

The Digital Mapping Revolution: How to get the best out of data capture in the field

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Introduction

Geological (Structural) mapping and data collection in the field form fundamental components of any effective exploration programme, regardless of commodity, mineralisation style or geological setting. The early adoption of effective mapping and field data collection strategies, from regional/prospect scale to focused 3D mapping/sampling of mineralisation targets, not only improves the chances of exploration success, but provides the basis upon which exploration strategies can be developed in a cost-effective manner.

Whereas the fundamental concepts of geological and structural mapping and sampling have not dramatically changed over the years, the technologies available to the field geologist to conduct mapping and sampling have. Recent advances in portable mapping devices and GIS software for the first time allow the development of paperless workflows that allow effortless capture, integration and interpretation of data in the field, and seamless integration of the field data in centralised exploration databases. We present three specific studies that have successfully implemented paperless workflows.

Field sampling

The use of a customised ArcGIS™ – ArcPAD™ workflow has been effectively implemented in a detailed mapping/sampling exercise of sulphides on a waste dumps as part of Mine Closure planning. The mapping data and photographs were collected in the field using a customised data collection procedure on a handheld mapping device running ArcPAD™, and uploaded every evening on a secure ArcGIS™ web server for inspection by team members based on site and in the head office. This allowed the daily adjustment of the sampling and mapping programme based on the on-going interpretation of field data by the entire team.

Structural mapping

In structural mapping, a customised paperless mapping workflow has been developed, which allows the capture of point, line and polygon data in the field, as well as recording the geological and structural data in project-specific database templates with built-in validation rules to prevent erroneous data entry. The use of portable mapping devices, as opposed to standard GPS, also opens up the possibility to have all relevant base data and desktop interpretation available in the field for validation. The data of multiple mapping teams is managed by check-in and check-out procedures that allow disconnected editing and daily reintegration of the field data at a click of a button. This ensures that mapping teams have updated field maps on a daily basis.

Trench- and drillhole logging

The ArcGIS™ geodatabase concept has also been used successfully in logging of trenches and of drill core. A customised database was set up including drop-down lists with logging codes and appropriate validation rules, and import-export procedures developed to merge the validated data into a master drill-hole database. The disconnected editing and check-in – check-out procedures again allow the simultaneous logging of data by several teams, and seamless integration of all data in the master database at the push of a button.

Conclusion

Recent case studies have started to successfully implement paperless mapping and sampling technologies that not only improve the quality of the work done in the field, but dramatically optimise exploration activities. Optimised paperless (digital) workflows have become a viable alternative to the traditional techniques that field geologists normally rely on for data capture and interpretation in the field. New technologies that combine the GPS and notebook into one handy digital device are emerging at a rapid rate, with simple data capture already available on tablets and smartphones. Full, customised data capture, for now, remains only possible in powerful handheld digital devices running specialised software. However, at the current rate of development, the modern geologist will soon have affordable portable digital solutions at hand to assist in the data capture and mapping in the field.