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Urban geomorphological heritage – A new field of research

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Urbanization is one of the major challenges that the world faces. In 2015, 54% of the world population was living in urban areas and in some countries this percentage is close to 100% (Singapore 100%; Qatar 99%; Belgium 98%). In several parts of the world annual urbanization rates exceed 5% (e.g. Oman 8.54%; Rwanda 6.43%; Burkina Faso 5.87%), which means that urban sprawl is a widespread phenomenon. Urbanization and correlated infrastructure building highly impact and sometimes completely destroy natural landforms.

Geomorphological heritage research has traditionally focused on rural or natural regions, in particular protected areas (nature parks, geoparks). We consider that urban areas, which have been poorly investigated until now, are particularly interesting in a geomorphological heritage point of view for almost three reasons: (i) The geomorphological context (site) of some cities is part of their "image" and their fame (e.g. the sugarloaf of Rio de Janeiro); (ii) Urban sprawl often interacts with landforms, which addresses the challenge of geoheritage protection in fast urbanizing areas; (iii) Cities are often tourist destinations, which creates a potential for a geotourist promotion of their geomorphological heritage.

This study addresses the main challenges research on geomorphological heritage is facing in urban contexts: (i) the complex interrelationships between natural landforms and urban forms; (ii) the partial or total invisibility of landforms and sediments that are covered or destroyed by urban infrastructures; (iii) man-made landforms as part of urban geomorphological heritage; (iv) the suitability of some landforms (valleys, gullies, mounts) for specific urban uses; (v) the geomorphic constraints of landforms on urban development; and (vi) the importance of some landforms for the urban landscape and the image of the cities.

To address these challenges a methodological framework is proposed, which combines: (i) the geomorphological analysis of the urban landscape through geomorphological mapping (with use of a specific legend for man-made landforms) and geohistorical analysis of landscape evolution (historical maps processing); (ii) the selection, characterization and assessment of urban geomorphosites; (iii) proposals for the conservation and promotion (geotourism) of the urban geomorphological heritage.