



European Commission's 7th Framework Programme
Grant Agreement No. **226520**

Project acronym: **COMBINE**

Project full title: **Comprehensive Modelling of the Earth System for Better
Climate Prediction and Projection**

Instrument: Collaborative Project & Large-scale Integrating Project

Theme 6: *Environment*

Area 6.1.1.4: *Future Climate*

ENV.2008.1.1.4.1: *New components in Earth System modelling
for better climate projections*

Start date of project: 1 May 2009

Duration: 48 Months

**Milestone Reference Number and Title: M5.4. Strategy 3 for ocean initialization
completed**

Lead work package for this milestone: WP5

Organization name of lead contractor for this milestone: ECMWF

Due date of milestone: April 2012

Actual submission date: May 2012

M5.4: Strategy 3 for Ocean Initialisation

The initialization of coupled models in the presence of model error is a serious challenge for seasonal and decadal forecasts. Within COMBINE WP5, different strategies are implemented and compared, and new approaches are investigated. The first objective of WP5 was to implement feasible ocean initialization strategies for the Earth System models in the project that will take part on the CMIP-5 comparison. The second objective is to evaluate the adequacy of different initialization and forecast strategies, namely full initialization, anomaly initialization and flux correction. This latter approach, complementary of the full initialization, aims at correcting the coupled model error during the integrations instead of the traditional a-posteriori bias correction. Techniques to estimate empirical corrections of model error have been investigated and implemented in the ECMWF coupled model. This strategy permits to measure the interactions between mean state and variability, and it sheds light on the non-linear nature of ocean-atmosphere feedbacks. It can also be a way of improving the skill of the forecasts. This strategy will be compared with the standard full initialization and anomaly initialization at a later date. The implementation of this strategy and the impact on ENSO variability has been reported in the following publication:

Magnusson, L., M.A. Balmaseda and F. Molteni, 2011: On the dependence of ENSO simulation on the coupled model mean state. ECMWF Technical Memorandum 658.