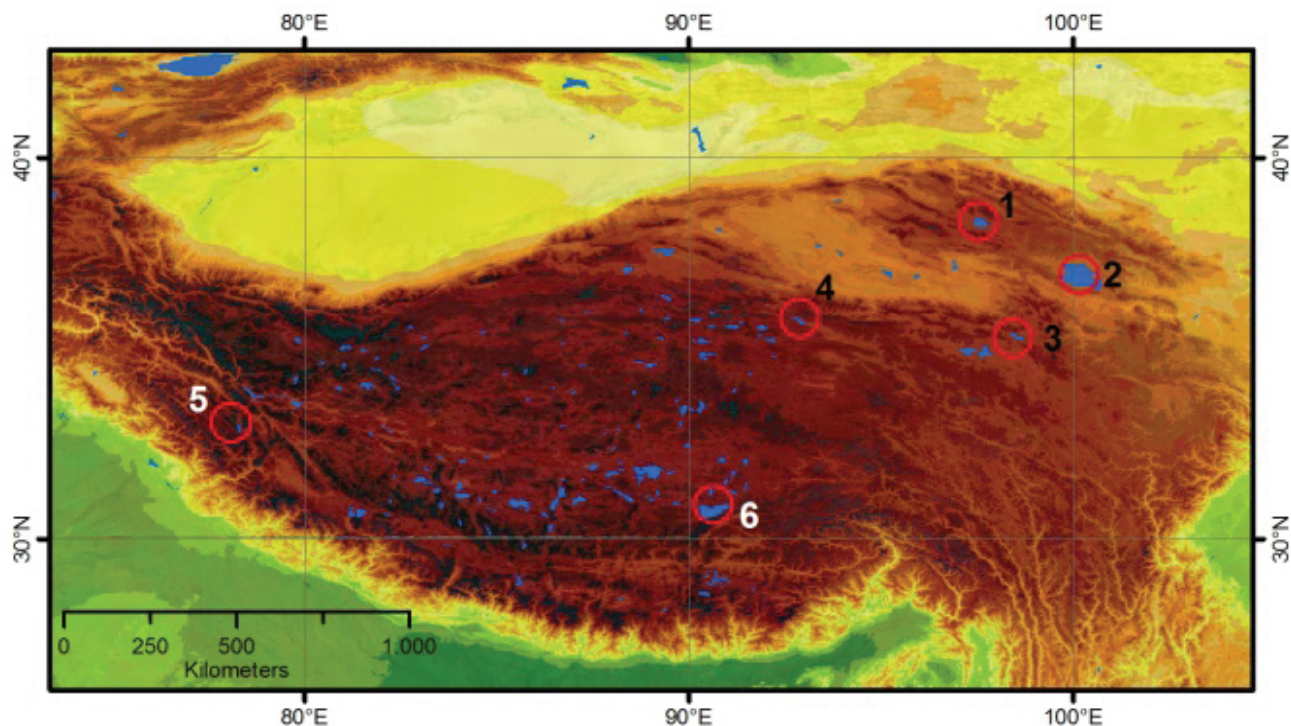


Fig. 1. Distribution map of lakes on the Tibetan Plateau, China with locations of lakes, mentioned in the talk.

1= Hala Lake, 2=Qinghai Lake, 3=Donggi Cona, 4= Heihai, 5= Tso Kar, 6= Namco.

* Corresponding author. E-mail: wuenne@zedat.fu-berlin.de

facing the scientific community conducting lake research. Furthermore, reconstructing past hydrological budgets, on- and offshore sedimentary processes and ecological stages depend on the location of sites which are selected for the identification of climate-driven variations (Wünnemann et al., 2012, Yan and Wünnemann, 2014), a further challenge for researchers with respect to validation of obtained data. I will demonstrate on the base of selected lake systems from the Tibetan Plateau, how differently lakes monitored catchment-lake interactions throughout the Late Quaternary and which factors controlled the hydrological and ecological cycles.

Five aspects influencing lake-catchment records through time are highlighted:

1. Tectonic impact
2. Lake-internal sediment allocation
3. Periglacial processes
4. Spatio-temporal geochemical variability in lake sediments
5. Biological diversity with respect to algae formation and ostracod assemblages

Key words: Lake basin, Lake catchment, sediment variability, tectonics, climate change, Tibetan Plateau, China.

Acknowledgements

This work has been financially supported by NSFC grant 40971003 and DFG grants Wu 290/10-3, Wu 290/11-1. I thank my colleagues from Germany and Nanjing University who joined the projects and contributed to the

results presented here.

References

- Coleman, S.M., Yu, S.Y., An, Z.S., Shen, J., Henderson, A.C.G., 2007. Late Cenozoic climate changes in China's western interior: a review of research on Lake Qinghai and comparison with other records. *Quaternary Science Reviews* 26, 2281–2300.
- Dietze, E., Hartmann, K., Diekmann, B., IJmker, J., Lehmkuhl, F., Opitz, S., Stauch, G., Wünnemann, B., Borchers, A., 2012. An end-member algorithm for deciphering modern detrital processes from lake sediments of Lake Donggi Cona, NE Tibetan Plateau, China. *Sedimentary Geology* 243–244, 169–180.
- Dietze, E., Wünnemann, B., Hartmann, K., Diekmann, B., Jin, H., Stauch, G., Yang, S., Lehmkuhl, F., 2013. Early to mid-Holocene lake high-stand sediments at Lake Donggi Cona, northeastern Tibetan Plateau, China. *Quaternary Research* 79 (3), 325–336.
- Wünnemann, B., Demske, D., Tarasov, P.E., Kotlia, B.S., Bloemendal, J., Diekmann, B., Hartmann, K., Reinhardt, C., Riedel, F., Arya, N., 2010. Hydrological evolution during the last 15 kyr in the Tso Kar lake basin (Ladakh, India), derived from geomorphological, sedimentological and palynological records. *Quaternary Science Reviews* 29 (9–10), 1138–1155.
- Wünnemann, B., Wagner, J., Zhang, Y., Yan, D., Wang, R., Yan, S., Fang, X., Zhang, J., 2012. Implications of diverse sedimentary patterns in Hala Lake, Qinghai Province, China for reconstructing Late Quaternary climate. *Journal of Paleolimnology* 48, 725–749.
- Yan, D., Wünnemann, B., 2014. Late Quaternary Water Depth Changes in Hala Lake, Northeastern Tibetan Plateau, Derived from Ostracod Assemblages and Sediment Properties in Multiple Sediment Records. *Quaternary Science Reviews*, DOI 10.2016/j.quascirev.2014.04.030.