



Numerical analysis for evaluating the effects of land-subsidence on the hydraulic behaviour of an urban drainage network

G. Camorani (1)

(1) Authority of Po River Basin, Parma, Italy

In the last decades significant land-subsidence phenomena affected several areas of the Po River plain, in northern Italy. The city of Modena, located in the Po River plain, is a remarkable example of land-subsidence prone area.

The study presents the results of a comprehensive hydrological-hydraulic modelling of the wide and rather complex urban drainage network of Modena, aiming at assessing the effects of land subsidence on the hydraulic behaviour of the system.

Firstly, we calibrated a semi-distributed rainfall-runoff model and estimated the design storms associated with different nonexceedance probabilities. Secondly, we modified the geometry of the drainage network (i.e. the heights of links and nodes) taking into account the actual lowering of the land-surface observed for the study area at a dense geodetic control network from 1950 to the present day. Four different scenarios were therefore created, reproducing the historical geometry of the sewer network in 1950, 1981 and 2002. A set of rainfall-runoff simulations was then performed using the identified design storms and the three different network geometries.

The results of the study allowed to assess the sensitivity of the hydraulic behaviour of Modena drainage network to the observed land-subsidence.