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Facies Analysis of the Tandoğdu Travertines, Van, Eastern Anatolia, Turkey: implications for the active tectonic deformation behind the formation and evolution of the travertines

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Abstract

In this study, stratigraphic and sedimentologic characteristics of Tandoğdu travertines exposing at the 13 km southwest of Başkale, Van were examined. In this respect, we shed light on their formation conditions and depositional environment by determining their morphological characteristics and analyzing their facies distribution. In addition, kinematic studies were conducted by collecting structural data from the structures hosting the travertines. Tandoğdu travertines having bed type and ridge type travertines have 5 distinct lithofacies based on the studies conducted. These are: (1) crystalline crust facies, (2) coated bubble facies, (3) paper-thin raft type facies, (4) lithoclast - breccia facies and (5) paleosoil facies.

According to the examination of their morphologies and lithofacies; lithofacies were developed depending on the temperature of fluids forming the travertines. Distal from the source field of the hydrothermal fluids, paper-thin raft type facies were developed in shallow pools. Proximal to the source field of the hydrothermal fluids, crystalline crust facies and coated bubble facies were deposited. Existence of breccia facies indicates the effects of active tectonism during the formation of travertines. Hot hydrothermal pools on the ridge type travertines prove the still active tectonic activities. On-going studies aim to date growth of the travertines by U-Th dating method which will also shed some light on the tectonic scenario behind the evolution of the travertines.