Stratigraphy, Geochemistry and Geochronometry of Sedimentary Archives Around Hisarlık Hill – a Pilot Study

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Abstract

The aim of this geoarchaeological pilot study is to investigate to what extent geochemical and geochronometric techniques can be used in order to decipher the landscape development around Hisarlık hill and to detect events that left traces in the sedimentary archives encircling the Troia settlement area. Three drill holes close to and one further away from the hill were sunk up to 23 m below ground level into the sediments at today’s footslope and alluvial plain positions. The stratigraphy and sedimentology of the cores were investigated. In addition, geochemical analyses as well as luminescence (OSL) and 14C dating were carried out on samples taken from the drill cores. Detailed stratigraphic and geochemical analyses are not only relevant for landscape reconstruction, but also for identifying the facies suitable for luminescence dating. Hill-slope sediments and some alluvial deposits are considered to yield reliable ages. Major landscape changes by sediment accumulation occurred during the Troia VI and IX periods.

1 Introduction

Because Troia was almost continuously inhabited over 4000 years (3500 B.C. – 500 A.D.), it is an important reference point in the chronology of the Old World from the Early Bronze Age until the Roman Imperial Times (Korfmann and Mannsperger 1998). Therefore, this site is of special interest for investigating the interaction between man and environment.

Exploring and measuring the living space and its changes during time are very important in order to understand ancient civilized people. This seems particularly true in the case of Troia owing to its geostrategic location at the southern entrance of the Dardanelles. Thus, it can be expected that any changes – natural or man-made – of the surrounding landscape
had crucial effects on Troia's culture-historical role. Studies adjacent to the settlement of Troia give the possibility to conclude from scientific results both natural and historical events, as the sediments represent and archive geological and geomorphological events as well as historical and archaeological ones.

Besides the extensive archaeological excavations, started in 1870/1871 by Heinrich Schliemann and going on today by Manfred Korfmann's team, a great number of geomorphological investigations in the plain of Troia was done by Ilhan Kayan (cf. Kayan et al., this Vol.) within the last years. Kayan and his colleagues drew up the stratigraphy of that area forming the basis for the studies and analyses presented here. Four drill cores, described in this paper, are part of that geomorphological work. To our knowledge, it is the first time that geochemical methods together with sedimentological and chronometric studies were performed on the deposits of the plain of Troia. An aim of this study is to quantify the sedimentary processes.

The deposits in the plain of Troia consist mostly of alluvial sediments of the two rivers Karamenderes and Dümrek, which have eroded the Mesozoic and Palaeozoic marbles and serpentinites as well as the Tertiary volcanic deposits in the hinterland. Occasionally, colluvial and marine deposits are included in the alluvial sediments the expression 'colluvial' here is used in its meaning according to Dalrymple et al. (1968). Infrared stimulated luminescence (IRSL) can be used for age determination of colluvial and alluvial sediments; the former ones have mostly been dated successfully (e.g., Lang 1996; Kadereit 2000), whereas the latter ones commonly are problematic.

2 Material

The vicinity of Troia is characterized by a low and a high plateau which consists of shallow marine limestones. Troia itself is located on a ridge of the lower plateau. In the north, west and south the ridge is surrounded by the delta plains of the Karamenderes and Dümrek Rivers (Kayan 1995, 1996).

The actual study area is situated close to the ancient city of Troia. Sediment samples have been taken from four drill cores, three of them (numbers 145, 157, 158) being located quite near the “Troia-ridge”, the fourth, number 144, in the delta plain of the Dümrek about 1.5 km north of Troia (Fig. 1). This latter drill core reached a depth of 23 m. Drill site 157, situated about 500 m northeast of the great theatre of Troia and about 100 m away from the slope, reached a depth of 12 m. Located about 100 m away from the cave to the west of Troia, drill hole 158 reached a depth of 11.2 m. Drill site 145, reaching a