

## Improvement in winter seasonal predictability by including a stratospheric description in the forecast model

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The CNRM-CM5 model, based on Arpege and Nemo components for atmosphere and ocean respectively, has been recently used by Météo-rance and Cerfacs in the CMIP5 exercise. This model has a very crude representation of the stratosphere. It has also been used for seasonal prediction exercises like CHFP. The predictability of the northern mid-latitudes in DJF is not very different from what was obtained 10 years ago in similar exercises like DEMETER. However progresses have been obtained during the last decade in the tropical regions, in particular the ENSO area, thanks to the improvement in ocean initialisation and horizontal resolution. Recent experiments show that keys to a better midlatitude prediction are a joined introduction of stochastic terms in the equations and of a realistic stratosphere. We will particularly examine this latter point with the first results of the FP7-SPECS projet. The improved version has 40 vertical levels above 100 hPa, a fully prognostic ozone variable, and a non-orographic gravity wave drag parameterization.