



Sedimentary Processes in Lake Van: First results from a joint interpretation of seismic and drilling data

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Lake Van is a lake by volume of 607 km³ and a maximum depth of 450 meters in a tectonically active zone in eastern Anatolia, Turkey. In summer 2010, Lake Van was the target of a deep drilling campaign (PaleoVan) in the frame of ICDP (International Continental Scientific Drilling Program). Two sites were drilled based on reflection seismic data collected during a seismic campaign in 2004. Here we present a first joint interpretation of the seismic and drilling data.

Interpretation of seismic reflection data from lake reveals three physiographic provinces: a lacustrine shelf, a lacustrine slope, and a deep, relatively flat lake basin. The most prominent features of the lacustrine shelf and slope are prograding deltaic sequences, numerous unconformities, submerged channels, as well as closely spaced U- and/or V-shaped depressions, reflecting the variable lake level history of Lake Van. The seismic units of the shelf are dominantly composed of low-to-good continuity, variable amplitude reflections interpreted as fluvial deposits.

The lake consists of three prominent basins (Tatvan, Deveboynu, and Northern Basins), separated by basement highs or ridges (Ahlat Ridge). The seismic units corresponding to these basins mainly consist of low to very high amplitude, well-stratified reflection patterns. Chaotic reflections are seen in parts of these basins. The Deveboynu Basin consists mainly of chaotic reflections. The Tatvan and Northern Basins are characterized by an alternating succession of well-stratified and chaotic reflecting layers. The chaotic seismic facies are interpreted as slump and slide deposits, which are probably the result of quick lake level fluctuations and/or earthquakes. The moderate-to high amplitude, well-stratified facies seen in the deep parts of the basins away from the terrigenous sediment sources are interpreted as lacustrine deposits and tephra layers. The total sediment thickness in the deep parts of the lake is over 400 m. Prominent clinofolds indicate the initial flooding of Lake Van about 500 ka ago. The acoustic basement and the sediments lying on top of the basement in the southern part of the lake are disrupted by various intrusions and extrusions suggesting active volcanism.

Synthetic seismograms calculated based on core logging, wire-line logging and check shot data will allow the correlation between seismic and drill data. This approach will allow extrapolating the stratigraphy from the wells to 3D-space by using the seismic data.

KEYWORDS: Lake Van, ICDP, seismic, synthetic seismogram, wire-line logging