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SAPHYR: the Swiss Atlas of Physical properties of Rocks

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SAPHYR is a representative database containing the major physical parameters of rocks, with full coverage for continental crustal rocks, which can be used by the scientific communities as an instrument for investigating geological processes, as well as by the wide public with interests in land and resources planning. The data that populate our database come from the Swiss Alps and surrounding regions. They have distinct sources: scientific literature, public reports and data (upon agreement) from industry and governmental bodies, and, most important, a great number of new laboratory measurements on new and existing samples. Measurements campaigns on density, permeability, porosity, magnetic susceptibility and ultrasound velocities have been performed in the last years to cover under-represented rock types and to complete the suite of the main physical parameters. Especially velocities measurements were carried out at increasing confining pressure and temperature (the latter only on a limited number of samples). The aim was to define pressure and temperature derivatives in order to extrapolate the results at different crustal in situ conditions.

The database is strongly “rock type” oriented; the starting point of the data collection has been the detection and recognition of main lithologies on the basis of mineral composition and texture, as the main representative components of a complete continental crust, organised into lithology groups on the basis of specific criteria. Physical parameters are treated statistically in each lithology group: the mean

and the variance of each data group are collected together with max, min and average values. The narrowest data range spanning > 70 % probability is identified.

The representation of the data is geographical information system (GIS) based: outputs of SAPHYR are maps of physical parameter distribution. Here the example of the lithological map of Switzerland combined with contoured values of V_p .

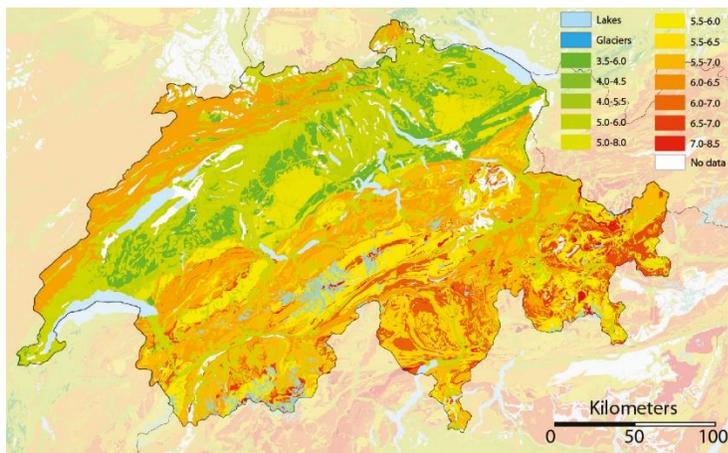


Figure 1: Example of SAPHYR output: a map representing the distribution of velocities of P waves (km/s) at room pressure and temperature.

The aim of this database is to be an open source of data to a wide public. It has to maintain a high scientific standard, but need to be accessible not only to academia and for scientific purposes, but also to local authorities, and common people. The database will be published as Atlas and will be online on the portal of the Swiss Federal Office for Cartography swisstopo.

