Editorial

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When they make a map at a given scale, the readers of the *International Journal of Cartography* know that they need to adjust and often simplify the level of detail of their geographic data, in order to keep the details of the map legible. This process, map generalisation, has long been a research topic for cartographers, as shown by the lifespan of the International Cartographic Association (ICA) commission on map generalisation and multiple representation, whose chairs were the guest editors of this special issue. But research on map generalisation is experiencing important mutations that are illustrated in this special issue. For many years, research in map generalisation has mainly been driven by the need for automation from the national, or regional, mapping agencies (NMAs) that produce series of topographic paper maps (Mackaness, Ruas, & Sarjakoski, 2007). This major focus is no longer, for three main reasons:

- NMA topographic map generalisation made great progress towards automation in the past years (Duchêne et al., 2014), and NMAs are no longer urging researchers for innovation.
- NMAs are no longer the main providers of topographic maps, with big companies such as Google or Microsoft making their own maps, and also more and more derived from volunteered geographic information (Sester, Arsanjani, Klammer, Burghardt, & Haunert, 2014; Touya, Antoniou, Christophe, & Skopeliti, 2017).
- Cartography is becoming more interactive and multi-scale, so there is a shift towards information visualisation techniques, and human-computer interaction design is becoming at least as important as map design itself.

The papers published in this special issue of the *International Journal of Cartography* illustrates this transition period, and the first three papers show that the challenges of good old map generalisation are still important. It is important to identify geographic patterns and structures that are implicit in the datasets used as input for map generalisation, in order to abstract or preserve these patterns (Mackaness & Edwards, 2002). For river network generalisation purposes, Lawrence V. Stanislawski, Michael P. Finn, and Barbara P. Buttenfield, in *Classifying physiographic regimes on terrain and hydrologic factors for adaptive generalization of stream networks*, propose a classification of the physiographic regimes of the streams, to adapt the simplification operators applied to the stream geometry. The classification uses terrain analysis as well as hydrologic factors of the streams (e.g. soil and bedrock permeability) to decide if the streams of an area belong more to coastal plains or humid mountains (seven classes are used). What would be an automated map generalisation without geometry simplification algorithms? The second paper of the issue, *Simplification of polylines by segment collapse: minimizing areal displacement while preserving area* by Barry J. Kronenfeld, Lawrence V. Stanislawski, Barbara P. Buttenfield & Tyler Brockmeyer, proposes a novel polyline simplification algorithm that preserves the area of closed polylines. The algorithm is tested on several complex lakes and does preserve the area of the lakes while simplifying their outline. When you have several simplifications algorithms at disposal like the one proposed in the previous paper, it is difficult to know which one, with which parameters to use in a specific situation. The third paper, *Regression modeling of reduction in spatial accuracy and detail for multiple*
geometric line simplification procedures by Timofey Samsonov and Olga Yakimova, propose a regression model able to compare different line simplification algorithms regarding the output accuracy and level of detail. They show how the parameters of two simplification algorithms such as Douglas- Peucker, and Visvalingam-Whyatt can be linked using the regression model.

Following this more classical research, the next two papers extend the scope of traditional map generalisation by applying generalisation principles to more unusual datasets. First, Variable DEM generalization using local entropy for terrain representation through scale by Paulo Raposo follows the classical principle of adapting the simplification to the local geography of the map to raster digital elevation model smoothing. The method is able to preserve more terrain details in high reliefs while applying stronger smoothing in flatter areas. The following paper is Using stroke and mesh to recognize building group patterns by Xiao Wang and Dirk Burghardt. It focuses on the cartographic generalisation of buildings data extracted from OpenStreetMap. As in the first paper of the issue, they propose a method to recognise patterns that we want to preserve during generalisation. In this case, they recognise building patterns such as alignments by building a mesh between the buildings and then searching for strokes in the arcs of the mesh.

Finally, the last two papers extend map generalisation research to interactive multi-scale maps. In Designing Multi-Scale Maps: Lessons Learned from Existing Practices, Marion Dumont, Guillaume Touya, and Cécile Duchêne study several existing multi-scale maps to derive guidelines of multi-scale map design to enable smoother zooming interactions. In particular, it seems that progressive abstraction changes in building/built-up area depiction help towards smoother zooming interactions. The last paper, Web-based dissemination of continuously generalized space-scale cube data for smooth user interaction by Martijn Meijers, Peter van Oosterom, Mattij Driel, and Radan Šuba, uses a continuous rather than progressive approach of multi-scale interactive mapping. The authors show how to use the Space-Scale Cube model in a mobile web client that serves continuous multi-scale maps. They propose continuous magnifying lenses called slicing surfaces that show more detail inside the surface and less outside.

This special issue proves that research in map generalisation is alive and well, and the extension of the scope of generalisation research gives us motivating new challenges for future years.

References


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