



Quaternary deposits and soil formation in the Aragón Pyrenees (Spain) – First results from sedimentological studies

Florian Hirsch, Thomas Raab, and Stefan Schuhart

BTU Cottbus, Lehrstuhl für Bodenschutz und Rekultivierung, Cottbus, Germany (hirschf@tu-cottbus.de)

Within the scope of the research project Post LGM Pedogenesis and Geomorphodynamics in the Aragón Pyrenees funded by the DFG (Az RA 931/3-1) late Quaternary glacial, periglacial, fluvial and anthropogenic sediments are used to reconstruct the palaeoenvironment. The two research areas Gállego Valley and Aragón Valley are located in Aragón about 50 km northwest of Huesca which is a type region for Pleistocene glaciation in the Central Spanish Pyrenees.

Our reconstruction of the paleoenvironment is based on a first soil mapping along catenas and the facies differentiation of the sediments. Sedimentological analyses are performed by a measurement of macrofabrics, clast roundness, lithology and followed in the laboratory by grain size and chemical analyses.

Preliminary results indicate that beside the glacial also periglacial morphodynamics play a major role for the formation of the soils present in the area. Moreover, we have hints for human impacts on the soil landscape as in several profiles periglacial and glacial sediments are superimposed by colluvial sediments which we interpret as a correlative sediment of soil erosion on the slopes. The pedostratigraphy is characterized by horizontal and vertical small scale heterogeneity which also results in varying stages of pedogenesis.

Sedimentological analyses show that in the unglaciated backslopes periglacial slope deposits (PSD) consisting of a Lower and an Upper Head are present. The coarse fraction (> 2 mm) of the PSDs in the unglaciated area is limited to autochthon or parautochthon material. The Upper Head clearly differs from the Lower Head and tills by higher amounts of fine material (< 2 mm) which is interpreted as a result of the eolian genesis typically mentioned for this type of PSD. Upper Heads are mainly found on sheltered sites (old forest stands) indicating the frequent erosion caused by anthropogenic land-use. On these sheltered sites luvisols are developed.

Lower Heads are characterized by only a small amount of fine material and a high amount of angular clasts, whose a-axes are parallel to the slope direction. Therefore the Lower Heads are more resistant to erosion induced by anthropogenic land-use. On the exposed Lower Heads leptosols are the dominant soil type indicating a short time for soil formation.

Formerly glaciated areas on the footslopes and on the valley floors are characterized by diamictic and allochthon sediments consisting solely of angular to sub-rounded clasts orientated parallel to the direction of the former glacier movement. These properties are characteristic for subglacial environments and lodgement processes. Soils on the glacial sediments are reddish and form cambic horizons. Anthropogenic superimposing is common on the tills with truncated profiles and colluvisols.