How data quality can be used to improve block models and day-to-day decisions in the mining industry

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The mining industry – especially exploration – thrives on the mechanisms of Quality Assurance and Quality Control (QAQC). In other words, reliability in good practices and technical reports. Although standards, blanks, and duplicates try to assure grades and control uncertainty and variability, a productive and lucrative mine isn't made of just that. From the prospect phase to the opening of a mine, hundreds to thousands of people are involved in a myriad of activities. No matter what role each person plays, they are all doing the same thing: gathering, processing and interpreting data; And it all ends up turning into bytes at the end of the day.

Based on the Mathematical Theory of Communication and related research, William Delone and Ephraim McLean published in 1992 a paper that proposed a framework for Information Systems. They proposed a six-dimension model (System Quality; Information Quality; Use; User Satisfaction; Individual Impact; Organization Impact) that tried to outline the input, flow, and output of data and information within an organization. For each dimension there are multiple parameters that can be evaluated to assess data quality, such as Accuracy, Completeness, Consistency, Usability, Clarity, Uniqueness, among others. If we try and see a mining operation as an Information System, one can improve good practices far beyond the "regular" QAQC, long before standards, blanks, duplicates, and technical reports were necessary.

Before becoming a mine, a project usually changes hands as drilling scales up in both cost and opportunity. This implies different types of data that are collected, different technical procedures, presence of digital and analogic data of different kinds, and different day-to-day software that is used. This results in all sorts of messy, low-standardized, low-quality, and low-confidence databases.

By applying data quality theory on mining databases, we can calculate which area is more sensitive and allocate subsidies more efficiently, a problem that otherwise is not highlighted by other types of assessment, such as a variogram. In this work, based on real cases, we present a hypothetical example of how data quality can be applied to improve decision making in a gold mine, and how looking only to spatial variability and dependency can be a menace to decisions reliability.