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AusGeol.org – A Virtual Library of Australia's Geology

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Recent advances in digital imaging techniques now facilitate simple, cost-effective generation of digital representations of geological features. These visualisations can be utilised to augment conventional geological educational programs and also provide resources for professional education and research.

The AusGeol project is developing a virtual library of Australia's geology. The project is funded by the Australian Government Office for Learning and Teaching, and is supported by a consortium of universities, as well as state and federal geoscience agencies. The visualisations and accompanying educational resources generated in this project are freely available as Open Educational Resources and are distributed through the AugGeol.org website. This presentation outlines the AusGeol visualisation methods, showcases selected visualisations, outlines the current status of the digital library and describes plans for future enhancement of this educational resource.

Digital photogrammetry, based on 'structure from motion' algorithms, can generate photo-realistic, texture-rendered digital models and orthoimages of geological outcrops. Photogrammetric models can be fully coordinated in three dimensional space and hence capture all geometric and textural features of the real outcrop. Photgrammetry can be undertaken at any scale. Imagery for large-scale features (>50m) are best acquired using UAVs. Medium-scale (0.5-50m) visualisations can be generated from UAV, pole and terrestrial photography. Small scale features (0.05 to 0.5m) are acquired using macro photographic methods.

Multi-resolutional (gigapixel) photography depicts outcrop features at both small and large scales within a single image. These large pixel count images can be generated by stitching hundreds of conventional photographs acquired using a robotic panorama camera head. Multi-resolutional images can also be generated as orthoimagery using photogrammetric methods.

High resolution, full spherical panoramas are generated using a tripod, panorama head and a camera with a fisheye lense. These images, when viewed in 3D imaging software, enable a seamless, zoomable, 360 degree view of a locality from a single viewpoint. Multiple full spherical panoramas can be linked together, with other visualisations and additional data, to generate walk-through tours of geological sites.

All AusGeol visualisations have coordinates and associated geological attributes that encode stratigraphic, lithological, age and mineralogical characteristics. The AusGeol.org site delivers visualisations via either a web mapping platform, that provides a spatial view of the distribution of visualisations, or through a list option with objects displayed based on metadata search criteria. The AusGeol site does not currently support on-line display of visualisations. All products are provided free

as downloadable files for display using local hardware and software. The AusGeol site also provides open-access software for annotation and geometric analysis of 3D virtual models.

The AusGeol project provides new educational resources for tertiary Earth science education that complement conventional field based geoscience education programs. It also provides a collaborative model for potential future development of a global database of virtual geological objects for education, research and public outreach.