speculate on its influence on the depositional pattern on the northern margin of the Pannonian basin.

Sets of steep E-W to NE-SW-trending extensional faults and NW-SE-trending transfer faults dissect the Austroalpine basement to form a system of blocks, which formed the floors of small (locally isolated) sedimentary basins from the Triassic onwards. Sedimentation was intermittent, controlled by reactivation of the bounding faults. As the availability of reliable slickenfibre data in this area is restricted (B.Sperner pers. comm. 1993), and sedimentary control on the timing of fault movements is poor, radiometric dating (Ar/Ar on white micas) proved an invaluable tool in determining the absolute timing of reactivation of the E-W to NE-SW-trending set as sinistral transtensional faults with varying amounts of dip-slip: ca. 85-82 Ma. Deformation was strongly partitioned into the fault zones, and the intervening blocks were only weakly deformed.

At least some of the E-W-trending set functioned sporadically as growth faults during rifting, with the largest sediment thicknesses on the southern i.e. downthrown side. This pattern is preserved as the thrusting related to the Lower Cretaceous compressional event was non-pervasive in the Inner Western Carpathians, in contrast to the Alpine-Pannonian transition zone, where coeval "corner effects" produced a more complex deformation pattern. It is speculated that the basement of the northern Pannonian basin to the south of the IWC similarly escaped major shortening, in which case the reactivated structures dominating the formation and development of Palaeogene and Neogene basins could be extensional faults of Triassic-Jurassic age, with coeval rift infill locally underlying the younger basins, rather than major thrust faults postulated in analogy to the transition zone further to the west. This implies that additional source and reservoir rocks may be preserved in the subsurface of the northern Pannonian basin.

Geodynamic evolution of the Central Dinarides

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As distinguished from the northwestern and southeastern Dinarides, the central parts are characterized by a zoned pattern in the distribution of the large lithostratigraphic units. From the southwest i.e., the Adriatic microplate to the northeast, six main lithological associations originating in different environments can be distinguished.

(1) The carbonate platform (CP) formations of the Alpine passive continental margin (the present External Dinarides) are underlain by Upper Paleozoic formations. Initial stages of CP evolution were predisposed by rifting accompanied by the magmatism of the continental crust origin, which finished in the Late Triassic. Afterwards monotonous carbonate sedimentation continued in stable environments and lasted, with a few hiatuses, unitil the Middle Eocene.

(2) The passive continental margin formations originated by continuous sedimentation on the slope of the CP and its foot. Two main units can be distinguished: (a) Jurassic to Turonian sandstones and limestones, only in some places with flysch signatures, and (b) Senonian - Paleogene (?) carbonate flysch sediments.

(3) The ophiolite formations originated in different environments: (a) Late Triassic to Early Cretaceous radiolarites with shales, micrites and basalts. (b) Graywackes and shales, i.e. an olistostrome melange with fragments of graywackes, basalts, diabases, gabbros, peridotites, cherts and exotic carbonate rocks; the age of the melange is presumably Jurassic to Early Cretaceous. (c) Ophiolites are represented by peridotites with subordinate gabbros, diabases and basalts; the radimetric ages of ophiolites range from 180 to 136 Ma. (d) Late Jurassic to Late Cretaceous overstep sequences represented mostly by clastic and carbonate rocks.

(4) The active continental margin formations, related to the subduction zone, are represented by (a) Upper Cretaceous-Paleogene trench sediments with blocks of blueschists; (b) Tectonized ophiolite melange in which exotic blocks of Upper Cretaceous and Paleocene limestones are also included; (c) Alpine medium-pressure metamorphic rocks originating from the surrounding Upper Cretaceous-Paleogene sediments, and (d) Alpine synkinematic granitoids.

The four formations marked by (2) to (4) are included in the Internal Dinarides.

(5) The allochthonous Paleozoic-Triassic formations are thrust onto the internal units but the frontal parts of the nappe overlie the northeastern margin of the CP. In some areas, below the Paleozoic-Triassic nappe tectonic windows composed of rocks of the ophiolite formations are found.

(6) Post-orogenic Oligocene and Neogene formations accumulated in marine to fresh-water environments in Oligocene intramontane basins, numerous Neogene depressions in the uplifted Dinarides, and in the Pannonian Basin.

Geodynamic evolution of the central Dinarides was related to a sequence of tectonic events which took place within the Alpine Wilson cycle. (1) Rifting processes of some 40-50 Ma duration which ended in the Late Triassic. (2) Opening of the Dinaridic Tethys which took place in Late Triassic/Early Jurassic time when a spreading center was set up. This made possible the generation of the oceanic crust during the period of 60-70 Ma. At that time there was probably also subsidence of the northeastern marginal parts of the CP composed of the Triassic formations with unconformably underlying Paleozoic formations, which were thus included in the basinal parts. (3) Subduction processes started in a subsequent Late Jurassic/Early Cretaceouc time as indicated by the first emplacement of ophiolites. By the end of these processes, the Paleozoic-Triassic formations overlain by the oceanic crust were probably detached and thrust onto the emplaced ophiolites and their country rocks. The emplacement of ophiolites and stocking of the Paleozoic-Triassic nappes was accompanied by the first strong Alpine metamorphism (120-110 Ma). (4) In the northern Dinarides, in the Late Cretaceous a magmatic arc has been already generated as indicated by the presence of trench sediments and igneous rocks characteristic for such a geotectonic setting. (5) The main deformational (compressional) event (about 40-50 Ma) and medium-pressure metamorphism accompanied by synkinematic granite plutonism took place after the Eocene termination of subduction processes. This deformation produced main NW-SE-trending fold, thrust and imbricate structures with the southwestern vergences. Only north of the presumed subduction zone, opposing northeastern vergences due to obduction were recognized. (6) Post-orogenic evolution started after the Eocene uplift of the Dinarides which gave rise to the separation of the Tethys into the Mediterranean and the Paratethys.

Which is the time of rotation? Review of paleomagnetic and K-Ar data from Romania

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Recent K-Ar data from Romania has changed or improved the age of some magmatic rocks sampled for paleomagnetic studies. A first important change concerns the age of basaltic andesites from Mures Valley (Apuseni and Poiana Rusca Mountains). These rocks, previous considered as Paleogene, have ages between 66 ma and 72 Ma. The second important contribution of the radiometric data concerns the ages of the two groups with different paleomagnetic directions from Miocene magmatic rocks of Apuseni Mountains. Two K-Ar data from the group with a declination around 70° suggest an age between 14.7 - 12.4 Ma. The K-Ar data from the group that show no rotation suggest an age around 11 Ma. The paleomagnetic data support the existence of a domain characterized by a large clockwise rotation in the eastern part of the Carpatho-Pannonian area. The amplitude of the rotation is variable from 70° in the Apuseni Mountains -Banat area to 120° in the Bucegi Mountains. Data from the Apuseni Mountains suggest a very fast rotation during Sarmatian. This rotation was coeval with the counterclockwise rotation of the Gutai Mountains, but took place after the end of the counterclockwise rotation of the North Pannonian Paleogene basin (around 16 Ma). This fast rotation was accommodated in the brittle layer by coeval trusts and strike-slip faults in the East and South Carpathians and extensional grabens and shear zones in the Great Hungarian Plain. These rotations reflect probably the continuously deforming lithosphere beneath the seimogenic upper crusts. K-Ar data from Pannonian-Quaternary volcanic rocks of East Carpathians show the migration of the volcanism along the arc and a short duration of volcanic activity in individual segments. Paleomagnetic rotations are absent in these magmatic rocks, but the migration is in the same sense as the previous clockwise rotation. The above features are all consistent with the slab breakoff model. Cinematic parameters derive from these data will be discussed with respect to the proposed tectonic models for this area.

Styles of Miocene thrusting, strike-slip faulting and extension in the eastern Calcareous Alps

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The final stage of collisional shortening in the Eastern Alps was characterized by intense brittle deformation of the Calcareous Alps during the Miocene. Thrusting over the European margin occurred until the Early Miocene (Karpatian stage, 17 Ma) as dated by overthrust Molasse sediments. Thrusting was generally directed northwards and exceeded 34 km since the Late Oligocene (Wessely, 1987). The irregular morphology of the overthrust European basement controlled deformation styles in the upper plate. From the