

HyMeX - Representation of heat waves and drought in MED-CORDEX-ERA Interim simulations at IPSL using WRF and MORCE models

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Heat waves and droughts are extreme weather events intrinsically linked, through strong coupling between the Earth's energy and water cycles. Their impact in short and medium term can be considerable on our societies in terms of health, socio-economic and ecological damage, as in 2003 in Western Europe or Russia in 2010. They are even more affected by climate change than the average state of the atmosphere and could be more frequent, more intense and more extended in the future. Besides this effect could be enhanced by the fact that Mediterranean, a vulnerable area of important geographic and climatic contrasts, is among the most responsive to global warming. In the frame of the HyMeX and MED-CORDEX programs, 4 different simulations have been conducted with WRF driven by ERA-INTERIM reanalysis over 1989-2008. 2 simulations have been performed at 50-km grid resolution with 2 different surface schemes (RUC and 5-layer diffusive schemes) and 2 simulations have been performed at 20-km grid resolution with the 5-layer diffusive scheme, with either a prescribed sea-surface temperature or in a fully coupled mode with the NEMO-MED12 ocean model. The control simulation (CTL) corresponds to the 50-km resolution and 5-layer diffusive scheme configuration. The WRF/NEMO-MED12 configuration is part of the MORCE (Model of the Regional Coupled Earth system) platform. The simulated continental temperature and precipitation variability and extremes are first compared to ECA&D database and then sensitivity analysis between the different configurations is performed in order to highlight the dynamical and hydrological processes controlling the occurrence and life cycle of heat waves and droughts.