International Society for Geomorphometry Coffee Talk

June 7th, 2023

7:00 MDT (UTC -6), 9:00 EDT (UTC -4), 10:00 BRT (UTC - 3), 14:00 BST (UTC +1), 15:00 CEST (UTC +2), 16:00 EEST (UTC +3), 21:00 CST (UTC +8)

" A simplified geostatistical approach for digging into the complexity of surface roughness analysis: need for standardization?"

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Sebastiano Trevisani holds a Ph.D. in Applied Earth Sciences, and since July 2018 is an Associate Professor in Applied Geology at the University Iuav of Venice, where his teaching activity is related to the courses "Environmental Geology" and "Applied Geology". His main research activities are related to geocomputational approaches (e.g., geostatistics, geomorphometry, etc.) for the analysis of geoenvironmental systems, with a special focus on geosphere-anthroposphere interlinked dynamics (such as hydrogeology, natural hazards, geoengineering issues in urbanized contexts, geomorphometry, and sustainability). From November 2010 to June 2018, he was a researcher in Applied Geology at the Department of Architecture Construction and Conservation (DACC) of the University Iuav of Venice (Venice, Italy). He has also worked for various research institutes, including (from 2007 to 2010) the Research Institute for the Hydrogeological Protection (IRPI) of Padova (Italy) of the National Council of Research (CNR), and (from 2006 to 2007) the National Institute of Applied Oceanography and Geophysics of Trieste (Italy) (OGS).

Abstract: Surface roughness is a relevant feature of solid earth/planetary surfaces, providing information on the related geomorphic factors. Surface roughness is a general concept covering multiple aspects of the spatial variability structure of surfaces and can be characterized at different scales and with different metrics. In this context, geostatistical-based roughness indexes are a valid solution, providing a good balance between flexibility of algorithms and interpretability of the results. This talk introduces a geostatistical algorithm tailored to the analysis of key aspects of short-range roughness, requiring a minimum intervention by the user. The proposed algorithm has been developed both for promoting the adoption of geostatistical approaches as well as for highlighting the necessity to consider multiple aspects of surface roughness. The algorithm is implemented as open-source code both in R language using the functions of the "Terra" package as well as in Python for Esri ArcMap GIS.

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