



LIME: 3D visualisation and interpretation of virtual geoscience models

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Three-dimensional and photorealistic acquisition of surface topography, using methods such as laser scanning and photogrammetry, has become widespread across the geosciences over the last decade. With recent innovations in photogrammetric processing software, robust and automated data capture hardware, and novel sensor platforms, including unmanned aerial vehicles, obtaining 3D representations of exposed topography has never been easier. In addition to 3D datasets, fusion of surface geometry with imaging sensors, such as multi/hyperspectral, thermal and ground-based InSAR, and geophysical methods, create novel and highly visual datasets that provide a fundamental spatial framework to address open geoscience research questions.

Although data capture and processing routines are becoming well-established and widely reported in the scientific literature, challenges remain related to the analysis, co-visualisation and presentation of 3D photorealistic models, especially for new users (e.g. students and scientists new to geomatics methods). Interpretation and measurement is essential for quantitative analysis of 3D datasets, and qualitative methods are valuable for presentation purposes, for planning and in education. Motivated by this background, the current contribution presents LIME, a lightweight and high performance 3D software for interpreting and co-visualising 3D models and related image data in geoscience applications. The software focuses on novel data integration and visualisation of 3D topography with image sources such as hyperspectral imagery, logs and interpretation panels, geophysical datasets and georeferenced maps and images. High quality visual output can be generated for dissemination purposes, to aid researchers with communication of their research results. The background of the software is described and case studies from outcrop geology, in hyperspectral mineral mapping and geophysical-geospatial data integration are used to showcase the novel methods developed.