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Editorial

Editorial for Glacial and Geomorphological Cartography Special Issue

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Received: 12 November 2018; Accepted: 15 November 2018; Published: 20 November 2018

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Landforms are the most superficial part of the earth's crust. They are usually the foundations on which life develops, and continuously interact with the biosphere, hydrosphere, and atmosphere, as well as with anthropic activities. Moreover, landforms are often some of the few remaining witnesses of former climates or surface dynamics. Geomorphology is therefore a science of the utmost importance, and geomorphological mapping is one of its most commonly used tools.

The aim of this Special Issue is to provide an insight into the use of maps, mapping, and Geographic Information Systems (GIS) technologies for geomorphological and glaciological research. Geomorphological mapping has been one of the most basic, useful, immediate, and aesthetically pleasing tools for Geomorphology since its appearance in the 1960s. During the last 20 years, new methods and tools, such as GIS, Digital Elevation Models (DEMs), laser scanners, Laser Imaging Detection and Ranging (LIDAR) and Unmanned Aerial Vehicles (UAVs), have enriched and extended the scope, application, and outcomes of geomorphological mapping. Mapping is an especially useful instrument for Glaciology and Glacial Geomorphology, as maps can quickly describe glacial retreat and change. Glacial mapping has also changed considerably over past years, and the aforementioned tools, in addition to radar or photogrammetry, can provide measurements on glacier volume or speed, which is important for applications like glacial modelling or hydrological research, to name just a few.

An interesting combination of traditional mapping methods plus some of the most up-to-date ones has been used in the papers published in this Special Issue. Evans et al. (2018) [1] provide an example of the combination of traditional fieldwork/mapping methods and the use of high-resolution aerial imagery, with regards to its application in the description of landforms in active temperate glacial margin landsystems. In turn, landform distribution and shape provide a valuable insight into recent changes in the climatic and sedimentary regime on Icelandic piedmont lobes.

Barr et al. (2018) [2] take advantage of Artic-DEM, a high-resolution multitemporal DEM, to map glaciers in a remote area to a high degree of accuracy, being able to distinguish its limits even in the case of debris-covered ice margins. The importance of multitemporal DEM coverage is highlighted in this contribution, as it makes it possible to calculate important glacier dynamics indicators, such as glacial advance, local ice thickening/thinning, and surface velocities, which can again be related to climatic patterns and interesting ice-volcano interactions.

Gehrmann and Harding (2018) [3] provide a step forward in the use of glacial landforms to obtain information about former glacier dynamics. By performing several metrics on moraine ridges, made available thanks to a high-resolution LIDAR DEM, they were able to create a proglacial landform deposition and deformation model, which will help describe the Scandinavian Ice Sheet evolution.

Glaciers are considered as indicators of climate change, as their extension is related to a specific precipitation-temperature budget. By mapping and describing mountain glacial landforms, Temovski et al. (2018) [4] were able to calculate the Pleistocene glacial expansion in the Central Balkans area, as well as provide valuable information on the glacier characteristics and the palaeoenvironmental conditions that drove glacier creation in this area. Using similar tools, in addition to cosmogenic dating methodologies, Úbeda et al. (2018) [5] provide a thorough description of the current and past glacial evolution and local environmental conditions on one of the world's largest tropical glaciers, the Nevado Coropuna (Peru), also offering an interesting insight into the regional palaeoclimatic framework and palaeoclimatic teleconnections that drove it.

Gómez-Lende and Sánchez-Fernández (2018) [6] demonstrate the usefulness of innovative mapping technologies, such as the Terrestrial Laser Scanner, in exploring one of the last frontiers of the earth's cryosphere: frozen caves. They also provide useful suggestions as to the way forward in the study of these secluded sites. Goto et al. (2018) [7], for their part, make use of traditional techniques, such as photogrammetry, but applied to new aerial imagery; the results are combined with DEMs obtained from other sources, in order to describe the tectonic geomorphology in the Okinawa Trench, a highly tectonically active area.

Besides having proved its usefulness in blue sky science, geomorphological mapping can provide applications for land management. One such application is highlighted by González-Amuchastegui and Serrano (2018) [8], who show how a basic geomorphological map can be used to define geo-heritage hotspots, propose geo-tourism routes and create visually pleasing dissemination materials, in order to manage and improve visitors' experiences in natural protected areas.

All in all, this Special Issue shows how geomorphological mapping techniques, both traditional and innovative ones, can improve scientific knowledge on the distribution and dynamics of glacial and non-glacial landforms, environments, and dynamics. The outcomes from the contributions are invaluable in describing current and past global change, as well as proposing land management strategies.

Conflicts of Interest: The author declares no conflict of interest in this article.

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