Supplementary material

Investigating the representation of heatwaves from an ensemble of km-scale regional climate simulations within CORDEX-FPS Convection

Climate Dynamics

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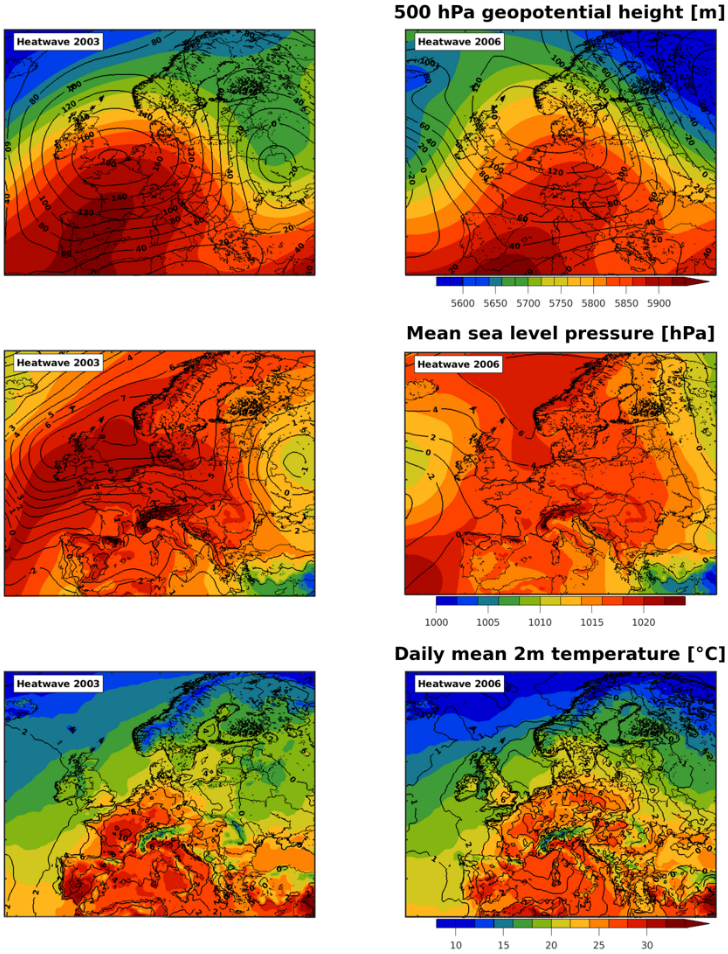

Fig. SM 1 ERA5 500 hPa geopotential (upper row), mean sea level pressure (middle row), and daily mean 2m temperature (bottom row) averaged during 2003 (left column), 2006 (middle column), and 2007 (right column) major heat waves. Anomalies from summer (JJA) climatology (2000-2009) are shown by contour lines

2m rel. humidity	Soil moisture
850 hPa V-wind component	500 hPa geopotential height

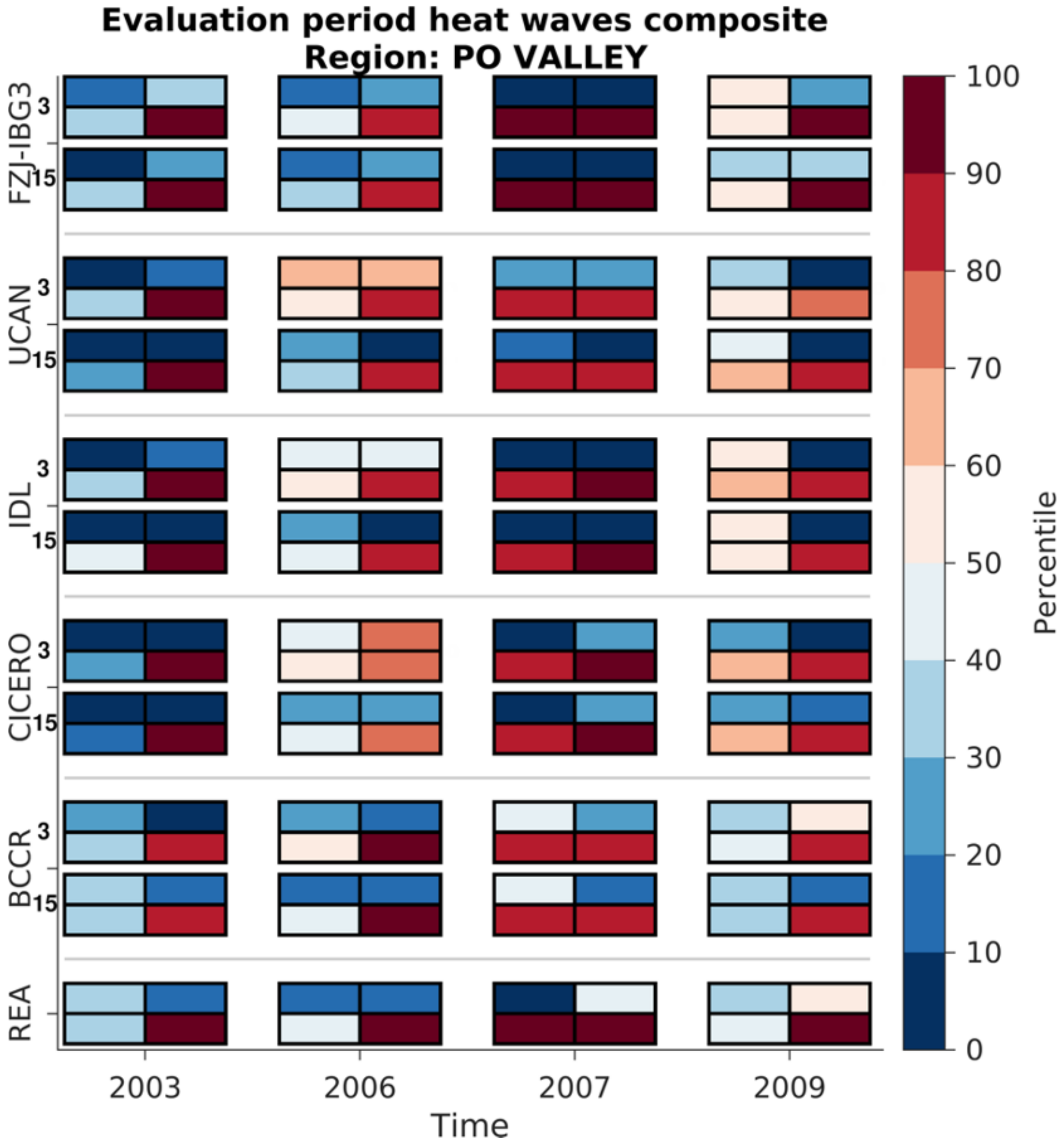

Fig. SM 2 Percentiles (2000-2009 JJA months statistical distribution) corresponding to the mean value of the four variables during heatwave events for the representative Po valley domain. Spatial means over the three domains are considered. HW events are selected considering the UERRA reanalysis. “15” and “3” indicate results for RCMs and CPRCMs respectively

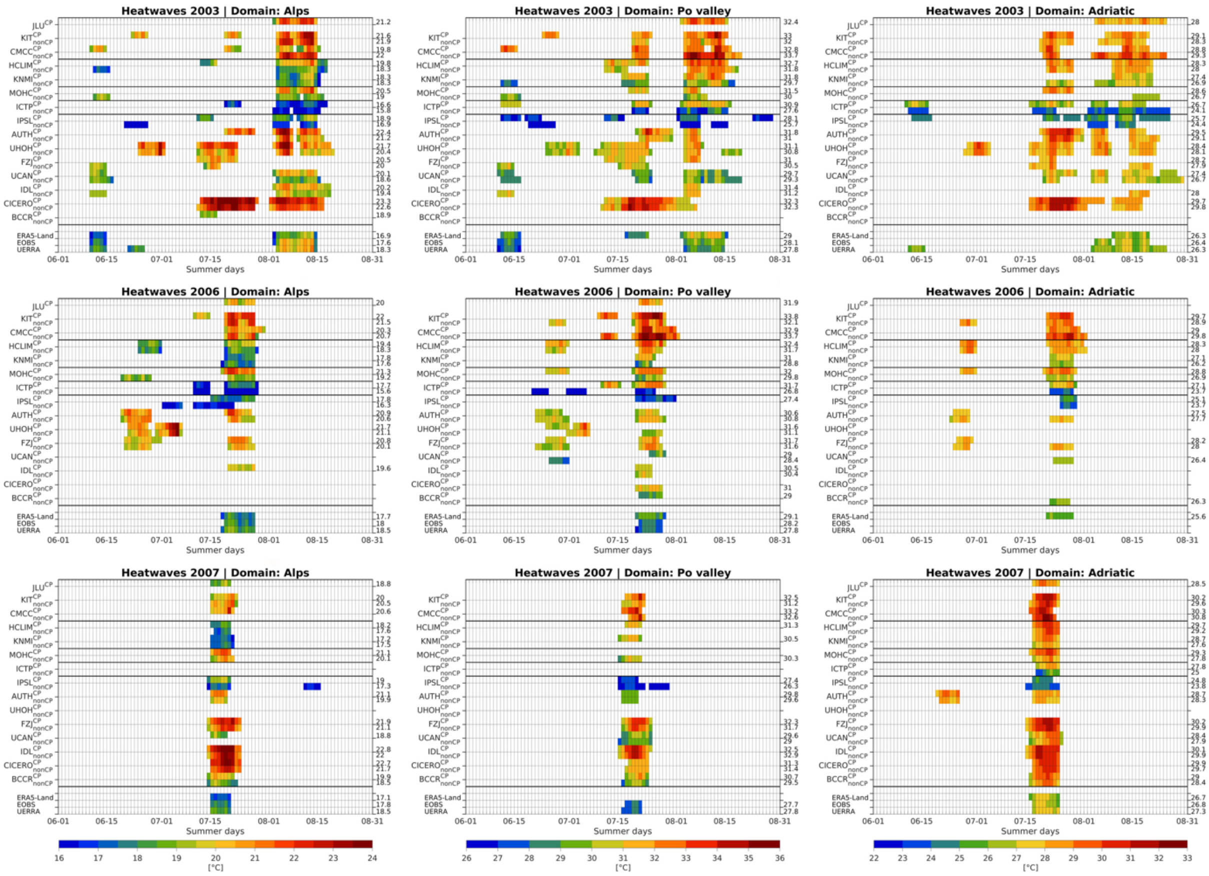

Fig. SM 3 Same as Figure 2, but HWs are selected considering the 90th percentile of summer season daily mean temperature statistical distribution during the evaluation period. On the right y-axis are reported means of HWs daily mean temperature

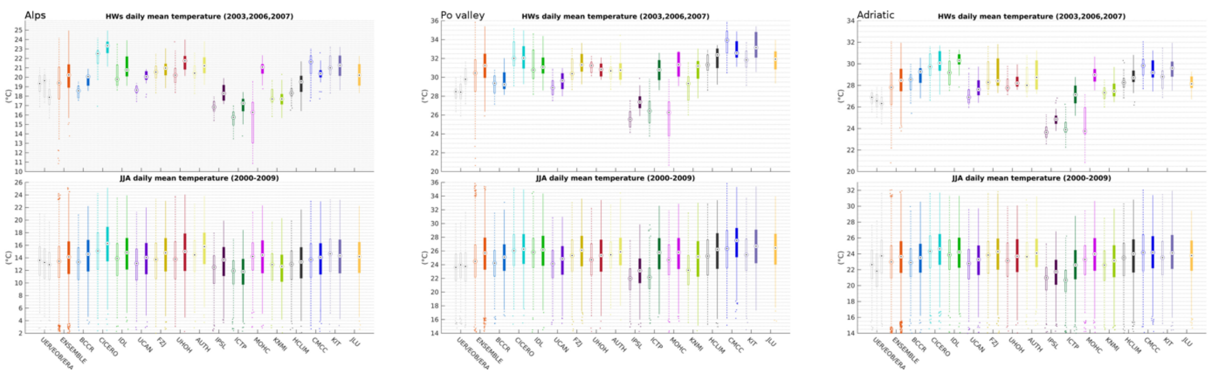

Fig. SM 4 Same as Figure 3, but with statistical distributions built over spatially averaged daily mean temperature instead of daily maximum temperature

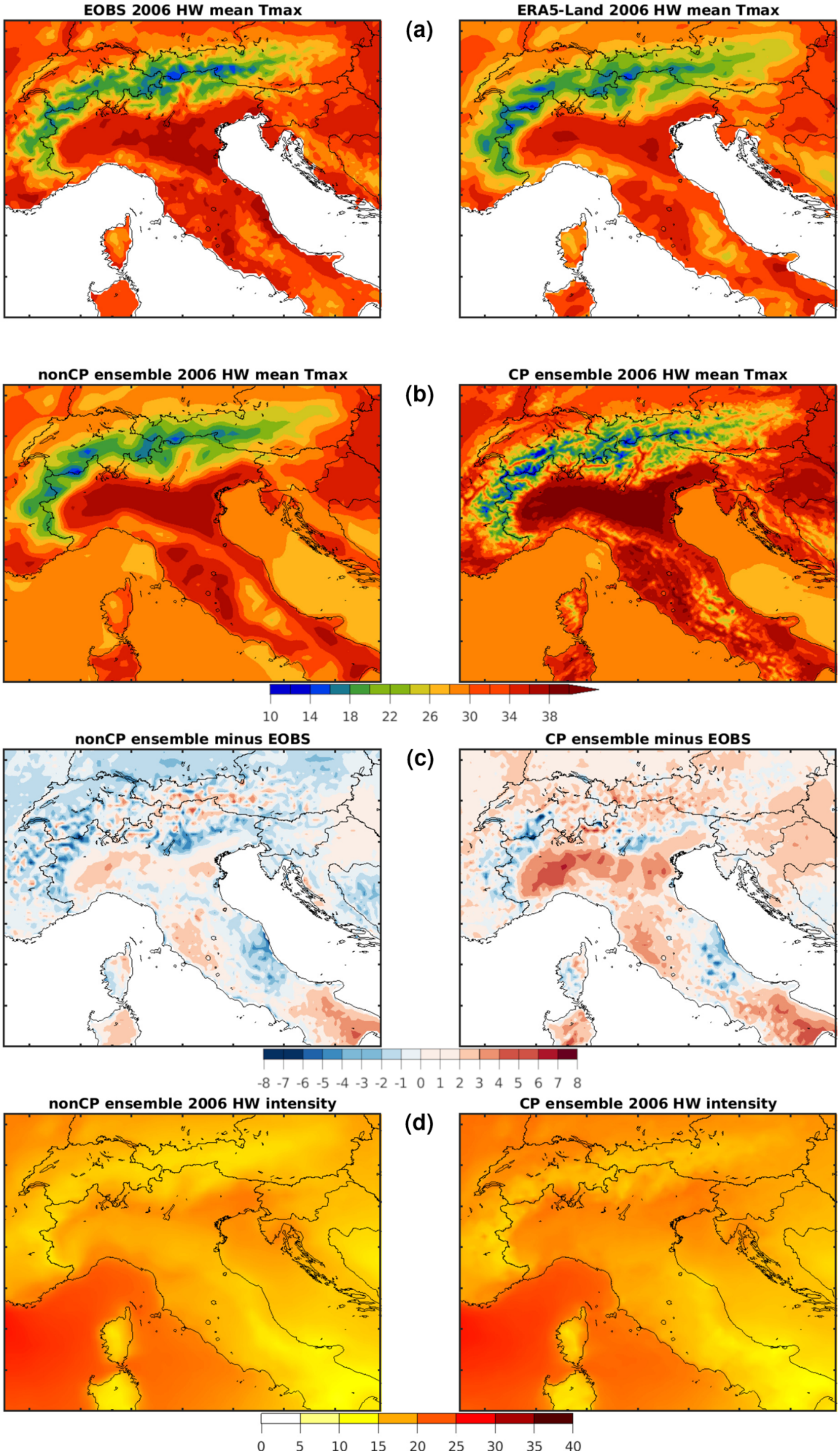

Fig. SM 5 Same as Figure 4, but for the 2006 HW event

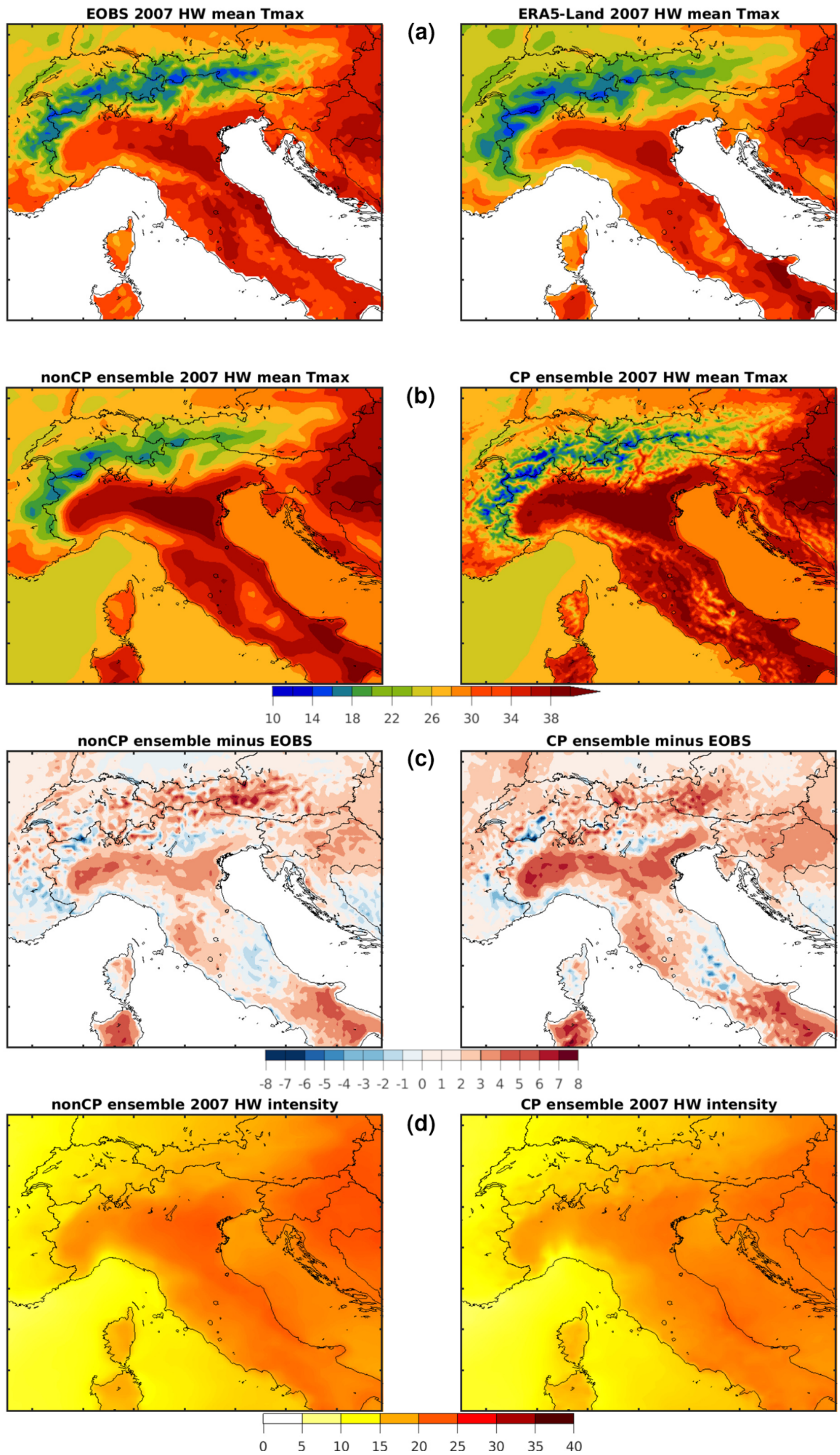

Fig. SM 6 Same as Figure 4, but for the 2007 HW event

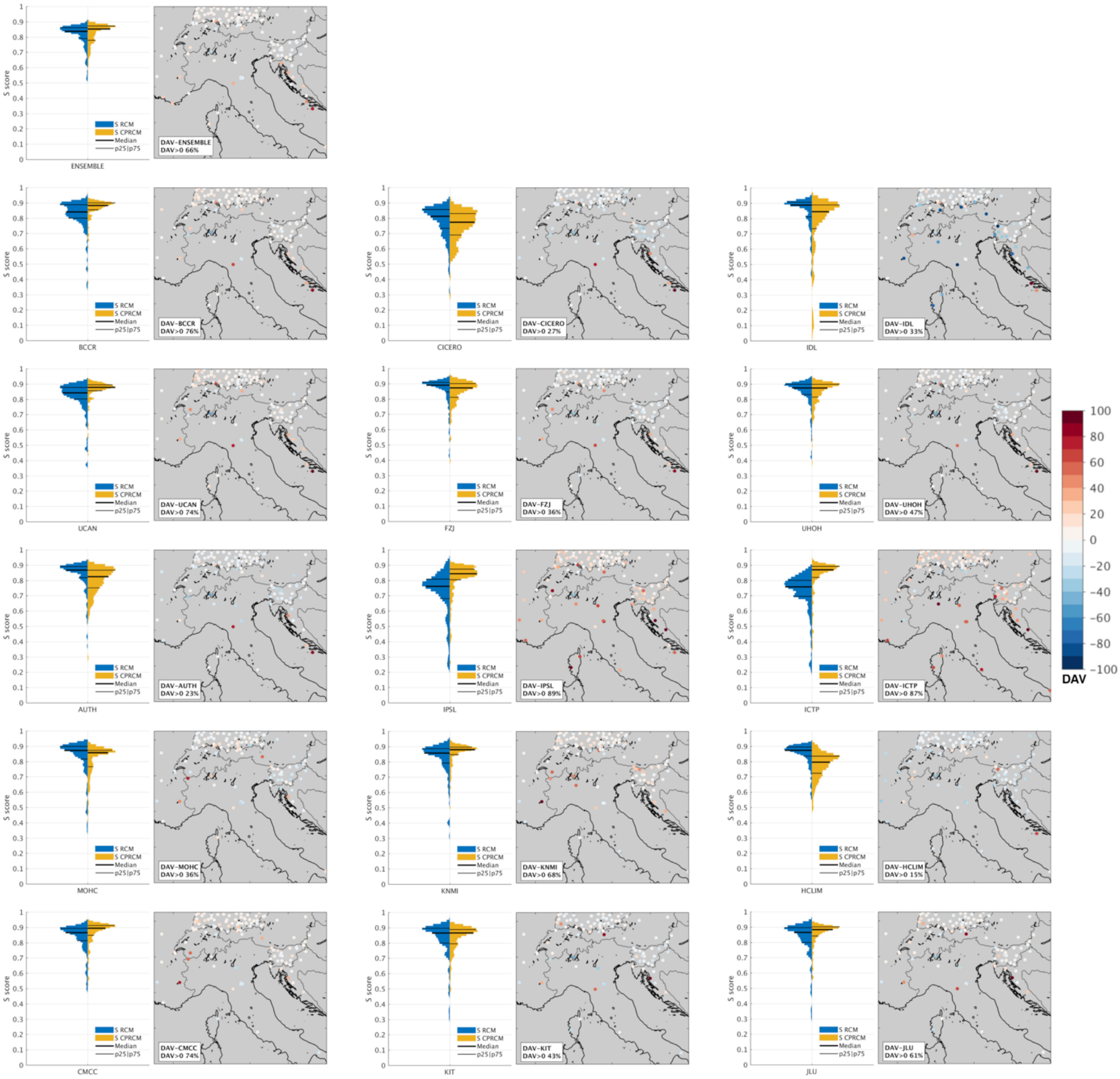

Fig. SM 7 Same as Figure 5, but applying a standard lapse rate (0.0065 °C/m) height correction to simulated Tmax time series. Correction is derived from the difference of both RCMs and CPRCMs with reference to observational station height

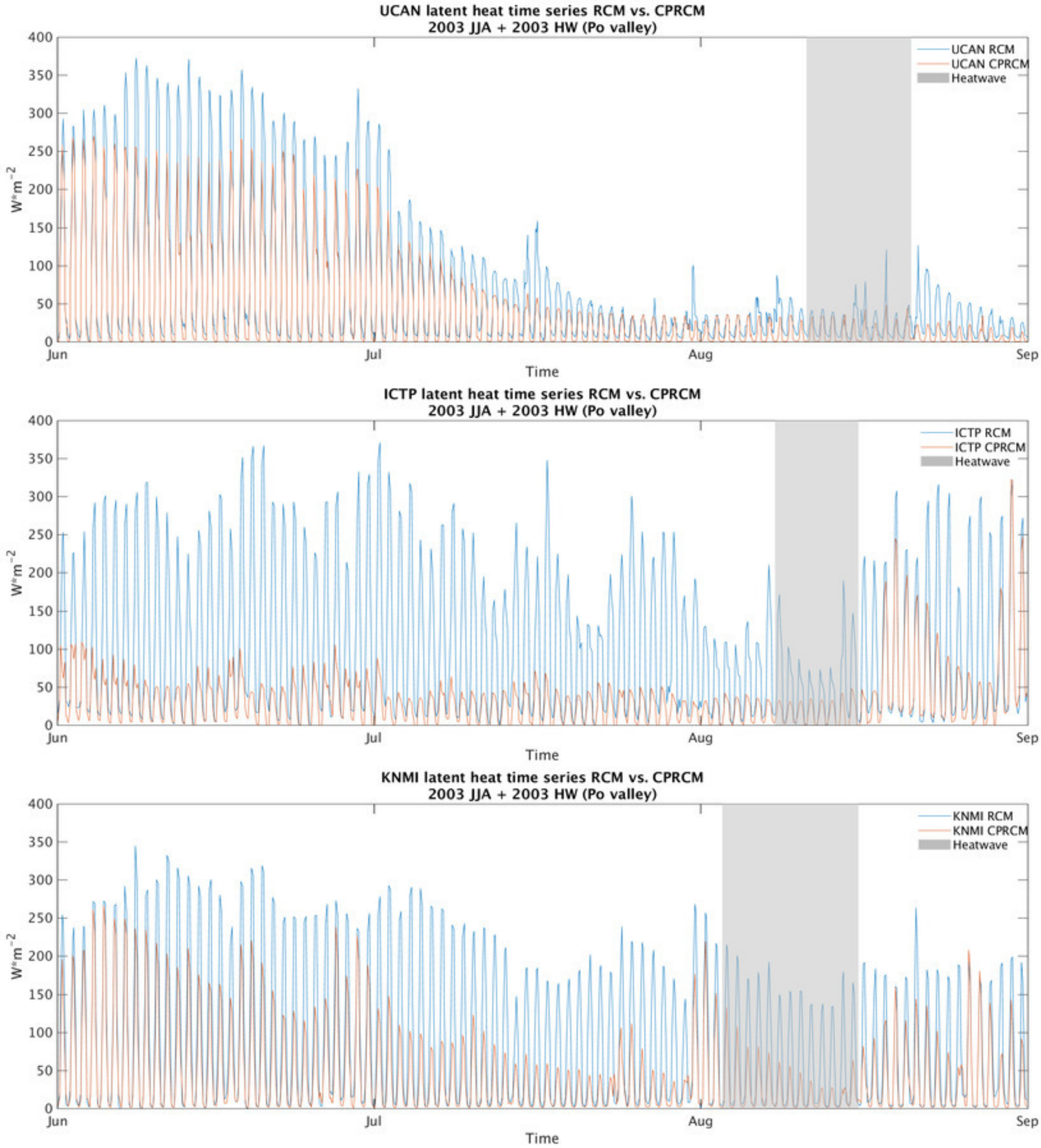

Fig. SM 8 Hourly time series of latent heat physical values for three representative models during a representative summer season (2003). Gray-shaded temporal segments identify HW events

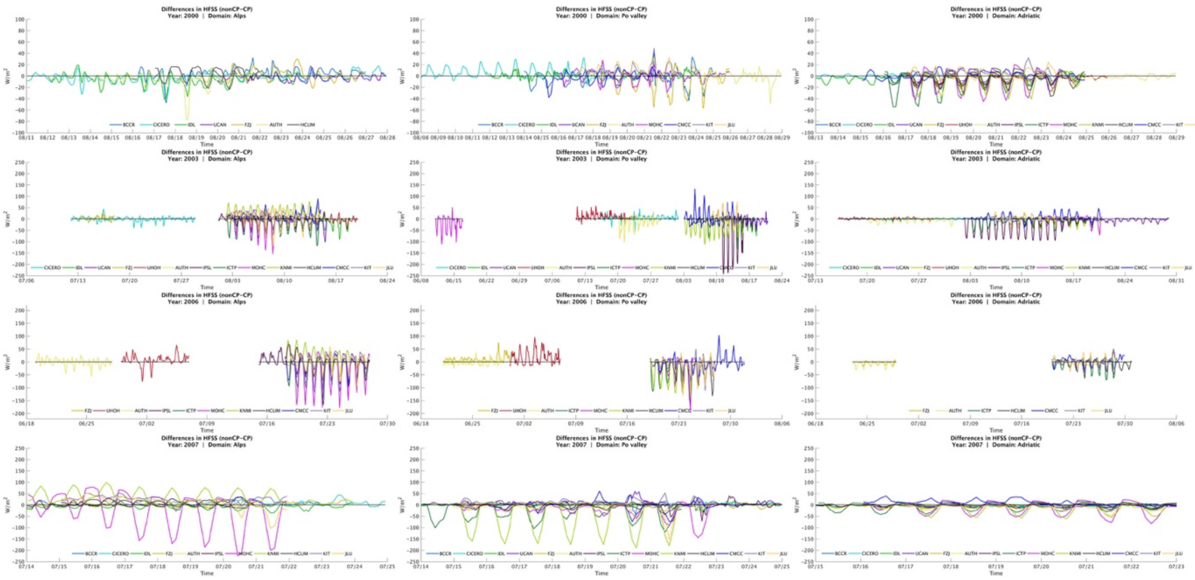

Fig. SM 9 Same as Figure 6, but for the sensible heat flux

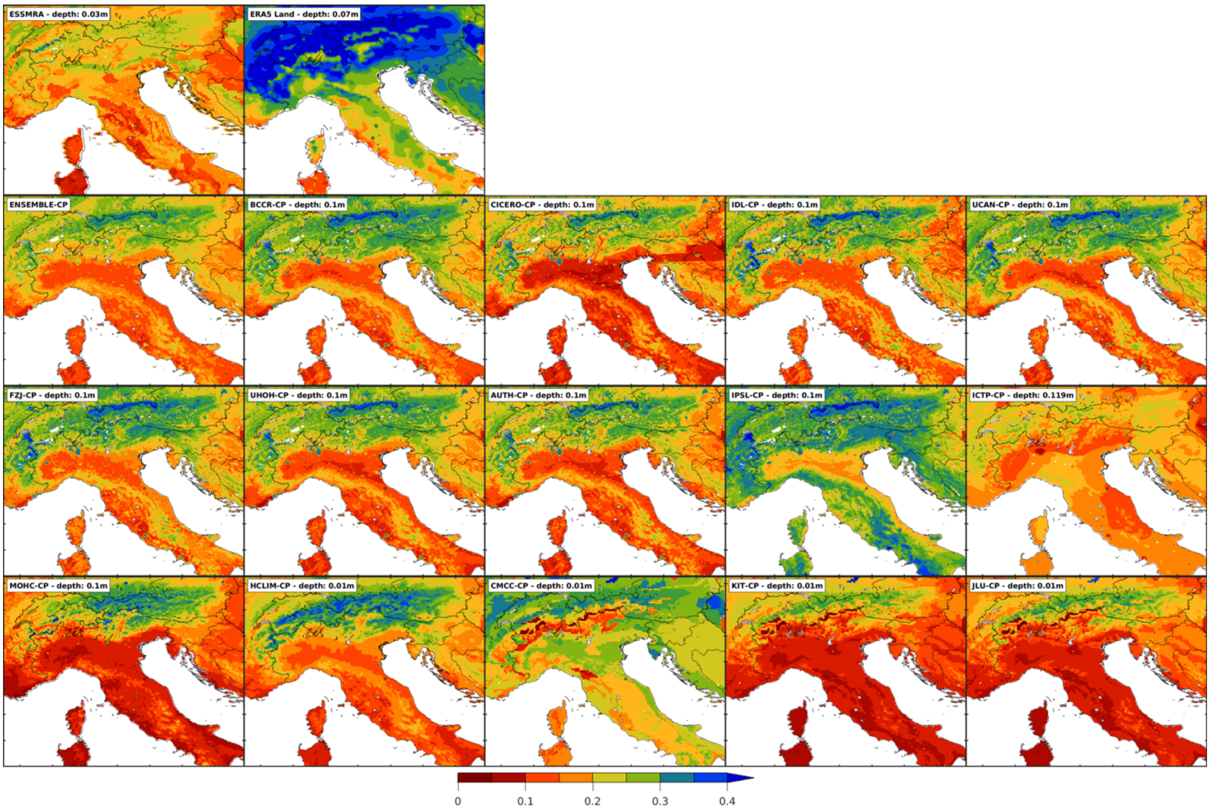

Fig. SM 10a Same as Figures 8a, but with soil moisture values averaged over the entire evaluation period summer seasons (JJA)

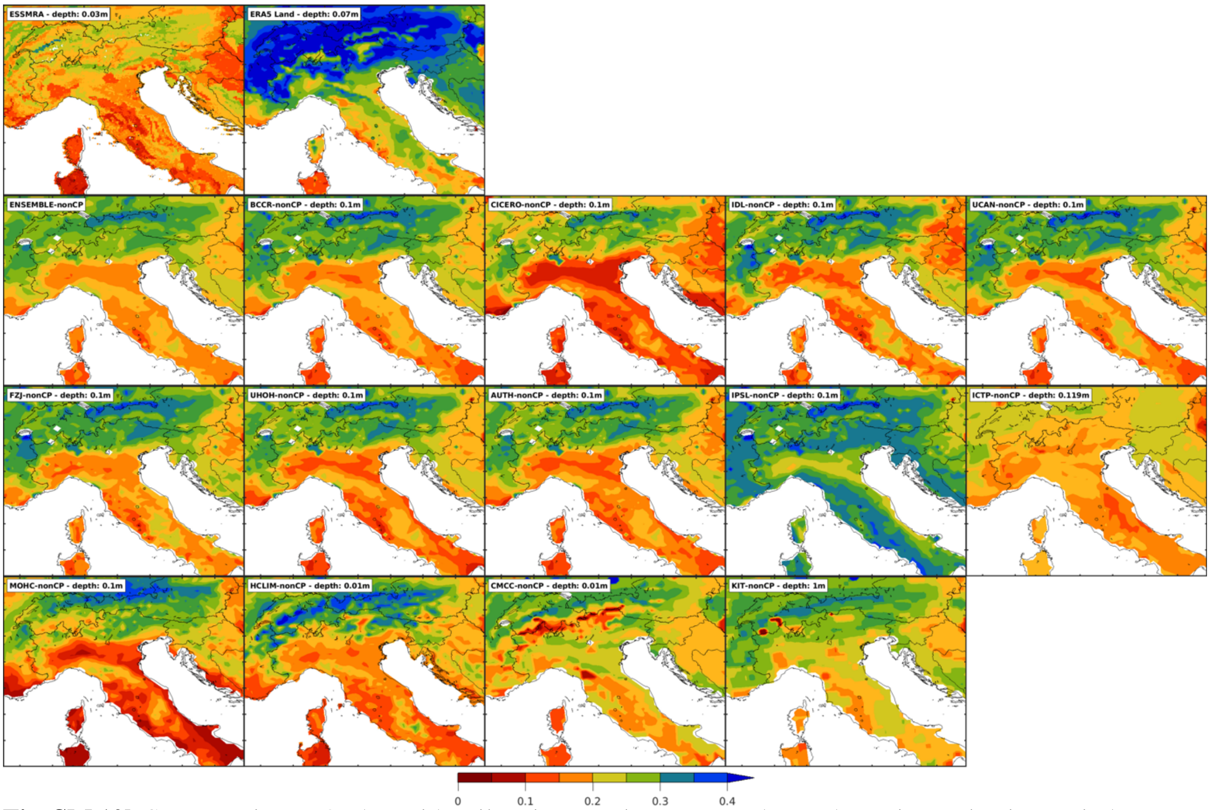

Fig. SM 10b Same as Figures 8a, but with soil moisture values averaged over the entire evaluation period summer seasons (JJA)

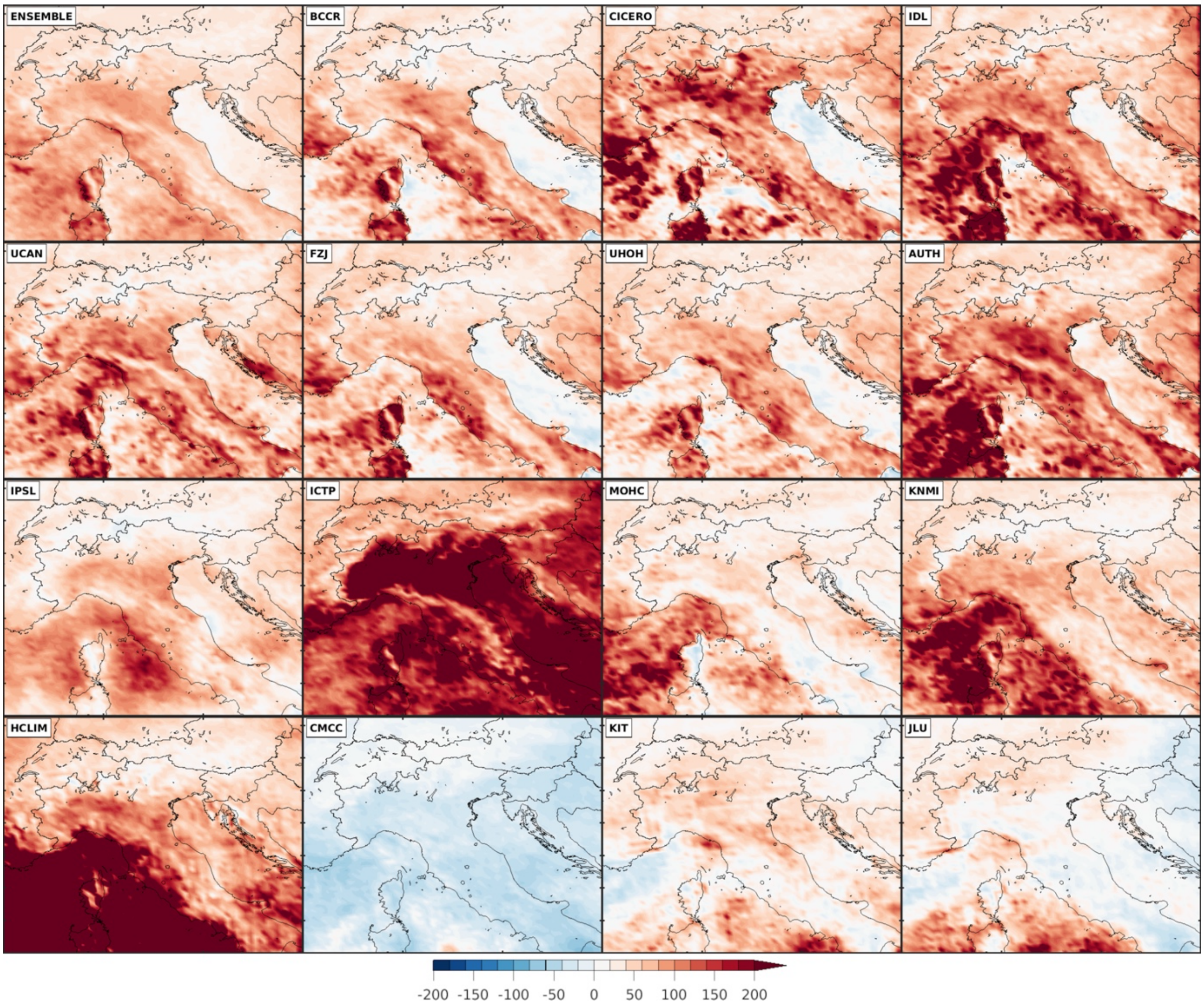

Fig. SM 11 Percentage differences between CPRCMs and RCCMs summer season mean DSL. For JLU CPRCM DSL is compared to the KIT RCM. Preliminarily to the DSL computation, CPRCMs have been remapped into the RCMs common grid (~15 km)