Persistent organochlorine residues in estuarine and marine sediments from Ha Long Bay, Hai Phong Bay, and Ba Lat Estuary, Vietnam

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Abstract: To assess the organochlorine contamination in the northeast coastal environment of Vietnam, a total of 41 surface sediments were collected from Ha Long Bay, Hai Phong Bay, and Ba Lat estuary, and analyzed for their organochlorine content. Organochlorine compounds (OCs) were widely distributed in the Vietnamese coastal environment. Among the OCs measured, DDT compounds predominated with concentrations ranging from 0.31 to 274 ng g^{-1}. The overall contamination level of DDTs in coastal sediments from northern Vietnam is comparable with those from other Asian countries. However, concentrations exceeding 100 ng g^{-1} are comparable with high concentrations reported from India and China, the largest DDT consumers in the world. The overall concentrations of PCBs, HCHs, and chlordanes in surface sediments were in the ranges of 0.04-18.71 ng g^{-1}, not detected (n.d.) - 1.00 ng g^{-1}, and n.d. - 0.75 ng g^{-1}, respectively. Ha Long Bay and Hai Phong Bay were relatively more contaminated with DDTs and PCBs than other regions, respectively. In contrast, the distribution of HCHs was relatively homogeneous. OCs contamination in the coastal environment of Vietnam is closely related to shipping and industrial activities. The levels of DDT compounds in harbors and industrial areas exceeded their sediment quality guideline values suggested by Environment Canada [CCME (Canadian Council of Ministers of the Environment), 2002. Canadian sediment quality guidelines for the protection of aquatic life. In: Canadian Environmental Quality Guidelines. Canadian Council of Ministers of the Environment, Winnipeg, MB] and Australian and New Zealand [ANZECC and ARMCANZ, 2000. National water quality management strategy. Paper No. 4, Australian and New Zealand Guidelines for Fresh and Marine Water Quality, vol. 1, The Guidelines. Australia. Document: http://www.deh.gov.au/water/quality/nwqms/volume1.html], indicating that adverse effects may occur to marine species in that areas.

Author Keywords: Contamination; Marine sediment; Organochlorine pesticides; PCBs; Vietnam
Index Keywords: Barium; Chlorine compounds; Microfluidics; Mixtures; Sedimentation; Sedimentology; Submarine geology; Tellurium compounds; Coastal environments; Ha long bay; Marine sediments; Organochlorine (OC); Organochlorine (OC) compounds; organochlorine residues; Surface sediments; Viet Nam; Marine pollution; 1,1 dichloro 2,2 bis(4 chlorophenyl)ethane; 1,1 dichloro 2,2 bis(4 chlorophenyl)ethylene; alpha hexachlorocyclohexane; beta hexachlorocyclohexane; chlordane; chlorphenotane; delta hexachlorocyclohexane; dieldrin; endrin; lindane; organochlorine derivative; polychlorinated biphenyl; assessment method; coastal zone; comparative study; concentration (composition); DDT; estuarine sediment; marine sediment; measurement method; organochlorine; PCB; persistence; sediment pollution; article; Asia; China; coastal waters; concentration (parameters); environmental protection; estuary; India; industrialization; organic pollution; quality control; sea pollution;

sediment; Viet Nam; water quality; Environmental Monitoring; Geography; Geologic Sediments; Hydrocarbons, Chlorinated; Pesticide Residues; Polychlorinated Biphenyls; Vietnam; Water Pollutants, Chemical; Asia; Ba Lat Estuary; China; Eurasia; Far East; Ha Long Bay; Hai Phong Bay; India; South Asia; Southeast Asia; Viet Nam

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