Long-Term Distribution of ¹³⁷Cs in Seawater around the Korean Peninsula: Assessing the Impact of the Fukushima Nuclear Accident

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The Fukushima Daiichi nuclear disaster in March 2011 resulted in the release of significant amounts of radioactive substances, including Cesium-137 (¹³⁷Cs), into the environment. This event marked a major environmental concern, particularly in the Pacific Ocean, as radioactive materials spread across vast distances through ocean currents. One of the regions potentially affected by this contamination is the seawater surrounding the Korean Peninsula, which is influenced by major ocean currents, such as the Kuroshio Current and the Tsushima Current. Given the proximity of the Peninsula to the site of the accident and the dynamic marine environment, understanding the behavior of ¹³⁷Cs in this region is crucial for assessing its long-term environmental and ecological impacts.

The primary objective of this study is to explore the distribution characteristics of ¹³⁷Cs in the seawater around the Korean Peninsula over a decade since the Fukushima disaster. The study focuses on both surface seawater and depth profiles to understand the spatial and temporal variability in concentrations of this radioactive isotope. By evaluating the movement, dilution, and potential accumulation of ¹³⁷Cs within different water masses, this research aims to contribute valuable insights into the environmental consequences of the Fukushima accident on the marine ecosystem in the Korean coastal waters.

The distribution of ¹³⁷Cs in the seawater is influenced by various factors, including ocean currents, mixing processes, sedimentation, and biological activity. Moreover, understanding the time-series behavior of ¹³⁷Cs in these seawaters is important not only for environmental monitoring but also for assessing potential risks to marine life and the fishing industry, which are integral to the local economy. While global studies on the fate of Fukushima-derived radionuclides have been conducted, there remains a need for detailed, region-specific studies to provide accurate assessments of the situation.

The results of this investigation will enhance the understanding of the long-term behavior of Fukushima-derived radionuclides in the region and provide a foundation for future environmental monitoring efforts. Through collaboration with international bodies and the continuous monitoring of radioactivity levels in the marine environment, the findings of this study will support ongoing efforts to ensure the safety of marine ecosystems and the health of coastal communities.