

COMPARISON OF AERIAL AND TERRESTRIAL PHOTOGRAMMETRY FOR 3D MAPPING OF PETRIFIED TREES, LESVOS GEOPARK

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New technologies in data acquisition led to an increasing interest in capturing high-resolution images using Small Unmanned Aerial Systems (SUAS) and terrestrial means for geological research. The purpose of this study is to compare two different data acquisition methods in order to create accurate and precise cartographic products. Three dimensional (3D) models generated from images with ground sampling distance 0.1cm-0.3cm acquired by SUAS and a DSLR camera were used to map a group of petrified tree trunks at Sigri, Lesvos island, Greece. The methodology involves two different workflows: aerial and terrestrial survey carefully planned in order to serve photogrammetric specifications to map the location accurately, precisely and rapidly. In total, mapped 12 petrified tree trunks of each method separately. Then 3D surface models and the equivalent 3D models were generated using the "structure from motion" (SfM) algorithm. Location, geometric characteristics and volume of the petrified trees are extracted and calculated from this information acquired by 3D models. The comparison made among, the 3D cartographic products which acquired by SUAS, 3D cartographic products acquired by DSLR camera and measurements acquired by conventional methods. The results of the survey, illustrates how aerial and terrestrial remote sensing techniques can offer accurate 3D spatial information of location, orientation and geological position of the petrified trees.

Keywords: Lesvos geopark; petrified trees; SUAS; terrestrial photogrammetry