Po Catchment, Italy

Test Bed Leaders

- Jutta Thielen (Joint Research Centre, European Commission)
- Stefano Tibaldi (ARPA, Bologna)

Test Bed Description

The Po river basin is situated in Northern Italy and covers an area of ca. 73,000 km2. The Po River is the largest Italian river and 15 million people live within its reach (population densities up to 1500 inhabitants/km2). The Po basin includes several Italian regions: Piemonte, Lombardia, Valle d'Aosta, Emilia Romagna, Liguria, Trento and small parts of Veneto. Its main flow direction is west to east crossing whole Northern Italy and flowing into the Adriatic Sea. It has a total length of 650 km stretching from its headwaters, at 2000 m of elevation, in the south-west of the Piemonte region, close to France, through all of Northern Italy passing the city of Torino, coming close to Alessandria, Pavia, Piacenza, Cremona and Ferrara to the Adriatic Sea. The Po has 141 tributaries, the biggest are Tanaro, Ticino, Sesia, Adda, Oglio and Dora Baltea and the surface water use in the region exceeds 25 billion m3/a. In the alpine part of the catchment there are three big lakes: Lago Maggiore, Lago di Como and Lago di Garda. Forecasting space/time scales of interest: medium-range weather and flood forecasting up to 10-15 days

Key Scientific Questions

- removing bias from meteorological forecasting data
- medium range probabilistic flood forecasting
- usefulness of meteorological ensemble approach for QPF in improving flood forecasting

Key Objectives of the Research Project

Test simplistic routines for bias removal in an area such as Northern Italy that is dominated by important orography (Alps) and for which the weather forecasting models have problems to produce reliable quantitative rainfall forecasts. The test bed leaders would like to test bias removal routines proposed for Bangladesh for this region. The method will be applied for both the deterministic and the probabilistic weather forecasts.

Methods for flood forecasting based on threshold exceedances are being developed by the JRC within the framework of the European Flood Alert System and could be tested for the Po also by other researchers. Availability of quasi-real time ensemble high-resolution limited-area model quantitative precipitation forecasts in the Po Valley and alpine region will be exploited to test their usefulness in improving reliability of flood forecasting models and techniques.

Data Resources

- GIS information on the catchment including DEM (1km), land use (1km) , soil data (1:1M), river network (1km, 5km)
- Discharge data at selected stations for a time period from 1995-present
- Ca. 10 x 3 discharge stations (with rating curves) for the 10 major tributaries to the Po River
- 4-6 discharge stations (with rating curves) for the main Po River

- ensemble Limited-area model forecasts (QPF) from 2003-present
- rainfall, evaporation and temperature on gridded fields (JRC MARS) from 1995-present
- rainfall and temperature point data (ARPA) from 1995-present:
    a) time resolution daily ca. 1000 stations
    b) time resolution hourly ca. 500 stations