

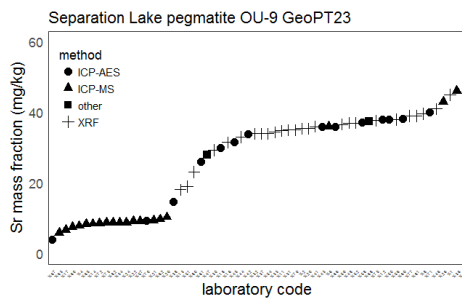
## Is geochemical data fit for the purpose?

T. MEISEL<sup>1</sup> AND P.C. WEBB<sup>2</sup>

<sup>1</sup>Montanuniversität, 8700 Leoben, Austria,  
thomas.meisel@unileoben.ac.at

<sup>2</sup>The Open University, Milton Keynes, UK

Unlike many other fields of research, earth scientists can look back to a long tradition of chemical analysis starting in the late 18<sup>th</sup> century. Analytical geochemists have been involved in sixty-five years of interlaboratory comparisons and twenty-two years of proficiency testing involving geological materials (GeoPT scheme of the International Association of Geoanalysts IAG). In addition a whole range of certified and uncertified matrix-matched reference materials (RM) have been available since the 1950s. But has the quality of reported results improved through the knowledge acquired in analytical geochemistry and with the availability of modern analytical instruments over the last few decades? Is data produced in geochemical laboratories today fit for the purpose?



An interesting story is the difference between ICP-MS and XRF data for an 2.6 Ga old Rb-rich and Sr-poor pegmatite. In this case most of the ICP-MS results are wrong as the radiogenic contribution of <sup>87</sup>Sr was not taken into account.

Also some data from proficiency tests show a rather disconcerting picture. For example Cr mass fraction results on RM HARZ01 (GeoPT38A) range from 37 to 4505 mg/kg with a mode value of 2990 mg/kg. The range of values is even larger for REE. For example Yb mass fractions range from 0.007 to 40 mg/kg with a mode of 0.014 mg/kg.

Interestingly enough, the GeoReM database reveals that 7 of the top 10 most frequently requested RM are basalts and the top 2 are glasses. This may indicate a mismatch between the compositions of the RM used for calibration and method validation and the actual samples analysed. Knowledge of appropriate preparation techniques and measurement procedures combined with use of suitable matrix-matched RMs has not kept up with the rapid increase in geochemical data produced.