



Lateral Open Boundary Conditions for Nested Limited Area Models: a scale selective approach

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Current approaches to the lateral open boundary condition problem for nested regional primitive equation ocean numerical models are reviewed and a new approach that considers a scale decomposition of the nesting field variables is proposed. The Flather (1976) open lateral boundary condition is derived from mass conservation considerations and we use this approach to derive a new set of lateral open boundary conditions for barotropic velocities. In order to demonstrate the quality of this new approach, several existing methods, normally used in primitive equation regional models, are compared with the new one and with in-situ data. The system used to perform the numerical experiments is composed of a free-surface, high-resolution ocean model, covering the entire Adriatic Sea, and a rigid-lid coarse model reproducing the Mediterranean Sea dynamics, both with the same atmospheric forcing. A comparison of the model results with observed data indicates that the proposed scheme improves the performance of the boundary conditions under specific regimes.