

SESSION: (C1) Initialization initialization shock and model error (includes data assimilation)

(C1-02)

Non-linear and non-stationary forecast errors: should we revisit the current forecast strategies?

Magdalena A. Balmaseda, Laura Ferranti, Stephanie Johnson, Michael Mayer, Christopher Roberts, Tim Stockdale, Steffen Tietsche, Frederic Vitart, Hao Zuo.

ECMWF

Current approaches for sub-seasonal and seasonal forecast use a set of initialized coupled hindcast to bias correct the forecast products. This approach implicitly assumes stationarity of forecast errors and neglects non-linear interaction between mean state and variability. Here we review a number of cases where these assumptions do not hold, resulting in degradation of forecast skill. The limitations of the a-posteriori linear bias approach in ENSO have discussed in previous studies, and are summarized here. We also discuss results from the latest ECMWF seasonal forecasting system, which exhibits a clear decadal modulation of the forecast errors associated with different regimes of the Atlantic Meridional Circulation. These pathological cases raise the question of whether better forecasts could be obtained by modifying the current forecast or initialization strategies. A framework for an alternative forecast strategy, where the model errors are explicitly accounted for during the model integration via empirical modelling is presented. This framework will exploit the information from coupled data assimilation increments to train the error model. The strengths and weakness of such an approach will be outlined.