Re-emergence of North Atlantic subsurface ocean temperature anomalies in a seasonal forecast system

Jeremy P. Grist[1], Bablu Sinha[1], Helene. T. Hewitt[2], Aurélie Duchez[1], Craig MacLachlan[2], Patrick Hyder[2], Simon A. Josey[1], Joël J.-M. Hirschi[1], Adam T. Blaker[1], Adrian. L. New[1], Adam A. Scaife[2,3], Chris D. Roberts [2,]

1) National Oceanography Centre, UK.

2) Met Office, Hadley Centre, UK.

3) College of Engineering, Mathematics and Physical Sciences, University of Exeter

4) European Centre for Medium Range Weather Forecasts (ECMWF), UK

Different atmospheric (~60km and ~25km) versions of GLOSEA5 are used to study the seasonal re-emergence of North Atlantic subsurface temperature anomalies. Control and perturbed 50-member ensembles are integrated for six months from 1 September 2007. The perturbation is a predominantly negative (density-compensated) temperature anomaly beneath the mixed layer. Re-emergence of this anomaly is preceded by a pressure pattern that induces stronger, colder and drier winds over the mid-latitude Atlantic, and enhanced latent heat loss. In response to re-emergence there is a reduction in latent heat loss, atmospheric convection and eddy kinetic energy and positive SLP anomalies downstream.