

The CMCC Seasonal Prediction System: a contribution to the Copernicus C3S multi-system ensemble

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Centro Euro-Mediterraneo sui Cambiamenti Climatici (CMCC) is one of the additional providers of seasonal forecasts to the Copernicus Climate Change Service (C3S). The seasonal prediction system (CMCC-SPSv3) developed at CMCC, that provides forecasts for the C3S multi-system is completely new in terms of dynamical core and initialization data and strategy.

The CMCC-SPSv3 is based on the general circulation model CMCC-CM. The model consists of several independent components that simulate the Earth's atmosphere (CAM5), ocean (NEMO₃.4), land (CLM4.5/RTM) and sea-ice (CICE), together with a central coupler/driver component controlling data synchronization and exchange. The model atmosphere is in spectral element configuration and extends vertically up to 46 levels (about 60km), in order to consider the entire stratosphere layer. The ocean component has a resolution of about 25km and fifty vertical levels (31 in the first 500 meters). The strategy for initialization accounts for a full value technique for all the climate components, combining eighty (forty for the re-forecasts) initial conditions randomly chosen out of ten perturbations of the atmospheric state, eight of the ocean state and three of the land surface.

This work aims at presenting CMCC-SPSv3 validation. Results show valuable quality of seasonal forecasts in terms of skill, accuracy, discrimination and reliability.