ANCIENT LAKE NEAR ÖKÜZINI AND KARAIN CAVES (SOUTHERN TURKEY)

Maciej Pawlikowski

INTRODUCTION

Field survey conducted in September 1993 showed the presence of lake sediments near Öküzini and Karain caves. Fifteen open-air Paleolithic sites were located on the ancient lake shore. Surface lithic artifacts were collected in bags by J.-M. Léotard and students for future investigation. Lake sediments were sampled for mineralogical investigations.

LOCALIZATION AND SAMPLING

Locations of samples collected for mineralogical analysis are indicated on Figure 3.

The ancient lake is located on the plain directly in front of the Katran Dagı Mountains (Fig. 1). Field survey revealed that the western shore of this lake was present very near the base of the Cretaceous limestone mountains. These observations confirmed that the entrances to both caves were in the past defended by water of this lake.

The shoreline oscillated during the history of the lake, creating small bays and peninsulas. The size of the lake also changed and because of this, archaeological sites can be found at various distances from the center of the lake. There were various phases when the lake was small or large, or completely dry, as it is today. The distance between the northern and southern shores was up to 2.5 km.

Lake sediments are seen morphologically (from the hills) as big gray spot surrounded by red-brownish sediments which represent the terra rossa. In places, the gray lake marls are in contact with other sediments, such as limestones, slope sediments, gravitational cones and alluvial deposits (Fig. 2).

The lake is localized in a small depression formed between the Katran Dagı Mountains and the plain. This depression was formed morphologically due to the deepening of the limestones of the plain in the direction of the mountains. Lake sediments were deposited directly on the surface of Cretaceous rock (limestone, radiolarite) or on the red terra rossa. The full thickness of these sediments is unknown but the morphology of the area suggests that the thickest sediments were deposited near the base of the mountains.

Only the top part of the lake sediments was sampled. Samples were taken from the wall of pits which had been dug to collect fresh water for local agriculture. All sample represent lake marls containing various admixtures of red clays (redeposited terra rossa), skeletal material and molluscs. Lake marls contain an admixture of detrital material (quartz, radiolarite grains, mica). Near the base of the mountains, one can also observe the admixture or intercalations of conglomerates in lake marls.

METHODS OF INVESTIGATION

The samples were tested mineralogically using a polarizing light microscope and X-ray diffractometry.

Microscopic analyses were done using transparent thin sections and a Laboval microscope in order to determine the mineral composition of lake marls.

X-ray analyses were performed with the use of a DRON 2.5 diffractometer and Cu K_α radiation. Interpretations of the patterns was done using the Xrayan computer program.

RESULTS

Microscopy

Microscopic observation showed that all tested samples are composed of similar material. Calcite constitutes the main component of lake marls – up to 95% of tested rocks - and is represented by small grains up to 20 µm in size. Small flaks of clay minerals are observed between these grains. Rounded grains of quartz and Cretaceous micritic limestone consitute the mixture of detrital material. Molluscs are present as well and observed mostly as intercalations in the upper part of the profile (Fig. 3).

X-ray analysis

These investigations confirmed that calcite is the major component of ancient lake sediments. It is represented by peaks of the following values of D_{hkl}: 3.85, 3.03, 2.84 and 2.28 A. Alongside these peaks, one can also observe peaks indicating quartz: (d_{hkl} = 4.26, 3.35 A) and kaolinite (d_{hkl} = 7.13, 4.50, 3.56 A).

ARCHAEOLOGICAL SITES

Fifteen open-air sites were identified along the ancient shoreline (Fig. 1). They are briefly described as follows:

Site 1: Located on a small alluvial cone built on conglomerate containing Cretaceous limestone pebbles. Archaeological material is slightly mixed as a result of plugging.

Site 2: Artifacts present on the limestone surface of a small peninsula. Archaeological material is present under the traces of a black pit.

Site 2a: Archaeological material present in primary position, localized near the modern water canal and near an old canal built of stone.
Site 3: Various artifacts collected near the entrance to a deep cave developed on the plain in Cretaceous limestone. Material present is *in situ* in terra rossa.
Site 4: Chipped material present near the ancient lakeshore.
Site 5: Concentration of chipped radiolarite in terra rossa sediment.
Site 6: Large concentration of chipped material (workshop) present *in situ* at the bottom of red soils.
Site 7: Dispersed flakes and artifacts of red radiolarite.
Site 8: Large workshop with lots of chipped material.
Site 9: Large concentration of chipped material.
Site 10: Reach concentration of chipped stone in the upper part of the lake marls.
Site 10a: Chipped material present in lake marls.
Site 11: Small concentration of chipped radiolarites near the ancient lakeshore.
Site 12: Reach site on limestones above Öküzini cave.

DISCUSSION

Field survey as well as mineralogical analyses confirmed the presence of an ancient lake near Öküzini and Karain caves. Lake sediments are represented by marls (calcite) crystallized chemically from lake water. The process of sedimentation was occasionally augmented by deposition of detrital material transported down the mountain slopes. Intercalations of coarser materials confirm the presence of surface streams and therefore, intensive rains.

Traces of an organic pit that can be seen near archaeological site no. 2 indicate that the lake was shallow near the northern shore.

Open-air archaeological sites discovered around the lake represent various phases of occupation. Mineralogical research of the full profile of lake sediments would be important to better understand climatic fluctuations and to correlate these open-air sites with the Paleolithic layers present at Öküzini and Karain caves.

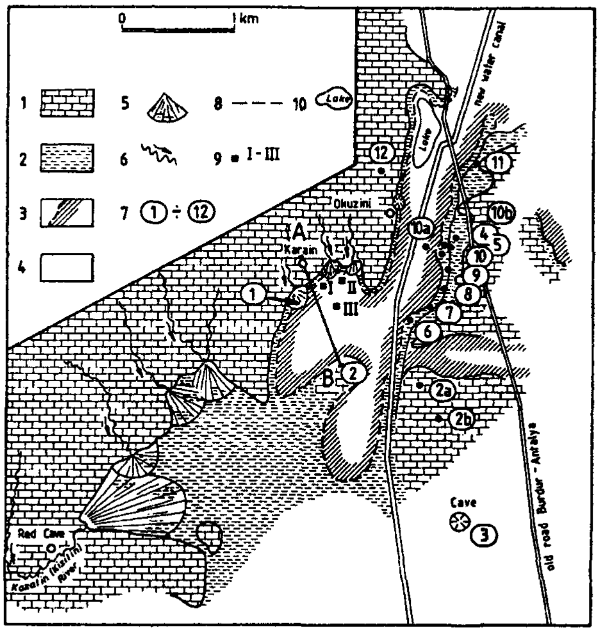

Figure 1. Localization of the ancient lake.
1) Cretaceous limestone of the Katran Dagı Mountains;
2) terra rossa at secondary position; 3) traces of a black pit;
4) area not tested; 5) alluvial cones; 6) valleys of streams and rivers; 7) open-air archaeological sites around the ancient lakeshore; 8) limit of the lake sediments; 9) geological trenches; 10) recent lake.

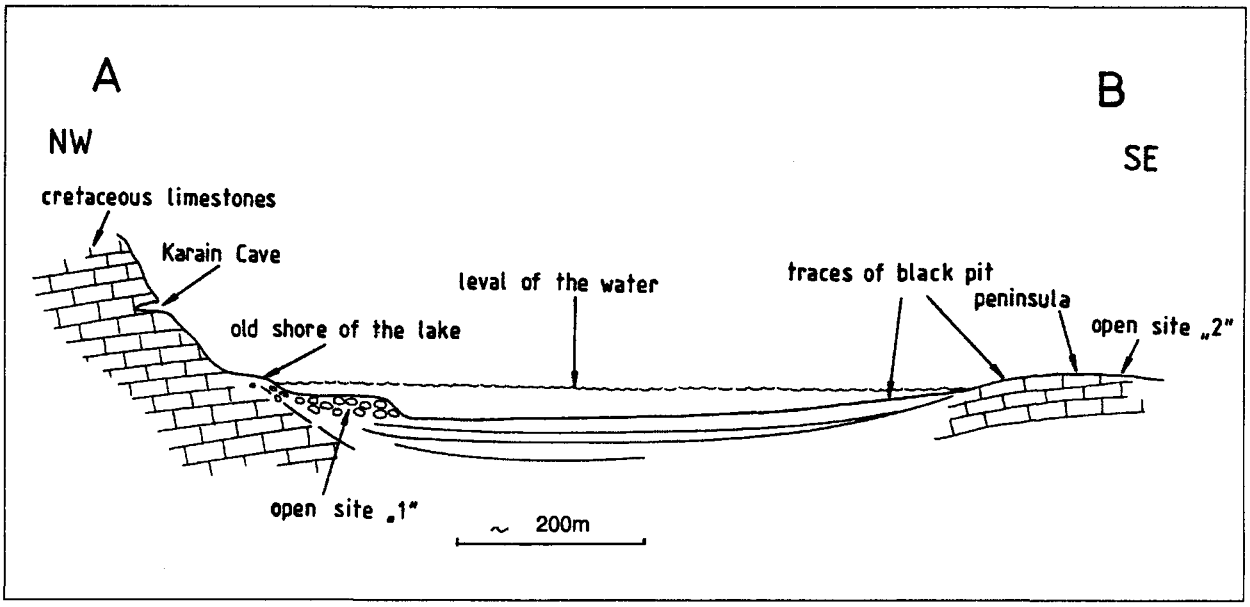

Figure 2. Geological cross-section A-B (see Fig. 1) showing the contact of lake sediments with an alluvial cone developed at the outlet of a small stream and small peninsula composed of Cretaceous limestone.

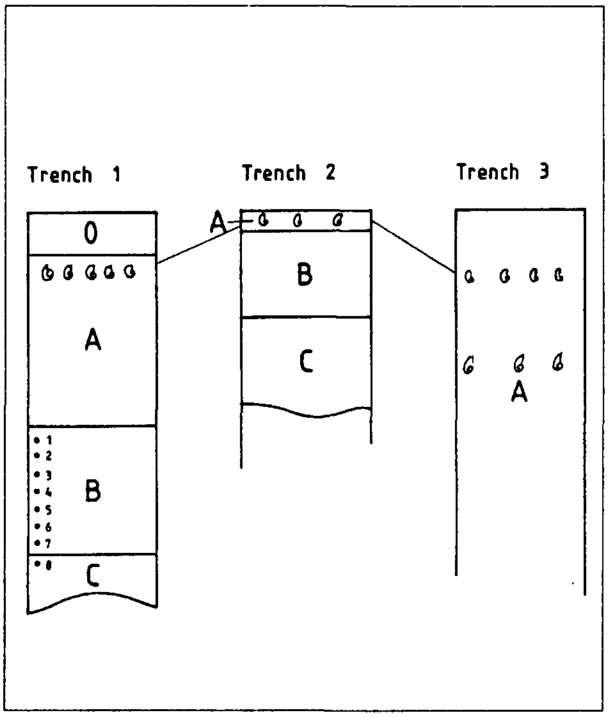

Figure 3. Profiles of tested geological trenches.
0- modern surface sediments; A- lake marls containing mollusc skeletons; B- lake marls containing admixture of redeposited terra rossa; C- gray lake marls. 1-8: numbers of tested samples.

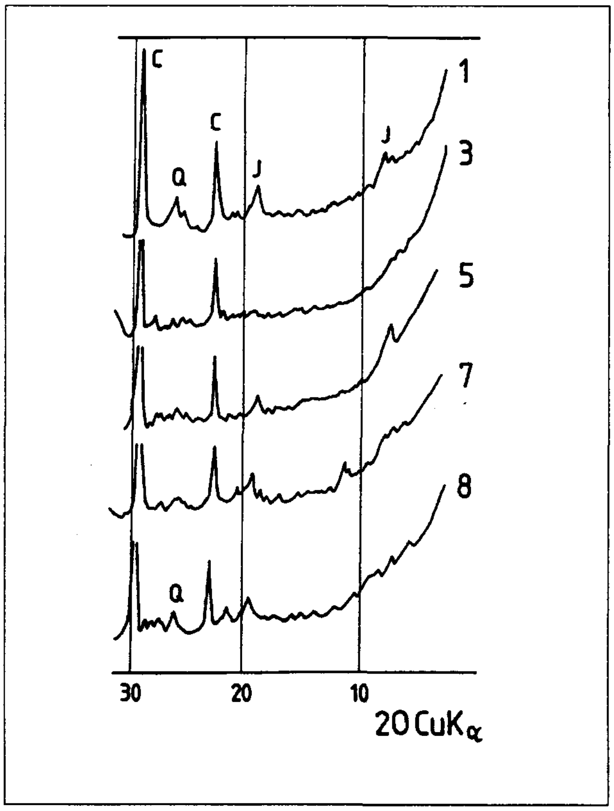

Figure 4. X-ray patterns of the tested samples of lake marls (samples 1-8).