

## **Digital Field Mapping to 3D Model—A Case Study Example from Arthur’s Seat, Scotland**

Peter Rourke, Stuart Smith, Jennifer Ellis, Christian Seiler\*, and Alan Vaughan

Midland Valley Exploration, 2 West Regent Street, Glasgow G2 1RW, United Kingdom

\*E-mail, christian@mve.com

The current generation of geoscientists is well versed in digital technologies and techniques. Over 90% of geoscience students own a smartphone or a tablet device (survey by Midland Valley). These devices have reached a stage of portability and processing power that allows for large amounts of geological data to be collected and stored digitally, quickly and easily. Using digital devices for data collection in the field has many benefits, including easy access to existing data and a multitude of georeferenced base maps, efficient navigation and positioning, and rapid collection of geological data. Digitally collected data can be immediately displayed and queried in the field, and avoids time-consuming and error-prone transcription of paper-based data. The enhanced data availability and the possibility of data sharing can be used to update geological models in real time, allowing more interactive and efficient collaboration between data collection and model building.

In an idealised workflow, a geologist – or a team of geologists – will collect a large amount of field data and be able to process and analyse this while remaining in the field. This allows for a more efficient approach to field work: real-time model building can be used to validate field data, highlight problem areas that need further investigation, and guide further field work, resulting in more statistically reliable 2D and 3D models. This information can be shared widely between the field work team and with geomodellers off site. This talk aims to give an overview of the advantages of using digital techniques for data collection and highlight the benefit when this data is used to create 3D models based on a case study using Midland Valley’s Move™ software suite and its digital mapping app FieldMove Clino.

As part of the Tectonic Studies Group Annual General Meeting 2015, geoscientists from Midland Valley worked with fellow geoscientists from a range of academic and commercial institutions as part of a field trip to the Carboniferous volcanic complex known as Arthur's Seat in Edinburgh, Scotland. The aim of the course was to discuss and promote best practices for digital data collection using FieldMove Clino and developing a workflow for rapid integration into a 3D model. A large volume of data was collected from a number of localities highlighting a range of lithologies and structures. This data was analysed in the field throughout the day to better understand the tectonic setting. The data was then collated and used as the basis for 3D model construction in Move™. With the addition of a DEM and current and historic satellite imagery and mapping as well as a sound understanding of the regional tectonostratigraphic framework the attendees were able to use the constrained model building techniques available within the Move software to build a 3D model. Subsequently, a basic and an advanced model have been made publically available as part of Midland Valley's Academic Software Initiative to highlight the workflow from digital data collection to 2D and 3D model building and the type of models that can be produced using this workflow.