A CASE STUDY OF A POLYPHASE MEGA-IMBRICATE ZONE: THE EASTERN PERIADRIATIC LINEAMENT IN THE KARAVANK MOUNTAINS (AUSTRIA)

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According to the geological maps of the Austrian Geological Survey the east-west trending Periadriatic Lineament (PL) separate the Eastern Alps (Northern Karavank Mountains) and the Southern Alps (Southern Karavank Mountains) in the study area. Former structural investigations showed a laterally far less continuance due to strong segmentation along high-angle faults of limited displacement, numerous of them displacing the lineament also. The geological structures of the Karavanks south of Maria Elend are dominated by E-W- to SE-NW-striking high-angle faults, separating from each other in so far 24 imbricates, crosscuted by faults striking in NW-SE direction. They are of variable size, stratigraphic range, facies, palaeogeographic origin and diagenetic/thermal overprint, which are tested by biostratigraphy, microfacies analysis and measurements of the Conodont Colour Alteration Index (CAI). These individual segments, which derived from different palaeogeographic positions of Triassic-Europe by far tectonic transportation of crustal fragments, can be clearly distinguish by 1) stratigraphic range, facies and palaeogeographic origin, 2) diagenetic/thermal overprint, and 3) a specific structural inventory, which do not strike in the neighbouring segments. These particular sets of structures restricted to individual tectonic entities were created before the amalgamation, and are thus transported structures. Paleozoic and Mesozoic slices are mixed. However, there are successions with affinities to most Triassic(-Jurassic) facies zones of the Northern Calcareous Alps (NCA), the Southern Alps, and the "Slovenian-Bosnian Trough". All these stratigraphic and structural features indicate that enormous amounts of horizontal movements must exist between at least some of these tectonic slices. For example, small-scale segments of Paleozoic sediments, which are located a) west of Mt. Kapellenberg, or b) west of Mt. Großer Muschenig or east of Mt. Kleiner Muschenig, are marked by a complexity in both sedimentary successions and transported tectonic processes, bordered by a complex interplay of boundary conditions. Beside the metamorphic (CAI ~6.0), hemipelagic Devonian limestones of segment I, comprise segment VII Trogkofel limestones with Permian shallow water organisms in partly crinoidal-rich grainstone-oncoids. Another geological complex segment with transported tectonics, located between the Maria-Elend Sattel to the Mt. Kahlkogel is characterized by ?Carnian strongly recrystallized dolomites, overlain by a discontinuity of grey turbiditic to bioturbatic Sevatian radiolarian-rich wackestones and grey Rhaetian to Jurassic argillo-calcareous turbiditic radiolarian-rich wackestones. In these turbiditic, radiolarian-rich wackestones the occurrence of Jurassic radiolarians is reported for the first time in this area. These mostly poor preserved radiolarians indicate a Callovian age. Another interesting fact is the diagenetic/metamorphic overprint of different segments in this area. To the north and northeast Late Carnian reef-near sediments reach CAI 5.5 to 6.0, corresponding to low grade metamorphism. In addition to the stratigraphical and facies constraints also the CAI data prove the mega-imbricate shear zone of the study area. These high values of CAI 5.5 to 6.0 are comparable with the faciesequivalent thermally overprinted rocks of the Ultratirolic unit of the NCA or some individual slide blocks in the Hallstatt Mélange. The thermal overprint of different tectonic slices in this region is therefore transported. Summarising the main structural events of the Karavank Mountains south of Maria Elend, the amalgamation of these imbricates occurred during a long history of deformation in a variety of geodynamic frameworks, significantly changing in place and time. Despite some knowledge about general trends in deformation within the study area, e. g. the fact that the amalgamation of imbricates progressed from south to north and the imbricate zone is often displaced by approximately NE-SW-striking and even younger NW-SE-oriented high-angle faults of limited displacement. The youngest movements are comparable with the lateral tectonic extrusion. This is also kinematically in good correlation with data obtained from outcrops in Slovenia. During the Oligocene extensive magmatism (Periadriatic tonalites) occurred, followed by dextral strike slip movements and major rotations. Lateral motions since the Turonian formed a mega-imbricate zone between the Dinarides and the Eastern Alps contemporaneous with the movement of the Drau Range and the Transdanubian Range towards the east, to their present position.

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