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Investigating the Iodine-129 levels of Seawater and Coral Core in the West Philippine Sea

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Iodine-129 is a long-lived radionuclide introduced into the environment through human nuclear activities (HNAs) such as nuclear accidents, nuclear fuel reprocessing, and nuclear weapons testing. It is considered an excellent oceanographic proxy and tracer of HNA-derived radionuclide due to its biophilic nature, conservative behavior, and sufficiently long residence times in the ocean.

Here, we present data from 119 seawater samples from all over the Philippines and one coral core from the WPS analyzed for I-127 and I-129 concentrations and ratios using inductively coupled plasma mass spectrometry (ICP-MS) and accelerated mass spectrometry (AMS) to provide a more extensive spatial and geographical picture of the I-129 levels in the WPS.

Results show that $^{129}\text{I}/^{127}\text{I}$ ratios of WPS seawater samples occur at around 3.22 to 5.87×10^{-11} , roughly 49-72% greater than those from other parts of the Philippines. Moreover, findings suggest that the elevated levels previously detected in corals and seawater have been sustained until now and are isolated only in the WPS. Notably, the calculated I-129 concentration in both seawater and coral samples are 1-2 magnitudes higher than the pre-nuclear level in the ocean, which indicate that the source of elevation in the study area is anthropogenic likely coming local sources around the region.

We expect our current work to provide updated information on ^{129}I concentrations in the WPS, which is crucial for understanding potential health risks, threats to the marine environment, and nuclear safety and security. Data generated from this study can serve as a basis for policy makers in crafting recommendations aimed to mitigate risks associated with radioactive materials in the marine environment.

Student Submission

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