**Increasing iodine-129 concentrations in the West Philippine Sea**

**Angel T. Bautista VII,1,\* Rachelle Clien G. Reyes1, Remjohn Aron Magtaas1, Mary Margareth T. Bauyon1, Sophia Jobien M. Limlingan1, Jeff Darren G. Valdez1, Angela M. De Guzman1, Eliza B. Enriquez1, Anne Drew V. Carrillo, Mary Rose P. Gabuyo, Jeffrey C. Munar2, Edwin E. Dumalagan Jr.2, Caroline Marie B. Jaraula2, Fernando P. Siringan2, Haruka Kusuno3, Miwako Toya3, Hiroyuki Matsuzaki3**

*1Department of Science and Technology – Philippine Nuclear Research Institute, Quezon City, Philippines*

*2Marine Science Institute (UP-MSI), University of the Philippines, Diliman, Quezon City, Philippines*

*3Micro Analysis Laboratory Tandem Accelerator (MALT), The University of Tokyo, Tokyo, Japan*

\**e-mail: atbautistavii@pnri.dost.gov.ph corresponding/presenting author*

Iodine-129 (129I) is a radioactive isotope with a long half-life, introduced into the environment due to human nuclear activities, such as nuclear weapons testing, nuclear fuel reprocessing, and nuclear accidents. It serves as a useful indicator of nuclear activity impacts, an environmental tracer, and a marker of the Anthropocene epoch. Earlier research involving corals suggested heightened levels of 129I in the West Philippine Sea (WPS) and the broader East and South China Sea regions, but the origin of this radioisotope remained unclear. This study presents 129I concentration measurements taken from 119 surface seawater samples across various Philippine seas and compares them with existing data from the Yellow, East, and South China Sea to identify the possible source of the increasing 129I concentrations in the WPS. Results show that 129I concentrations in the WPS, averaging 10.8 x 106 atoms/kg of seawater and ranging from 6.54 to 14.8, are significantly higher, particularly 1.5 to 1.7 times greater (P < 0.0001) than in other areas of the country. The primary source of this increasing 129I concentration appears to be located around the Bohai and Yellow Seas. One possibility is that 129I from European nuclear fuel reprocessing facilities and historical nuclear weapons testing at Lop Nor and Semipalatinsk is deposited on soils in northeastern China. Rivers then carry these radioactive materials, drain into the Bohai and Yellow seas, and are eventually transported to the WPS through prevailing ocean currents (Fig. 1). Moreover, analysis of a new coral core from the WPS indicates a continuous upward trend in 129I/127I ratios of about 1 x 10-12 per year from 1971 to 2020, indicating that 129I input into the WPS continues to the present. This study underscores the importance of developing policies to tackle transboundary radioactive contamination and highlights the valuable application of 129I as a tracer for understanding the complex ocean circulation patterns in the South China Sea region.

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**Figure 1**. Map of 129I/127I (x 10-12) ratios of surface seawater with major ocean currents (Subei Coastal Current or SBCC and Zhejiang-Fujian Coastal Current or ZFCC) possibly transporting seawater with high 129I/127I ratios to the WPS and the across the regionThis study, 1–4.

**References**

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