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First-order shallow aquifer characteristics across Europe: The International Hydrogeological Map of Europe at scale 1:1.5 Million (IHME1500)

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Since the mid of the last century, pan-European hydrogeological overview-mapping is conducted at the scale 1 : 1.5 Million following common standards and guidelines to interpret suitable geologic mapping units in terms of potential uppermost aquifer (or non-aquifer) characteristics. These comprises potential aquifer productivities and general hydrogeological aquifer conditions (fissured vs. porous). The printed IHME1500 dataset successively elaborated and published from 1970 – 2013 consists of 25 individual map sheets. Besides the potential aquifer characterization grouped in six classes, IHME1500 offers a complete coverage of lithological material properties of potential shallow aquifer assemblages, and tracelines of major fault structures. Regional information on groundwater surfaces, aquifer thicknesses and depths, locations and characteristics of groundwater springs and other punctual information related to European groundwater resources is present for some areas in selected map sheets, however not digitally available.

Synoptic IHME1500 vector data consists of a topographically corrected, seamless and harmonized polygon layer with attribute information on potential aquifer productivity and lithology. While the standardized aquifer-classification is relatively easy to harmonize across the entire mapped area, the lithological information of IHME1500 is presented using sheet-specific legend information resulting in more than 1000 aquifer lithology classes. An attempt was made to harmonize this information utilizing a specifically developed taxonomic scheme, treating consolidated, partly consolidated and unconsolidated materials separately. The translation of the original lithological information into this scheme allows for a hierarchical grouping of the mapping units into five generalization levels, where the highest aggregation level displays a ternary map showing the distribution of consolidated, partially consolidated and unconsolidated aquifer materials. The harmonized and hierarchically structured IHME1500 information based on the published map sheet data also allows for the extension of the mapped area in regions where only incomplete, unpublished IHME1500 draft information is available. IHME1500 now covers the entire European continent up to the Urals, the Caucasus region, and parts of the Middle East (Turkey, Cyprus, parts of Syria and Iraq).

IHME1500 represents the only digitally available coherent overview information on potential groundwater resources and shallow aquifer characteristics across Europe. The data is therefore of great use for European policy support in terms of e.g. transboundary aquifer identification and characterization, the harmonization of regional European groundwater bodies, and the delineation of hot spot regions for aquifer systems under potential environmental stress with respect to climate change, natural hazards or migratory flows. Additionally, the lithological information of IHME1500 represents the only harmonized pan-European dataset on shallow subsurface geologic materials available and can used for the spatial delineation of soil parent materials and as a spatial predictor for the evaluation of geomorphological hazards at overview scales. IHME1500 GIS data can be downloaded through BGR′s product centre (http://produktcenter.bgr.de).