



# Advancement in Swiss hydrogeological mapping

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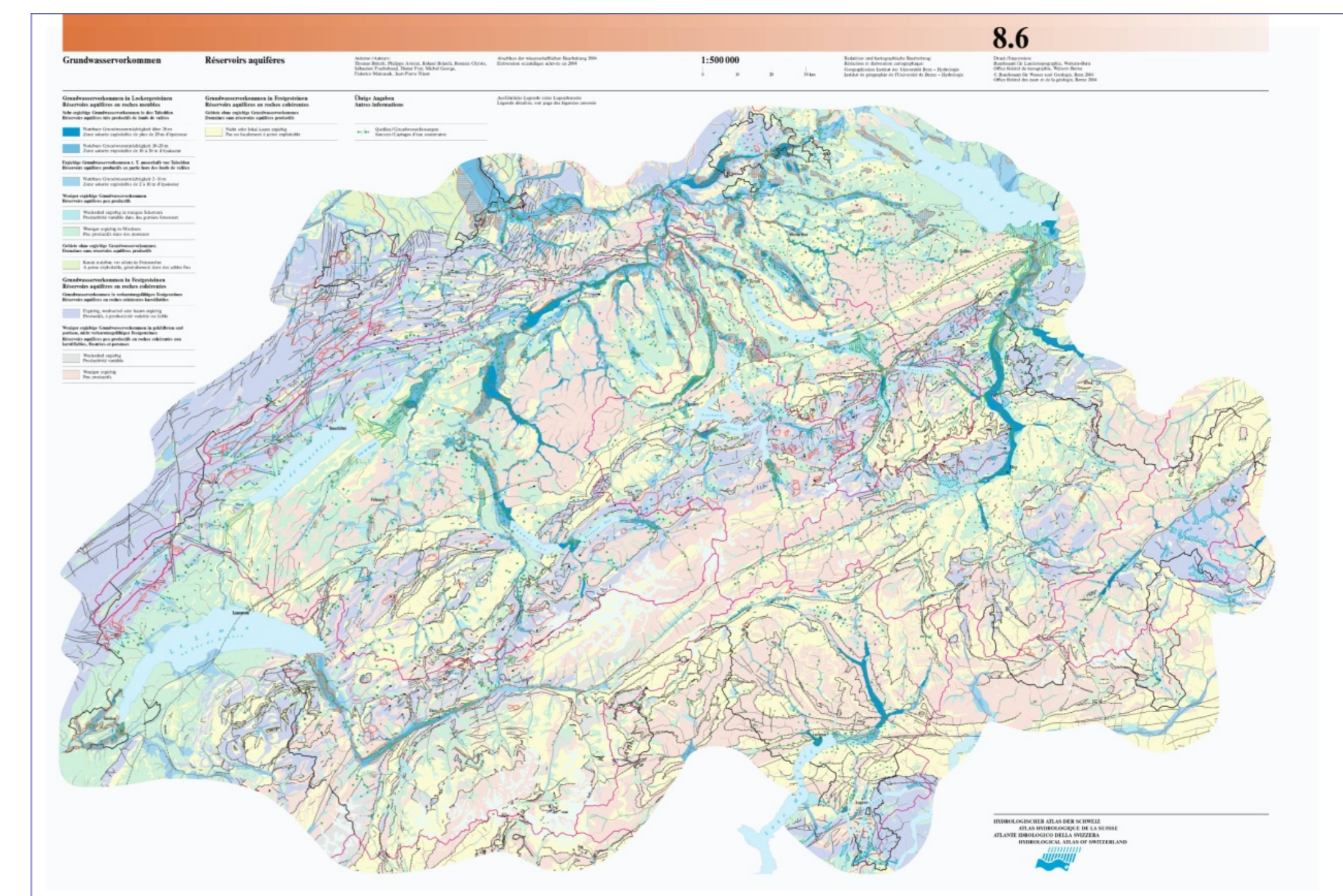
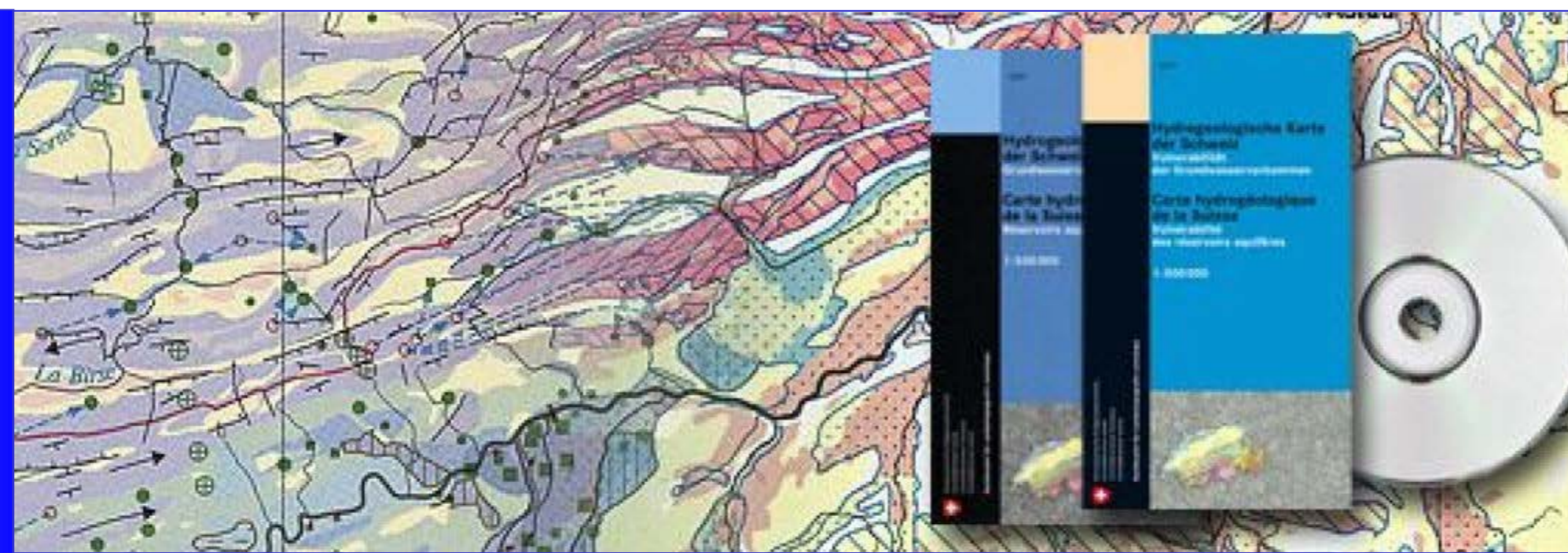
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## NATIONAL SCALE GROUNDWATER RESOURCES MAPS

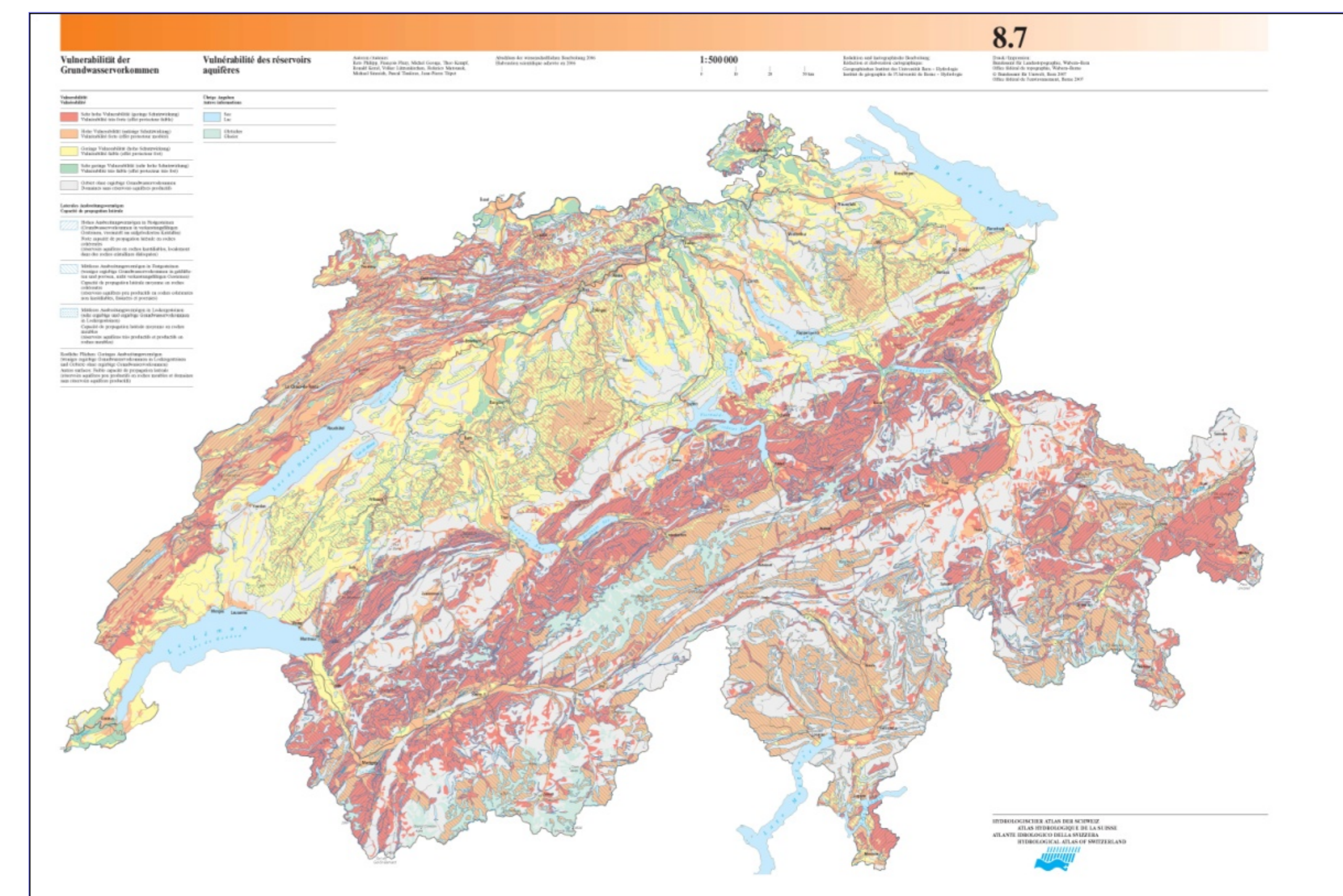
With a share of over 80 %, groundwater renders by far the leading contribution to the drinking water supply in Switzerland. The Hydrogeological Maps of Switzerland 1:500'000 refer to different aquifer types. The entire underground of Switzerland is subdivided into ten types of distinct domains, characterised by the nature of aquifers that they contain – unconsolidated sediments or bedrock – and by the aquifer productivity. The map shows the principal springs and pumping wells and provides hydrodynamic data for regions of groundwater recharge and discharge. This document is the basis for a good understanding of the demands of optimal protection and management of our groundwater resources. A second sheet indicates the vulnerability of groundwater resources to possible contamination at the national scale. The notion of vulnerability represents an important element in the prevention-based protection of drinking water. This map is intended as an instrument for general planning, informing a wide public audience or teaching purposes.

### GIS common polygon data set

- Geological map
- Tectonic map
- Hydrogeological maps



Groundwater resources map of Switzerland 1:500'000

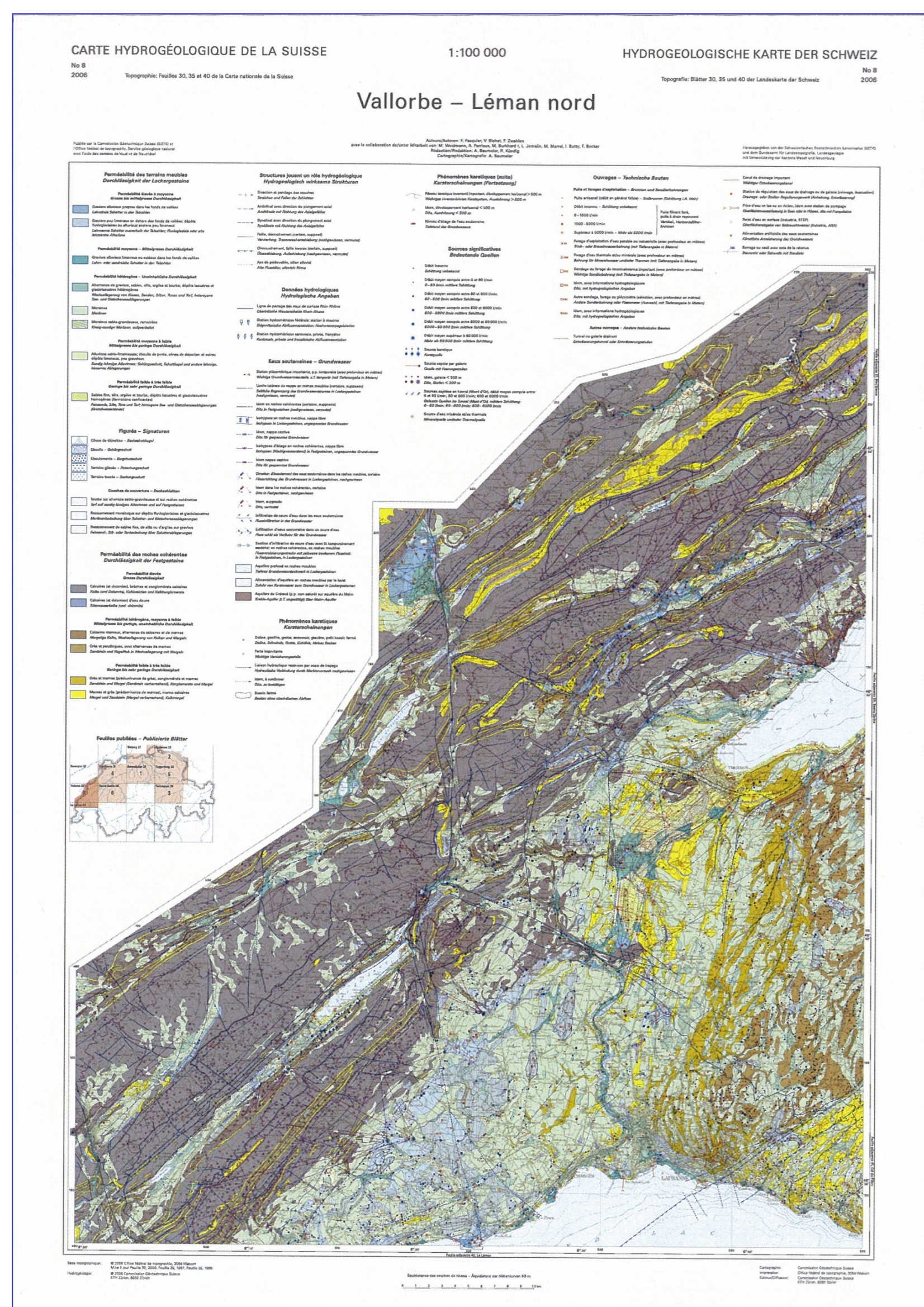


Groundwater vulnerability map of Switzerland 1:500'000

Both data sets were established in the framework of the Hydrological Atlas of Switzerland HADES, edited by the Federal Office for the Environment FOEN, the center of expertise of the Swiss Geological Survey for hydrogeology. They are also part of the GeoMaps 500 series, a product of the Federal Office of Topography swisstopo. They are available as printed maps, pixel maps or vector datasets, the latter embedded into a single GIS joint with a range of small scale geological, tectonic and geophysical maps of Switzerland. These maps give a broad overview of the composition and major features of the underlying structure of the country. The hydrogeological maps will thus be automatically updated once modifications in the basic geological and tectonic maps are conducted. They are integrated into national data viewers and geoportals (<http://map.bafu.admin.ch>) and in the Internat. Hydrogeological Map of Europe IHME.

## REGIONAL SCALE HYDROGEOLOGICAL MAPS

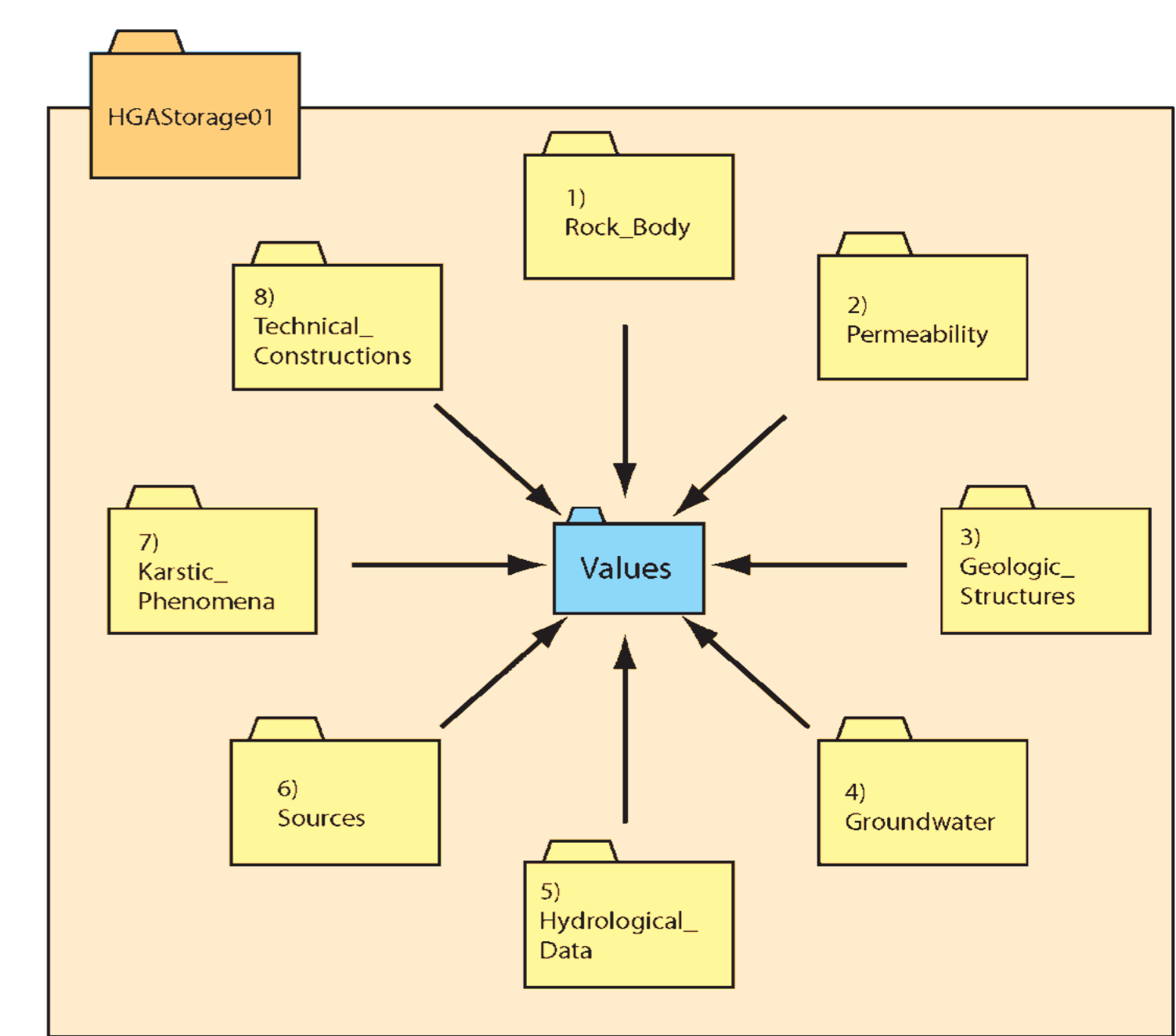
The Hydrogeological Map 1:100'000 (HYGEO100) provides a regional overview of the occurrence and water flow in the subsurface. The data set serves as a planning instrument that integrates and standardizes detailed hydrogeological data of regional map series and geoportals. Examples include cantonal water-protection and groundwater maps. The HYGEO100 classifies the subsurface according to the permeability of the unconsolidated and hard rocks.



Hydrogeological map of Switzerland 1:100'000, HYGEO100, sheet 8, covering the Swiss Jura Mountains and the eastern edge of the Plateau

The extent of the individual sheets is generally consistent with those of the topographic map of Switzerland. Currently, 12 out of 23 sheets are published in collaboration of the Swiss Geotechnical Commission SGTk and FOEN. Although the map provides a lot of detailed information, the scale is rather adequate as a planning and information instrument for regional to interregional or even international purposes, than for local studies. Nonetheless, the map may also be used for applied geological investigations in order to get a quick overview of a specific area, e.g. in the framework of a larger project.

The focus of the HYGEO100 has moved from a pure print product to an interactive GIS-based map, even though actual map sheets will remain available in print format. The first sheet in the digital version was published in 2006.



Hydrogeological data model of the HYGEO100

## CHALLENGES AND FUTURE DEVELOPMENT

Already existing sheets of the HYGEO100 are currently converted into a sheetline-free GIS project. A complete coverage of Switzerland in vector data format is planned. The long-term perspective is to create a joint GIS project, in which information from differently-scaled maps are integrated. This should then be available on internet platforms, linked with other digital databases. Relevant next steps are:

- Digitalisation and updating of the HYGEO100 published maps, as well as integration into the larger GIS project
- Enabling of higher interactivity within the GIS project with data query possibilities providing base information and links to the data host (federal or cantonal internet sites, on-line surveys etc.)
- Advancement of mapping techniques regarding 3D issues, particularly in karst systems where conventional maps may provide only limited or misleading information (collaboration with the Swiss Institute for Speleology and Karst Studies ISSKA)