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Consiglio Nazionale delle Ricerche

## FLOOD RISK IN ITALIAN ADMINISTRATIVE UNITS

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### IBIMET- CNR

The Bio-meteorological Institute of National Research Council (IBIMET-CNR) operates in Applied Meteorology and Climatology field, in Territory management, safeguarding and developing, in global Climate change studying with agriculture and environmental research activities, technological transfer and training. The present study has been realized in collaboration with Environmental and Geological Department Science of Bologna University in the framework of common research initiative in hydrological field on large scale applications.

### INTRODUCTION

The study of potential dangerous events due to extreme meteorological situation such as floods and overflows has been made at national scale in order to define a synthetic index representing the alluvial hazard for administrative units in cartographic form. We used Arc GIS 8.3 platform and some of its extension Spatial Analyst and Hydrology Modeling, in order to support analysis made at national scale. The study has been realized and finished during 2003.

### METHODOLOGIC APPROACH

We realized an identification of the area with the most probability of being overflowed under the hypothesis of 100 years of time return events.

The applied methodology is a probabilistic one with normalized indexes which describe:

Hazard index due to the events frequency;

Hazard Reduction Factor due to hydrological processes;

The applied methodology uses information about

- extreme pluviometric events derived from Hydrologic Annuals and from VAPI (Discharge evaluation in Italy).
- geomorphologic information derived from the Digital Elevation Model
- pedologic information from FAO soil cartography
- land use and cover information from CORINE project

### RESULTS

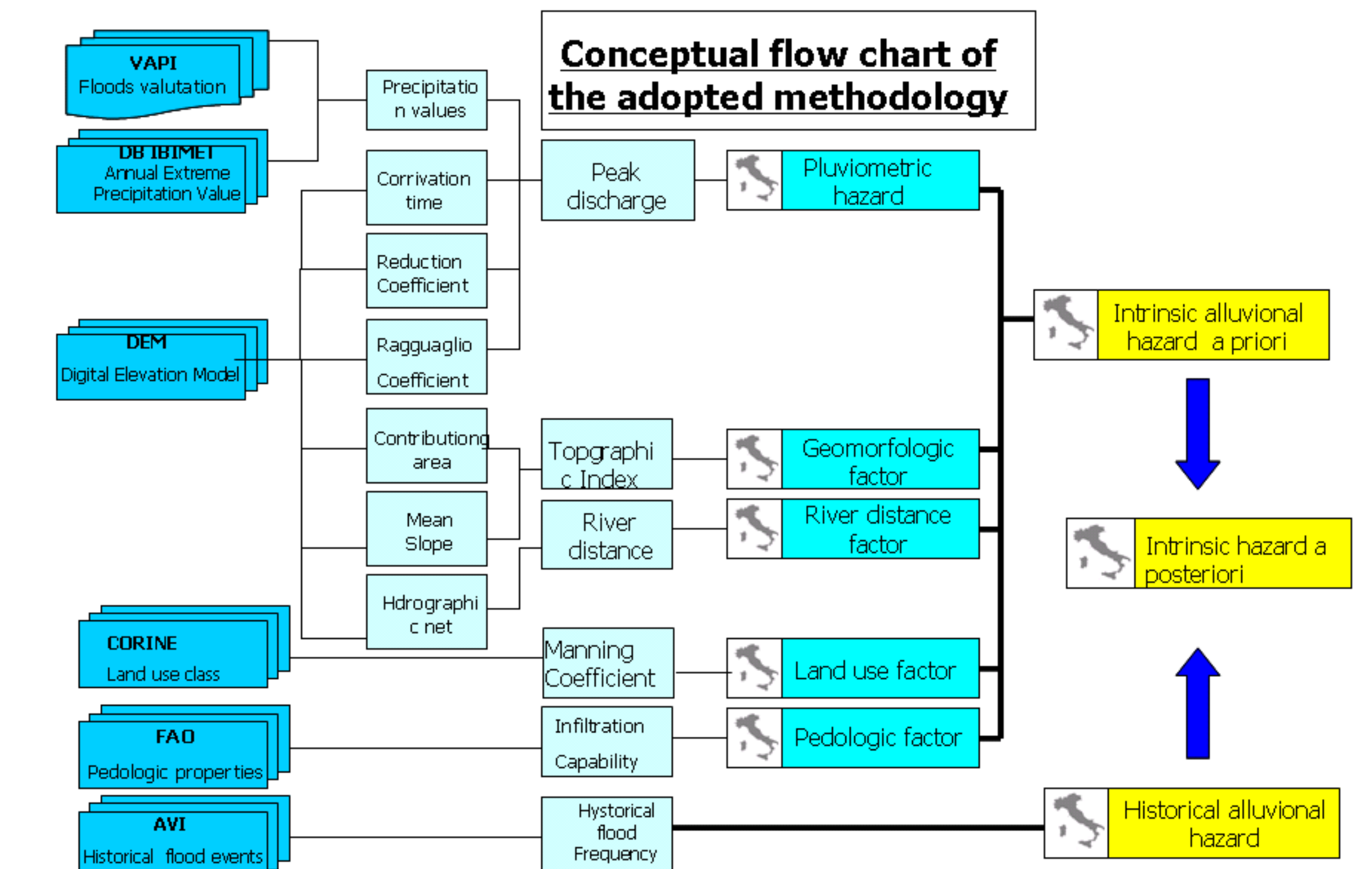
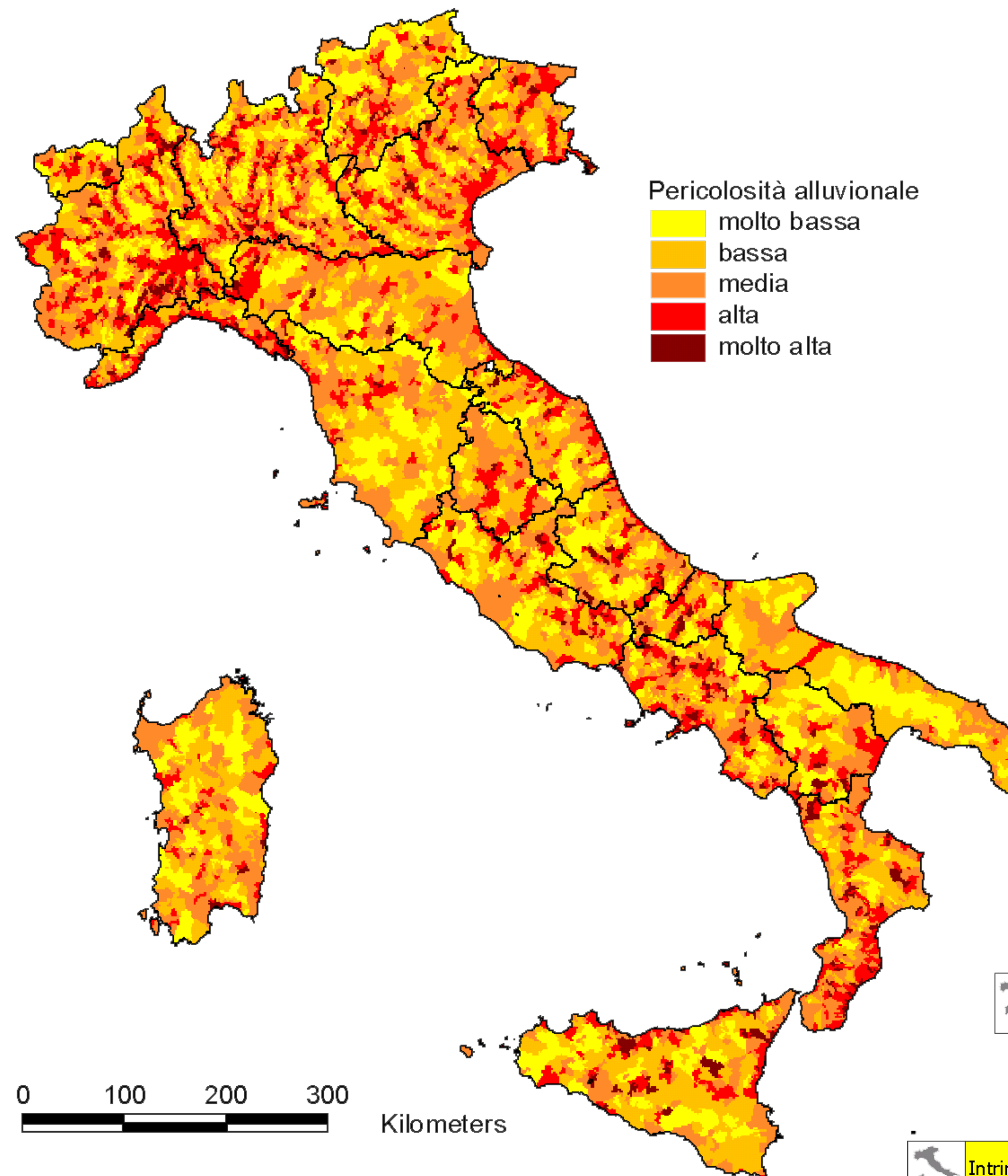
The alluvial hazard index a posteriori obtained from this study can describe in a quantitative way the alluvial hazard associated with a single Italian administrative unit; this index could be used as a frequency indicator of the possibility of alluvial events occurrence. This index could be used as a frequency indicator of the possibility of alluvial events occurrence. The elaboration result is a map in which the intrinsic hazard is divided into 5 classes from very low to very high.

### CONCLUSION

The administrative units scale aggregation does not correspond to the real hazard index spatial distribution. As a matter of fact it depends on climatologic (extreme precipitation) and on the morphology of the analysed zone; it does not surely depend on the administrative division of the territory. The obtained result however seems to reflect a credible alluvial hazard distribution at national scale. The administrative units in which there are one or more river courses to which is associated an high hazard index, preserve in their hazard aggregated index an high value. On the contrary in the administrative units in which there is a limited presence of rivers or characterized by a low pluviometric index, they keep a low aggregated intrinsic index.

In the end, we can consider that the intrinsic alluvial aggregated index a posteriori at administrative units scale could give an evaluation of maximum pluviometric and alluvial hazard associated at the administrative units. The approximations and simplifications necessary for the computation however compel to a critical use and, for particular interested zones, to a more detailed analysis.

## ALLUVIAL HAZARD



An hydrologic conceptual infiltration model and runoff generation model has been applied on the entire national territory at the elementary cell (900 m resolution), through a series of raster procedures implemented with ArcGIS 8.3.

