



Docking of the Western Carpathians to stable Europe: time relation of tectonic deformation and rotation as evidenced by paleomagnetic vectors and AMS lineations

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The Western Carpathian fold and thrust belt is ultimately bounded in the south by the mid Hungarian fault zone, while the outer limit is the Carpathian mountain front overriding the Miocene sediments of the Carpathian foredeep, which is the continuation of the North Alpine molasse zone. The Western Carpathian orogen shows a distinct progradation from south to north (in present co-ordinates). The thrusting events ended in the Central Western Carpathians in the Turonian, in the Pieniny Klippen belt the main phase of deformation is of latest Cretaceous –Paleocene age, while the Western Outer Carpathians were folded during the Miocene. According to general opinion, the arcuate shape of the Western Carpathians is due to oroclinal bending, probably taking place in the Miocene, simultaneously with the thrusting of the nappe pile over the foredeep sediments.

During the last 20 years a systematic paleomagnetic and AMS study was carried out in the Cenozoic flysch of the Central and Outer Western Carpathians and in the late Cretaceous red marls of the Pieniny Klippen Belt and Pieniny andesites of Miocene age. A total of 100 geographically distributed localities were investigated and the results published in several papers. In this presentation the paleomagnetic and AMS results relating to the latest Cretaceous-Miocene large scale displacements will be summarized which lead to the accretion of the fold and thrust belt to the southern margin of stable Europe.

The paleomagnetic data set is characterized by highly consistent westerly declinations for primary magnetizations (Late Cretaceous, Oligocene) as well as remanences of post-folding/tilting, i.e. Miocene age. The magnetic fabrics of the sediments are foliated and suggest weak deformation. AMS lineation in the Silesian nappe of the Outer Carpathians is closely correlated with local bedding strike, suggesting that the lineation is due to compressional tectonics. The above results imply that the general orientation of the Western Carpathian front was NW-SE striking and did not change between the late Cretaceous and the Miocene. Compressional deformation predated the en bloc CCW rotation of the Western Carpathians. Concerning subordinate relative rotations within the orogen, oroclinal bending may be partly responsible for the arcuate shape, but bending must have taken place before the Oligocene. In the western segment of the Outer Carpathians the declinations are somewhat more CCW rotated than in the central and eastern segment, probably due to tectonic activity within a left lateral wrench corridor.

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