

Soil erosion in relation to land use changes in the Amik Lake sediments near the Antioch antique city during the last 4kyr

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Abstract

The Amik Basin in the Eastern Mediterranean region occupied since 6000-7000 BC has sustained a highly variable anthropic pressure culminating during the Late Roman Period when the Antioch city reached its golden age. The present 6m long sedimentary record of the Amik Lake occupying the central part of the Basin constrains major paleo-environmental changes over the last 4000 years using a multi-proxy analyses (grain-size, magnetic susceptibility and XRF geochemistry). An age model is provided by combining short-lived radionuclides with radiocarbon dating. A lake/marsh prevailed during the last 4kyrs with a level increase at the beginning of the Roman Period possibly related to optimum climatic condition and water channelling. The Bronze/Iron Ages are characterized by a strong terrigenous input linked to deforestation, exploitation of mineral resources and the beginning of upland cultivation. The Bronze/Iron Age transition marked by the collapse of the Hittite Empire is clearly documented. Erosion continues during the Roman Period and nearly stopped during the Early Islamic Period in conjunction with a decreasing population and soil depletion on the calcareous highland. The soil-stripped limestone outcrops triggered an increase in CaO in the lake water, and a general decrease in ZrO₂ released in the landscape that lasts until the present day. During the Islamic Period, pastoralism on the highland sustained continued soil erosion of the ophiolitic Amanus Mountains. The modern Period is characterized by a higher pressure particularly on the Amanus Mountains linked to deforestation, road construction, ore exploitation and the drying of the lake for agriculture practices.

Keywords: Southern Turkey; Antioch city; Amik Lake; Core sediments; Chemistry; Land-use; Soil erosion; Late Holocene