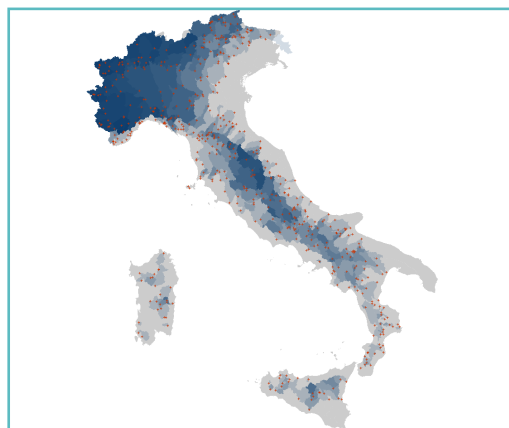




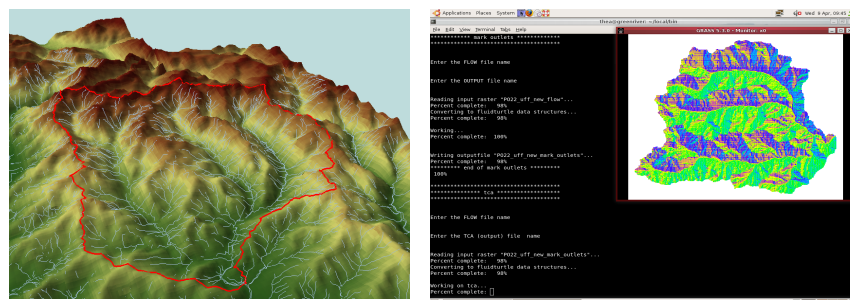
www.cubist.polito.it

The CUBIST Project relates to the “Characterisation of Ungauged Basins by Integrated uSe of hydrological Techniques”. The project was initiated by a funding of the Italian Ministry of Education in 2006 and aims to make a step forward in characterising the hydrology and the climatology of Italy. To this end, an extended information system has been set up. The database includes about 6000 rainfall stations, 700 temperature stations and about 400 river basins, completely defined in their geomorphologic characteristics and with several climatic and hydrologic parameters. The CUBIST database optimises table dimensions and access performances; a geodatabase extension allows to manage geo-data [watersheds, stations, nodes] from within the database. Many Public Domain data, coming from heterogeneous sources and coding standard, have been used to populate the database, after a vast activity of verification, correction, homogenisation and occasional re-coding. The CUBIST Information System has been completely developed using Free and Open Source software: the database is developed in PostgreSQL with Postgis; GIS analysis are performed in the GRASS environment; psql, PgAdmin and phpPgAdmin offer direct data access; QGIS or gvSIG and Mapserver are used as GIS software; Tomcat + Mondrian + OpenI offer web OLAP tools. The system is currently working in an intranet domain.

For the about 400 discharge station, time series of maximum annual discharge are available, obtained from the 4 volumes of Publication n.17 edited by S.I.M.N., which covers a period ENDING in 1970. Several time series are integrated with subsequent data added within the activities of the CNR-GNDCI [<http://www.gndci.cnr.it/it/vapi/welcome.it.htm>].



Geomorphologic data have been obtained from the NASA-SRTM DEM applying GIS automatic routines

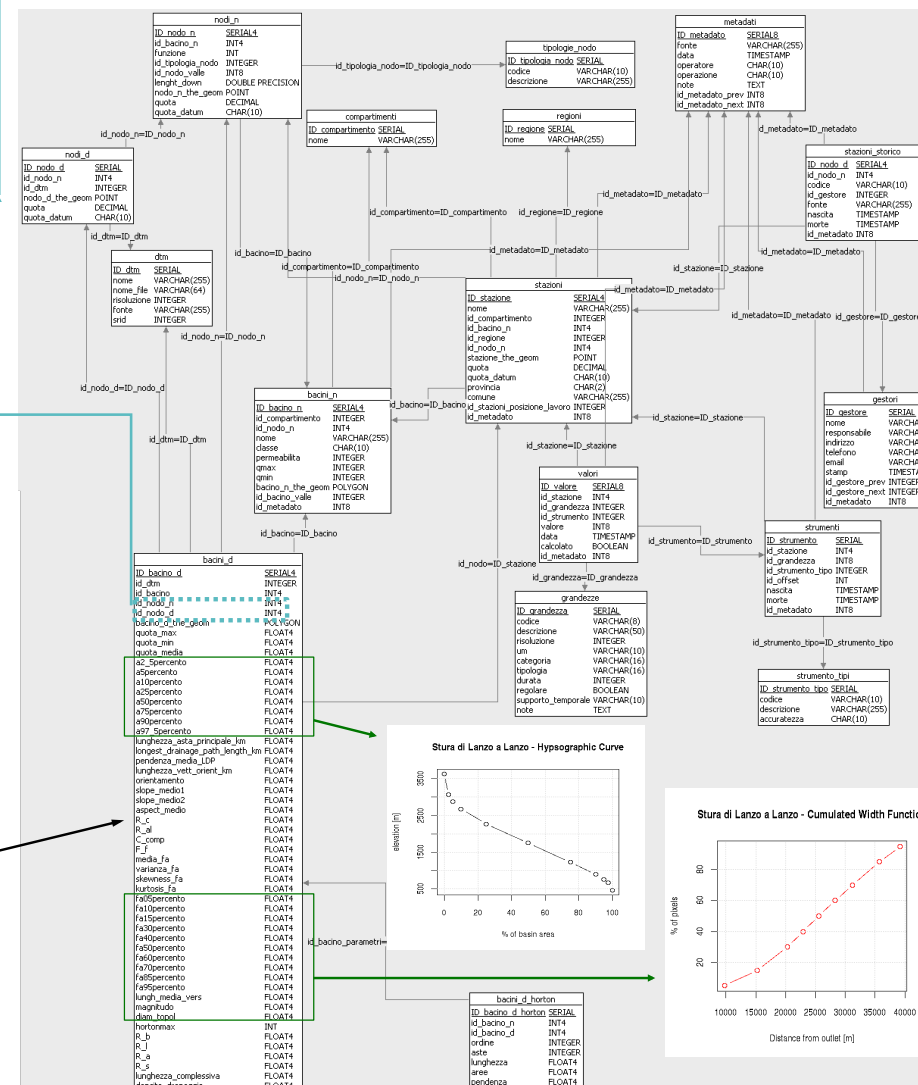


Drainage basins morphometric parameters computation has been automated using GIS-GRASS tools with a Linux-bash procedure that combines and post-processes results of the “Fluidturtle” libraries (<http://www.ing.unitn.it/~rigon/indexo.html>). Computation of statistical indices was made using an “R” procedure. Our script is open, easily customizable and available at the address www.idrologia.polito.it/~alviglio/software/GRASSIndex.htm.

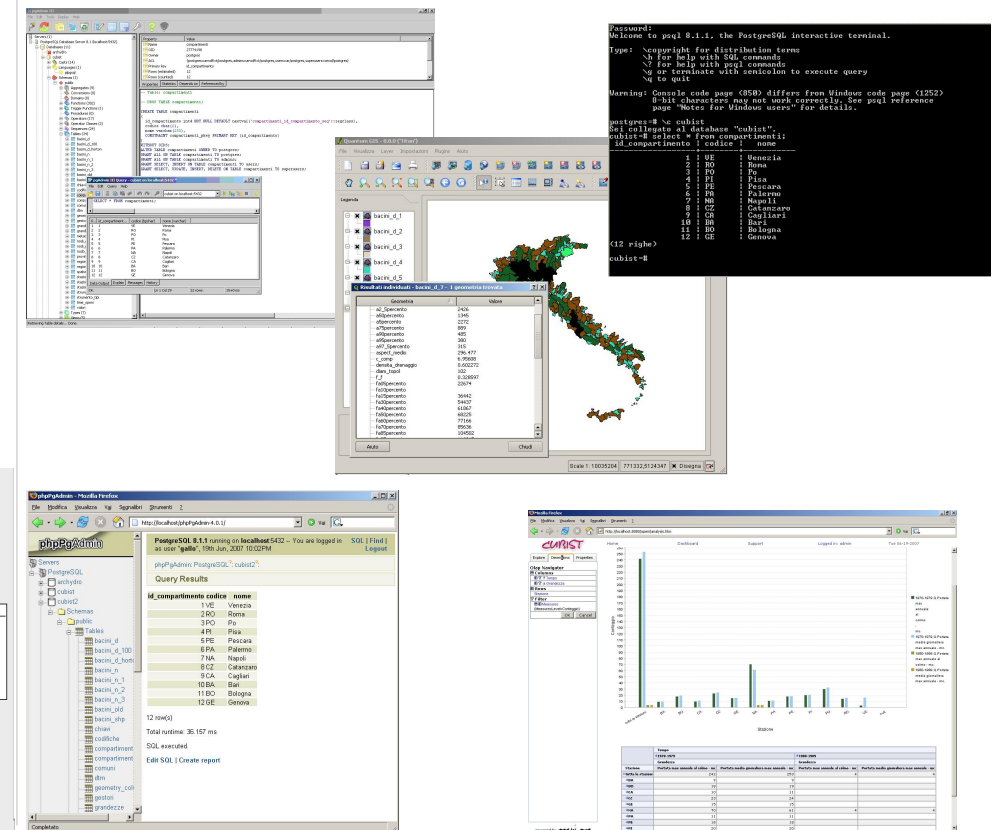
More than 30 different morphometric parameters are available for each of the 400 basins.

The complete list and the documentation can be consulted at:
<http://www.cubist.polito.it/index.php/sito/activities/documentation>

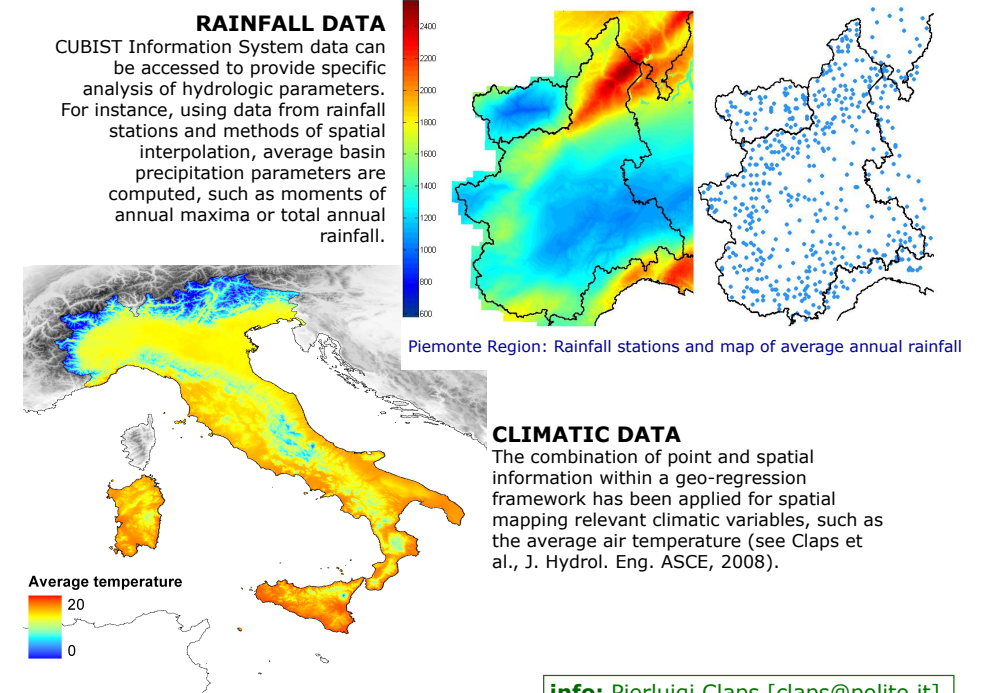
The database structure is compatible with the ArchHydro and CUAHSI Hydrologic Information Systems. In addition, CUBIST presents new relevant features, such as the numerical cartography-derived dataset management, the recursive linking for the management of the hierarchal basin relations, the management of the historical information on measurement stations.



Client and web-based tools provide full direct data access; desktop and web GIS software can browse and query geographical tables. A powerful OLAP environment has been set up to explore data cubes, experimentally applying Business Intelligence technologies in hydrology



CUBIST Information System data can be accessed to provide specific analysis of hydrologic parameters. For instance, using data from rainfall stations and methods of spatial interpolation, average basin precipitation parameters are computed, such as moments of annual maxima or total annual rainfall.



CLIMATIC DATA

The combination of point and spatial information within a geo-regression framework has been applied for spatial mapping relevant climatic variables, such as the average air temperature (see Claps et al., J. Hydrol. Eng. ASCE, 2008).

info: Pierluigi Claps [claps@polito.it]