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# 3D modeling of the Seidlwinkl-Nappe in the central Tauern Window, Austria

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The Seidlwinkl-Nappe in the central Tauern Window is an intensively folded nappe containing Permian to Early Cretaceous metasediments affected by Alpine (Paleogene) tectono-metamorphic event. Although these metasediments have been mapped in great detail, the complex three-dimensional geometry of the nappe is not easily envisaged from the map view. The general structure of the nappe comprises a NW-verging, mostly isoclinal fold with a sheared and thinned lower limb, and parasitic folds of variable orientation and amplitude in the upper limb close to the large-scale fold hinge.

In order to facilitate geological interpretation, we created a 3D tectonic model of three selected tectono-stratigraphic contacts with different lithologies within the Seidlwinkl-Nappe, i.e. the top of the gneissic metasediments (Wustkogel Formation), the top of the Triassic carbonate rocks and the top of the Early Cretaceous schistose metasediments, using the commercial software Gocad (Paradigm). By intersecting the mapped horizons with a digital elevation model of the area, we constructed the three-dimensional outcrop line of the horizons. Additional information on the orientation of the layers was used to construct dip direction and dip for each layer in each position. Finally, the exposed parts were connected to create the full surface for each horizon, respecting the existing or missing intersections with topography.

The modeled geometry of the nappe displays the shape of a large scale sheath fold. Parasitic folds (of several 10 to 100 m amplitude) are present along the entire large scale fold hinge. However, the orientation of their fold axes is roughly N-S in the western part of the nappe, but NW-SE in the eastern part, with a smooth transition between the two.

Clearly, this modeling cannot replace thorough field work and structural analysis. However, key areas could be identified, which should be visited in future field studies to distinguish between polyphase deformation and single-phase folding and associated sheath fold formation.