(3) Mid-Cretaceous (110-90 Ma). Gradual underthrusting of the thinned Fatric crust beneath the North Veporic thrust wedge, d,collement of the Zliechov basin infill to form an accretionary fold-and-thrust belt with coeval flysch deposition in forearc or piggyback basins. Shortening started also in the South Tatric domain. Thermal relaxation and compressional uplift of the ultra-Veporic thrust stack due to underplating of the Fatric crust.

(4) Late Turonian (around 90 Ma). After elimination of the Fatric basinal area and pushing-up of its detached and imbricated sedimentary filling over the South Tatric frontal ramp, an extensive overthrusting, narrowly age-constrained event occurred in the CWC. The Krizna (Fatric) and Choc (Hronic) nappes were gravitationally emplaced above the Tatric cover.

(5) Early Senonian (90-80 Ma). Shortening relocated to the outer Tatric margin facing the Penninic-Vahic ocean, where flysch coarsening-upward complexes deposited during underthrusting of the Vahic crust. Contemporaneously, the Veporic metamorphic core complex was rapidly exhumed by top-to-the east unroofing. Small anatectic granitic bodies intruded the Veporic basement.

(6) Middle Senonian (80-70 Ma). Deeply denuded Veporic units were overriden by the Silicic relief nappes. Transtension in the inner CWC zones, accretion along their outer edge with terrigenous and pelagic sedimentation.

(7) Late Senonian - Early Paleogene (70-60 Ma). Collision of the Tatric sheet and overlying nappes with the Oravic continental ribbon (Kysuca and Czorsztyn units of the later Pieniny Klippen Belt) after diminishing of the Vahic basin, followed by dextral transpression within the collisional zone and wrench faulting inside the CWC area.

The maps of tectonostratigraphic units and principal structures of the Western Carpathians and adjacent areas

Dušan Plašienka[1], Andrea Halmešová[2], Igor Hrušecký[3], Michal Kováč[2] and Martin Šujan[4]

[1] Geological Institute, Slovak Academy of Sciences, Bratislava
[2] Dept. Geol. Paleont., Comenius Univ., Bratislava, Slovakia
[3] VVNP Research Oil Company, Bratislava, Slovakia
[4] EQUIS Ltd., Bratislava, Slovakia

The first, tentative versions of two map sheets in the scale 1:1,000,000 have been compiled to demonstrate the present state of knowledge about the general tectonic structure of the Western Carpathians and surrounding areas.

The aim of the first map is to outline the dominant composition and regional distribution of the principal tectonostratigraphic units. The units are specified according to the paleogeographic and paleotectonic principles (e.g. the time of structuralization), less based on the lithostratigraphic and deformation criteria. In general, the map is stripped off the "post-tectonic" sedimentary and/or volcanic cover superimposed on the tectonic edifice formed during the main Alpidic compressive events. Thirty one items of the legend comprise superunits of the Alpine-Carpathian foreland and the orogenic zone itself.

The structural map depicts the most important macro- to megascopic structures, especially antiforms, synforms, large-scale recumbent folds, buried horsts, low-angle thrust faults, high-angle con-tractional (reverse) faults, extensional normal faults and strike-slip and/or oblique-slip contractional and extensional fault zones. Narrow spacing of reverse faults indicates imbricated tectonic style, the com-bination of reverse faults and synforms or antiforms defines fold-and-thrust belts. Coincidence of several kinematic types of faults in one line points to re-peated reactivations of a long living "lineaments" (usually former sutures) with changing kinematic role through time. Five temporal periods of formation of principal structures shown (Paleozoic-Middle Jurassic, Late Jurassic-Early Cretaceous, Late Cretaceous, Paleogene-Early Miocene and Neo-gene) are distinguished by different colours. Based on the age of the main phase of structuralization and dominating tectonic styles, two principal structural-tectonic provinces may be recognized in the map. These are the Alpine-Carpathian foreland (North European Platform) and the Alpine-Carpathian orogenic belt. The former obtained its fundamental structural features already in pre-Alpine times, the latter exhibits polyphase Alpidic evolution and a wide range of tectonic styles.

The Southern Alps - Dinarides relationship

Marijan Poljak

Geological Survey Ljubljana, Slovenia

According to the classic division of the Alps, the area south of the Periadriatic line belongs to the Southern Alps. These in general include the Southern Karavanken and Carnic Alps, the Julian Alps and Dolomites and the Sava hills (Sava folds) of Central Slovenia.

The division of the Dinarides originates from the Kober's "bilateral orogen" that determines the External, Central and Internal zone. However, only the terms External and Internal Dinarides have been in common usage. The area to the south, i.e. the Adriatic basin bears different geotectonic names.

The cross-section from the Adriatic basin to the Periadriatic line, at least in Slovenia, shows a gradual paleogeographic transition between above mentioned units. Laterally from the Southern Alps to the Dinarides and vice versa, they express paleographic unity.

Starting from the south, the Istrian platform of the Adriatic basin transits normally to the External Dinarides, and they both form a unique Adriatic - Dinaric carbonate platform of Mezozoic to Paleogene age with non-significant paleogeographic differences. Their contact is a folded zone with a minor tectonic offset along reverse faults formed in post - Eocene age.

The transition of the External Dinarides to the Southern Alps and/or Internal Dinarides is also gradual. These last ones are represented here by a zone of Mesozoic deep water sediments known as the Slovene through. It was initiated in Middle Triassic, and had continuously progressed to the south. In post - Oligocene time, through sediments have been generally thrusted upon the Aridatic - Dinaric carbonate platform.

The northern rim of the Slovene basin is the Julian carbonate platform, that had desintegrated during Lower Jurassic and had been more or less covered by deep water sediments to the end of Mesozoic. In post-Oligocene, the Julian platform has been thrusted southward over the Slovene basin with undetermined amplitude of tectonic desplacement.

The Paleozoic basement of the Julian Alps is exposed to the north as the Southern Karavanken. The contact between these two units is mostly tectonical and it is determined by thrusts and normal faults of post-Oligocene age.

Laterally, starting from the northern Italy, the External Dinarides outcrop in the northern rim of the Po basin as the Trento platform, and they continue southeastward occupying the most part of southern Slovenia, Croatia and Bosnia. The deep water sediments of the Belluno through continue into the Slovene through and into the Central Bosnian zone of Internal Dinarides. The Julian platform together with its Karavanken basement could be followed east and northeastward into Transdanubian range of Central Hungary where they both emerge with the basinal sediments of the Southern Alps and/or Internal Dinarides.

Therefore the boundary between the Southern Alps and Dinarides, that is usually placed "somewhere" in Slovenia is artificial one, and it represents more geographical than geological division.

Subsidence analyis of reconstructed profiles of the Pienniny Klippen Belt Basin

Pawel Poprawa[1] and Michal Krobicki[2]

[1] Polish Geological Institute, Warsaw, Poland
[2] Academy of Mining and Metallurgy, Kraków, Poland

The area of research is Polish part of Pieniny Klippen Belt (PKB), for which twelve synthetic pre-orogenic 1-D profiles of individual zones of the basin were reconstructed. Profiles represent Czorsztyn-, Czertezik-, Niedzica and Branisko-Pieniny successions, and cover Pliensbachian-Early Campanian basin history. We applied subsidence analysis technique for analysing pre-orogenic history of tectonic vertical movements of the basin basement, which includes quantitative balancing of thicknesses, absolute ages, bathymetry and lithological data for individual lithofacial units, as well as calculating isostatic and decompaction effect of backstripping.

There is a good control on thicknesses of formations (small total thicknesses of profiles are characteristic: aprox. 200-500m) as well as on stratigraphy and lithology (last one has a minor influence on a model). Bathymetry estimations are based on lithofacial analysis, relations to CCD and ACD, and faunal indicators. Quantitative bathymetric control is poor, but relative changes are certain. Models for PKB basin strongly depend on bathymetry, what causes their error bars to be wide.

Our preliminary results (tectonic subsidence curves) show high dynamic of vertical tectonic movements of basin basement. Remarkable similarities exist in a general pattern of subsidence history over the whole PKB basin.

For Pliensbachian-Bajocian the curves show slow subsidence, which during Bathonian accelerated. Callovian-Oxfordian are characterised by very rapid subsidence, which might be attributed to tectonic event taking place across all the basin (more pronounced for Branisko and Pieniny successions). The subsidence character might be interpreted as extensional or transtensional. The second one is supported by high rate of subsidence, its short live span and sudden extinction, and lack of thermal cooling. The question is if lateral heat flow mechanism (characteristic for small transtensional basins) might be applied in a case of PKB basin, which was several tens of kilometres wide.

At the end of Oxfordian rapid uplift started, which lasted until Berriasian, ceasing with time. It is interpreted as a record of major modification of stress regime in the basin (possibly to transpressional regime?).