

A transverse section through the Pindos Nappe in the northern Peloponnes (Greece)

DIETER RICHTER, Laboratorium für Technische Gesteinskunde und Ingenieurgeologie der Fachhochschule Aachen, Bayernallee (Germany)

The strata of the Pindos Nappe form coherent mountain chains in the western part of the Peloponnesus and along the west coast of the Argolian Gulf and they are only connected in the north. Regarding the geologic map of Greece 1 : 500 000 (RENZ et al. 1954) the eastern Pindos mountain chain does not seem to have been much tectonically disturbed. Yet in detail the exposures reveal many tectonic features in striking contrast to the apparently flat and undisturbed stratification.

Folds represent the most conspicuous tectonic feature. They can be attributed to two groups. West-vergent large recumbent folds of a first generation represent key structures because they correspond to the dominant flat bedding conditions (DOERT et al. 1978). Their facing or vergence proves that the Pindos Nappe moved from east towards west. Upright to inclined, partly even overturned, multi-vergent minor folds represent a second generation which is superimposed onto the main fold complex. These multi-vergences are caused by physical differences between the incompetent and competent strata in broad anticlines and synclines which arose during the first generation folding process. The synclines were overfolded from both sides into bag-shaped structures so that the minor folds on their eastern limbs face westward and those on the western limbs eastward.

The directions of fold axes are rather scattered and they plunge only slightly. Since there is a lack of sharp axial orientation and since inhomogenities in the rocks, caused by their physical composition in the first generation folding, have effected the vergences to such an extent, it may be concluded that the Pindos Nappe represents a superficial tectonic level which suffered only a low confining pressure during the tectogenesis.

There are many small-scale dip-slip faults which dip mostly east in the eastern part of the mountain chain, i. e. towards the Argolian Gulf, and this reflects the subsidence of the Gulf area. Further to the west, the faults dip increasingly in the opposite direction. They can be related to the collapse of the Tripolis Basin. Both types of faults often form complicated horst and graben structures. All these tension planes have developed during a younger tectonic phase.

North of Achladokampos, the underlying Tripolitza Zone is exposed in the Syros Window. The Pindos rocks lie on Tripolitza Limestone at the northern and middle part of the window, but in the south they lie on flysch of the Tripolitza Zone. This suggests that the Pindos Nappe is resting on an eroded surface. In the Mainalon and Rodhias mountains, west of the Tripolis Basin, the outliers of the Pindos Nappe lie mostly on the flysch of the Tripolitza Zone, but also on Tripolitza Limestone, which also proves the denudation phase preceding the Pindos overthrust.

Further towards the west the axial planes of the first generation west-facing folds become gradually steeper. The frontal Pindos mountain chain forms north-south trending ranges made up of numerous thrust slices, gently dipping to the east, each of which is in itself strongly folded. In contrast to the eastern mountain chain the first generation folds show axial planes which are vertical or steeply dip to the east. The evidence shows, folding preceded thrusting. Since the style of deformation is completely different between the Pindos Nappe and the underlying Tripolitza Zone (which is exposed in tectonic windows) no structural relationship exists between the two tectonic levels. The folding, uplift and denudation in part of the Tripolitza Zone must have taken place before the movement of the Pindos Nappe over the eroded surface of the Tripolitza Zone. The youngest beds of the Tripolitza Zone, that have been found in some places beneath the Pindos Nappe, are flysch of Aquitanian age. The main tectogenesis of the Tripolitza Zone and the subsequent Pindos overthrust could therefore not have happened earlier than Aquitanien, i. e. all these tectonic events occurred probably during the Middle Miocene.

The Pindos allochthon moved at least 100 kms over the Tripolitza Zone. Subsequently, the two tectonic levels were subject to a final arching of the central Peloponnesus. Along the flanks of this upwarping the Pindos rocks remained as the western and eastern mountain chain, in between they were extensively eroded. The previously described faulting process, which occurred probably during the upper Neogene and Quarternary, resulted in a block mountain mosaic and caused the formation of large fault basins in which the Pindos rocks sank down to great depth.

DOERT, U., RICHTER, D. & MARIOLAKOS, I. (1978): Ein tektonisches Querprofil durch die Olonos-Pindos-Zone im Gebiet südwestlich Argos und seine Bedeutung für den Gebirgsbau des Peloponnes (Griechenland). - (Manuscript).

RENZ, C., LIATSIKAS, N. R. & PARASKEVAIDIS, I. (1954): Geologic Map of Greece 1 : 500 000. - Inst. Geol. Subsurf. Res., Athens.

