

MULTI-RECOVERY MODEL FOR ESTUARIES

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The RECOVERY model was developed by Boyer et al (1994). The model is a PC-based screening-level model to assess the impact of contaminated bottom sediments on surface waters. The contaminant is assumed to follow linear, reversible, equilibrium sorption and first-order decay kinetics. The physical representation of a system by the RECOVERY model consists of a well-mixed water column (i.e. zero-dimensional) underlain by a vertically stratified sediment column (i.e. one-dimension). The sediment is well mixed horizontally, but segmented vertically into a well-mixed surface (active) layer and deep sediment. The deep sediment is segmented into contaminated and clean sediment regions. Pathways incorporated in the RECOVERY model, in addition to sorption and decay, are volatilization, burial, resuspension, settling, advection, and pore-water diffusion.

Because of lack spatial resolution capability, The RECOVERY model may not be appropriately applicable for bays and estuaries where, generally, hydrodynamic dispersion and transport are important both in magnitude and spatial variations. Therefore, we have modified and implemented the original single-box RECOVERY model into a multi-box version, the Multi-RECOVERY model. Similar to the original RECOVERY model, the Multi-RECOVERY model is also PC-based with a Graphic User Interface (GUI) module to make the use of the model user-friendly. The program allows the user to rapidly generate and analyze recovery scenarios for contaminated sediments.

The functionality of the implemented Multi-RECOVERY model is tested using a designed scenario and the sensitivity analysis for the Multi-RECOVERY model has also been executed. The simulation results for the Multi-RECOVERY model are compared and identified with those of the original RECOVERY model for a single-box case. The Multi-RECOVERY model is applied to ten (10) boxes case. Figure 1 shows the contaminant concentration profile in the mixed layer with time for boxes 1, 5, and 10.

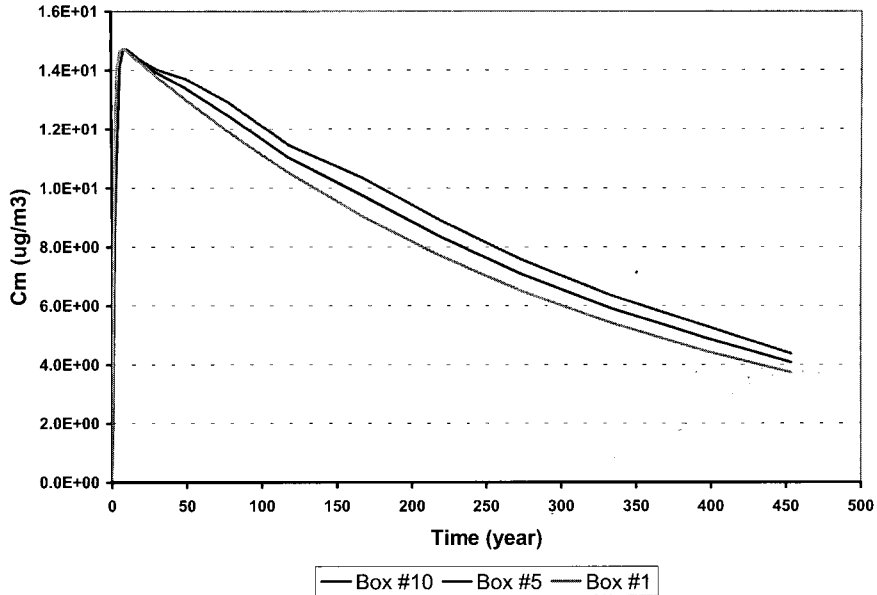


Fig. 1 Contaminant concentration in the mixed layer with time for Boxes 1, 5, and 10

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