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EGU22-5563
https://doi.org/10.5194/egusphere-egu22-5563
EGU General Assembly 2022

FaBI: A new collection of flood data and attributes of basins in Italy

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The availability of large data samples can be useful in several research areas, including rainfall/flood frequency analysis, hydrological modelling and quantification of the hydrologic effects of catchment heterogeneities. In recent years, considerable efforts have been spent to build nation-wide databases of basin attributes, with catalogs or web repositories in USA, England, Switzerland, Austria, Canada, Australia, Brazil and Chile. We present here FaBI (Floods and attributes of Basins in Italy) i.e. the first collection of hydrologic data and gauged basin attributes encompassing the whole of Italy, that counts 631 basins and their flood records.

The collection puts together flood data and other hydrological indices on one side, and many basin geo-morpho-climatic and soil-related attributes. In terms of hydrologic data, the starting base is that of two recent databases, i.e. the *Improved Italian - Rainfall Extreme Dataset* (I^2-RED) and the *Catalogo delle Piene dei Corsi d'acqua Italiani.* The latter was the main source for identification of the watersheds to consider, that are those for which extremes of daily or of peak discharges are available. On this set of 631 basins a consistent effort has produced the computation of spatially relevant attributes and indices with the condition that each variable derives from a uniform nation-wide coverage. Many attributes are related to the geomorphology of the river network, as Horton ratios, shape and amplitude factors. They were computed by processing a digital elevation model with a 30-meters spatial resolution, through the implementation of the *r.basin* R algorithm. On these values several quality-control procedures have been applied, starting with a check of consistency with previously published data. The raster river network extracted has been compared with a vector reference one provided by the *Istituto Superiore per la Ricerca e Protezione Ambientale* (ISPRA), allowing us to identify areas where it was necessary to manually force the digital elevation model. The relation between the length of the main channel and its longest path has been investigated and the Hack's law was used to double-check the computed main channel length. Several spatial average values of climatological indices have been computed, privileging data gathered from ground stations, that are subsequently interpolated in the space. This attains average values of temperature and precipitation at different time scales, for the first time available in a unique repository. The FaBI collection provides a vast range of new opportunities to perform regional and national-scale hydrological analyses, taking advantage of the hydro-climatologic and morphologic variety of the Italian basins, that represent a vast range of transitions between Alpine and semi-arid geographic environments in a Mediterranean context.