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## 15. New Production by 15N and Export Production by 234Th

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## Export Production by $^{234}$Th, including $^{210}$Po and $^{210}$Pb

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{S, 234Th.diss, 234Th.part, 234/238.diss, 234/238.part, 234/238.removed, Si, NO2, NO3, PO4}
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(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 $HNO_3$, and spiked with $^{230}$Th, $^{208}$Po and stable Pb yield tracers. 250 mg of Fe was added, and after 1 day isotope equilibration, $NH_3$ 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 $HNO_3$ to decompose the ascorbic acid, Th was isolated by ion exchange and electroplated according to Anderson and Fleer (1982). $^{234}$Th was counted by anticoincidence low-level beta counting (background 0.15 dpm) on-board ship, whereas the $^{230}$Th and Po was counted in the home laboratory.

The filter samples were decomposed by microwave acid digestion in a mixture of 10 ml $HNO_3$, 0,5 ml HF and 2 ml $H_2O_2$. Organic residues were destroyed by adding 2 ml $HClO_4$ after spiking with $^{230}$Th, $^{208}$Po and stable Pb yield tracers. Radionuclide analysis of the filter samples was performed following the same procedures as for the water samples.

$^{210}$Pb of water and filter samples was determined through the ingrowth of $^{210}$Po. The solution remaining after the first Po plating, which still contained the Pb fraction, was stored for about one year to allow new $^{210}$Po to grow from decay of $^{210}$Pb. 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). $^{210}$Pb and $^{210}$Po 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).


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