that faulting took place after the lithification of rocks in a compressional stress field with σ_1 oriented SW-NE. Summing up, we conclude that (1) all of the observed small-scale structures (i-v) formed in the same stress field and (2) most of the structures (i-iv) are early features which developed at the onset of folding when the host strata were poorly indurated. Only later, when the host strata became more indurated, the studied strata were cut by (v) strike-slip faults.

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The Western Carpathians from an Alpine and East Carpathian perspective

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The contact zone between the External Western Carpathians and the Central West Carpathians, the Pieniny Klippen Belt s.l., is of bewildering complexity compared to what is found west and east of the Western Carpathians, namely in the Alps and Eastern Carpathians of Romania. This is at least partly due to substantial modifications of the original Pieniny Klippen nappe pile, presently only preserved as steeply dipping fragments, during the east-directed lateral extrusion of ALCAPA in Miocene times. Hence, it is useful to go west and east from the Polish-Slovakian sector in order to speculate what might have been going on within this contact zone before the Miocene.

Given the complexity of the Pieniny Klippen Belt s.l. it is not surprising that the nomenclature of the tectonic units within and adjacent to this belt is of even greater complexity. Plašienka (2008) used the term "Oravic" in order to distinguish those parts of the Pieniny Klippen Belt s.l. that constituted an independent paleogeographic unit from other parts of the Pieniny Klippen Belt s.l. that are derived from dismembered parts of the Central East Carpathians (e.g. Manin, Klape, Haligovce units). The northern boundary of the "Oravic" units adjacent to the Magura flysch is equally complicated and there is a debate about the tectonic position and paleogeographic position of the Grajcarek succession, probably to be parallelized with the Saris unit of Slovakia (Birkenmajer & Gedl 2017, Jurewicz 2018), which may be taken as the structurally lowest part of the "Oravic" unit (Plašienka 2012), or, as a part of the Magura basin consisting of Mesozoic rocks thrust northwards over the mostly Cenozoic parts of what is considered the Magura unit s.s., or, as a transitional zone (Jurewicz 2018).

Viewed from the Alps it is clear that tectonic units derived from the Briançonnais microcontinent disappear east of the Engadine Window. There are no signs of a ribbon continent between the derivatives of the former Valais Ocean (Lower Penninic nappes) and the former Piemont-Liguria Ocean (Upper Penninic nappes) in Austria (Schmid et al. 2004). This implies that the Valais Ocean that opened in Lower Cretaceous times must have opened within a pre-existing Piemont-Liguria Ocean open since Mid-Jurassic times. Remnants of both oceans are present in Austria (Rheno-Danubian flysch and Glockner nappe representing the Valais Ocean; Yppsitz Klippen in Niederösterreich and Rechnitz Window representing the Piemont-Liguria Ocean). In the Western Carpathians, however, a kind of Briançonnais appears again in the form of the "Oravic" units; particularly the Czorsztyn unit shows amazing facies similarities (Trümpy 1988). Therefore, one expects derivatives of the Valais Ocean north of, and/or below the Czorsztyn unit, i.e. in the Graicarek unit of Poland and the Saris Unit of Slovakia. If correct, these two units would not represent parts of the "Oravic" (=Briançonnais) paleogeographical domain but rather Jurassic-Cretaceous parts of the Magura basin, later thrusted onto the Cenozoic of the Magura Unit s.s. South of the "Oravic" (=Briançonnais) Zone Units one expects relics of a Piemont-Liguria Ocean since the parallelization of the Central Carpathian nappe pile with the Austroalpine nappes of the Alps is beyond any doubt. Logically this suture would have to looked for between the "Oravic" parts of the Klippen Belt (Pieniny s.s. and Branisko/Kysuca) and the inner "Periklippen" units (Manin, Klape, Haligovce); yet they have not been found yet, presumably due to intense Miocene displacements and reworking associated with the lateral extrusion of ALCAPA taking place within the Pieniny Klippen Belt s.l. The only known remnants of a Piemont-Liguria Ocean are found in the Belice Unit of the Považský Inovec Mts. and in the Inacovce-Krichevo Unit known from bore holes in eastern Slovakia (Plašienka et al. 2012), both occurrences being located in tectonic windows below Central Carpathian thrust sheets and south of the Klippen Belt s.l.

The two-ocean hypothesis proposed for the Western Carpathians finds support viewed from the Eastern Carpathians of Romania and adjacent Ukraine (Schmid et al. 2008). The Ceahlau-Severin unit contains relics of an ocean that opened in Mid-Jurassic times, con-

temporaneous with the opening of the Piemont-Liguria Ocean, and hence can be considered the easternmost extension of the Piemont-Liguria Ocean along which the Tisza and Dacia Mega-Units of European origin separated from the European foreland. This demands a link between Piemont-Liguria and Ceahlau-Severin oceans across the future Western Carpathians. While the Ceahlau-Severin unit was closed and accreted to the Dacia Meg-Unit already in Early Cretaceous times another oceanic to semi-oceanic domain, the Carpathian embayment, remained open much longer, i.e. until the Miocene roll-back of the European slab allowing for the invasion of the embayment by the Tisza and Dacia Mega-Units. It is proposed that this second oceanic domain was connected to the Valais-Magura Ocean that opened in Early Cretaceous times.

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Variscan structures in the Khasagt Mountains (SW Mongolia) and their relations to evolution of south-western margin of the Zavkhan terrane (Central Asian Orogenic Belt)

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The Khasagt Mountains massif is located NW from Altai City in SW Mongolia. Its basement represent SW part of the Zavkhan terrane of the Central Asian Orogenic Belt (CAOB). Geological structures in that area trends WNW-ESE, paralelly to the Main Mongolian Lineament which is located to SW and S. Our research concerns the western part of the massif. In the study area from South to North, increasingly younger rocks sequences (from Mesoproterozoic to Devonian; Énhbaár et al. 2005, Wójcik et al. 2015) are exposed. Tectonic structures in the southern part of study area were identified as related to Proterozoic (Baikalian orogeny) and Middle Cambrian (Early Caledonian orogeny) tectonic events (Sikora et al. 2016, Sikora & Wójcik 2017) which are linked with early stages of accretion of the CAOB. In northern part of study area, we documented tectonic structures linked with Variscan orogeny. Especially we present structural data about compressional deformations in brittle regime, which occured after placemet of the Lower Devonian (Late Ordovician-Silurian? vide Bold et al. 2016) Numrug complex granitoids. Evidence for post Middle Devonian tectonic event are the overthrusts of Lower Cambrian carbonate rocks (Salaany Gol Fm.) and Lower Devonian granitoids on Middle Devonian clastic sediments (Tsagaan Shoroot Fm.). In many outcrops of the Tsagaan Shoroot Fm. reverse faults and thrust duplexes are observed. It should be noted that Variscan structures have simillar orientation like the oldest structures from southern part of the Khasagt Mountains, but their range is smaller. In our opinion post-Middle Devonian structures documented tectonic event on periphery of main Variscan tectonic zone, which was located on southern part of the Main Mongolian Lineament. Nevertheless, presented data are important for analysis of tectonic evolution of the Zavkhan terrane and understanding complicated terranes accretion in this part of the CAOB.

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