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Magnetic susceptibility as a high-resolution climate proxy in lacustrine sediments of the Qaidam paleolake (NE Tibetan Plateau) throughout the Quaternary

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Magnetic proxies in lacustrine archives play an important role as they are acquirable in high resolution due to short measurement times. One premise for building a link between magnetic properties and climate variation is to investigate what is controlling their changes. The magnetic record of drill core SG-1 (940-m-long) in the Qaidam Basin, in particular magnetic susceptibility (χ), is a good example for the value of magnetic properties concerning climate change. SG-1 was obtained from the Chahansilatu sub-basin in the western, presently hyper-arid Qaidam Basin and contains late Pliocene-Quaternary lacustrine sediments. Potential humidity sources in that region during the past were primarily the Westerlies but also the East Asian monsoon. Time markers for depth-time transformation of drill core SG-1 were previously acquired by magnetostratigraphic and optical stimulated luminescence (OSL) dating, indicating a time span from 2.8 to 0.1 Ma. Relating the high-amplitude variation of the χ record to orbital forcing and applying extensive time series analysis, a more detailed depth to time transformation is achieved. To assess the climate sensitivity of χ, the χ record is compared with other magnetic parameters and with palynological results. The pollen ratio *Artemisia*/Chenopodiaceae (A/C) shows a good anti-correlation with χ values, except of the interval around ~1.5 Ma. Thus, for core SG-1 high and low χ values predominantly document dryer and less dry conditions, respectively. Our observations reduce the possible mechanisms leading to the observed χ variation to two interfering scenarios: low-temperature oxidation (LTO) in the sedimentary source area and a change of the catchment area. As a bottom line of this study, the updated time frame of drill core SG-1 and the comparison of χ with other magnetic properties and palynological results lead to a well-dated, high-resolution record of humidity fluctuations during the late Pliocene-Quaternary on the NE fringe of the Tibetan Plateau.