



Development of a multi-platform in situ analyzer for dissolved iron and manganese

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The sensors development group at the Southampton Oceanography Centre have been developing in situ analysers for both dissolved iron and manganese. The research group formed in 1999 includes chemists, engineers and oceanographers. The aim was to develop a family of in situ instruments capable of full ocean depth deployment, with environmentally relevant detection limits. The instruments have been designed for use on a number of platforms, including, but not limited to, bouys, AUV's, ROV's and CTD's.

The first instrument was developed to study dissolved manganese distribution in a seasonally anoxic Scottish Loch system and was successfully deployed on the SOC AUV, *Autosub* in 2001. During an 8-day sampling program, over 30,000 data points were collected. The veracity of the data was confirmed with independently collected samples analysed using traditional methods. The data highlight a high level of complexity in the distribution of dissolved manganese, which is missed using the more traditional sampling techniques.

This early instrument was only rated for shallow water environments and the detection limits were in the range of 20-30 nM dissolved manganese. The next stage of the programme was the development of a more robust deep water system, with lower detection limits and the potential to determine both manganese and iron. The system has been successfully deployed in the Lau basin and along the Mid-Atlantic ridge to locate active hydrothermal vent systems. The analysers are able to determine both dissolved iron and manganese with detection limits on the order of 5 nM. The systems were deployed on CTD's, the Wood Hole Oceanographic Institution AUV ABE and the SOC TOBI system.