



## **A strategy for using old aerial photographs for sea cliff retreat measurement**

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For sea cliff retreat hazard assessment, systematic inventories of past cliff failures are essential, preferably based on photogrammetry based multi-temporal studies of aerial photographs. However, the use of old aerial photos for this purpose yields frequently inaccurate data, mainly because the required base information is not usually available. To solve these problems a photogrammetric study was made in the 16 km long Burgau-Lagos cliffed coast in Algarve (Portugal), that includes cliffs with varied geomorphology and height (20m to more than 100m) and low rate of evolution. The older aerial survey used (1938-1948) presents problems that include hardly visible fiducial marks, poor contrast, no camera calibration certificate and is only available as contact prints that had to be scanned. The more recent survey (2002) has complete camera calibration information and a set of ground control points. The methods used include the assessment of the exterior orientation of the photos by a multi-temporal aerotriangulation using BLUH (Leibniz University Hanover aerotriangulation program) with the 2002 survey ground control and identical object points in the two photo sets. The aerotriangulation data enabled the computing of accurate calibration information for the older photos, which was followed by aerotriangulation for assessment of their exterior orientation. The main features of the cliff morphology were stereo plotted in the two models and used as breaklines for automatic generation of DTMs for the two epochs, using photogrammetric software LISA and the Orthoengine module from PCI Geomatica. The DTMs comparison reveals the areas of change of the cliffs, enabling

the identification and accurate measurement of the cliff retreat events.