



High resolution DTM for flood inundation models

G. Camorani, F. Filippi

Authority of Po River Basin, Parma, Italy

The River Po is the longest river in Italy, and the largest river in terms of streamflow. The Po River Basin Authority coordinates the management for the entire drainage basin area, which embraces a number of different districts and the whole Po Plain (Pianura Padana), a very important agricultural region and industrial heart of northern Italy. Modern techniques for topographical survey enable us to retrieve numerical descriptions of the floodplain morphology with planimetric resolution of 1m and finer. These techniques, along with the increasing availability of GIS tools for hydrological and hydraulic analyses, expand the capability of flood inundation models. The Po River Basin Authority recently commissioned the construction of a 2m DTM for the river bed of a 350km reach of the middle-lower portion the River Po. For this portion of the river, the riverbed consists of a stable main channel 200-500m wide and two lateral banks (the overall width varies from 200m to 5km) confined by two continuous artificial levees (Figure 4). The DTM was constructed on the basis of the data collected in year 2005 during numerous flights, using two different laser-scanner (3033 Optech ALTM and Toposys Falcon II), from altitudes of approximately 1500 m. Below water, channel bathymetry of the navigable portion was characterized by a boat survey using a multibeam sonar (Kongsberg EM 3000D), conducted in the same year, integrated elsewhere with the information collected during a previous ground survey consisting of around 200 cross sections conducted by AIPO (Interregional Authority of the Po River) still in 2005. The resulting DTM (see the example in Figure 4) was validated against the data achieved through a DGPS. Mean quadratic residuals between DGPS survey and DTM were $< 0.13\text{m}$ for approximately 25,000 control points located over a 150km reach. Also, the validation procedure confirmed the absence of local systematic differences.