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Editorial: Harmonising geological data in Switzerland

An important step towards better communication in geology

Each scientific community has its own terminology and definitions, and geology is not an exception. A precise common language facilitates communication and exchange of data, information and knowledge in the academic domain, as well as in applied science and public policy-making. The HARMOS project of the Swiss Geological Survey (2011–2014) was aimed at arriving at a consensus with regard to geological terminology and definitions in the field of Swiss lithostratigraphy. This Special Issue of the Swiss Journal of Geosciences presents some of the results of this project, together with more advanced interpretations of these results by the geoscientists involved.

The starting point of the project was the increasing demand for geological data sets in GIS format and their increasing application in diverse fields, such as subsurface and land-use planning, civil engineering, natural hazard assessment, deep disposal of nuclear waste—all areas underpinned by 3D geological modelling. Since Swiss geology is dominated by sedimentary rocks, the initial emphasis was on the fundamental geological discipline of stratigraphy. Stratigraphy provides the spatial and temporal framework in geology, and as such constitutes the basis for further investigations and insights into other domains, like tectonics, sedimentology or palaeogeography. In the first instance, the branch of geoscience known as lithostratigraphy—the science of subdividing, classifying and naming rock bodies based on observable field criteria (petrography, mineral and fossil content, geomorphology and mutual geometrical relationships)—has been in focus, as required for the production of detailed geological maps at a scale of 1:25,000.

A geological map provides a specific geological dataset and serves at the same time as a means of communication,

Alpine gneiss (pavement), Jura limestone (skirting) and Molasse sandstone (wall) of the Swiss Federal Parliament Building: a harmonious assemblage and fundamental superposition summarising the regional stratigraphic history of Switzerland, under national patronage. (Photo: Alain Morard)

requiring a clear and unambiguous nomenclature. Legends of geological maps follow the concepts of lithostratigraphy, where mapping units (formations—rock units whose characteristics differ from surrounding formations and/or which are bounded by mappable discontinuities) are defined solely based on lithological characteristics. In this system, age does not play a primary role—age requires further interpretative steps and approaches (distinguished, for instance, as chronostratigraphy, biostratigraphy, sequence stratigraphy, etc.). While in the past a geological map was an individual creation reflecting the authors' focus and knowledge at that time, seamless datasets are now required where the geological concepts and geometries are harmonised, thus allowing thematic requests

within the data sets as well as the generation of new regional overview maps.

Against this background, the Swiss Geological Survey started an initiative in 2011 for the development of a harmonised litho*s*tratigraphic standard legend (the HARMOS project), to provide the basis for the nationwide geological map of Switzerland at a scale of 1:25,000. More than forty experts, most of them members of the Swiss Committee on Stratigraphy and/or the Swiss Geological Survey (a section of the Federal Office of Topography, known as *swisstopo*), worked intensively on defining and harmonising the regional lithostratigraphic framework, using state of the art knowledge, at the same time respecting traditionally-used nomenclature wherever possible. First applications of these standards in the elaboration of new maps of the Geological Atlas of Switzerland 1:25,000, as well as in the vector datasets of the Geological Atlas of Switzerland (GeoCover), show the great benefit of these efforts.

Geology is not limited by national frontiers. Ignoring these, project members incorporated lithostratigraphic units from neighbouring countries (Austria, Germany, France and Italy) into the new system as far as possible. The new lithostratigraphic concepts will therefore also enhance cross-border communication. This will further facilitate the international trend of harmonising geological datasets across national borders, as already implemented in the GeoMol project, in which the nomenclature of Swiss Molasse units was harmonised with that of Austria, France, Germany, Italy and Slovenia.

Harmonisation of geological units is not only relevant to lithostratigraphy but may also be applied to tectonics. Therefore, a joint initiative of the Swiss Geological Survey with a large number of tectonics experts from Switzerland is discussing the possibility of harmonising the nomenclature of Alpine tectonic units. This expert group is at present developing a common tectonic model, based on the lithostratigraphic scheme presented in this Special Issue.

The newly established lithostratigraphic scheme, which will be used in all future geological maps published by the Swiss Geological Survey as well as in their GIS system, can be consulted online at http://www.strati.ch. A summary of this scheme is included as a printed leaflet in the back of the printed version of this Special Issue. The aim of the papers presented in the Special Issue is to provide examples of the usage of the revised lithostratigraphy at different levels in the stratigraphic column, with more detailed presentation and discussion of the new formations and their interpretation. We hope that our work will encourage geoscientists from different domains—academic research groups, geological consultant firms, governmental institutions, etc.—to promote the use of, and further develop, the stratigraphic nomenclature in Switzerland. Many thanks go to all who have contributed, and to all who are going to contribute in the future, to expanding our knowledge of Swiss stratigraphy.

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