Geophysical Research Abstracts
Vol. 20, EGU2018-1043, 2018
EGU General Assembly 2018

Geomorphometric characterization of natural and anthropogenic land cover in different landscapes context

Wenfang Cao (1), Giulia Sofia (1), Erle C Ellis (2), and Paolo Tarolli (1)

(1) University of Padova, Department of Land, Environment, Agriculture and Forestry, legnaro(PD), Italy (wenfang.cao@phd.unipd.it;paolo.tarolli@unipd.it), (2) Department of Geography and Environmental Systems, University of Maryland, Baltimore County, 1000 Hilltop Circle, Baltimore, Maryland 21250 USA.

Recently, it has been recognized that abiotic and biotic forces evolved together reshaping the Earth's surface. However, there is still a knowledge gap on the functioning of these two-driving forces, and on how they change with different landscapes and land covers. The aim of this research is to investigate and provide a deeper understanding of the probability distribution of Earth's surface morphology in different contexts and under various land covers. We selected four study areas (10 x 10 km) in Italy, covering different landscapes, from floodplains to mountains. The areas are named Veneto floodplain (P), Colli Euganei, that includes floodplains and hills (PH), Prosecco DOCG, which is mainly a hilly area (H) and Trentino, representative of alpine mountains (M). For these, LiDAR-derived Digital Terrain Models (DTMs) at 2-meter resolution are available. For each study site, we classified the landcover into crops, artificial, forest, grass and vineyard, according to the official Corine-Land-Cover classification.
Several geomorphometric indicators have been calculated: slope and curvature (Evans 1979), SLLAC (Slope Local Length of Auto-Correlation) (Sofia et al. 2014). For each parameter, we identified the probability density functions (PDFs) to identify the probability of each parameter falling within a particular range of values.
The preliminary results showed that:
i) from the distribution of slope, long tails of slope characterized steeper topography (H & M), while double peaks are found in the PDFs of vineyards landscapes both in PH and H, due to the terraces shape (walls, having high values of slopes; and benches, characterized by low values of slopes);
ii) as to SLLAC, it should be noted that natural landcover such as forest, present different distribution from anthropogenic land covers, and such difference manifests most clearly in P and H;
iii) when it comes to curvature, long tails on the negative side are related to channelized landscapes, while for the positive side, they relate to ridges: both of these characteristics display remarkably in H and M.
These results highlight how different land use type and landscapes can be described and thus might be classified also based on their topographic signatures, providing, therefore, an alternative approach for land use mapping and monitoring changes through time.

Reference

Evans IS (1979) An integrated system of terrain analysis and slope mapping. Final report on grant DA-ERO-591–73-G0040. University of Durham, England

Sofia, G., Marinello, F., Tarolli, P. (2014). A new landscape metric for the identification of terraced sites: the Slope Local Length of Auto-Correlation (SLLAC), ISPRS Journal of Photogrammetry and Remote Sensing, 96, 123-133, doi:10.1016/j.isprsjprs.2014.06.018.