# Drying of the Qaidam basin and its controlling factors deduced from core SG-1

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In our presentation we compile and interpret the results of a multi-proxy paleoclimate record obtained from an almost 1000 m deep drilling (SG-1 core) in the Chahansilatu sub-depression of the western Qaidam basin. This drill-core comprises fine-grained lacustrine sediments and spans the time from ~2.8 Ma to ~100 ka. The sedimentological sequence reveals a long-term drying trend that stepwise accelerated several times [1]. At ~2.5 Ma we identify a transition from a semi-deep fresh to brackish lake into a shallow brackish lake that existed until ~1.2 Ma and likely covered large parts of the entire basin. A large lake area possibly even prevailed between ~1.2 to 0.6 Ma when the lakes system was in a shallow perennial state. It is therefore difficult to explain how the basin could have acted as a major dust source for the Chinese Loess Plateau as it was proposed recently [2].

The magnetic susceptibility ($\chi$) variation in SG-1 reflects the paleoclimate evolution at high-resolution. It bears a large-amplitude cyclic variation throughout the core that can be related to dry (high $\chi$) and more humid (low $\chi$) phases as shown by comparison with the palynological record of the *Artemisia*/Chenopodiaceae (A/C) ratio [3,4]. Because of variable sediment accumulation rates spectral results are fuzzy; however, the presence of obliquity and eccentricity cyclicities can be still identified including the Mid-Pleistocene Transition. The variations of $\chi$ and geochemical parameters can be furthermore matched with the marine oxygen isotope curve. All this points out that global climate change was of major importance for the climate variability at the NE Tibetan Plateau region during that time. The trend of high-cut filtered $\chi$ data resembles stages of drying similar to the sedimentological record. During the last ~0.9 Ma i.e., the period of strongest drying when the lake system changed into saline mudflats and playa saline lakes [1], there is a decreasing trend of $\chi$ that overlays the high-amplitude fluctuations. According to the palynological calibration of high and low $\chi$ values a decreasing trend of $\chi$ values would indicate a tendency towards a more humid climate. This contradiction can be only explained by different factors influencing the climatic evolution of the area.

From our results we conclude that during the last 2.8 Ma the Qaidam basin experienced relatively pronounced cyclic changes of drier and more humid climate in line with the global climate variation. It remains unclear whether this was related to a changing influence of the Pacific monsoon or the Westerlies. The stepwise accelerated drying observed in our record may be explained by tectonic activity in association with the NE Tibetan Plateau uplift. It is, however, very unlikely that within such short periods the magnitude and extent of uplift caused an atmospheric response, therefore we assume that tectonically triggered changes in the catchment system were responsible. Finally, the trend of $\chi$ values let us speculate that an additional regional process overlaid the global climate variation which at the end led to the almost complete drying of the Qaidam basin when the lake system crossed a critical state.

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