



## **FLOOD MAPS INFORMATION CONTENT FOR INSURANCE AND RE-INSURANCE INDUSTRIES**

*A. C. Taramasso and G. Roth*

Geo Risk Management Lab, University of Genoa, Italy

### **Abstract**

The Italian National Association of Insurance Companies (ANIA) has recently financed a project with the aim to develop a Flood Insurance Risk Management Integrated System, known as SIGRA. On the basis of different insured portfolios, the system is able to perform a variety of insurance and re-insurance related quantitative economic analyses. Within such system, flood maps are used to identify hazard prone areas, to provide vulnerability estimates, and as a basis to simulate flood scenarios area extent.

According to Italian and European laws, floodplains mapping has a strong influence on other planning levels and is at the basis of a number of legal restrictions concerning suitability for building and urban development. Therefore, there is a need to distinguish between areas subject to different hazard levels, which are commonly identified by Basin Authorities, according to the Floods Directive 2007/60/EC, as follows:

- areas with high flooding probability (flood return period,  $T$ , in the range 20-50 years);
- areas with moderate flooding probability ( $T=100-200$  years);
- areas with low flooding probability ( $T= 300-500$  years).



For each location recognized as prone to flood, as well as for each ensemble of risks (i.e., portfolio), SIGRA is able to produce physically realistic flood scenarios that take into proper account flood maps information produced with reference to the different return periods. The system is therefore able to simulate the release of hydraulic forces which will affect and cause damages to properties located in flood prone areas. Flood depth and velocity, as well as flood duration, are recognized as determinant factors in assessing damages. Flood damages however, not only depend from the afore mentioned “exogenous” variables but also from risk values and vulnerabilities. Eventually, SIGRA calculate insurance and re-insurance related economic parameters as the Annual Expected Loss, the Possible Maximum Loss and the Maximum Possible Loss.

According to the Company’s insurance policy, the system finally allows for the personalization of the risk estimation. This is mainly accomplished through the specification of “ad hoc” parameters’ ensembles, defined accordingly to the Company’s claim payment experience.