Editorial: Applied Geomorphological Mapping

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Mapping forms and deposits, and inferring processes, of a landscape is a very complex exercise (Demek, 1982). Its difficulty lies, on the one hand, in the challenge of identifying the processes themselves, their spatial and temporal extent (including the magnitude of activity) and the underlying base rocks (both in the field and through desk based analysis) and, on the other hand, the implementation of effective cartographic representation. General geomorphological maps are often driven by the need to understand the evolution of a portion of the landscape and a need to forecast future evolutionary trends. They have thus become a major research instrument in their own right (Hayden, 1986). Applied geomorphological mapping has to consider the evolution of the area under investigation, even if the specific objectives are more limited.

The cartographic representation of geomorphological information poses some distinct challenges. To improve readability of geomorphological maps one approach is to reduce the complexity of the cartographic elements favouring a "question-driven" approach, representing fewer processes at a time on the same map (e.g. Savigear, 1965; St-Onge, D. A., 1968). In this way the map is more readable for the user and the fundamental needs of improving land planning can be easily and more efficiently passed on to land managers. This issue also relates to the need for an increased interdisciplinary dialogue between geomorphologists and other professionals (Griffith and Hearn, 1990).

Another approach is the adoption of recent digital analysis and visualization techniques. Increased computer power (both hardware and software) not

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only allows the application of sophisticated modelling techniques, but also the visualization of results in ways that can constitute a better bridge between the producers of geomorphological maps and the end users. The growing application of GIS, virtual reality, environmental sensor networks, remote sensing and spatial analysis in this field is a clear example.

At a time when the world urban population is greater than the world rural population (UN Habitat, 2007) and with the effect of higher concentrations of human beings, the overlap of dense populations with fragile environments has highlighted the urgent need to improve the communication between land planners and earth scientists to prevent negative feedbacks of unregulated land occupation and transformation. In these scenarios the results of *applied* geomorphological investigations can play a critical role in letting non-experts understand the risks and challenges of erroneous intervention in a territory. The presentation of different future scenarios is a very effective tool for disseminating scientific analyses (e.g. IPCC, 2007), and leads to an increased awareness by the general public and managers. At the same time the earth science community needs to pursue more *general* research in order to extend our understanding of the interaction of Earth surface processes and the subsequent creation of landforms.

For these reasons the IAG/AIG (International Association of Geomorphologists (http://www.geomorph.org) has formed a working group on Applied Geomorphological Mapping (http://www.appgema.org) aimed at fostering inter-disciplinary links and promoting the adoption of standard mapping procedures. Specifics outputs from the working group will include a professional handbook of geomorphological mapping, a reference database of papers, a standardised set of cartographic symbols (and related GIS tools) and a pamphlet on "The Applications of Geomorphology in Land Planning and Natural Hazards Prevention" to be published within the context of the International Year of Planet Earth (http://www.yearofplanetearth.org/). The first output from the working group is this special issue of the Journal of Maps, a showcase of (applied) geomorphological mapping produced at a variety of scales using both manual survey and remote sensing techniques. Griffiths and Abraham (2008) present a series of detailed geomorphological maps ($\sim$0.5 km^2) produced through an on-site survey for a landslide prone region in West Dorset, UK, designed to convey relevant information to different audiences. Detailed field surveying is also used to produce maps of soil pipes ($\sim$25 km^2) in the Mocatan region of Spain (Chilton et al., 2008) and of 19 peat flows across Ireland (Dykes, 2008).

At a larger scale, Vilardo and Ventura (2008) use digital elevation models (DEMs) and orthophotos to outline the 1944 Vesuvius (Italy) lava flow over ∼5 km^2. Theler and Reynard (2008) take a composite approach and use DEMs and airphotos to perform initial mapping and modelling exercises. This is supplemented by field mapping to produce the final map.

Regional maps are presented in the last two papers. Chueca and Julian (2008) use air photos to map the Pyrenean Alta Ribagorza in Spain, a high altitude mid-latitude region (∼700 km^2). May, J-H. (2008) uses a mixture of CORONA and Landsat satellite imagery to map the Quebrada de Purmamarca, Jujuy, NW Argentina (∼380 km^2).

We feel that the wealth of new digital technologies is reviving the interest in, and expanding the frontiers of, geomorphological mapping. It is a great pleasure to introduce the readers to this special issue that we believe can constitute a reference point for all future activities of the working group.

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