GONDWANA FRAGMENTS IN THE EASTERN ALPS: A TRAVEL STORY FROM U/PB ZIRCON DATA

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We compare detrital U / Pb zircon age spectra of Carboniferous and Permian / Lower Triassic sedimentary rocks from different structural positions within the Austroalpine nappe pile of the Greywacke Zone with published ages of magmatic and metamorphic events in the Eastern Alps and the West Carpathians. Similarities between sink and possible sources are used to derive provenance of sediments and distinct frequency peaks in sink and source age pattern are used for paleogeographic plate tectonic reconstructions. From this, travel paths of Austroalpine and West Carpathian basement units are traced from the Late Neoproterozoic to the Jurassic. We place the ancestry of basement units on the northeastern Gondwana margin, next to Anatolia and the Iranian Luth-Tabas blocks. Late Cambrian rifting by retreat of the Cadomian Arc failed and continental slivers re-attached to Gondwana during a late Cambrian/ early Ordovician orogenic event. In the Upper Ordovician crustal fragments of the Galatian superterrane rifted off Gondwana through retreat of the Rheic subduction. An Eo-Variscan orogenic event at ~ 390 Ma in the Austroalpine developed on the northern rim of Galatia, simultaneously with a passive margin evolution to the south of it. The climax of Variscan orogeny occurred already during a Meso-Variscan phase at ~ 350 Ma by double-sided subduction beneath Galatia fragments. The Neo-Variscan event at ~ 330 Ma was, unlike previously considered, mild in eastern Austroalpine units. This orogenic phase was hot enough to deliver detrital white mica into adjacent basins but too cold to create significant volumes of magmatic or metamorphic zircon. Finally, the different zircon age spectra in today's adjacent Permian sediments disprove original neighbourhood of basins. We propose lateral displacement of major Austroalpine and West-Carpathian units along transform faults transecting Apulia. The intracontinental transform system was released by opening of the Penninic Ocean and simultaneous closure of the Meliata Hallstatt Ocean as part of the Tethys.