ABSTRACT

In high latitudes, landscapes of low relief are known to contain residues of pre-glacial saprolites, which testify to limited modification of the pre-glacial relief by the Pleistocene ice sheets. In this thesis different types of palaeorelief of a basement area with low to moderate relief are identified and used as a basis to describe the subsequent glacial reshaping. GIS technique and digital elevation data on a 50-m grid are used to calculate relative relief of an area in SW Sweden comprising a sub-Cambrian peneplain (relative relief 0-20 m), an uplifted and dissected part of the sub-Cambrian peneplain (r.r. 5-40 m) and an etchsurface (r.r. 20-135 m) of supposed Mesozoic age. The tectonic division of these palaeosurfaces into fault blocks is described by using spatial interpolation in GIS.

Landforms in all scales are classified according to their process of formation. Characteristics and spatial distribution of large- and intermediate-scale landforms are mapped from air-photos, while the minor landforms are documented in field. It is shown that landforms within the glacially scoured Precambrian basement of SW Sweden are closely related to the principal structural pattern of the bedrock. It is concluded that this pattern is more compatible with differential weathering than glacial erosion, even if multiple ice flows in different directions are considered. Etched rock basins occur at all levels within the etchsurface along the Swedish west coast. Their shape and distribution are clearly adjusted to the joint pattern as shown by their location along joints or joint intersections. Basin development is identified as an important component of long-term landform evolution and the transformation of a primary upland into a surface of low relief with residual hills. Other forms are directly related to the development of basins. High cliffs occur where master joints form marginal scarps to the basin. Basement areas in between master joints form hills. Deep narrow clefts have developed through etching and in their lower parts small-scale etchforms occasionally have been preserved throughout the glaciations.

The qualitative and quantitative effects of glacial erosion are assessed in relation to the identified palaeorelief. It is concluded that the increase in relief from the sub-Cambrian peneplain to the Mesozoic etchsurface is due to differences in timing of uplift, exposure and etching. Increased relief promotes enhanced glacial reshaping, but the magnitude of glacial erosion is considerably less than the amplitude of the palaeorelief. Besides stripping of saprolites, the glacial reshaping concerns mainly the small- and intermediate-scale landforms. Measurements and mapping of etched joints and roches moutonnées in two different lithologies, augen-granite and orthogneiss, visualize that the efficiency of glacial erosion is governed by coincidence between pre-glacially etched structures and direction of ice flow.

The thesis emphasises the importance of using a long-term evolutionary approach to glacial landscapes, as well as landform analysis, to separate the sequence of processes that have formed the landscape.

Key words. *Landforms, morphotectonics, palaeosurfaces, GIS, digital elevation data, granite, deep weathering, etchsurface, basins, joint-guidance, glacial erosion, roche moutonnée.*