

STRUCTURAL AND FABRIC DEVELOPMENT OF THE METAMORPHIC PLATTENKALK GROUP (PERMIAN - EOCENE) OF WESTERN CRETE, GREECE

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The island of Crete belongs to the frontal part of the Aegean microplate, i.e. to the upper plate of the active Eastern Mediterranean collisional zone. There, the metamorphic Plattenkalk Group (Permian-Eocene) represents the lowermost tectonic unit of the nappe pile. In western Crete it forms an E-NE striking anticline with northwesterly dip. The Samaria Gorge exhibits an excellent cross-section 16 km in length, showing low- and high-strain domains, which have obviously developed during the same phase of ductile deformation. The low-strain domains do not show any shortening, while the high-strain domains yield two types of southerly dipping ductile shear zones, (a) one of them along thrust sheets' boundaries with a simple-shear geometry and (b) the other within the thrust sheets showing pure shear. The dominant rocks of the Plattenkalk Group are calcite marbles and meta-cherts. These lithologies have been analysed in both domains in order to compare the microscopic tectonic fabrics. Our results demonstrate that during ductile deformation, not only simple shear processes have happened, but coaxial non-rotational deformation as well. Strain was accumulated by a combination of pure shear with stretching parallel to the thrust plane and axial symmetric elongation, and simple shear with the shear plane parallel to the thrust plane. Accumulations of deformation markers show considerable gradients of strain, increasing from the lower to the upper parts of the sequence. We conclude, furthermore, that the processes of deformation of the Plattenkalk Group in western Crete have occurred autochthonously. Additionally, we have worked out a three-dimensional digital representation of the working area with the help of an integrated CAD software package (Surpac 2000), aiming to link and to interpret the large-scale internal structures of the Plattenkalk and to calculate geometrical fabric data for the different domains.