



Sea-state dependency of air-sea fluxes in ECMWF Earth System Model

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The global analyses and medium range forecasts from the European Centre for Medium range Weather Forecasts rely on a state of the art atmospheric model. In order to best represent the momentum exchange at the surface of the oceans, it is tightly coupled to an ocean wave model. An ocean model is now included as part of the operational medium range forecasting system. In this context, a first set of sea state effects on Upper Ocean mixing and dynamics was successfully added to the system. Impact of sea-state dependent momentum forcing, the Stokes-Coriolis force and the enhanced mixing by breaking ocean waves have been added.

Because the feedback from the ocean can be significant, it is only in the fully coupled system that parameterisation for air-sea processes should be revisited. For instance, experimental evidences point to a sea state/wind dependency of the heat and moisture fluxes. Following an extension of the wind wave generation theory, a sea state dependent parameterisation for the roughness length scales for heat and humidity was introduced. Assessment of the different parameterisations will be presented in the context of the fully coupled system.