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Seasonal predictability of Mediterranean Weather Regimes in the Copernicus C3S Systems

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Seasonal predictions in the Mediterranean region have relevant socio-economic implications, especially in the context of a changing climate. To date, sources of predictability have not been sufficiently investigated at the seasonal scale in this region. To fill this gap, we explore sources of predictability using a weather regimes (WRs) framework. The role of WRs in influencing regional weather patterns in the climate state has generated interest in assessing the ability of climate models to reproduce them.

We identify four Mediterranean WRs for the winter (DJF) season and explore their sources of predictability looking at teleconnections with sea surface temperature (SST). In particular, we assess how SST anomalies affect the WRs frequencies during winter focussing on the two WRs that are associated with the teleconnections in which the signal is more intense: the Meridional and the Anticyclonic regimes. These sources of predictability are sought in five state-of-the-art seasonal forecasting systems included in the Copernicus Climate Change Services (C3S) suite finding a weaker signal but an overall good agreement with reanalysis data. Finally, we assess the ability of the C3S models in reproducing the reanalysis data WRs frequencies finding that their moderate skill improves during ENSO intense years, indicating that this teleconnection is well reproduced by the models and yields improved predictability in the Mediterranean region.