Geophysical Research Abstracts
Vol. 12, EGU2010-9447-1, 2010
EGU General Assembly 2010

Lake thresholds and the geomorphologic role of Göllü Polje (Eastern Anatolia, Turkey) during very high magnitude levels of Lake Van

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Soda Lake Van is a very important reference site for Late Glacial and Holocene palaeoenvironmental records in the Caucasus, Near and Middle East. Influenced by past climatic regimes, changes in the hydrology of Lake Van being very sensitive to humidity and temperature changes, past climates and environments have been studied from deep lake sediments (Landman et al., 1996, Degens &.Kurtmann, 1978, Litt et al., 2009). Meanwhile, more precise and also older lake records are available in wide terraces around the lake. From these records (Christol et al., in press), a first reconstruction of past level changes evidences a rise up to +85m during Late Pleistocene, and an older rise up to $\geq$ +110m (Kuzucuoglu et al. in press). Today's threshold of Lake Van is positioned at +90m (in the vicinity of Tatvan city), and must be related to the + 85m lake maximum (Late Pleistocene). However, this + 90m threshold must be younger than the $\geq$ +110m rise evidenced at several places around the lake, for which an older threshold must have existed higher, today eroded or destructed. The solution to this problem has been searched for in the Göllü polje area.

Located very close to the south-western coast of Lake Van, the Göllü Polje opens at the foot of a high metamorphic massif. Today, this closed basin is isolated to the north from Van Lake by a limestone barrier only +91 m high, and to the south from the Tigris headwaters by a threshold positioned +120 m (1766m) above today's lake level. In this latter place as in other critical points of the drainage pattern related to the isolation of the polje, we identified thick ash falls (pumices and scoriae) burying fossil flood plains at the location of capture areas and drainage disappearance. These ash falls, emitted by two nearby volcanoes, the Nemrut and İncekaya, increased the apparent height of the thresholds around the polje, and deeply disturbed the drainage pattern in the area connecting Lake Van and the Tigris headwaters.

In order to check the possible invasion of the polje by Lake Van during the > 110m transgression maximum, we extracted a ca. 7m long sequence from the polje floor. Sediment analyses allow the relative dating of this fill as younger than the > 110m transgression maximum (no soda lake water intrusion). They evidence also a more-or-less regular phasing of high/low Göllü lake phases, interrupted by temporary flooding periods (polje functioning). They suggest that the high Göllü polje phases were both commanded by abundant water input from the drainage area (humidity? snowmelt?) and by static equilibrium with Pleniglacial high Lake Van levels evidenced in the terraces at + 55 m.

Keywords: Lake Van, past climates, lake level changes, Lake Van threshold, karst.