



## **Assessment of decadal predictability and associated mechanisms of the CNRM-Cerfacs forecast system**

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As part of the WCRP international effort and within the COMBINE EU-project, the CNRM-Cerfacs group has produced a series of decadal hindcasts over 1960-2005 following the CMIP5 protocol designed to first estimate the level of predictability at decadal timescale and second to dig out the possible related mechanisms. The CNRM-Cerfacs system will be presented (model components, ocean initialization etc) as well as its performance (drift, bias, skill etc.) in a forecast mode. Focus will be laid on the differences between low-top (up to 5 hPa) and high top (up to 0.01 hPa) configurations and on the traditional modes of variability (AMO, PDO etc.). Results suggest that most of the predictability comes from the external forcings (increased GHGs, aerosols, volcanoes) at global scale while ocean initialization is a clear added-value at regional scale especially over the North Atlantic. Three additional ocean initialized ensemble experiments (VOLC, SOL, GHGcste) have been carried out to quantify the relative role of the external forcings and associated uncertainties for the 2010-2035 decadal forecast. The VOLC experiment corresponds to an hypothetical Pinatubo-like eruption in 2010-2011, while SOL refers to an ensemble where the 11-yr solar cycle is disrupted and maintained constant to its minimum 2009 value and GHGcste stands for simulations where GHGs are set fixed to their 2010 concentrations over the forecast period. The respective impacts on AMOC of the three external forcings and the mechanisms leading to the AMOC alteration will be presented.