

Geostatistical analysis of the flood risk perception queries in the village of Navaluenga (Central Spain)

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Flash floods provoke a high average mortality as they are usually unexpected events which evolve rapidly and affect relatively small areas. The short time available for minimizing risks requires preparedness and response actions to be put into practice. Therefore, it is necessary the development of emergency response plans to evacuate and rescue people in the context of a flash-flood hazard. In this framework, risk management has to integrate the social dimension of flash-flooding and its spatial distribution by understanding the characteristics of local communities in order to enhance community resilience during a flash-flood. In this regard, the flash-flood social risk perception of the village of Navaluenga (Central Spain) has been recently assessed, as well as the level of awareness of civil protection and emergency management strategies (Bodoque et al., 2016). This has been done interviewing 254 adults, representing roughly 12% of the population census.

The present study wants to go further in the analysis of the resulting questionnaires, incorporating in the analysis the location of home spatial coordinates in order to characterize the spatial distribution and possible geographical interpretation of flood risk perception. We apply geostatistical methods to analyze spatial relations of social risk perception and level of awareness with distance to the rivers (Alberche and Chorrerón) or to the flood-prone areas (50-year, 100-year and 500-year flood plains). We want to discover spatial patterns, if any, using correlation functions (variograms). Geostatistical analyses results can help to either confirm the logical pattern (i.e. less awareness further to the rivers or high return period of flooding) or reveal departures from expected. It can also be possible to identify hot spots, cold spots, and spatial outliers. The interpretation of these spatial patterns can give valuable information to define strategies to improve the awareness regarding preparedness and response actions, such as designing optimal evacuation routes during flood emergencies.

Geostatistical tools also provide a set of interpolation techniques for the prediction of the variable value at unstudied similar locations, basing on the sample point values and other variables related with the measured variable. We attempt different geostatistical interpolation methods to obtain continuous surfaces of the risk perception and level of awareness in the study area. The use of these maps for future extensions and actualizations of the Civil Protection Plan is evaluated.

References

Bodoque, J. M., Amérigo, M., Díez-Herrero, A., García, J. A., Cortés, B., Ballesteros-Cánovas, J. A., & Olcina, J. (2016). Improvement of resilience of urban areas by integrating social perception in flash-flood risk management. *Journal of Hydrology*.