FM7L_11972

XXI International Congress of Theoretical and Applied Mechanics
Warsaw, Poland, August 15–21, 2004

Sea Convective Motions Driven by Random Buoyancy Inputs

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A numerical and analytical model for dynamics of dense water plumes in a homogeneous and a stratified sea initially at rest, suddenly perturbed on the air-sea surface by a series of space and time random buoyancy inputs localized on small space and time scales, due to strong transverse winds, is presented here. The conditions for their generation are identified. A Lagrangian rapresentation allows the time evolution for a set of perturbed by the Coriolis force, single, not entraining, plumes, able to carry down dense water mass, to be obtained. Their separate evolution till the initial collective rotating chimney formation phase is observed. Scaling laws depending on the surface air-sea interaction statistics involved and on the forcing time scale, are examined; their dependence on buoyancy fluctuations more than mean values is shown.

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