The 36th International Symposium on Remote Sensing of Environment,
11 – 15 May 2015, Berlin, Germany, ISRSE36-360

DEVELOPMENT OF A LOW COST PHOTOGRAMMETRIC TOOL FOR COASTAL MONITORING AND ASSESSING THE ACCURACY OF SHORELINES OBTAINED FROM LANDSAT IMAGERY.

E. Sanchez-Garcia [a, *], J.E. Pardo-Pascual[ab], A. Balaguer-Beser [ac], J. Almonacid-Caballer [a]

[a] Geo-Environmental Cartography and Remote Sensing Group, Universitat Politècnica de València, Camino de Vera, s/n 46022, Valencia, Spain

[b] Department of Cartographic Engineering, Geodesy and Photogrammetry, Universitat Politècnica de València, Camino de Vera, s/n 46022, Valencia, Spain

[c] Department of Applied Mathematics, Universitat Politècnica de València, Camino de Vera, s/n 46022, Valencia, Spain

THEME: Marine and Coastal Environment, Resources and Dynamics.

KEY WORDS: shoreline changes, terrestrial photogrammetric software, low cost coastal monitoring, plan view photos, Landsat imagery.

ABSTRACT:

This work lies in the development of a semi-automatic photogrammetric application C-Pro (*Coastal Projector*) for extracting the shoreline using terrestrial photography. The application projects the photography on a geo-referenced plane defined by the user allowing quantitative measurements in a defined coordinate system. This plane could be, for example, the sea level altitude or a Digital Terrain Model (DTM), with the main objective to obtain the shoreline at time in which the photography was taken. The basis of this work is the calibration and the repositioning camera processing where the external orientation parameters of the photogrammetric system are found. For this purpose, it has been necessary to include geometric conditions related to the horizon line and terrestrial sphericity in the collinearity adjustment system, using them as multiple control points at infinity. C-Pro allows an efficient monitoring for specific and sensitive coastal areas with a unique photograph from the place in situ and a minimum of three control points. The accuracy of geo-referenced image products collected with this application has been previously calibrated in regard to a high precision coastline, both of them obtained in a short time interval.

In addition, this photogrammetric code has also been used to asses and analyse easily the accuracy of shorelines obtained from Landsat images using the previous software SELI (*Shoreline Extraction from Landsat Imagery*) developed in our research group. This new application allows the analysis and knowledge of the behaviour of the previous extracted Landsat shorelines in different kind of beaches without the necessity of expensive surveys of the study areas. Thus, the analysis of the areas will become easier and will permit the improvement of Landsat shoreline extraction techniques, obtaining better accuracy and robustness for future studies with a tool that could work systematically for coastal management in different areas of the world.

* Corresponding author. Email: elsncgar@topo.upv.es