



The use of old cartographic datasets along with remote sensing data for better understand and map the 2005-2008 floods in Romania

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Floods are the major disaster affecting many countries in the world year after year. From Romania perspective, floods are among the most hazardous natural disasters in terms of human suffering and economic losses. Major floods occurred in 2005, 2006 and 2008, the worst ones in more than 40 years, have affected large regions of Romania: in the Timis county (April 2005) over 1 300 homes have been damaged or destroyed, 3 800 people have been evacuated and about 30 000 hectares of agricultural land flooded; in five counties situated in eastern Romania (July 2005) 11 000 homes were inundated, 8 600 people have been evacuated, 20 people were killed, 53 000 ha farmland flooded, 379 bridges damaged or destroyed; in 12 counties along the Danube (April 2006) 3 077 homes were affected (1.049 completely destroyed), 16 000 people evacuated, five people killed, 144 000 hectares of land flooded; in six counties from the North-East part of Romania (July 2008) 3 985 houses were affected (over 300 totally destroyed), 15 834 people evacuated and 35 084 hectares of agricultural land inundated.

Flood management evolves and changes as more knowledge and technology becomes available to the environmental community. Satellite imagery can be very effective for flood management in detailed mapping that is required for the production of hazard assessment maps and for input to various types of hydrological models, as well as in monitoring land use/cover changes over the years to quantify prominent changes in land use/cover in general and extent of impervious area in particular. In the same time, the wealth of old cartographic documents is an important cultural and scientific heritage. By careful studying this kind of documents, a modern manager can better understand the way territory was managed in the past and the implications of that management in today's floods reality. Good quality photo cameras, flat-bed and large size scanners were used to convert the analogue old cartographic materials into digital files. Specially, highly compressed, file formats were used to reduce the raster database size without affecting the documents quality. Digitisation and online distribution of this kind of documents, via an online system, provided new ways to access and to interact with our patrimony and new tangible arguments for the flood decision makers. The research included the development of key components and modules providing characterisation (based on metadata), virtual storage, discovery and access services, including intuitive query and browsing mechanisms and exploiting the potential of semantic web and advanced storage technologies.

For all the mentioned flood events various processing techniques (classification, geo-referencing, filtering, and photo-interpretation) were used to combine the optical and radar images in order to delineate the flooded areas. The resulted flood masks were integrated in GIS environment with the old cartographic database and also with digital layers that represent the current geographic reality.