

PROGRESS REPORT FOR AINGRA09094

PROJECT TITLE	Bound for Botany Bay: archival and sedimentological records of Australia at the point of European contact	
INVESTIGATOR(S)	Institution and Department	
Chief Investigator	Dr Stephen Gale	Geosciences, The University of Sydney
Other Investigators	Atun Zawadski, Institute for Environmental Research	
Students		
ANSTO Investigators	Atun Zawadski	
Specialist Committee	E	

SCIENTIFIC OBJECTIVES

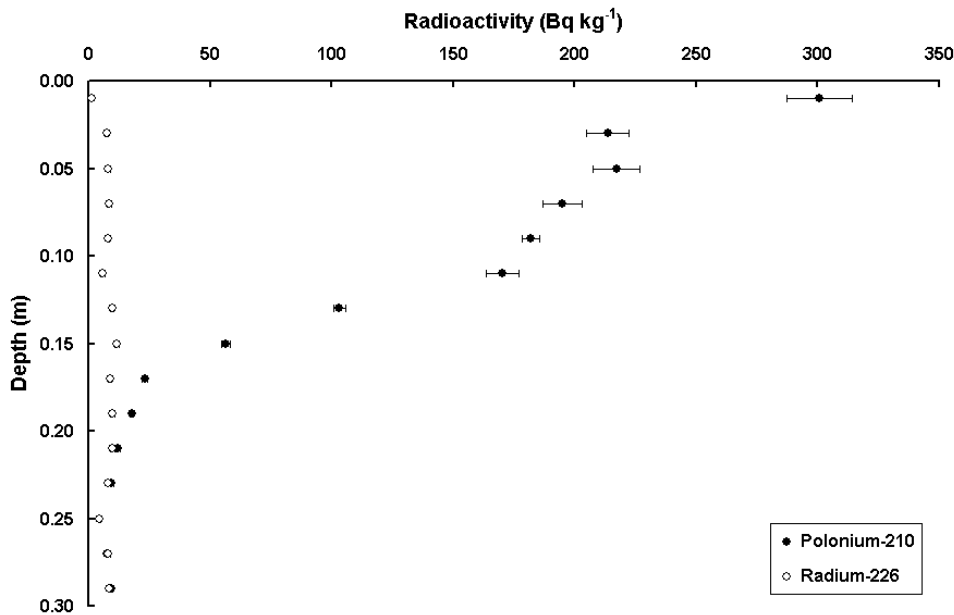
This project seeks to establish sedimentological records of the nature of and human interactions with the Australian biophysical environment at the instant of European contact, and to compare these with evidence derived from the archival record. It aims to answer questions regarding the partial nature of each data source, their reliability as a record of the environment, the extent to which they mesh and the extent to which they differ.

PROGRESS REPORT and RESEARCH OUTCOMES

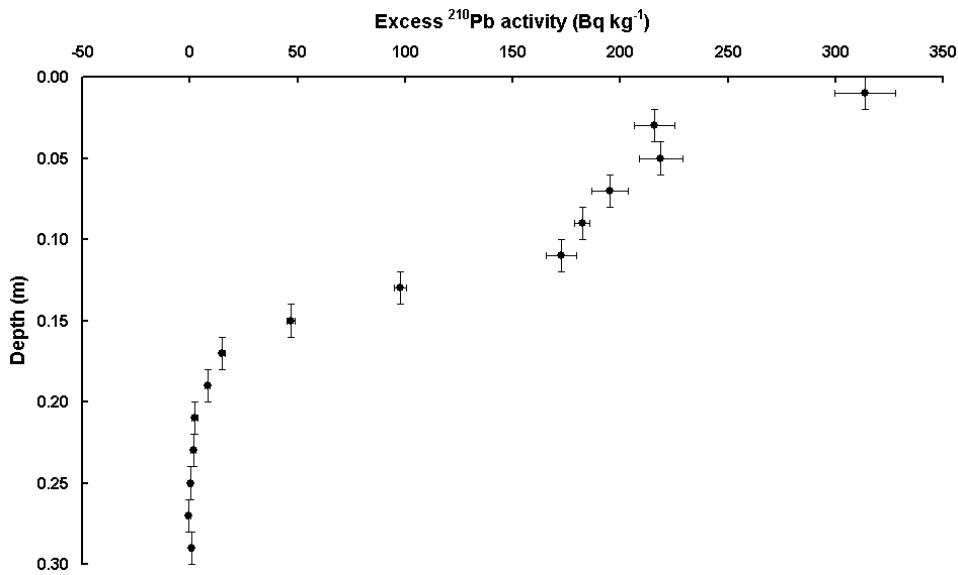
Radium-226 and ^{210}Po activities were determined for the upper 0.30 m of the sequence preserved in core D4, the master core recovered from Blue Hole Swamp on Kurnell Peninsula adjacent to Botany Bay. The calculated $^{210}\text{Pb}_{\text{excess}}$ activities declined to zero at the base of the profile, allowing the use of the Constant Rate of Supply (CRS) model to determine chronologies. In total, eight chronologies were modelled. Three event markers in the sequence were employed to test these chronologies: the mid-18th century magnetic inclination maximum, the 1932 tetraethyl lead marker and the 1945 date determined by Mooney *et al.* (2001) for the first appearance of *Pinus* pollen in local coastal lake basins. The CRS3 model offered the best fit with the independent chronologies and this was used to place the palaeoenvironmental records from the site in a reliable chronological framework. An additional check on the modelling comes from the calculated flux of $^{210}\text{Pb}_{\text{excess}}$ at the site. This lies firmly within the range of measurements of modern flux in Sydney.

Mooney, S.D., Radford, K.L. and Hancock, G.J. 2001. Clues to the 'burning question': pre-European fire in the Sydney coastal region from sedimentary charcoal and palynology. *Ecological Management & Restoration* 2, 203–212.

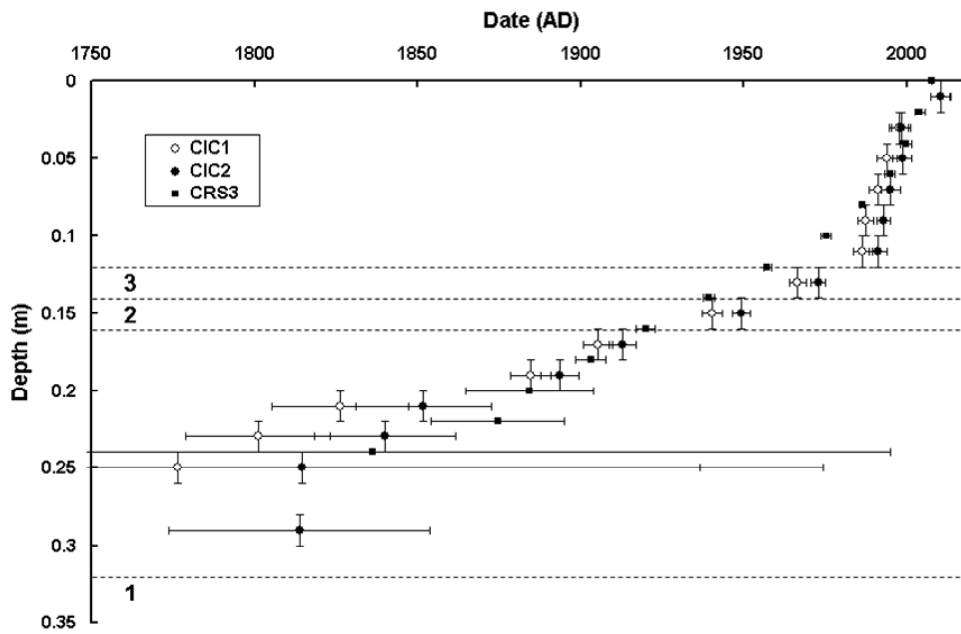
DATA



Polonium-210 and ^{226}Ra activity as a function of depth in core D4, Blue Hole Swamp, Kurnell Peninsula, Sydney, New South Wales.



Excess ^{210}Pb activity as a function of depth in core D4, Blue Hole Swamp, Kurnell Peninsula, Sydney, New South Wales.



Alternative ^{210}Pb chronologies, core D4, Blue Hole Swamp, Kurnell Peninsula, Sydney, New South Wales. The numbers represent date event markers that may be used to calibrate the chronologies. 1 = the 18th century magnetic inclination anomaly, 2 = the mid-20th century lead pollution marker, 3 = the appearance of *Pinus* pollen in the sedimentary record.

PUBLICATIONS / REPORTS arising as a result of your work.

PhD STUDENTS