

A model to access geochronological data for the Geological Survey of Austria

Werdenich, Manuel¹; Iglseder, Christoph¹; Linner, Manfred¹; Steinbichler, Mathias²; Reiser, Martin¹; Huet, Benjamin¹

1 Department of Hard-Rock Geology, Geological Survey of Austria, Neulinggasse 38, A-1030 Vienna, Austria; 2 Department of Sedimentary Geology, Geological Survey of Austria, Neulinggasse 38, A-1030 Vienna, Austria.

Since its beginnings in the 20th century, geochronology provides a unique possibility to give an absolute age to geological features. A wide range of methods allows for temporal constraints on geodynamic processes such as the emplacement of igneous rocks, metamorphic and tectonic events, cooling and exhumation of basement rocks as well as erosion and deposition of sediments. Nowadays, the huge amount of available geochronological data provides a basis for geodynamic models and a modern understanding of the associated geological processes. However, the information is often scattered over several publications, buried in inaccessible articles from historical (“grey”) literature or it does not meet modern standards (e.g., ages calculated using outdated decay constants). Thus, the collection and assessment of geochronological data is an essential, but time-consuming and reoccurring task for many geological projects. Additionally, best practice in scientific research calls for a meticulous documentation of new data to allow for the reproducibility of results. To improve the accessibility and documentation of geochronological data at the Geological Survey of Austria, a project was set up to amalgamate geochronological data in a structured database. The data collection covers common dating methods and isotope systems including cosmogenic isotopes. To make them available as a point layer for geographic information systems (GIS), the data model assigns dated minerals from publications as well as the necessary background information of the samples to a geographical located point (GCHRON_number). The storage of the whole dataset allows, as simple as possible, a recalculation of geochronological data. The data model is structured in different data tables, directly linked to a key table including the GCHRON numbers, which is linked to the coordinate and detailed information of the dated mineral, lithology, geological unit and the corresponding geochronological method. Detailed information for each method is provided in separate tables. Several results from single minerals and from different methods can be attributed to one GCHRON number. At this stage, results from the U/Pb, Rb/Sr, Sm/Nd, K/Ar, Ar/Ar, Fission Track, U-Th/He and Lu/Hf dating of various minerals and whole rock material are included, referring to the method and dated material. Of course, calculated ages are also provided. In addition, a link to the reference, to open access respectively free access publications in the library of the Geological Survey, is provided. At the present stage, data from around 40 publications have been processed, primarily from the area east of the Tauern Window. This data model will facilitate geological work in projects of regional geology by providing a transparent uniform basis of available data. The geochronological data model will be evaluated during its internal use at the Geological Survey prior to its publication.