

D-2 Studies on Movements of Hazardous Chemicals in East-Asian Seas(Final Report)

Contact person Masayuki Kunugi
Senior Researcher
Marine Research Team
Global Environmental Studies Group
National Institute for Environmental Studies
16-2 Onogawa, Tsukuba 305-0053 Japan
Tel: 81-298-50-2434 Fax:81-298-50-2569
E-mail: kunugi@nies.go.jp

Total Budget for FY 1998 – FY 1999 81,246,000Yen (FY 1999: 40,819,000Yen)

Key Words Hazardous chemicals, East-Asian Seas, Spacial distribution, Bioaccumulation, GIS

The objective of this research project is to clarify the seasonal and spatial distribution, chemodynamics, and bioaccumulation of hazardous chemicals in East-Asian Seas. The results of this study are as follows.

1. We developed the continuous extraction sampling system of hazardous chemicals in the seawater for mounting the merchant vessel, and carried out 11 observing cruises in the Inland Sea from Dec., 1998 to March, 2000. HCHs, chlordanes and nonachlores were detected in the seawater and the atmosphere. Consequently, we made it clear that in the Inland Sea, origin of β -HCH was sediment, and α -HCH, γ -HCH, chlordanes, and nonachlores were added to seawater through the air, rainfall and river.
2. The distribution of hazardous chemicals in the seawater, aerosol, and sediments of the East China Sea was studied based on samples taken at Sept.-Oct. 1998 and Oct.-Nov. 1999. Organic halides such as HCH, chlordanes, and nonachlore were detected in seawater and aerosol samples. These results imply that α -HCH and β -HCH were transported mainly by air and river water, respectively, and suggest that the Changjiang discharge is one of the sources of hazardous chemicals in the East China Sea.
3. The sensitivity of GC-ICP-MS system was improved more than 1000 fold by using PTV method and by operating a shield torch at normal plasma conditions. Consequently, occurrence of tributyltin and triphenyltin, below 1 ppt in the East China Sea and the Sea of Japan was clarified. Squid Watch program using *Todarodes pacificus* was found to be a useful biomonitoring method to estimate organochlorine compounds in surface seawater of the open ocean.
4. Food chain structure in the benthic communities were studied in the offshore San-in coast and Yamato Bank, the Sea of Japan. Detritus is important food sources in bottom food chain, and small crustaceans are also play as food organisms. Trophic levels were estimated by means of ^{15}N stable isotope ratios, and were markedly higher in eelpout which fed on fish and crustaceans in San-in region, whereas on Yamato Bank, the large shrimp showed higher values in ^{15}N concentration.
5. Bioaccumulation of chemicals in the offshore sediment through offshore benthic foodweb in Japan Sea was studied. While the concentrations of PCDDs, PCDFs and Co-PCBs in the offshore sediments of Yamato Bank were much lower than those of Hokuriku and San-In area, their concentrations in the benthic fauna and TBT and TPT concentrations in the offshore sediments were similar. The concentrations of Co-PCBs and TPT in the benthic fish were higher among those of benthic fauna. These chemicals in the offshore sediment seemed to be accumulated through benthic foodweb.
6. We have developed information infrastructure for archiving data for hazardous chemicals and environmental health in East-Asian sea. This infrastructure is a computer system which is running on Internet environment consists of a geographic information system (GIS) and databases and Internet WWW servers for information dissemination. The system can store various monitoring and survey data and display them on geographical maps so that researchers can easily compare different data sets from different sources.