



Geomorphology and sedimentology of moraines and tills of the Serra da Estrela (Portugal)

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The Serra da Estrela is a granite plateau mountain in Central Portugal rising to 1,993m ASL. During the Weichselian the mountain presented a plateau ice-field with radiating valley glaciers occupying an area of 66 km². The equilibrium line altitude at the last maximum glacial extent was at ca. 1,650 m ASL. The altitude of the plateau near to the ELA induced a high climatic sensitivity to the ice-field. A detailed geomorphological survey of the mountain with a focus on glacial and periglacial landforms and deposits has been conducted and a geomorphological map was produced. This procedure allowed the identification of the glacier extent and of several stadial moraines. Till outcrops have been studied using sedimentological techniques (i.e. lithofacies, fabrics, quartz grain surface using the optical and the scanning electron microscope, and thin-section analysis). In this presentation we use the geomorphological and sedimentological observations to characterize the dynamics of glacier erosion and the genesis of the tills. The glaciers of the Serra da Estrela were warm-based giving origin to roches moutonnées, p-forms, striae and shatter marks and eroding most of the weathering mantle from the plateaux. This is demonstrated by the detailed geomorphological mapping of tors and bare-rock outcrops and by the SEM analysis of quartz grains. In some sites where glacier erosion was not so intense, tor exhumation is postglacial. The micromorphological analysis of diamictons in the Penhas da Saúde plateau where landforms are inconclusive for identifying the presence of former glaciers suggests that they are of glacial origin. This gives rise to the chance of the occurrence of an older glacial event in the Penhas da Saúde plateau.