

## **Pb and Pb isotopes in the South Pacific Subpolar Ocean**

**EDWARD ALLEN BOYLE<sup>1</sup>, NATHAN T. LANNING<sup>1</sup>,  
YERIM KIM<sup>2</sup>, FRANCO MARCANTONIO<sup>2</sup>, JESSICA N.  
FITZSIMMONS<sup>2</sup> AND KRISTIE DICK<sup>2</sup>**

<sup>1</sup>Massachusetts Institute of Technology

<sup>2</sup>Texas A&M University

Presenting Author: [eaboyle@mit.edu](mailto:eaboyle@mit.edu)

We have measured Pb concentrations and Pb isotope ratios for a section from 20°S to 55°S in the South Pacific Ocean along 160°W to 140°W. Surface water Pb206/Pb207 decreases from >1.17 at 20°S to <1.16 at 55°S. At 20°S, Pb206/Pb207 decreases to a minimum of 1.153 at ~600m, showing a strong contribution of Australian-type Pb in the core of the SubAntarctic Mode Water (SAMW). Proceeding southwards, this Australian-type Pb minimum deepens to include AntArctic Intermediate Water (AAIW) with Pb206/Pb207 = 1.156 at the AAIW salinity minimum at 55°S. Below the SAMW and AAIW, Pb206/Pb207 increases to 1.17-1.19, with the higher value closer to crustal Pb isotope ratios rather than anthropogenic Australian Pb. There are two possibilities accounting for the Australian-type Pb in the water masses originating in the subantarctic. Atmospheric circulation shows a persistent transport of air from the western Australian continent to the subantarctic Pacific; it is possible that the Australian-type Pb is transported by the atmosphere and deposited in the subantarctic ocean surface before sinking with the SAMW and AAIW water masses. Alternatively, Australian-type Pb is seen in the Indian Ocean down to at least 40°S in the Indian Ocean, and it is possible that the South Pacific subantarctic Pb is simply transported from the Indian Ocean into the Pacific by the Circumpolar Current (although it may be equally possible that the southern Indian Ocean Pb derives from subantarctic Pacific waters transported into the Indian Ocean by the Circumpolar Current). We will examine other types of evidence to see if these possibilities can be resolved.