Geophysical Research Abstracts
Vol. 19, EGU2017-5011, 2017
EGU General Assembly 2017

Stability analysis of chalk sea cliffs using UAV photogrammetry

John Barlow and Jamie Gilham
Department of Geography, University of Sussex, Brighton, United Kingdom (john.barlow@sussex.ac.uk)

Cliff erosion and instability poses a significant hazard to communities and infrastructure located is coastal areas. We use point cloud and spectral data derived from close range digital photogrammetry to assess the stability of chalk sea cliffs located at Telscombe, UK. Data captured from an unmanned aerial vehicle (UAV) were used to generate dense point clouds for a 712 m section of cliff face which ranges from 20 to 49 m in height. Generated models fitted our ground control network within a standard error of 0.03 m. Structural features such as joints, bedding planes, and faults were manually mapped and are consistent with results from other studies that have been conducted using direct measurement in the field. Kinematic analysis of these data was used to identify the primary modes of failure at the site. Our results indicate that wedge failure is by far the most likely mode of slope instability. An analysis of sequential surveys taken from the summer of 2016 to the winter of 2017 indicate several large failures have occurred at the site. We establish the volume of failure through change detection between sequential data sets and use back analysis to determine the strength of shear surfaces for each failure. Our results show that data capture through UAV photogrammetry can provide useful information for slope stability analysis over long sections of cliff. The use of this technology offers significant benefits in equipment costs and field time over existing methods.