Constraining the timing of palaeosol development in Iranian arid environments using OSL dating

The ages of palaeosols in arid environments in Iran are constrained using the optically stimulated luminescence (OSL) signal from quartz. The luminescence properties of quartz OSL and K-feldspar infrared stimulated luminescence (IRSL) at 50°C (IR50) and post-IR IRSL at 290°C (pIRIR290) signals are compared to investigate the degree of bleaching of quartz OSL in individual samples at the time of deposition. A comparison between the quartz OSL and K-feldspar IR50 ages shows that 12 out of 15 samples were probably well-bleached prior to deposition. The 17 OSL ages constrain at least four broad phases of sediment deposition and soil formation on the central Iranian plateau: (i) prior to, and (ii) during, mid/late MIS 5 (at Isfahan and Lar), (iii) MIS 3 (at Bam, Mahan and probably Isfahan) and (iv) MIS 1 (at Rayen and Jiroft). In summary, there is no convincing evidence for palaeosol formation during MIS 4 and MIS 2; however pedogenesis does appear to have taken place during all other marine isotope stages over the last full glacial-interglacial cycle.