Highlights

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Digital Geosciences on Mobile Devices - Concepts, Challenges and Applications

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Abstract

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1. Introduction

- computing equipment continuously elevates the analytical capabilities for solving geoscientific problems
- large drawback on computing equipment: the more powerful it is, the more stationary it is
- geoscience disciplines such as hydrology, geology or glaciology are driven by outdoor experiments that prohibit bulky equipment
- the advent of mobile computing equipment, such as smartphones and tablets, provides a possible solution to the equipment problem

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- form factor of mobile devices is small enough to allow every field-related geoscientist to carry one in the field
- as seen is popular articles, the range of available devices increases, which allows to find a devices fit-for-purpose to each situation
- range of devices also comes with a range of capabilities that influence their usability for specific field tasks
- availability of small form factor devices is only on part contribution to making digital geosciences more "mobile"
- availability and easy access to geoscience data (e.g. domain-specific maps, digital elevation models (DEMs), surface models in 3D) is equally important to perform combined digital- and field analysis
- while basemap access on mobile devices is trivial, surface-scanned data in form of point clouds and (textured) triangulated meshes is becoming increasingly available with novice-operable structure from motion (SfM) software and drones
- crowdsourced data and Volunteered Geographic Information (VGI) provides numerous data for domain-specific analysis, which is facilitated by easier data capture from amateur scientists using mobile devices
- In order to connect data and devices in the field, domain-specific mobile software is required
- the difficulties in mobile software development stem from the specific demands and challenges for mobile software, such as energy efficiency, multi-manufacturer support, smart sensor utilisation [add and expand]
- with the emergence of new application cases, which are demonstrated and discussed in this article, and an increasing interest from geoscience- and computer technology industry, a significant rise in the mobile software

availability for geoscience problem solving is expected for the near-term future

- Challenges