

'EARTH, ARGON, FIRE AND WATER'
**– THE APPLICATION OF INDUCTIVELY COUPLED PLASMA MASS SPECTROMETRY
AND ISOTOPE RATIO MASS SPECTROMETRY TO ENVIRONMENTAL INVESTIGATIONS**

G. STEWART WALKER

Environmental Investigations Section, Chemistry Centre West Australia, Perth WA 6004

This paper will present methods and results from the application of Inductively Coupled Plasma Mass Spectrometers and Isotope Ratio Mass Spectrometers to a variety of environmental investigations. These investigations range from ultra low levels of detection required for determining the history of anthropogenic pollution in the Great Barrier Reef to high levels for assessing water at mining sites and range from large numbers of large volumes samples required for long term environmental monitoring to unique samples required for forensic evidence.

A **Varian UltraMass ICPMS** in the Advanced Analytical Centre of James Cook University, Townsville, Queensland, a **Fisons PlasmaQuad II** in the Chemistry Centre West Australia, Perth, **VG SIRA 9, 10** and a **TracerMAT CN-IRMS** in the Scottish Universities Reactor and Research Centre, East Kilbride and a **Europa 20/20 S-IRMS** at Scottish Crop Research Institute, Nr Dundee, Scotland have been used to analyze concentrations and isotopic abundance of a variety of metals and carbon, sulphur, oxygen, hydrogen and nitrogen stable isotopes.

Samples analyzed include sediment, coral and soil; seaweeds, plants and sea cucumbers; freshwater, seawater and brine; mine settling ponds, industrial waters and drinking waters; hair, urine and various body-parts. Three concerns with such a varied selection of samples are effective sample preparation (getting the sample into the Mass Spectrometer in the first place), problems of matrix effects and interferences (determining 'true' results) and interpreting the results. These will be discussed with examples.