



Contribution ID: 330

Type: oral

## Improvement of Bulk Analysis of Environmental Samples by Using a Multiple Collector ICP-MS

*Wednesday, 22 October 2014 15:10 (20 minutes)*

The CEA is a member of the NWAL since 2001 for both bulk and particles analysis of environmental samples. Bulk analysis consists in the measurement of U and Pu isotopes in environmental samples (generally cotton 'swipe' samples). Most of the samples received by our laboratory contain extremely low amount of U (below 1 µg) and Pu (below 1 ng). Until recently U isotopic measurements were performed using a quadrupole ICP-MS (X-series II, ThermoScientific), and Pu isotopes were measured by means of a single-collector sector-field ICP-MS (Element XR, ThermoScientific). The latter is equipped with various devices which enhance its sensitivity. Although these instruments are very sensitive and have very low detection limits, in the femtogram range for Pu, reproducibility for isotopic ratio measurement is limited as all isotopes are measured sequentially with the single detector available. For instance, relative standard deviation for  $^{235}\text{U}/^{238}\text{U}$  ratio measurements is at best of 0.5%.

A multiple-collector ICP-MS (Neptune Plus, ThermoFisher), equipped with a large array of Faraday cups and ion counters, has been purchased and is now installed in the laboratory. Performance of this new instrument, in terms of accuracy, reproducibility, and detection limits, both for U and Pu measurements, will be compared to the ones obtained with the other instruments.

### Country or International Organization

France

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**Session Classification:** Technology Foresight and Emerging Technologies I