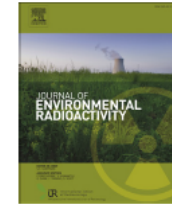




Contents lists available at ScienceDirect

Journal of Environmental Radioactivity

journal homepage: www.elsevier.com/locate/jenvrad



A comparison of marine radionuclide dispersion models for the Baltic Sea in the frame of IAEA MODARIA program



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ARTICLE INFO

Article history:

Received 28 August 2014

Received in revised form

19 September 2014

Accepted 21 September 2014

Available online

Keywords:

Baltic Sea

¹³⁷Cs

Dispersion

Sediment

Box models

Hydrodynamic models

ABSTRACT

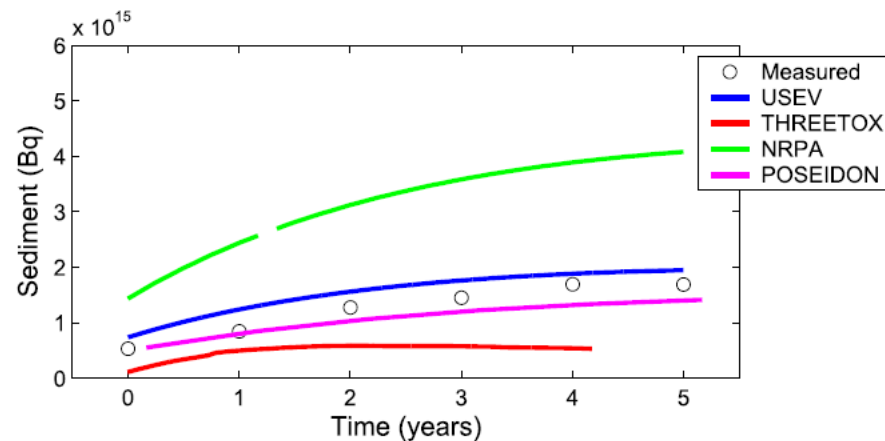
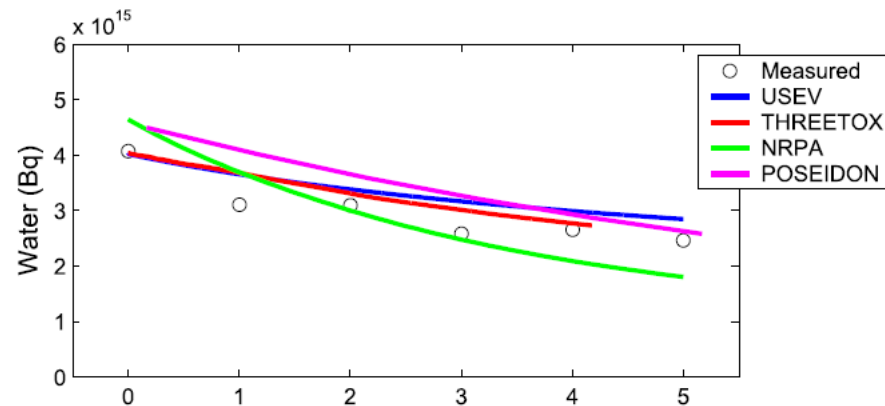
Four radionuclide dispersion models have been applied to simulate the transport and distribution of ¹³⁷Cs fallout from Chernobyl accident in the Baltic Sea. Models correspond to two categories: box models and hydrodynamic models which solve water circulation and then an advection/diffusion equation. In all cases, interactions of dissolved radionuclides with suspended matter and bed sediments are included. Model results have been compared with extensive field data obtained from HELCOM database. Inventories in the water column and seabed, as well as ¹³⁷Cs concentrations along 5 years in water and sediments of several sub-basins of the Baltic, have been used for model comparisons. Values predicted by the models for the target magnitudes are very similar and close to experimental values. Results suggest that some processes are not very relevant for radionuclide transport within the Baltic Sea, for instance the roles of the ice cover and, surprisingly, water stratification. Also, results confirm previous findings concerning multi-model applications.

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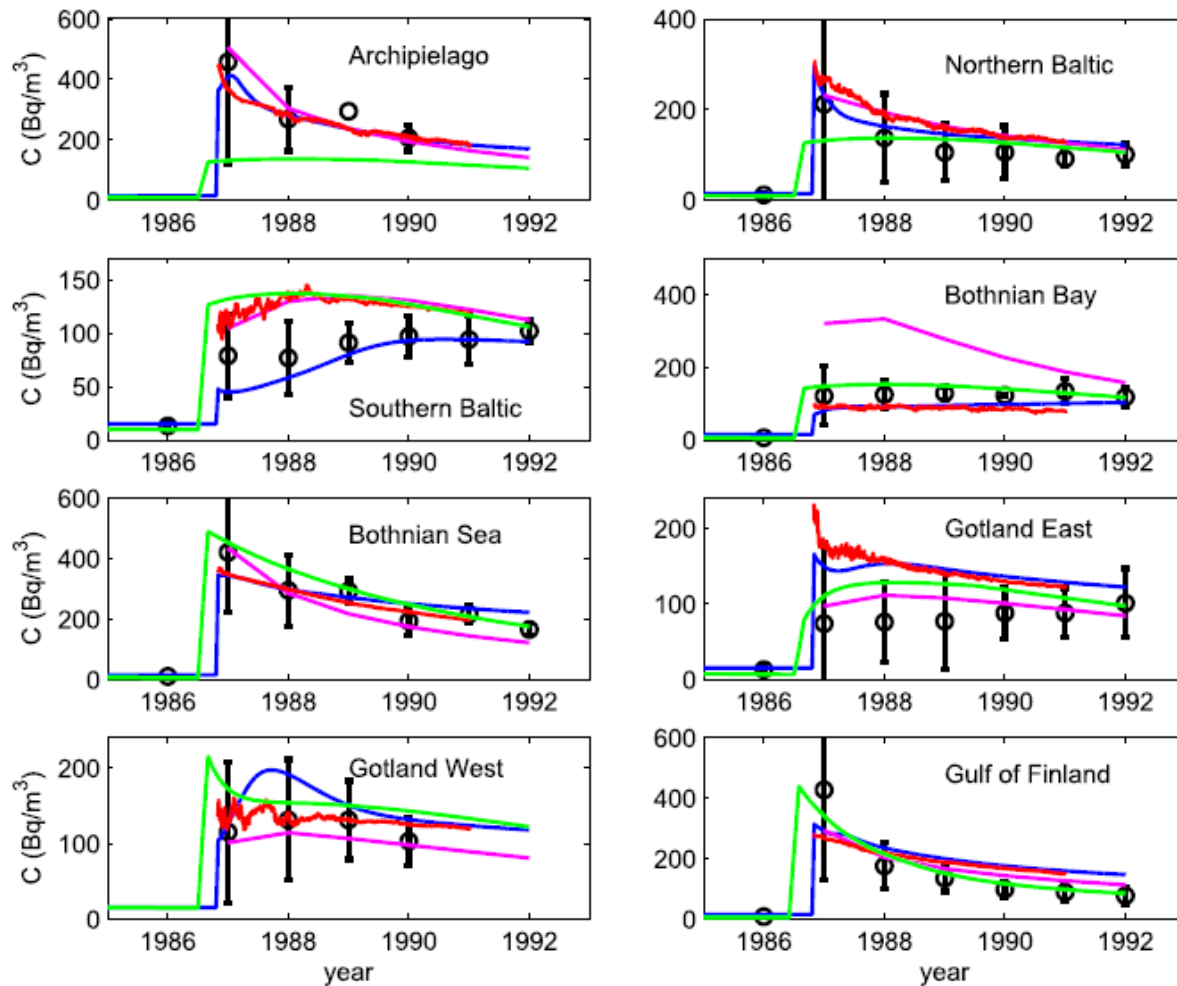
Scope

- Comparison of marine radionuclide dispersion models
 - Baltic Sea
 - Fukushima
- 4 dispersion models were applied to simulate transport and distribution of Cs-137 fallout from Chernobyl accident into the Baltic Sea
- Box models and hydrodynamic models
- Model results were compared with the field data

Inventories of Cs-137 in water and sediment: models vs measurements



Dissolved phase – Cs-137



Bed sediments – Cs-137

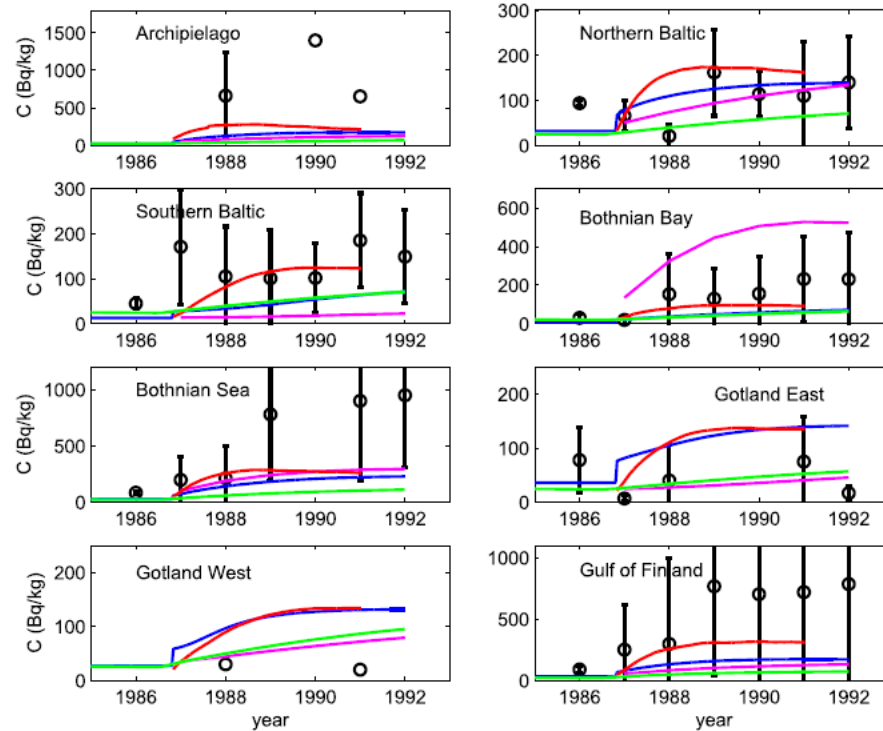


Fig. 7. As Fig. 6 but for bed sediments.

Findings

- Values predicted by the models for target magnitudes were similar and close to experimental values
- processes found to be not very relevant for radionuclide transport
 - Ice cover
 - Water stratification