

***In-situ* heavy metal orthophosphate fixation at Casey Station, Antarctica**

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Landfills contain complex mixtures of metals that can present a significant environmental risk if allowed to leach off-site. If the metals can be transformed into insoluble or sparingly soluble forms, then their environmental risk will be reduced. Chemical fixation using orthophosphate has routinely been used in temperate environments, as many metal-orthophosphate salts are insoluble. However, little is known about the formation and stability of metal phosphate phases at low temperatures and during freeze-thaw cycling.

Thala Valley landfill is the Old Casey Station, Antarctica, waste disposal site and was in operation between 1965 and 1986. Station waste included both domestic and construction waste. It has been observed that the landfill is leaching metals into the once pristine marine environment in Brown Bay. This is of great concern as the Antarctic environment is especially vulnerable due to its sensitive biota and short growing season. Therefore, our main research goal is to find out whether or not orthophosphate fixation can work in this cold environment.

In December 2008 an *in-situ* experiment was established at Casey Station using material from Thala Valley landfill mixed with different ratios of triple superphosphate and phosphate rock. The experiment was monitored and sampled during December 2008, January 2009 and January 2010, having undergone over a year of natural freeze-thaw cycling at Casey Station.