The Permomesozoic Stangalm Group and its correlatives in the Gurktal nappe complex: significance for paleogeography and tectonics of the Eastern Alps

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Detached, imbricated and tectonically decapitated cover successions of passive continental margins are often preserved in mountain belts within basement-cover thrust sheets. Based on a new mapping of Permomesozoic cover strata, we investigate the paleogeographic and tectonic origin of the Lower Triassic to Upper Jurassic Stangalm Group, which represents the post-Variscan cover of the Bundschuh nappe (basement) and is tectonically overlain by the Gurktal nappe complex (GNC; with Murau, Ackerl, Pfannock and Stolzalpe nappes) of the Austroalpine nappe stack. The Stangalm Permomesozoic unit was affected by an early Late Cretaceous nappe stacking under low-grade metamorphic conditions and subsequent extension during the Late Cretaceous. Lithostratigraphic peculiarities of the Stangalm Group include: only a thin siliciclastic Permian base, if any, and thin Lower Triassic quartzites, black phyllites, black calc-schists and related synsedimentary ore mineralizations of Anisian age, relatively thin Middle and Upper Triassic dolomites separated by Carnian siliciclastic beds – the latter show extreme thickness variations interpreted to result from synsedimentary normal faulting – and Jurassic cherty limestones and thin Upper Jurassic cherts. In contrast, the cover units between the Murau and Stolzalpe nappes range from Permian Alpine Verrucano Fm., Buntsandstein-type quartzites, Anisian rauhwacke to Anisian black marble/black calcareous schists. These strata belong to the Stolzalpe nappe or represent, more likely, a correlative to a similar Permomesozoic cover of the Ackerl nappe. The non-metamorphic to very low-grade metamorphic cover on the overlying Stolzalpe nappe starts with the post-Variscan intramontane molasse-type uppermost Carboniferous Stangnock and thin Permian Werchzirm Formations. These are spatially separated from several 100 meters thick Permian terrestrial red beds and relatively thin Middle-Upper Triassic carbonate platform sediments of the Eberstein Permotriassic in the eastern central, and, at Rosegg and Viktring, Permomesozoic strata along the southern margin of the Gurktal nappe complex.

We interpret the very thin siliciclastic successions at the base of the Stangalm Group to represent deposition on a rift shoulder – this feature contrasts with many other Austroalpine Permian to Mesozoic cover successions. We interpret the Triassic strata of the Stangalm Group to reflect an extension of the rifting stage, which also enhanced synsedimentary Early Anisian iron mineralizations, potentially related to normal faults as well as a second stage of extension during Early Carnian.

The Upper Carboniferous to Triassic cover successions of the GNC are dissimilar to those of the Drauzug unit, which is exposed to the SW of the GNC, and resemble those of the westernmost Northern Calcareous Alps. The new data makes it necessary to reconsider currently popular paleogeographic and tectonic models of the Austroalpine domain. The term Drauzug-Gurktal nappe system should be dismissed because: (1) the Drauzug unit does to represent a nappe in contrast to the GNC, (2) the paleogeographic dissimilarities of Permian and Triassic successions, and (3) eastern paleogeographic extension of the Drauzug unit in the North Karawanken thrust sheet overlying there the southern margin of the GNC.