

EGU21-6211

<https://doi.org/10.5194/egusphere-egu21-6211>

EGU General Assembly 2021

© Author(s) 2021. This work is distributed under the Creative Commons Attribution 4.0 License.



## 3D modeling of UK Coastline using social media data for landslide mapping and monitoring

**Sewedo Todowede**<sup>1</sup> and Irene Manzella<sup>2</sup>

<sup>1</sup>School of Engineering, Computing and Mathematics, University of Plymouth, UK

<sup>2</sup>School of Geography, Earth and Environmental Science, University of Plymouth, UK

The ubiquitousness of social media has created a valuable and massive amount of data relating to real-live events which are being explored to investigate a wide range of phenomena including, disaster monitoring, health surveillance, user sentiments, etc. For events such as landslide, which mostly occur in remote and localized areas, social media provide an opportunity to expand landslide mapping beyond the current approach.

Traditional sources of landslide events are via media reports, scientific articles, or aerial photography, thus, limiting landslide mapping to only areas where such resources exist. This is followed by repeated in-situ measurements with equipment such as LIDAR to create a 3D geomorphological model of the landslide. At locations with poor accessibility or hazardous conditions, mobilizing personnel and equipment to the site is often impossible. The financial implication of repeated field operations also means landslide monitoring programs are prioritized. These deficiencies have hampered the generation of a robust landslide inventory which is the crucial tool for understanding past landslides and developing an effective system for managing future landslides.

This study demonstrates the application of social media analytics for the identification and modeling of landslides along the South West coast of the UK. From the analysis of over 100,000 tweets, 23 landslide events reported by Twitter users are identified. Five (5) of these events have not been previously reported. Also, drone videos obtained from Twitter and YouTube were processed using Structure from Motion-Multiview Stereo (SFM-MVS) photogrammetry techniques to create a 3D model of landslides at five (5) selected locations.

Analysis of the 3D model created at one of the locations shows that an estimated 1480 m<sup>3</sup> of earth material was removed from the landslide due to the impact of Storm Dennis and Storm Ciara events of the 8<sup>th</sup> - 9<sup>th</sup> and 15<sup>th</sup> -16<sup>th</sup> of February 2020 respectively, while an estimated 295 m<sup>3</sup> was retained at the base of the landslide, possibly an effect of the landslide control/stabilization installation.

The result from this study shows the potential of social media to expand landslide coverage in the UK and to provide a high-resolution 3D model at minimum cost. These data can be used to monitor landslide evolution and to assess their hazard.

