

Surface exposure dating of Quaternary palaeoglacial records from Anatolia.

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Glaciers are indicators of climate change as well as sea surface and atmospheric temperature (e.g. IPCC 2001) and, in particular, it is glacier mass-balance which directly relates to climate change. Long-term climate shifts are transferred to variations in glacier length (e.g. Oerlemans 2001). Investigating the amplitudes and frequencies of Quaternary palaeoclimatic change necessitate the reconstruction and dating of variations of palaeoglacier extent.

Geomorphological evidence of Quaternary palaeoglaciations were identified on Mount Uludag (NW Turkey), in the Muslu valley in the Dedegöl Mountains (SW Turkey) and in the Kavron and Verçenik valleys in the Kaçkar Mountains (NE Turkey) (Figure 1).

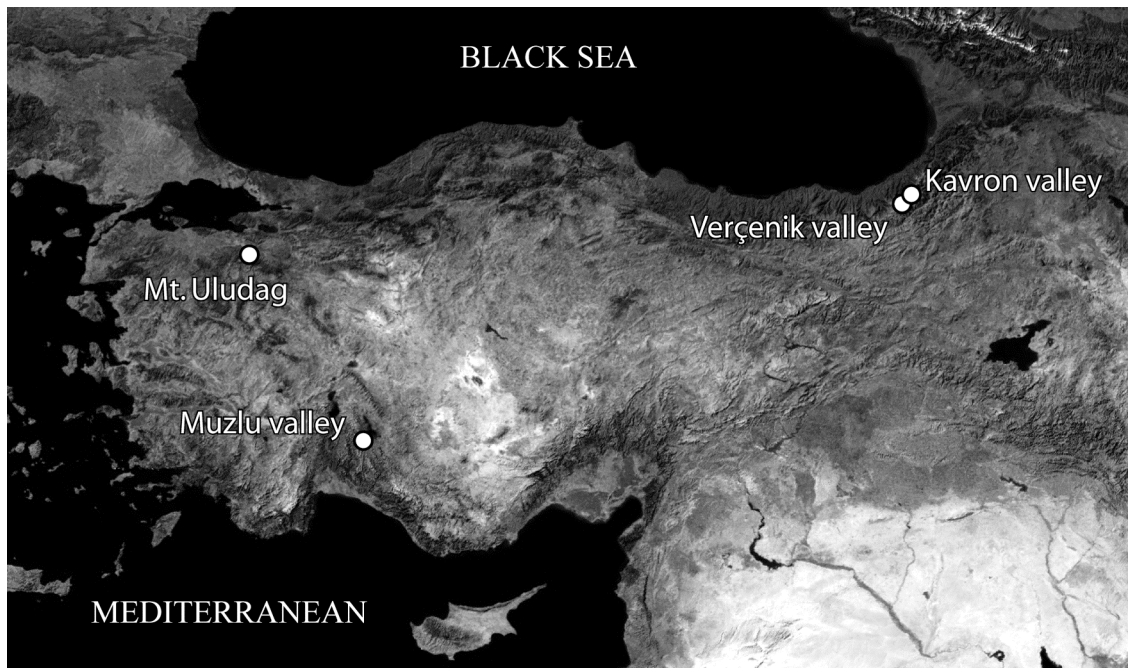


Figure 1. Sampling sites for surface exposure dating in Anatolia (Image: Nasa World Wind).

For surface exposure dating with ^{10}Be and ^{26}Al , 69 quartz bearing samples in all were collected from glacially transported boulders (49), ice moulded surfaces (17) and from glacially unaffected bedrock (3). Accelerator mass spectrometry measurements of $^{10}\text{Be}/^9\text{Be}$ and $^{26}\text{Al}/^{27}\text{Al}$ were performed at the ETH/PSI tandem facility in Zurich.

Surface exposure ages from the Kaçkar Mountains and from the Dedegöl Mountains from glacially transported boulders on lateral and terminal moraine ridges indicate a pronounced LGM glacier advance before c.26 kyr, which reached out to the main valleys and lasted until c.18 kyr in the Kaçkar Mountains (Akçar et al. submitted; Akçar et al. in press). The ice-advance on Mt. Uludag, which occurred around 17 kyr may be related to the LGM glaciation or to an early Late Glacial re-advance. Ice-moulded surfaces and glacially transported boulders in the Kaçkar Mountains indicate ice-free conditions in the main valleys, but glaciated tributaries, after c.18 kyr (Verçenik valley) and before c.16 kyr (Kavron valley).

Late Glacial glacier advances were dated in the Kaçkar Mountains as well as in the Dedegöl Mountains. Exposure ages suggest an ice-advance around 14 kyr back to approximately 1550 m asl. in the Muslu valley and between c.13 and c.11 kyr in the Kavron valley (but no clear Younger Dryas event). Evidence for a Late Glacial advance in the Verçenik valley is provided by superimposed striation of ice-moulded surfaces. In the Muslu valley, ice-free conditions were favoured at altitudes below c.1750 m asl. before around 13 kyr.

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