Terrain restitution in vegetated terraced landscapes from SfM or lidar: towards a specific DSM/DTM filter
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RATIONAL AND OBJECTIVES

Long-term observation systems which monitor Mediterranean cultivated rainfed areas of ten focus on physical processes and are land use monitoring. However, full understanding of those processes - especially for long-term periods - also require the monitoring of anthropogenic landscape structures that have high impacts on runoff and can change over time and for which methods providing spatial data are lacking. Recent progresses in 3D mapping and geomorphometry give new insights into this monitoring issue [1].

Among the artificial structures used for soil and water conservation, Mediterranean terraces have been adopted terraces from Roman times [2]. Indeed, terraces decrease slope intensity and lengths favour infiltration. The spatial pattern of terrace walls is heterogeneous and depends on natural terrain slopes. In erosion and hydrogeological studies, maps of terrace walls may be needed [3].

Methods to automatically delineate terraces from high resolution DSM were already proposed [4]. However, an accurate terrain restitution in vegetated terraced landscapes from DSM or LEAP points clouds, where terraced front is usually located under vegetation (bushes, vines, etc.) is still an open question, even from very high resolution data and with data accessed at the leaves-off period.

Most of existing DSM/DTM filtering based on slope gradient [5], or vegetation 3D geometry properties [6] usually fail to filter the vegetation while preserving the terrace front and foot geometry properties.

To narrow the scope of this work, the questions addressed are the following:

- How to process the DSM/DTM filtering in terraced landscape to overhang vegetation while preserving the terrace front footprint morphology?

- Are very high resolution DSM coming from LiDAR or UAV-based SfM point clouds suitable and accurate enough to map and diagnose the vegetated terrace of cultivated Mediterranean landscape? Note

- How to process the DSM/DTM filtering in terraced landscape to overhang vegetation while preserving the terrace front footprint morphology?

THE HIGHLANDDEM PROJECT

Recent progresses in 3D mapping and geomorphometry give new insights into the cultivated landscape structures monitoring issue. Teams joined in the HighLandDEM project have each developed techniques for 3D mapping and/or artificial structures mapping from very-high resolution Digital Elevation Models (DEM) and the HighLandDEM project is an unique opportunity to share, disseminate, cross-validate these techniques and overcome the above mentioned challenges.

CONCLUSIONS

To narrow the scope of this work, the questions addressed are the following:

- How to process the DSM/DTM filtering in terraced landscape to overhang vegetation while preserving the terrace front footprint morphology?

- Are very high resolution DSM coming from LiDAR or UAV-based SfM point clouds suitable and accurate enough to map and diagnose the vegetated terrace of cultivated Mediterranean landscape? Note

The HighLandDEM project offers an unique opportunity to share, disseminate, cross-validate these techniques and overcome the above mentioned challenges.

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