



GIS, aerial photos and remote sensing for loss estimation and flood vulnerability analysis in the Graben of Nardò – Copertino – Galàtone municipalities (southern Italy).

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This research studies an actual problem, concerning the environmental impact of calamitous events (floods and thunderstorms) with the geological and geomorphological environment of a study area, the Graben of Nardò – Copertino – Galàtone municipalities (southern Italy).

In fact, severe floodings take place frequently not only in autumn, but in summer as well. The effects of these calamities are amplified by the peculiar geological and morphostructural characteristics of the Graben. Flooding affects often large areas so that water-scooping machines are not able to remove the rainfall water. These events cause warnings and emergency states, involving people, structures and infrastructures.

Therefore, the area of Nardò – Copertino – Galàtone Graben, recurrently affected by large floodings, suffers a considerable economic and social impact.

These events not only deplete the soil, afflicting urban and agricultural areas, but also, in the specific case, the hydrological resources, which instead of favouring groundwater recharge, are disturbed and hence facilitate groundwater pollution.

For efficient and effective flood analysis, a Geographic Information System (GIS) is a useful tool, and there are many recent studies of flood vulnerability evaluation using GIS. In addition, since the distribution of land use/cover plays an important role in flood analysis, aerial photos and remote sensing methods, using a satellite image of 1997, are also considered useful when performing this kind of analysis and clas-

sification. Specifically in this study, GIS, aerial photos, remote sensing methods and historical records of major floods were combined and applied to develop a new technique for flood vulnerability analysis.

The general procedure adopted was to select the study area and follow the subsequent steps for flood vulnerability assessment:

1. Indirect mapping of:

- geomorphological details, emphasizing lowering zones of the Graben;
- basin and canal network.

2. Direct mapping:

- of actual floods (during or just after the flood);
- emphasizing diagnostic flood characteristics, using:
 - (a) AP (aerial photos) sequential imagery studies (1955 and 2000);
 - (b) RS (remote sensing) study of an image of June 1997;
 - (c) Field studies of flood evidences and GIS analysis

3. Overlay between “direct mapping” and “indirect mapping”.

4. Improvement of the “overlay between direct mapping and indirect mapping”, by combining this data set with other data sources (frequency analysis of floods, number of events, etc.) and detailed topographic data.

5. Flood vulnerability and loss estimation in the Graben area.

The analysis results clearly show that the Graben of Nardò – Copertino – Galàtone municipalities is potentially at greatest flood vulnerability, while along the Horsts the flood vulnerability is lower.