The Contact Zone between the ALCAPA and Tisza-Dacia Mega-Tectonic Units of Northern Romania in the Light of New Paleomagnetic Data

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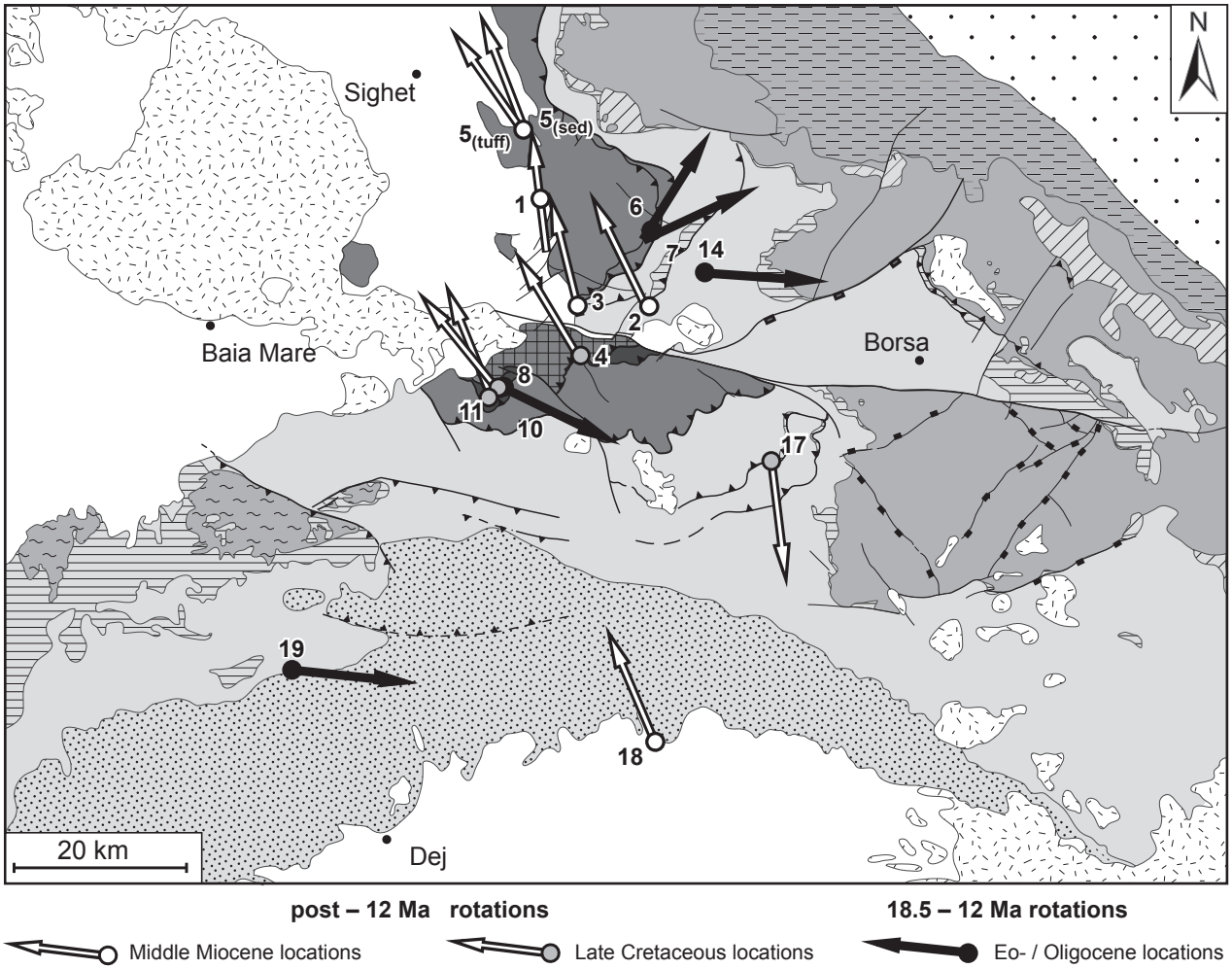
Paleomagnetic analyses were carried out on samples from 19 localities within two different mega-tectonic units in Northern Romania: Tisza-Dacia (11 localities) and ALCAPA (8 localities). The samples cover a range of different lithologies: (1) Late Cretaceous red-coloured marl to marly limestone, (2) Eo- Oligocene flysch sediments, and (3) Mid-Miocene (Langhian) tuffite (Dej tuff and related sediments). The Late Cretaceous and mid-Miocene specimens carry secondary paleomagnetic signals exhibiting a counterclockwise deflection of the paleo-declinations by some 30°, while the Eo-Oligocene localities indicate an overall clockwise deflected (between some 45° and >90°) paleo-declination with respect to present-day north. Clockwise rotation postdates the age of sedimentation (Lower Oligocene), as well as (at least partially) thrusting of the Pieniides onto the Tisza-Dacia mega-tectonic unit, which occurred between 20.5 and 18.5 Ma. Clockwise rotation predates post-12 Ma counterclockwise rotations inferred for the mid-Miocene localities.

Surprisingly the clockwise rotations of the first rotational stage affected not only the (par-) autochthonous sedimentary cover of



■ **Fig. 1.** Paleo-declinations, plotted relative to present-day north on a geological map. The secondary magnetizations of Mid-Miocene and Late Cretaceous localities indicate a post 12 Ma counter-clockwise rotation of about 30° (white arrows). The Eo-/Oligocene locations show consistent clockwise rotations that pre-date the counter-clockwise rotations (black arrows).

the Tisza-Dacia mega-tectonic unit, but also the allochthonous flysch nappes of the Pienides, i.e. the eastern tip of the ALCAPA mega-tectonic unit. Well-documented opposed rotation of the remainder of ALCAPA necessitates a detachment of this eastern tip of ALCAPA after 18.5 Ma. The most likely location for this detachment zone is along the margins of the Transcarpathian depression.

During a second (post-12 Ma) stage, counterclockwise rotations of up to 30° affected the entire working area. Regarding timing and magnitude, these second stage rotations are similar to rotations documented for the East Slovak basin, but different from those reported from the South Apuseni Mountains and the Central and Inner West Carpathians located west of the East Slovak basin.

First Paleomagnetic Results from the Oligocene Sediments of the Silesian Nappe, Western Outer Carpathians

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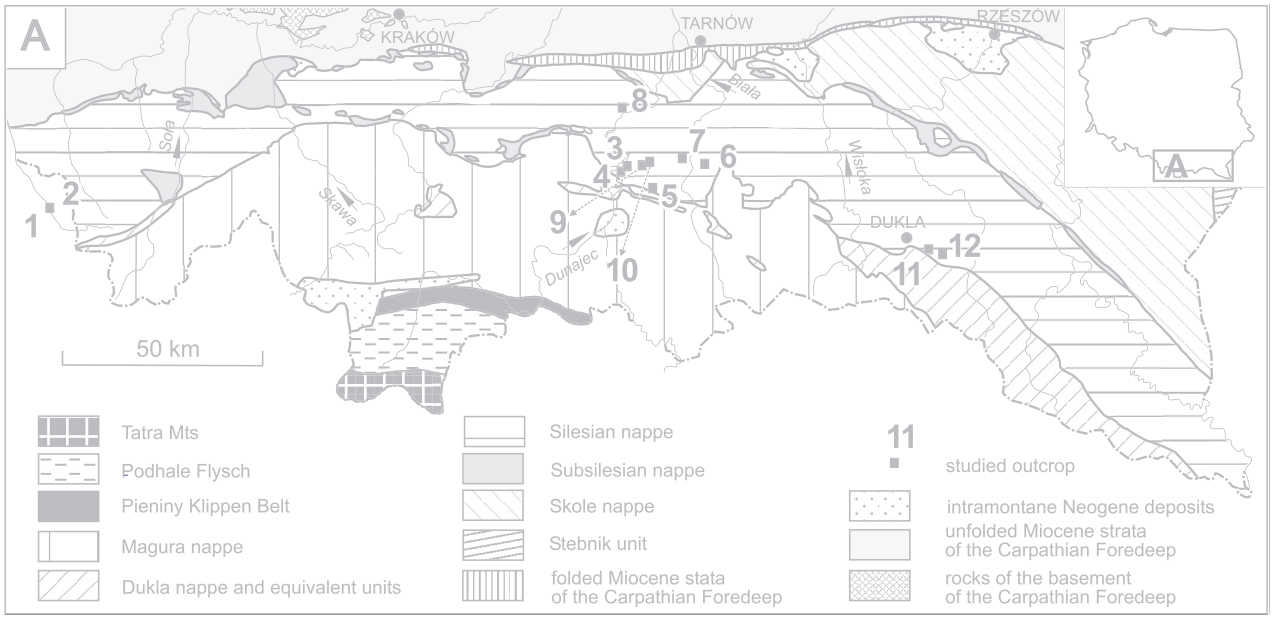
Western Outer Carpathians consist of several north-verging Nappes. The Silesian Nappe, the subject of the present study, is situated between tectonic units from which there are a number of Tertiary paleomagnetic results, the Magura Nappe and the molasse zone of the foredeep. It consists of Late Jurassic – Early Miocene rocks, mostly flysch sediments. The rocks of the Silesian Nappe form an arc, which is gently convex to the north. The regional fold axes are almost parallel to the trace of the frontal thrust of the nappe, thus they are WSW–ENE oriented in the west, E–W striking in the central segment and WNW–ESE oriented in the east. Bending followed regional folding and thrusting, after the mid-Miocene.

Krosno Formation consisting of shales and sandstones in different proportion represents the youngest strata of the Silesian Nappe. We sampled for paleomagnetic study the shaly members at 12 localities (and also a limestone bed at locality 2), distributed along the bend from the Czech–Polish boundary to Krosno. The sampled localities are of Oligocene age.

As a result of standard paleomagnetic measurements and evaluation, 10 localities yielded statistically good paleomagnetic results; for one locality (loc. 7) the statistical parameters are poor but the direction is still in line with the others. Tilt test on regional scale (including 11 localities) is positive, best statistics is obtained at 105 % untilting; the overall mean paleomagnetic direction is D = 310° I = 65° (k = 30 α95 = 8°). Although the remanence is of pre-folding (tilting) age, there is no correlation between individual declinations and the regional fold axes.

Magnetic fabric is dominantly foliated and is basically of sedimentary character. Yet lineation directions are E–W oriented (exceptions are locality 1, in the western and locality 9, in the central



■ **Fig.1.** Paleomagnetic sampling localities (1–12) in the Silesian Nappe.