Data field mapping tools for exploration – the future is here

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The approach to field data collection that a mining or exploration geologist takes has remained largely unchanged over the past century - using printed base maps or mine level plans at set scale and annotating them with rock observations and measurement results. These methods are advantageous in their familiarity, low cost, and applicability to a variety of field environments. However, digital methods for geological data collection and mapping are reaching maturity as computer hardware and software components become more advanced. Nevertheless, how do these new techniques and platforms measure up to traditional data collection and mapping techniques? How do they interface with data collection and 3D interpretation? Do they reward the initial investment in hardware, software, and education? We explore these questions by describing student field mapping projects and field mapping for research purposes that have guided the development of FieldMove Clino and FieldMove, digital geologic data collection and mapping software applications.

As with all data collection methodologies, advance preparation is key. Although base and geological maps may be digital, with or without elevation models, the most important aspect of preparation is learning to use the tools. Whether digital or analogue, the basic principles are the same, and practice in advance ensures that the means of mapping doesn’t distract the user. This allows them to take advantage of new functionality such as 3D spatial analysis of rock units.

We find that digital mapping tools speed data collection and improve the 3D spatial interpretation process. They facilitate more analysis and less data management than traditional techniques, especially in the “field office” during the evenings. With traditional paper mapping techniques, valuable interpretation time is sacrificed in data organization, transcription from paper to digital formats, and backup of collected field data, both during and after completion of the exploration programme. Data organization and transcription efforts may need to be duplicated when converting paper maps and field notes to digital formats, compounding inefficiencies and increasing the possibility of transcription errors. With digital mapping, data organization is introduced seamlessly into the workflow at data collection stage in the field. This removes the need for transcription from paper to digital format, and makes data backup as simple as copying digital files to external drives. Digital mapping makes cost effective use of highly trained staff by giving them more time for problem solving, targeting of areas of uncertainty, and the interactive nature of digital data helps them formulate more effective exploration programmes. The case is now compelling to make the collection of mining and exploration data fully digital.