Thesis Abstract

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Aeolianites and palaeosols on the Mediterranean coastal plains of Israel were investigated with luminescence dating in order to explore the sedimentological evidence for climate change in the area and the response to it.

The dated samples were taken from sites between the towns of Haifa and Netanya South, which are located in a quarry near the town of Habonim and further towards the coast, in a quarry North of the town of Hadera and further towards the coast as well as at the coastal cliff and in a sewage gully by the town of Netanya South.

The aims of this study were to correlate aeolianite and palaeosol exposures along the Mediterranean coast, to establish a chronology for a climatological interpretation, and also whether aeolianite formation and palaeosol development could be correlated with major climate events of the Late Pleistocene in the Eastern Mediterranean.

Over 80 samples were collected from various sites, covering exposures from North to South and also from East to West. They were dated with infrared optical stimulated luminescence (IR-OSL) and thermoluminescence (TL). In addition radio-fluorescence spectra were obtained from some of the samples and also their equivalent doses were determined with infrared radiofluorescence (IR-RF).

The chronology established through the luminescence dating results showed that aeolianite formation and palaeosol development in the Carmel and Sharon coastal plains are connected with the cyclical occurrence of enhanced rainfall over the Mediterranean. These conditions, which also cause the Mediterranean sapropels to form, are characterised by a sudden increase of precipitation. The rainfall lessens over the time of the episode but temperatures increase. It is likely that most of the soils in the coastal plains developed during the humid conditions of the rainfall episodes, while sand accumulation and aeolianite formation took place during the arid conditions at the end of the rainfall episodes or shortly afterwards. A new climate-event-stratigraphical model for the correlation of the deposits is suggested.