

Patterns of ^{210}Pb and ^{137}Cs accumulation in sediments on Australian/PNG coastal shelves of high and low continental sediment supply

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An overview of patterns of accumulation of ^{210}Pb (excess) and ^{137}Cs in continental shelf sediments of NE Queensland, the NW Shelf of Australia, and the Gulf of Papua is given. Atmospheric supply of these sedimentation tracer nuclides for NE Queensland is approximately $50 \text{ Bq } ^{210}\text{Pb} \cdot \text{m}^{-2} \cdot \text{yr}^{-1}$ and a 1950-1990 inventory of $400 \text{ Bq } ^{137}\text{Cs} \text{ m}^{-2}$, based upon terrestrial soil profiles and rain collections. These supply rates are much lower than in the northern hemisphere, and special efforts are required to use these sediment tracers in sedimentation models derived from high supply regions. The scavenging of these nuclides in coastal seas, and delivery to the sediment inventory, is probably a function of terrestrial sediment supply by rivers. River sediment plumes and resuspended fine sediments remove these atmospherically derived nuclides from the water column rapidly, whereas clear offshore waters that have low supply rates of fine particles deliver much smaller inventories of these nuclides to sediments. On the NW Shelf of Australia, river inflow is very small, and continental shelf sediment cores have low inventories of ^{210}Pb and ^{137}Cs . On the north Queensland continental shelf, small fluxes of water and terrestrial sediment are delivered to the inner shelf of the lagoon of the Great Barrier Reef. These river sediment inputs trap these tracer nuclides in fine riverine sediments of coastal estuaries, mangrove mud aprons, and shallow wind-protected embayments of the inner shelf, and we frequently find inven-

tories of both tracers 2-10 times greater than atmospheric supply rates. In the Gulf of Papua, where globally significant inputs of river water, solutes, and fine sediment are injected into the South Pacific Ocean, large fluxes (2-20 times atmospheric supply rates) of excess ^{210}Pb were found in the fine riverine sediments of the inner shelf and at the base of the continental slope. This region is a good example of an estuarine trap for particle reactive tracers, and exhibits ocean margin scavenging of continental slope-advected oceanic water from the Coral Sea and South Pacific Ocean.