



Challenges in coupled on-line-on-mine-real time mineralogical and chemical analyses on drill cores

Cédric Duée, Nicolas Maubec, Xavier Bourrat, Yassine El Mendili, Stéphanie Gascoin, Daniel Chateigner, Beate Orberger, Monique Le Guen, Anne Salaün, Céline Rodriguez, et al.

► To cite this version:

Cédric Duée, Nicolas Maubec, Xavier Bourrat, Yassine El Mendili, Stéphanie Gascoin, et al.. Challenges in coupled on-line-on-mine-real time mineralogical and chemical analyses on drill cores. Real Time Mining Conference, Oct 2017, Amsterdam, Netherlands. hal-01600090

HAL Id: hal-01600090

<https://brgm.hal.science/hal-01600090>

Submitted on 2 Oct 2017

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Challenges in coupled on-line-on-mine-real time mineralogical and chemical analyses on drill cores

Cédric Duée¹, Nicolas Maubec¹, Xavier Bourrat¹, Yassine El Mendili², Stéphanie Gascoin², Daniel Chateigner², Beate Orberger³⁻⁴, Monique Le Guen³, Anne Salaün³, Céline Rodriguez³, Valérie Laperche¹, Laure Capar¹, Anne Bourguignon¹, Fons Eijkelkamp⁵, Mohamed Kadar³, Fabien Trotet³

¹BRGM, 3 Avenue Claude Guillemin, BP 36009, 45060 Orléans Cedex 2, France

²Normandie University, CRISMAT-ENSICAEN, UMR CNRS 6508, Université de Caen Normandie, 14050 Caen, France

³ERAMET-ER-SLN : 1 avenue Albert Einstein, 78190 Trappes, France

⁴GEOPS-Université Paris Sud, Bâtiment 504, 91405 Orsay, France

⁵Royal Eijkelkamp, Uitmaat 8, 6987 ER Giesbeek, The Netherlands

Corresponding author: c.duee@brgm.fr

The SOLSA project aims to develop an innovative on-line-on-mine-real-time expert system, combining sonic drilling, mineralogical and chemical characterization and data treatment. Ideally, this combination, highly demanded by mining and metallurgical companies, will speed up exploration, mining and processing.

In order to evaluate the instrumental parameters for the SOLSA expert system, portable and laboratory analyses have been performed on four samples with contrasting lithologies: siliceous breccia, serpentized harzburgite, sandstone and granite. More precisely, we evaluated the influence of the surface state of the sample on the signals obtained by portable X-Ray Fluorescence (pXRF) for chemistry and portable Infra-Red spectroscopy (pIR) for mineralogy. In addition, laboratory Raman spectroscopy, X-Ray Diffraction (XRD), XRF and ICP-OES laboratory analyses were performed to compare surface bulk mineralogical and chemical analyses.

This presentation highlights (1) the importance of coupling chemical and mineralogical analytical technologies to obtain most complete information on samples, (2) the effect of the sample surface state on the XRF and IR signals from portable instruments. The last point is crucial for combined instrumental on-line sensor design and the calibration of the different instruments, especially in the case of pXRF.