

A geological 3D-model of Austria

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GeoSphere Austria (formerly Geologische Bundesanstalt - Geological Survey of Austria) has produced a supra-regional 3D framework model called “3D AUSTRIA” providing a large-scale geological overview for professional geologists, students and the public. This model is intended to act as support for subsequent regional modelling projects as well as for educational and communicational purpose.

The modelled domain covers a rectangular area of 175 000 km² including the national borders of Austria, down to a depth to 60 km below sea level. Model units are defined following the nomenclature of Schmid et al. (2004) and Froitzheim et al. (2008), each unit having a specific paleo-geographic origin and tectono-metamorphic history. Seven modelling units are considered: two continental plates (1) the Adriatic Plate, (2) the Eurasian Plate, four units from the Alpine orogenic wedge (3) the South-Alpine Superunit, (4) the Austroalpine Superunit, (5) the Penninic Superunit, (6) the Sub-Penninic Superunit and (7) Neogene sedimentary basins in the foreland and within the Alps. Due to the large-scale character of the model, relatively small constituents of the Alpine Orogen are merged together (Meliata Superunit and Inner Western Carpathian Superunit with the Austroalpine Superunit, Helvetic Superunit and Allochtone Molasse with the Sub-Penninic Superunit, intrusive rocks along the Periadriatic Fault with their host unit, minor Neogene basins with the Austroalpine Superunit). The model geometry is constrained by the geological map of Austria 1:1.5M (Schuster et al., 2019), (2) 24 published cross sections and (3) published contour maps for the Moho discontinuity (Ziegler & Dèzes, 2006) and the large Neogene basins. It has been generated with the SKUA-GOCAD software suite following the workflow of Pfeleiderer et al. (2016).

The framework model 3D AUSTRIA can be visualized with the web 3D Viewer of Geosphere Austria (<https://gis.geosphere.at/portal/home/webscene/viewer.html?webscene=c11cd25795294ba8b6f276ab2d072afb>) or downloaded from the Tethys Research Data Repository (<https://doi.tethys.at/10.24341/tethys.184>) allowing the generation of a physical multi-part model using 3D printing technology. It provides a unique way to comprehend the fundamentally 3D nature of sedimentary and tectonic features, like the unconformity at the base of Neogene sedimentary basins, the Alpine frontal thrust or the Tauern Window. The data acquired in the framework of the AlpArray project can be used in future for refining the geometry of 3D AUSTRIA.

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