Alps. This process probably started during latest Oligocene, and accelerated during the Early Miocene. The main dextral slip was accommodated along the Periadriatic and Mid-Hungarian shear zones. This dextral separation was associated with the lateral extrusion of the Alcapa wedge. During and/or after this tectonic episode, within the Ottnangian the eastern (Pannonian-Carpathian) part of the Alcapa suffered 50° CCW, the southern Tisza-Dacia block 60°-80° CW rotations.

The Pannonian basin system was born by rifting of back-arc style during the late Early and Middle Miocene time. The tension was oriented initially eastward, toward the free interface of the Carpathian subduction front. From the middle Badenian onward the direction of tension were controlled both by the retreating subducted slab and by the gradual cessation of thrusting in the Western Carpathians. The norheastward drag (NE-SW tension) was gradually replaced by E-W to SE-NW tension. After the cessation of thrusting along the northeastern segment, the whole basin was slightly compressed and some parts were inversted. During the Late Miocene, E-W to NE-SW tension renewed. From the latest Miocene the compressional tectonism has propagated from the Southern Alps gradually into the Pannonian basin and resulted in Pliocene through Quaternary inversion and uplift.

Miocene tectonic evolution of the Periadiatic Zone and surrounding area in Slovenia: repeated dextral transpression

László Fodor[1], Bogomir Jelen[2], Emő Márton[3], Dragomir Skaberne[2], Joze Car[4], Marko Vrabec[4]

[1] Department of Applied and Environmental Geology, Eötvös University, Budapest, Hungary
[2] Geoloski Zavod Ljubljana, Slovenia
[3] Eötvös Loránd Geophysical Institute, Budapest, Hungary
[4] Department of Geology and Paleontology, University of Ljubljana, Slovenia

Dextral separation of the Periadriatic zone was postulated by several authors using divers criteria, but detailed kinematics and timing of movements were not yet investigated along its whole length. Stratigraphic and sedimentological study, structural and paleomagnetic measurements, mapping, borehole data analysis permitted to unravel the Miocene-Quaternary tectonic evolution of its Slovenian segment.

The brittle deformation was characterised by NNW-SSE (NW-SE to N-S) compression and perpendicular tension. The prominent style of deformation within the two main shear zones, the Periadriatic line-Sostanj fault system and the subparallel Sava-Celje fault zone is penetrative dextral strike-slip faulting associated with folding and verticalisation of beds. Such dextral transpression took place in the Early Miocene (Ottnangian), than during the Karpatian, and reoccurred several times during the Late Miocene and Pliocene and lasted up to the Quaternary. Between the two shear zones, the western Smrekovec area is characterised by sinistral transpression, while the eastern Savinja block was affected by dextral transtension.

The highly strained rocks within the dextral shear zones show mainly clockwise, sometimes counterclockwise rotations, variable in amount. The non-coaxial nature of faulting was detected by the comparison of paleomagnetic and stress data; NE-SW compression occurred in sites where important CW rotation took place. The area of sinistral transpression could be rotated slightly in clockwise direction, following domino-type rotation induced by the boundary dextral shear zones.

Relationship between tectonic zones of the Albanides, based on results of geophysical studies

Alfred Frasheri

Faculty of Geology and Mining, Polytechnic University of Tirana, Albania

The Albanides link the Dinarides and the Helenides, with which they form the southern branch of the Mediterranean Alpine Belt. Our analysis of the Albanides and their extension into the Adriatic Sea integrates surface geological observations, well data and results of seismological, refraction and reflection seismic, gravity, magnetic and geoelectric surveys.

Evolution of the Albanides began with the Triassic subsidence of their Hercynian substratum under a tensional regime, culminating in crustal separation and opening of the Subpelagonian and Hellenic-Dinarid oceanic basins. The Alpine orogenic history of the Albanides spans Late Jurassic to Quaternary times and can be subdivided into a Late Jurassic-Early Cretaceous tectonic, a Mid-Cretaceous to Eocene main-tectonic, an Oligocene-Miocene late tectonic and Plio-Pleistocene neo-tectonic cycle.

The Albanides consists of two major paleogeographical domains. The Internal Albanides formed part of the oceanic Subpelagonian Trough, whereas the External Albanides developed out of the western passive margin and continental shelf of the Adriatic plate. During the early-tectonic phase, the ophiolitic Mirdita nape was obducted onto the margin of the Adriatic plate. This was accompanied by the development of a flexural foreland basin.

During the main-late and neo tectonic phases, progressive westward advance of the orogenic front was coupled with a westwards shift of the foredeep basin axis to its present location at the margin of Adriatic Sea. The External Albanides evolved out of the Ionian Mesozoic shelf sedimentary prism and the superimposed foredeep wedge. The Albanides are underlain by autochtonous continental basement was little deformed during their evolution.

The ophiolites of the Mirdita nape give rise to major gravity and magnetic anomalies, indicating that its thickness ranges between 2 and 14 km. Reflection seismic and gravity surveys carried out in the External Albanides and the Adriatic Sea define distinct structural belts which are related to different tectono-stratigraphic units.

Structuration of the Ionian and Sazani zones occurred during the late and neo-tectonic phases The carbonate dominated Late Triassic to Late Cretaceous series of the Ionian, Kruja and Krasta-Cukali zones contain several rich to very source rock intervals. In the Ionian zone Late Cretaceous, Paleocene and Eocene carbonates, Oligocene flysch type sandstone. The Tortonian Pliocene Molasse type clastics of the Periadriatic Depression.

Seismotectonic comparison of alpine collision structures: examples of recent extrusion in the Eastern Alps and in Turkey

Georg Gangl

Verbundplan, Donaukraft Engineering, Vienna, Austria

Introduction. The well known comparison of the movement of India towards the Himalyas with the deformation of an indenter against a plate, has allready been made by TAPONIER & MOLNAR twenty years ago. The fault pattern is similar in different parts of the Alpine chain. Two examples of „extrusion“ are given:

(1) The movement of Arabia agaist Anatolia and Iran (we focus on the border zone of Arabia near the East Anatolian Fault and the extrusion of Anatolia).

(2) The movement of the African promonetory (Italy) against the Alps (In this part we focus on the interpretation of earthquake data in Austria and the Pannonian Basin).

As a consequence, an extrusion of crustal parts can be observed more or less normal to the maximum pressure axis. This movement continues until now.

The following features are discussed: (1) Earthquake data and length of seismic catalogues. (2) Faults from geologic investigation and from satellite images. Can the activity be checked properly? (3) Measurement of the velocity of plates. Magnitudes of velocity can be given by GPS and SLR measurement which indicate that Italy moves relative to Europe with 0.7 cm/year and that Arabia moves relative to Anatolia with 3-4 cm/year. (4) Fault plane solutions. Examples of fault plane solutions are given to characterize the kind of motion. The two types of earthquakes can be distinguished due to fault plane solution: strike slip movement and thrust-type movement.A tectonic interpretation is given.

The common inversion of the seismological and DSS data - New traveltime tomography method and results for Europe

Valentin S. Geyko

Institute of Geophysics, National Academy of Sciences of Ukraine, Kiev

A new method of Taylor approximation of non-linearity of 3-D problems of seismics based on the wave equation and eikonal equation solution has been worked. It is shown that Taylor approximation of 3-D inverse traveltime problems has the following advantages over the linearization method. (1) It ensures a considerable gain as to the non-linearity approach accuracy. (2) It is valid with fewer constraints imposed on the velocity. (3) It is not need by the choice of reference velocity approach. (4) It does result in a problem correct by Tikhonov, instead of an essential incorrect one. (5) It involves significant reduction in the dimension of the problem for numerical inversion. (6) It is equally valid for the solution in Cartesian and spherical coordinates. The method is easily applied to interpret 3-D data of seismology and 2-D DSS data as well profile and spatial CMP data of seismic reflection and refraction wave exploration.

We describe processing and inversion of the observed seismic data by new method. The principled detailing of P-velocity model of the mantle obtained from the Bulletins of the ISC is only possible when using following additional data for every region: (a) the arrival and second times of the P-wave observed on long-range and DSS profiles, (b) data (absent in the Bulletins of the ISC) on the arrival and second times of the P-wave from a weak near earthquakes observed by seismic stations of the regional networks, (c) the second times of the P-wave in the range of epicentral distances of 12-25 degree determinate from records of major earthquakes, (d) the arrival times of the P-wave