
**Documentation of file RADIOISO.XLS**

**15. New Production by 15N and Export Production by 234Th**
Marita Wunsch (SFB), (Wolfgang Koeve, SFB), Frank Dehairs (VUB), (Leo Goeyens, VUB), Michiel van der Loeff (AWI)

**Export Production by 234Th, including 210Po and 210Pb**
Michiel Rutgers van der Loeff, Heike Höltzen, Jana Friedrich
{S, 234Th.diss, 234Th.part, 234/238.diss, 234/238.part, 234/238.removed, Si, NO2, NO3, PO4}
RADIOISO.XLS
(Michiel Rutgers van der Loeff, Heike Höltzen, Jana Friedrich)

Samples were taken with 270-l Gerard bottles. On shallow casts samples were collected at 6 depths, usually 20m, 60m, 100m, 200m, 400m and 600m. Some samples from deep casts had to be discarded because silicate analyses, compared with the silicate profile obtained from CTD-Rosette casts, indicated leakage during retrieval due to insufficient closure of the covers. The water was pumped by a centrifugal pump through a 142mm 1µ nuclepore filter. Filtered volume was measured with a KENT flow meter. A 20-kg aliquot of filtrate was weighed, acidified with 20 ml of HNO₃, and spiked with ²³⁰Th, ²⁰⁸Po and stable Pb yield tracers. 250 mg of Fe was added, and after 1 day isotope equilibration, NH₃ was added to a pH of 8.5, thus coprecipitating Th, Po and Pb with Fe(OH)₃. The hydroxide was collected by settling and centrifugation, and dissolved in a minimum amount of 9M HCl. After complexing Fe with ascorbic acid, Po was plated on silver planchets according to Fleer and Bacon (1984) based on the procedure of FLYNN (1968). After evaporation with some HNO₃ to decompose the ascorbic acid, Th was isolated by ion exchange and electroplated according to Anderson and Fleer (1982). ²³⁴Th was counted by anticoincidence low-level beta counting (background 0.15 dpm) on-board ship, whereas the ²³⁰Th and Po was counted in the home laboratory.

The filter samples were decomposed by microwave acid digestion in a mixture of 10 ml HNO₃, 0.5 ml HF and 2 ml H₂O₂. Organic residues were destroyed by adding 2 ml HClO₄ after spiking with ²³⁰Th, ²⁰⁸Po and stable Pb yield tracers. Radionuclide analysis of the filter samples was performed following the same procedures as for the water samples.

²¹⁰Po of water and filter samples was determined through the ingrowth of ²¹⁰Po. The solution remaining after the first Po plating, which still contained the Pb fraction, was stored for about one year to allow new ²¹⁰Po to grow from decay of ²¹⁰Pb. Then Po was extracted again by the method mentioned above. The silver planchets with the Po fraction were measured by alfa counting on silicon surface barrier detectors (EG&G Ortec). ²¹⁰Pb and ²¹⁰Po activities are decay-corrected to the time of sampling according to FLEER & BACON (1984). Error estimates (1-sigma) include counting errors and uncertainties in blanks, spike activities and sample volume.
The $^{226}$Ra activity was calculated from the silica concentration of the water from the relationship of Ku & Lin (1976). Salinity is obtained from corresponding CTD casts, and used to calculate $^{238}$U from the relationship given by Chen et al. (1986).


