Where did the ophiolites form? Options are: 1. In a single easterly ("internal") oceanic basin, with large-scale westward thrusting towards the Adrian foreland; 2. In single oceanic basin that was "overlapped" by strike-slip (i.e. terrane displacement); 3. In two separate oceanic basins (Pindos-Mirdita and Vardar). Orientations of units should take account of Neogene rotation to form the Aegean arc. Also, interpretation of kinematic data of emplacement directions is complicated by extensive Early Tertiary re-thrusting. There is evidence of westward emplacement of Vardar ophiolites (N Greece) and also of westward thrusting of external ophiolites (Albania). There is also evidence of northeastward directed intra-oceanic thrusting in northern Greece (Vourinos), Albania (Mirdita eastern ophiolites) and Serbia (Zlatibor), and also generally eastward thrusting of continental margin units (Othris, Greece). The most likely scenario is that ophiolites were emplaced westwards onto the Pelagonian and Drinia-Ivanjica zone (a microcontinent) from an oceanic basin in the Vardar Zone in the Late Jurassic, and also eastwards from the Pindos-Mirdita ocean in the Early Cretaceous.

A further question is where was the entire allochthonous complex ultimately rooted? Is the Olympos platform a window of the Adrian margin, or an accreted microcontinent within the Pindos-Mirdita ocean? Only deep seismic studies could finally resolve this question. However, the hypothesis that the entire allochthonous complex was thrust from a root zone to the east of the Serbo-Macedonian zone can be ruled out as there is clear field evidence that the Jurassic Gevgueli Ophiolite (NE Greece) remains magmatically welded onto continental basement rocks of the Serbo-Macedonian Zone and is not part of an overthrust allochthon.

Structural evolution of the Silesian nappe (Outer Carpathians) inferred from the analysis of cross-fold joints: case study from Bieszczady Mts (Poland)

Jacek Rubinkiewicz¹

¹Faculty of Geology, Warsaw University, Żwirki i Wigury 93, 02-089 Warszawa, Poland

The eastern part of Polish segment of Outer Carpathians consists of several NE-verging nappes. The Silesian nappe belonging to this stack was folded during Late Oligocene - Miocene times. Map-scale fold axes in inner part of the Silesian nappe are oriented N130E. Lower Cretaceous — Lower Miocene strata crop out in this area. This made possible to study development of jointing in rocks spanning a considerable time interval. Joints have been studied in 23 stations. Research has been focused on cross-fold joints comprising: (1) a single set of joints striking perpendicular to map-scale fold axes (T-joints) and (2) two conjugate sets of joints with the acute bisector oriented perpendicular to map-scale fold axes. Orientation of T-joints as well as orientation of the acute bisector between the conjugate sets and the value of the acute angle were determined for: (1) Lower Cretaceous strata, T-joints are oriented N48E. Acute angle between conjugate sets is 44°, whereas the bisector of this angle is oriented N49E. (2) In Paleogene and Lower Miocene strata, T-joints are oriented N48E. Acute angle between conjugate sets is 60°, whereas the bisector of this angle is oriented N47E.

The discussed data may be summarized in the following way: (i) both the T-joints and the acute bisector between the conjugate sets are oriented perpendicular to the regional fold axes within the whole studied stratigraphic sequence, (ii) the mean value of the acute angle between the conjugate sets increases from 32°, in Lower Cretaceous strata (1) to 44° in Upper Cretaceous strata (2) and 60° in Paleogene and Lower Miocene strata (3).

In the present interpretation, the orientation of maximum stress axis (σ₁) is considered to be parallel both to the T-joints and to the acute bisector between the conjugate sets, whereas the relative value of σ₁ is considered to be positively related to the value of the acute angle between the conjugate sets. In this interpretation: (1) the orientation of the main stress axis (σ₁) was permanent since Early Cretaceous time to Early Miocene time and, (2) the relative value of σ₁ was continuously increasing during the discussed span of time.

Maturation and thermal histories of Tertiary basins in the border region between Eastern Alps, Southern Alps, Dinarides, Pannonian Basin

Reinhard F. Sachsenhofer¹, Istvan Dunkl², Christian Hasenhüttl¹, Bogomir Jelen³ & Thomas Rainer¹

¹Institut für Geowissenschaften, Montanuniversität Leoben, A-8700 Austria
²Institut für Geologie und Paläontologie, Universität Tübingen, Sigwartstraße 10, D-72076, Germany

1100