magmas could have collected ultramafic xneoliths from a brittle-veined lithospheric mantle. No unequivocal evidence of subduction in the lithospheric mantle has been recorded in the Graz Basin ultramafic xenoliths and we may speculate that the processes which formed the interstitial amphiboles are related to metasomatic events.

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Results of deep seismic reflection profiling across the East Rhodopes, South Bulgaria

Alexander Velev[1], Ivan Boyanov[2] and Yotzo Yanev[2]

[1] Geology and Geophysics Corp., Sofia, Bulgaria
[2] Geological Institute, Bulgarian Academy of Sciences, Sofia

According to recent plate tectonics concepts a probable collage zone is located south of the Moesian platform. This zone consists of terranes detached from Africa and accreted to Eurasia. The East Rhodope exotic terrane is one of them. It is composed of Proterozoic (?) amphibolite facies metamorphics, Mesozoic metamorphic rocks, sediments and basalts intruded by Late Cretaceous granites, all locally overlain by Paleogene sediments and volcanics. The East Rhodope terrane is a pile of thrusts, its deep structure and relations to the West Rhodope terrane being under debate.

According to the first deep seismic reflection profile Ardino-Ivailovgrad (ER1), the thickness of the Paleogene cover is up to 2.3 km. The crust is divided into four superlayers A, B, C and D. The main result is the discovery of a so far unknown tectonic zone imaged on the line ER1c by an about 10 km wide, SW dipping band of moderate to strong reflectors (superlayer D). It cross-cuts superlayers A, B and C and extends into the upper mantle. Superlayer D is interpreted as a pre-Late Cretaceous obduction zone (East Rhodope thrust front) marking the boundary.

Style of postsedimentary deformation in Plio-Quaternary Velenje basin, NE Slovenia

Marko Vrabec

University of Ljubljana, Slovenia

Velenje basin is 10 km long elongate Plio-Quaternary intermontane depression, bounded by the Periadriatic line zone to the North and by the WNW-ESE trending Šoštanj fault to the South. Basin presumably originated in the regime of dextral transtension between these two fault systems. The basin fill is up to 1000 m thick and shows a typical fill-up sequence ranging from subaerial to lacustrine clastic sediments (Brezigar, 1986). The age of the sediments is poorly constrained except for the mammal remains and pollen content in the upper part of the stratigraphic succession, which indicate Upper Pliocene and Quaternary age (Brezigar et al., 1983), and the age of the basin is arbitrarily taken as Pliocene.

The main part of the basin is a 2 km wide trough-like structure between the Šoštanj fault and similarly WNW-ESE trending Velenje fault. In the basin area, Velenje fault is a boundary between major tectonic units of Kamnik-Savinja Alps to the South and Karavanke to the North (Mioè and nidarèiè, 1983, Brezigar, 1986) and is also a part of the Donat zone sensu Jelen (Jelen, 1994), which separates two major Tertiary tectono-stratigraphic units.

The largest part of data about the basin comes from the Velenje lignite mine. Borehole, seismic and other data show that lenticular, up to 160 m thick lignite seam has a synclinal shape, which is mostly due to the differential compaction of the basin fill. Lignite seam at the SE margin of the basin along the Šoštanj fault is cut by secondary faults and strongly segmented with up to several tens of meters of vertical offset between fault blocks, whereas above the Velenje fault the lignite seam is practically undeformed by faulting.

Using the data of more than 1000 boreholes, the geometry of the upper boundary of the lignite seam in the Šoštanj fault area was modeled and analyzed with various computer-aided techniques. The fault architecture and arrangement and geometry of minor tectonic blocks clearly indicate that the origin of structures is related to dextral movements along master fault(s) of the Šoštanj fault zone.

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Shift of basin subsidence due to oblique subduction along the Northern Austroalpine margin during the Late Cretaceous-Tertiary of the Eastern Alps and the Western Carpathians

Michael Wagreich

Intitut für Geologie, University of Vienna, Austria

Subsidence within the Late Cretaceous to Early Tertiary basins at the northern margin of the Austroalpine microplate (Austroalpine Units of the Eastern Alps, Tatric and higher units of the Western Carpathians) shows a regular time shift from the West to the East. Rapid subsidence into bathyal depths within the northwesternmost part of the Northern Calcareous Alps (NCA) began already in the late Turonian. Other basins of the Gosau Group of the NCA (WAGREICH & FAUPL 1994) and the western part of the Inner Western Carpathians (WAGREICH & MARSCHALKO 1995) indicate a shift of this subsidence pulse predated by short uplift and deformation from the Santonian in the west to the Maastrichtian in the southeast. This eastward youngig in the beginning of major subsidence is continued within the Centralcarpathian Paleogene, e.g. the Sulov Conglomerates (Paleocene) and turbiditic formations of the Eocene/Oligocene, partly also early Miocene in eastern Slovakia (see also KOVÁC et al., 1994).

This time shift of subsidence can be interpreted as a result of diachronous oblique subduction processes to the north of the active leading margin of the Austroalpine microplate (including the NCA and the Tatric units of the Western Carpathians). This margin was characterized by southward subduction of the Penninic Ocean from the Cretaceous onwards The short deformation and following rapid subsidence may be due either to tectonic erosion or subduction roll-back, or a combination of both processes. Tectonic erosion due to collision and subduction of an oceanic asperity is more probable in the Eastern Alps based on structural evidence and sedimentological reasoning such as the elimination of an accretionary ridge north of the NCA (WAGREICH 1993, 1995). Within the Western Carpathians a combination of tectonic erosion and later subduction roll-back is more likely, especially for the subsidence of the Centralalpine Paleogene basins, which postdate accretion of the Pieniny Klippen Belt to the north.

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Alpine thrust and subthrust structures below the Vienna Basin and along its adjacent borders.

Godfried Wessely

c/o OMV Aktiengesellschaft, Vienna, Austria

The segment of the Alpine Carpathian belt, which passes the Vienna basin from one border to the other below the Neogene basin fill, are mainly the Flysch Zone, the Calcareous Alps with their Palaeozoic base, the Greywacke Zone and the Central Alps.

The Alpine structural style has been studied by detailed surface mapping and by deep wells situated at the borders and within the basin. In the area of the Matzen-Schönkirchen oil fields further information has been obtained by 3D seismic surveys. Correlation between the Austrian and the Slovakian part of the Vienna Basin and the Carpathians on surface show in general a continuation of the main elements and their stratigraphic characteristics from the Alps into the Carpathians but some changes in the structural arrangement.

The Semmering-Leithagebirge system representing the Lower/Middle Austroalpine units seems to be replaced by a more heterogeneous structural and facial complex in the Male Carpaty mountains.

The overriding of the deeper Carpathian and Central Alpine units by the Calcareous Alps is evident in the Alps and Carpathians as well as the overthrust of these units over the Flysch or Klippen Zones. The Greywacke Zone disappears in the Vienna Basin toward NE.

The structures of the Calcareous Alps are strongly compressed especially along their frontal part. Steeping, overturning and backthrustings are the consequence. The narrowing of the Calcareous Alpine Zone toward NE could be a tension effect, but the steep structures point to a stacking of tectonic elements because of subsiding conditions during overthrusting. The main nappe systems are