A Supplementary Material

A.1 Evaluation of large-scale climate conditions

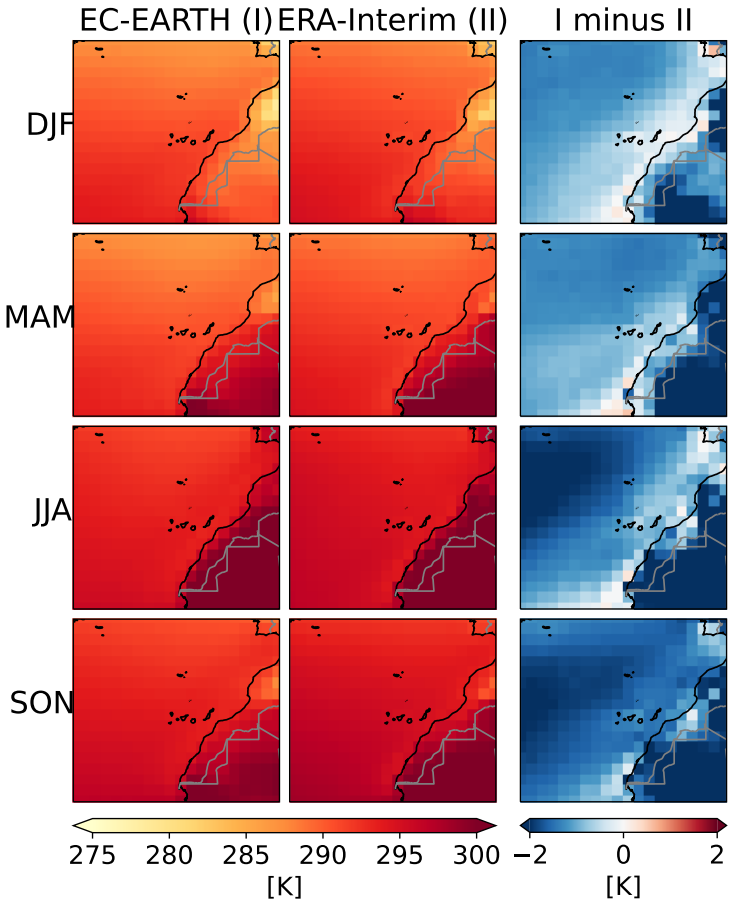


Figure A.1: Current signal of 2-meter temperature over the analysis domain as represented by the EC-EARTH GCM and ERA-Interim reanalysis data. The EC-EARTH signal was calculated over the CMCC present-day period (1996-2005), whereas for the ERA-Interim signal the ETH present-day period (2006-2015) was considered. Here, the reanalysis data was regridded onto the mesh of EC-EARTH.

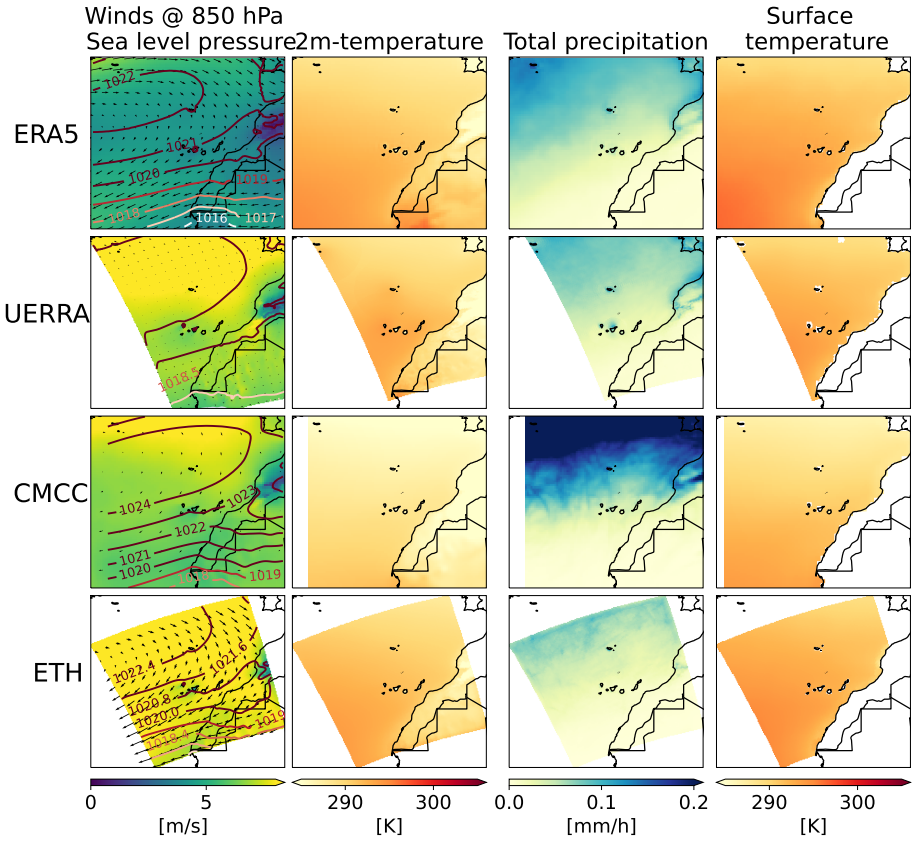


Figure A.2: Large-scale conditions over the Macaronesian domain for the winter season (DJF). The panels show, from left to right, the mean wind speed (shading), wind direction at 850 hPa (vectors) and the mean sea level pressure (contours), the mean 2-meter air temperature, the mean precipitation and the mean skin temperature for (from top to bottom) ERA-5 and UERRA reanalyses, and the two intermediate simulations of CMCC at 0.22° and ETH at 0.11° resolutions. The time periods considered are 1996-2015 for ERA-5 and UERRA, 1996-2005 for CMCC and 2006-2015 for ETH.

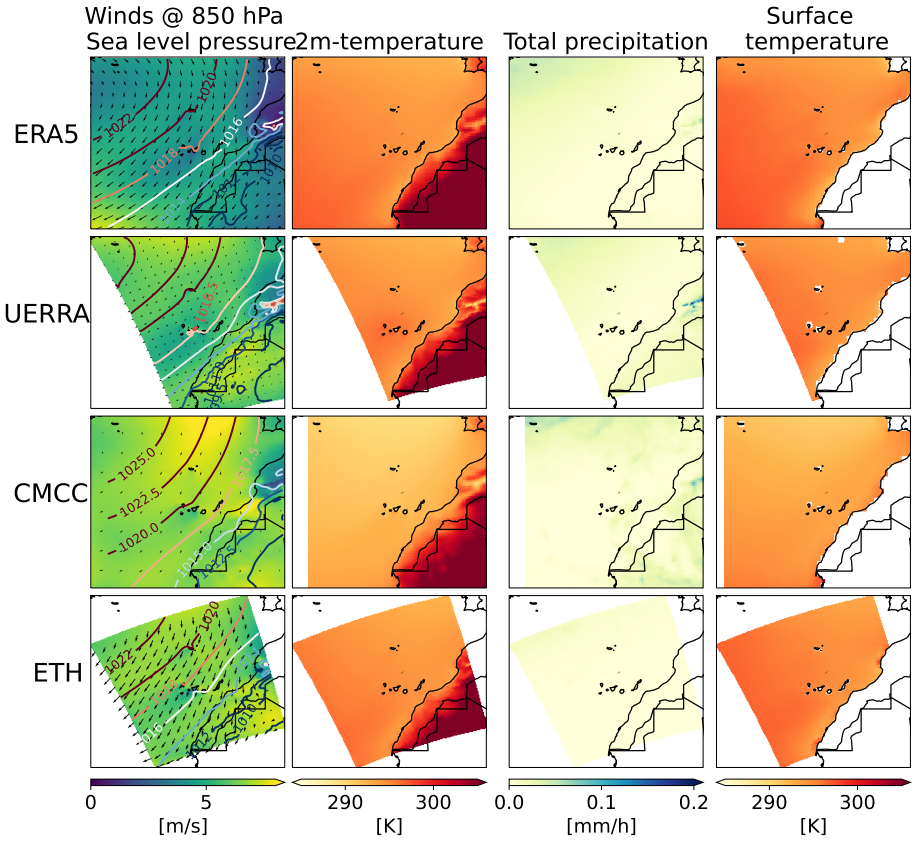


Figure A.3: Same as Fig. A.2 for the summer season (JJA).

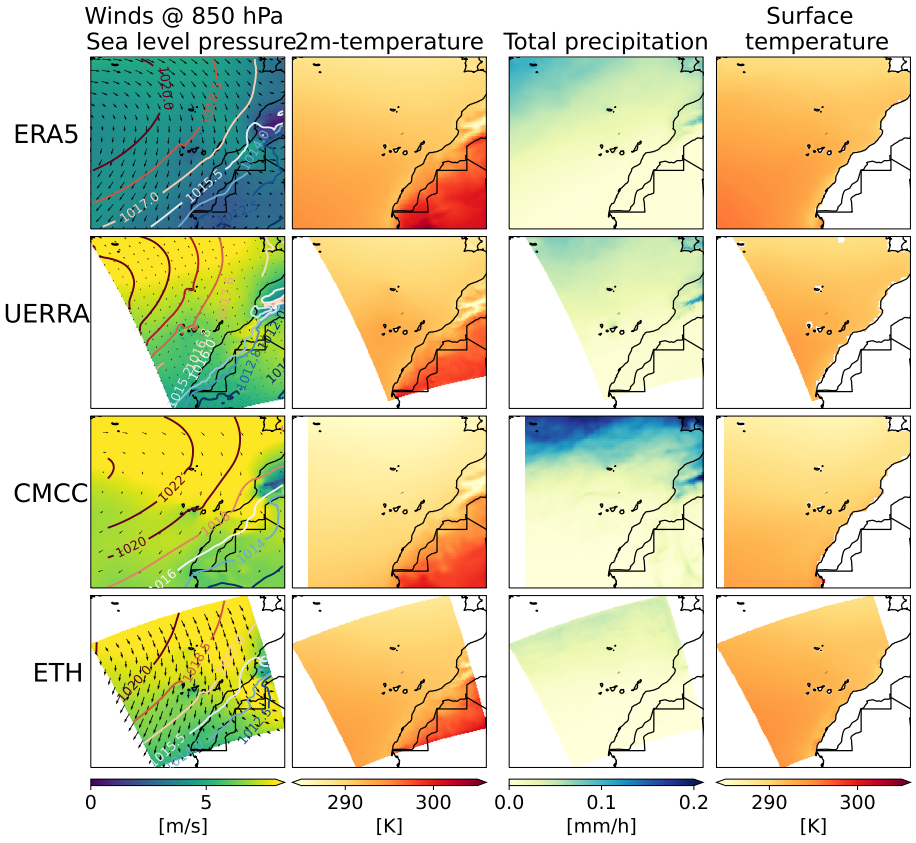


Figure A.4: Same as Fig. A.2 for the spring season (MAM).

A.2 Evaluation of precipitation indices

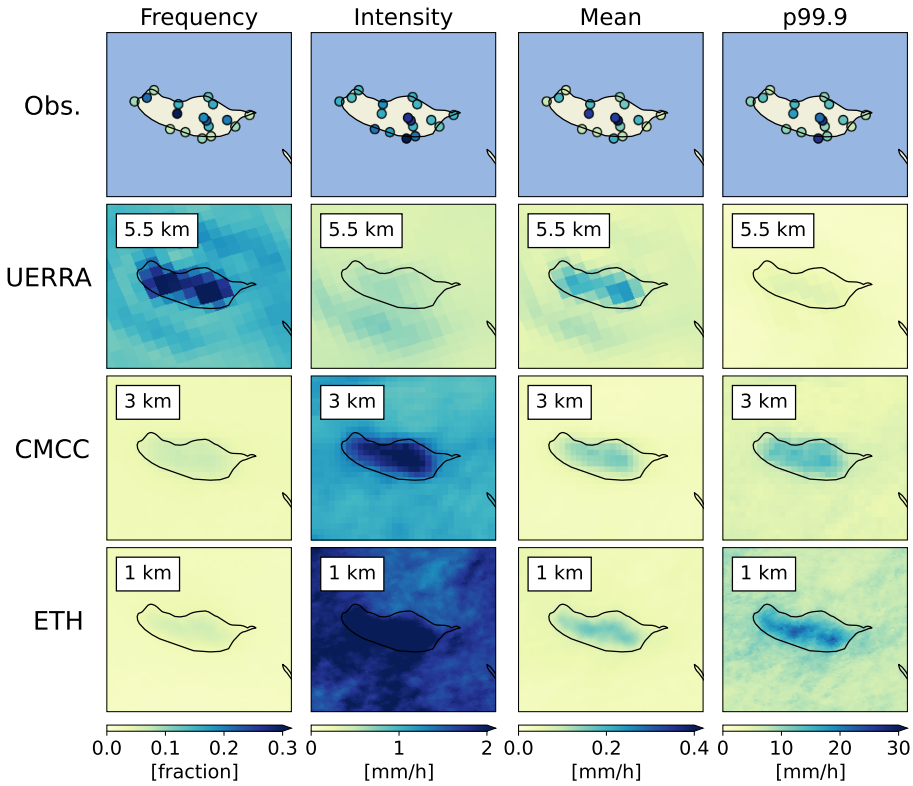


Figure A.5: Observed and simulated precipitation indices for the island of Madeira for the winter season (DJF). (From left to right) precipitation frequency, precipitation intensity, mean precipitation and heavy precipitation as displayed by (from top to bottom) UERRA reanalysis (5.5 km), CMCC (3 km), and ETH model (1 km) models. UERRA covers the 20-year time period 1996-2015, CMCC covers the period 1996-2005, and ETH covers the period 2006-2015. Station data was aggregated to hourly values to be consistent with the model output frequency. Note the different color bars for observations and UERRA.

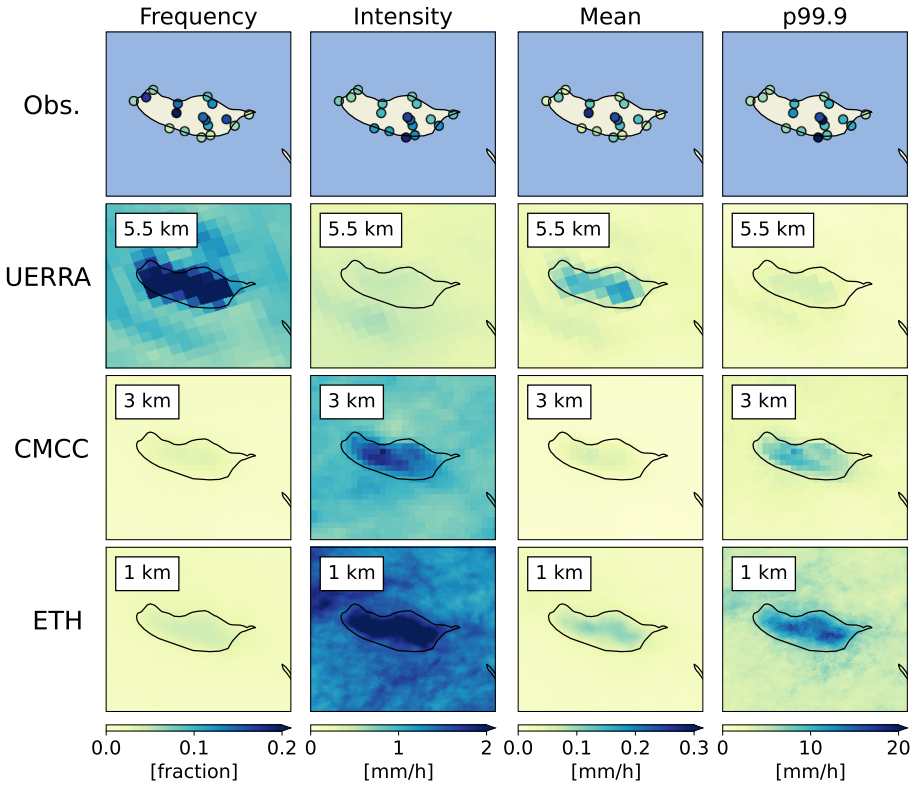


Figure A.6: Same as Fig. A.5 for the spring season (MAM).

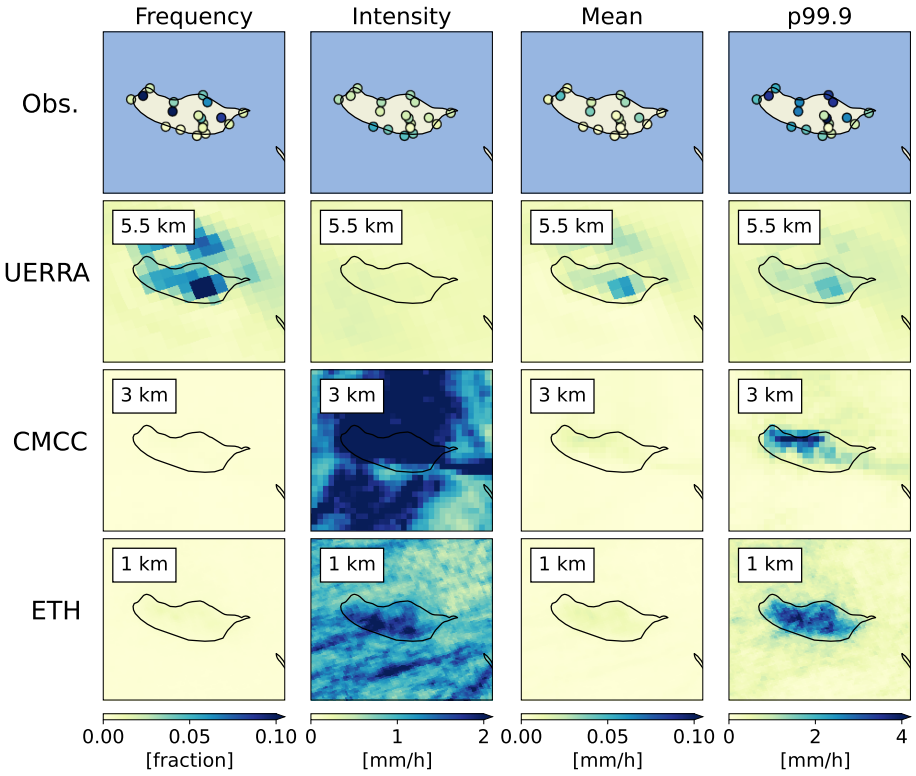


Figure A.7: Same as Fig. A.5 for the summer season (JJA).

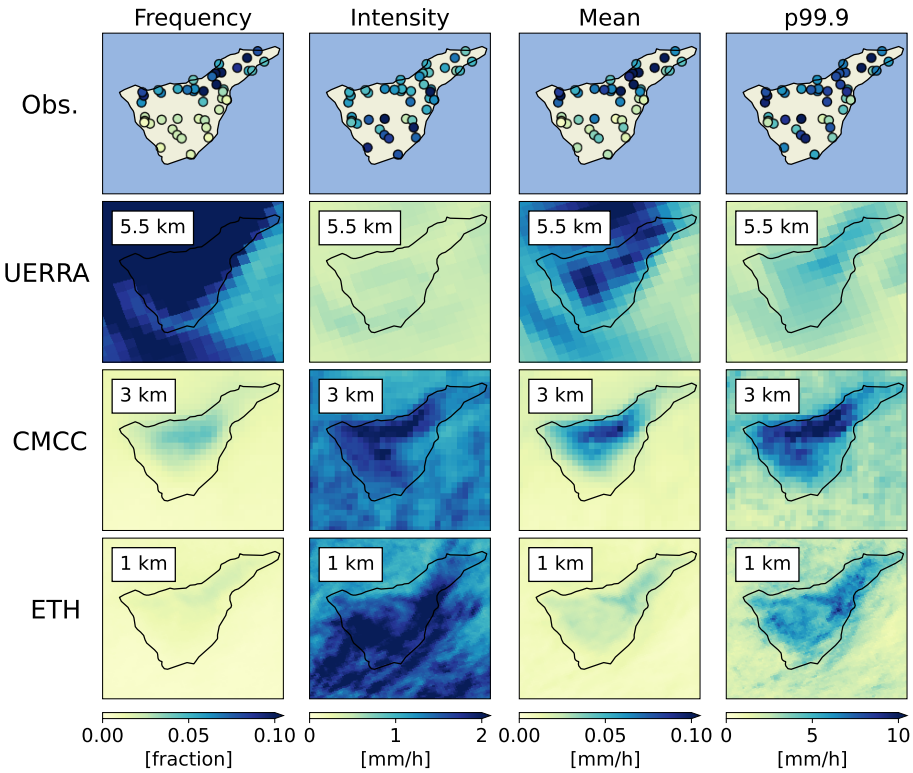


Figure A.8: Observed and simulated precipitation indices for the island of Tenerife for the winter season (DJF). (From left to right) precipitation frequency, precipitation intensity, mean precipitation and heavy precipitation as displayed by (from top to bottom) UERRA reanalysis (5.5 km), CMCC (3 km), and ETH model (1 km) models. UERRA covers the 20-year time period 1996-2015, CMCC covers the period 1996-2005, and ETH covers the period 2006-2015. Note the different color bars.

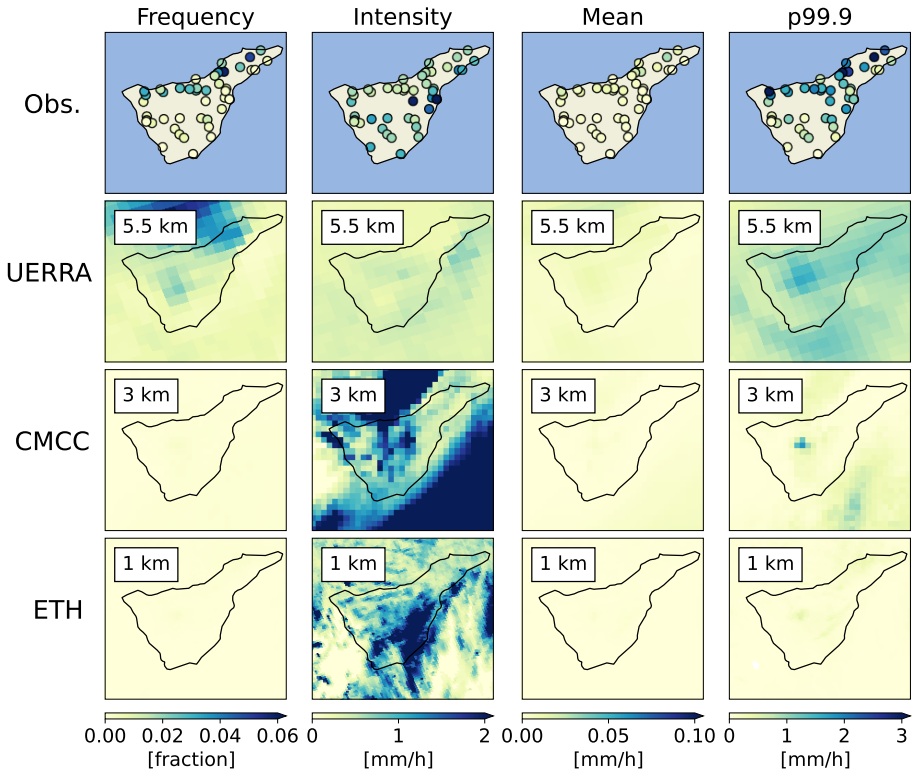


Figure A.9: Same as Fig. A.8 for the summer season (JJA).

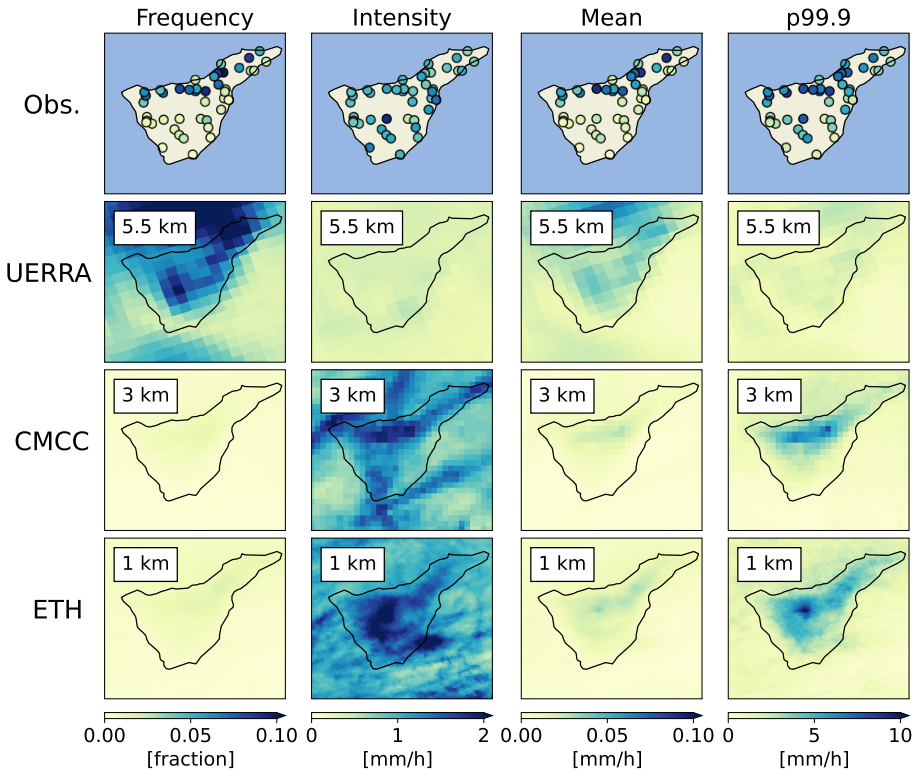


Figure A.10: Same as Fig. A.8 for the spring season (MAM).

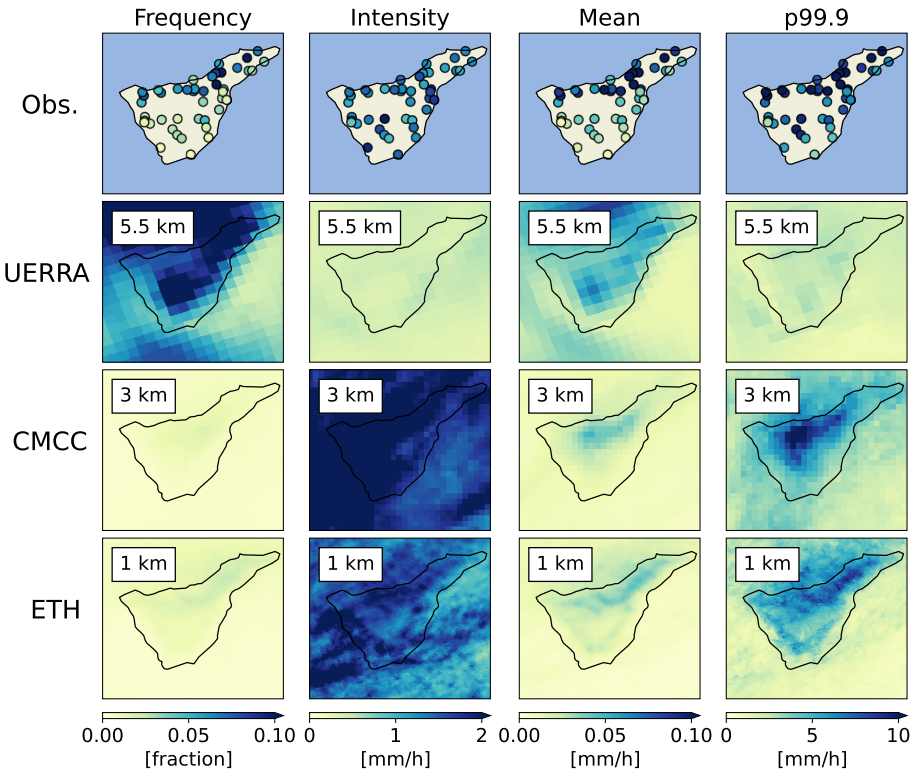


Figure A.11: Same as Fig. A.8 for the fall season (SON).

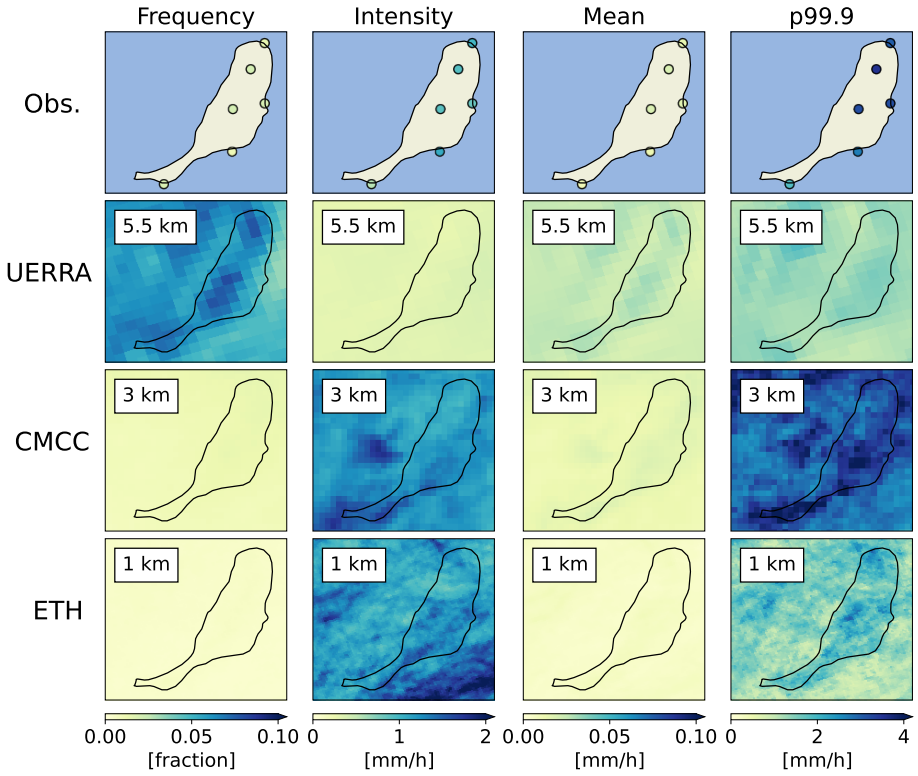


Figure A.12: Observed and simulated precipitation indices for the island of Fuerteventura for the winter season (DJF). (From left to right) precipitation frequency, precipitation intensity, mean precipitation and heavy precipitation as displayed by (from top to bottom) UERRA reanalysis (5.5 km), CMCC (3 km), and ETH model (1 km) models. UERRA covers the 20-year time period 1996-2015, CMCC covers the period 1996-2005, and ETH covers the period 2006-2015. Note the different color bars.

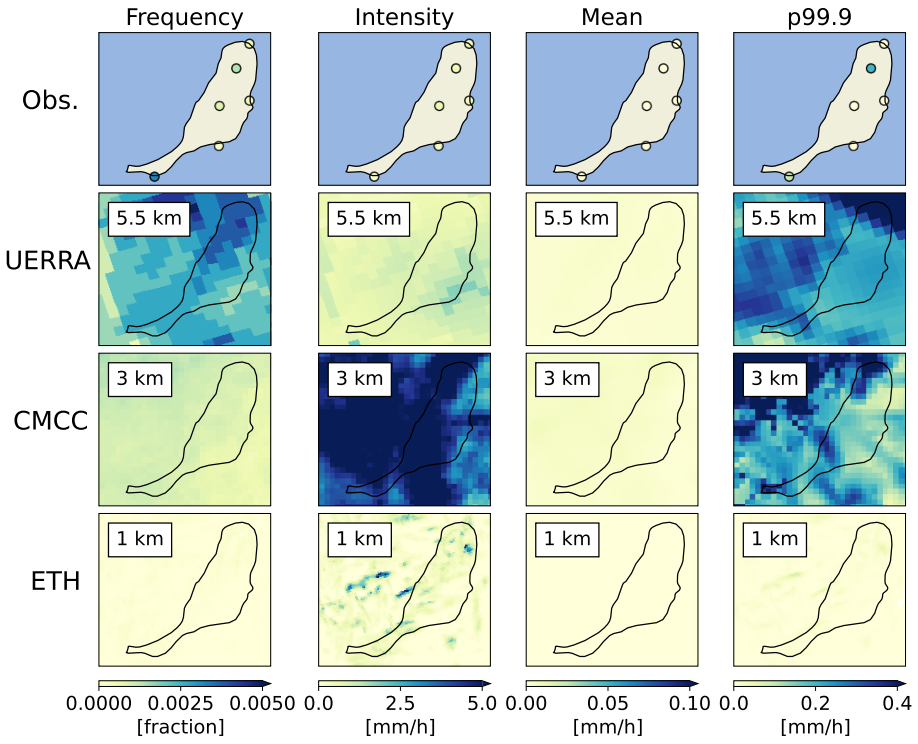


Figure A.13: Same as Fig. A.12 for the summer season (JJA).

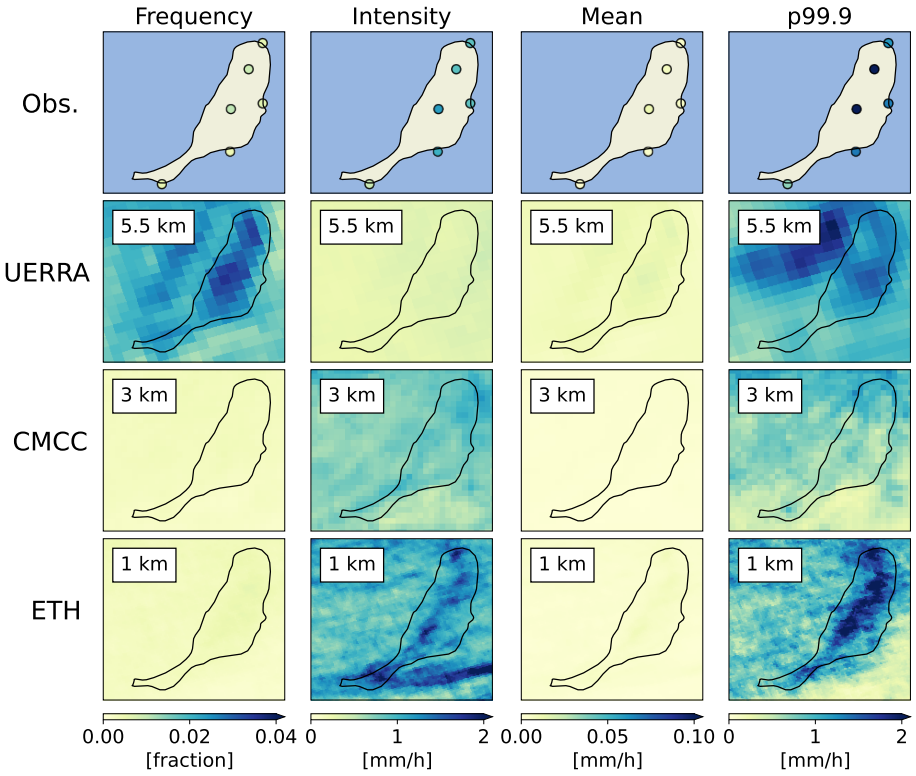


Figure A.14: Same as Fig. A.12 for the spring season (MAM).

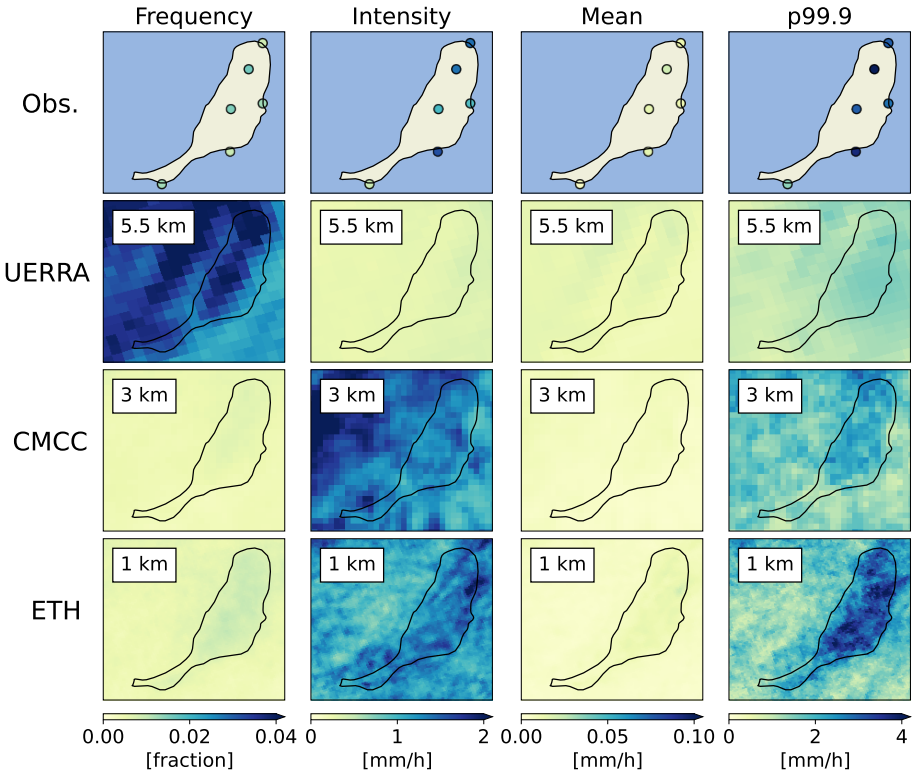
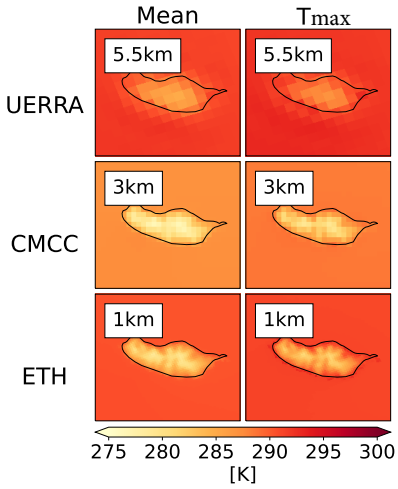
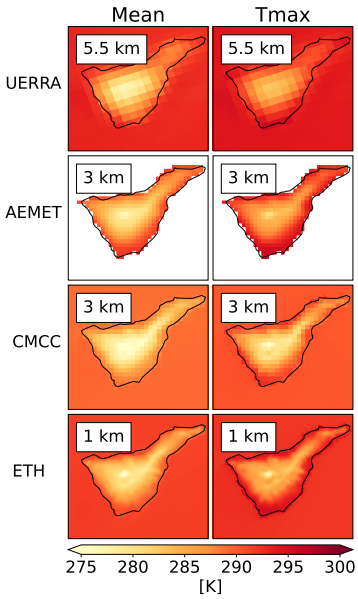


Figure A.15: Same as Fig. A.12 for the fall season (SON).

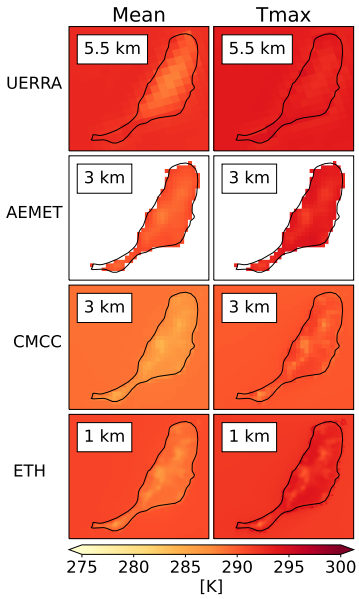
A.3 Evaluation of temperature indices



(a) Madeira

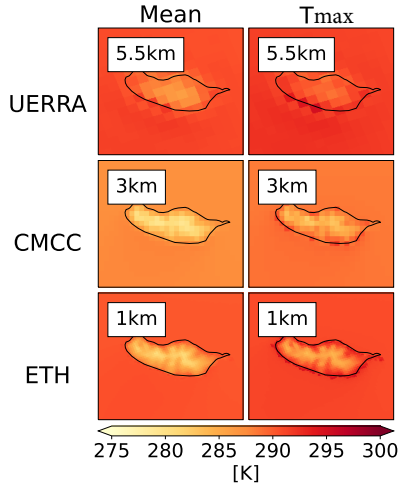


(b) Tenerife

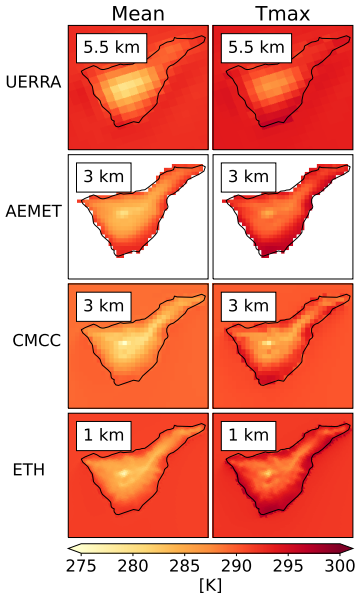


(c) Fuerteventura

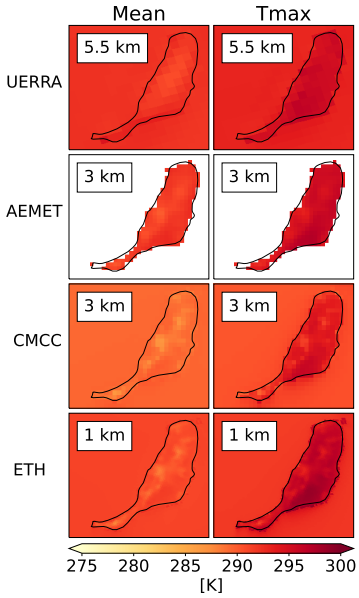
Figure A.16: 2-meter temperature (Mean) and mean of all daily maximum temperatures (TXx) for the winter season (DJF) as represented by (from top to bottom) UERRA reanalyses (1996-2015), AEMET gridded data (1996-2015), CMCC (3 km grid spacing, 1996-2005) and ETH models (1 km, 2006-2015) models over (a) Madeira, (b) Tenerife, (c) Fuerteventura. AEMET data is available only for Spanish territories.



(a) Madeira

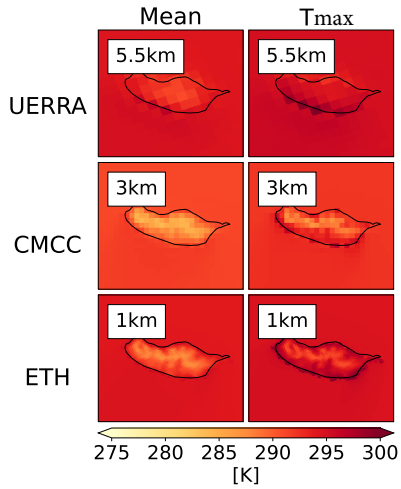


(b) Tenerife

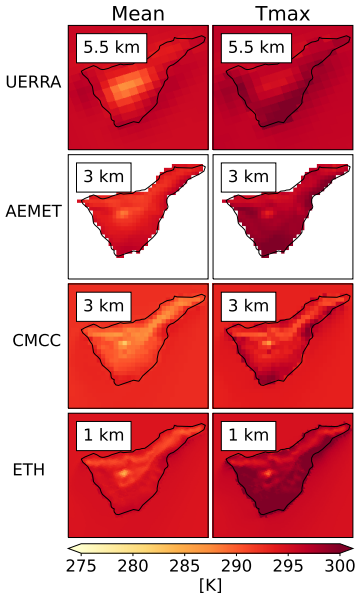


(c) Fuerteventura

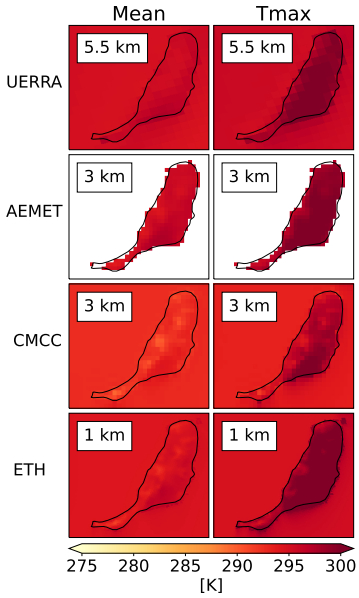
Figure A.17: Same as Fig. A.16 for the spring season (MAM).



(a) Madeira

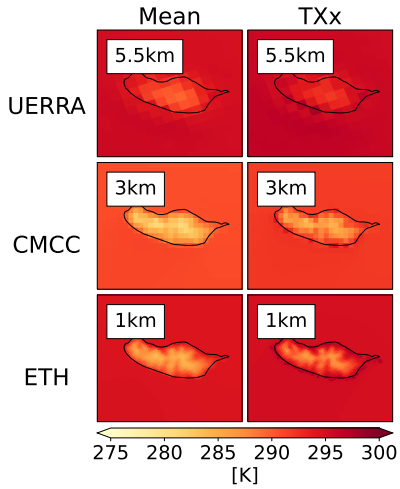


(b) Tenerife

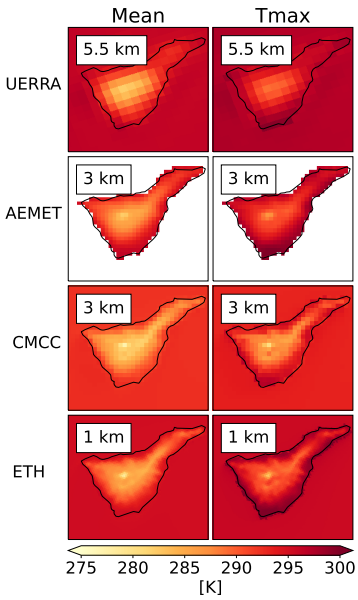


(c) Fuerteventura

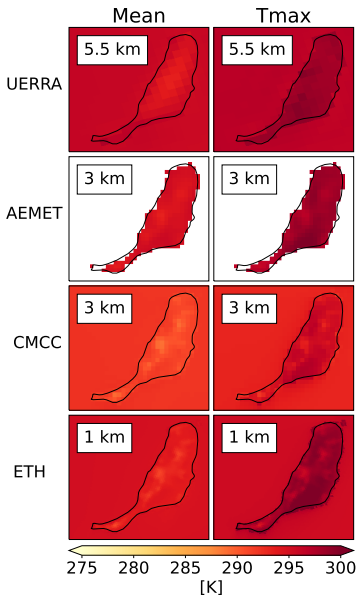
Figure A.18: Same as Fig. A.16 for the summer season (JJA).



(a) Madeira



(b) Tenerife



(c) Fuerteventura

Figure A.19: Same as Fig. A.16 for the fall season (SON).

A.4 Precipitation projections

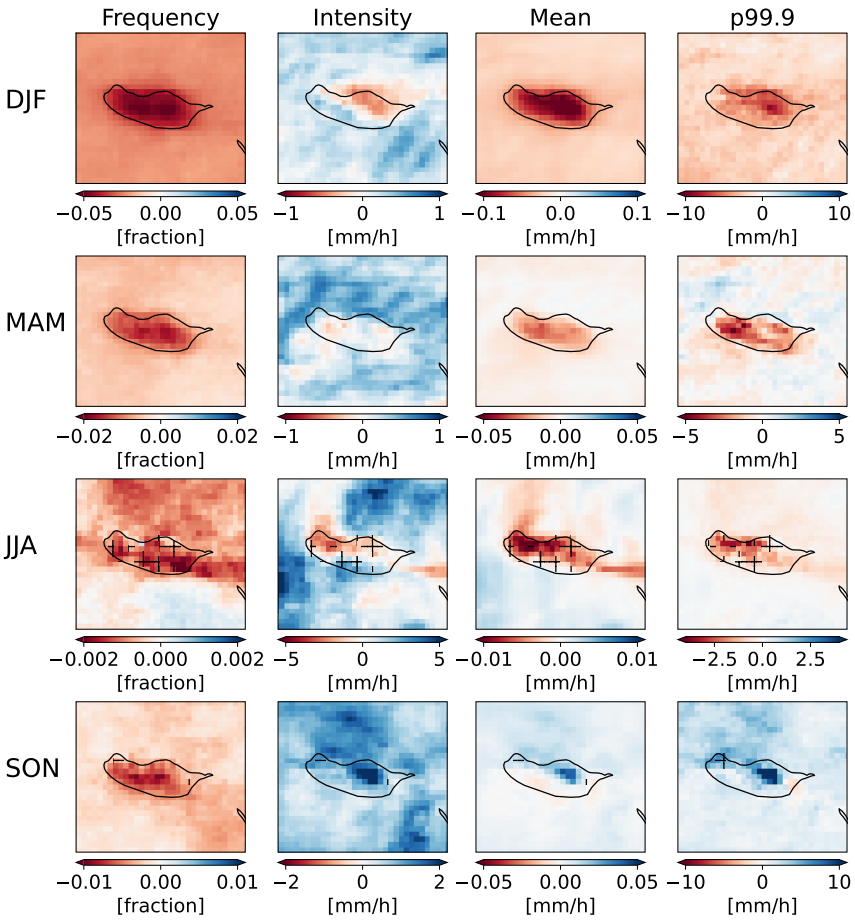


Figure A.20: Climate change signal of precipitation indices (from left to right, precipitation frequency, precipitation intensity, mean precipitation and heavy precipitation) projected by CMCC (3 km grid spacing, 2090-2099 vs 1996-2005) over Madeira for all seasons.

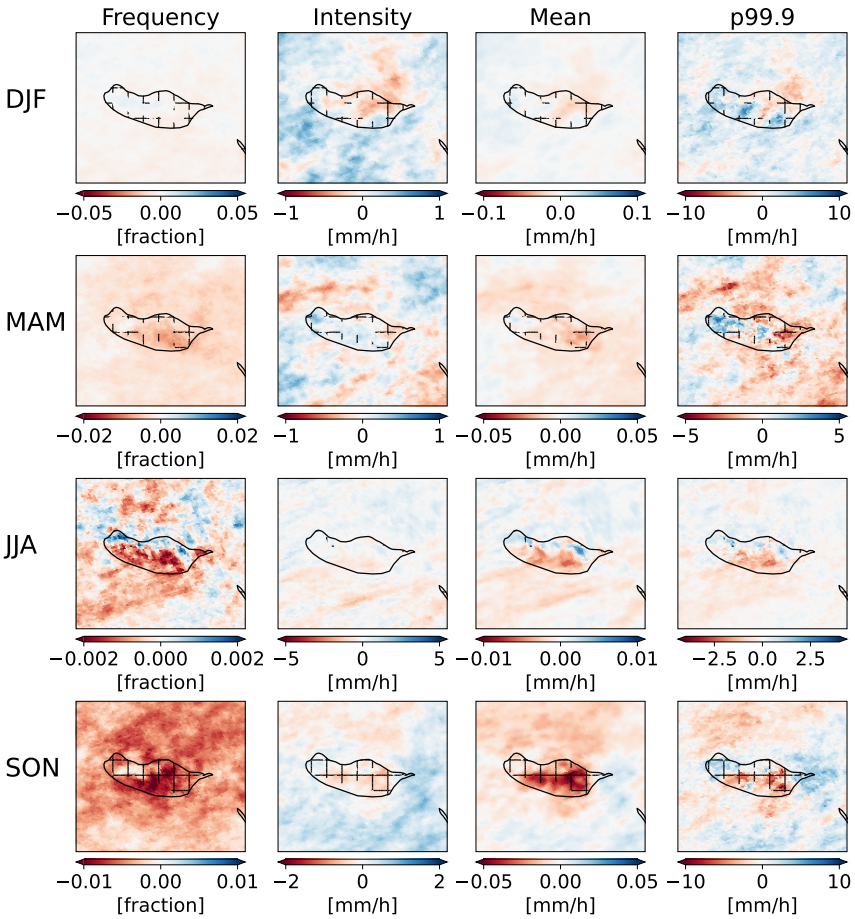


Figure A.21: Same as Fig. A.20 for ETH (1 km grid spacing, 2106-2115 vs 2006-2015).

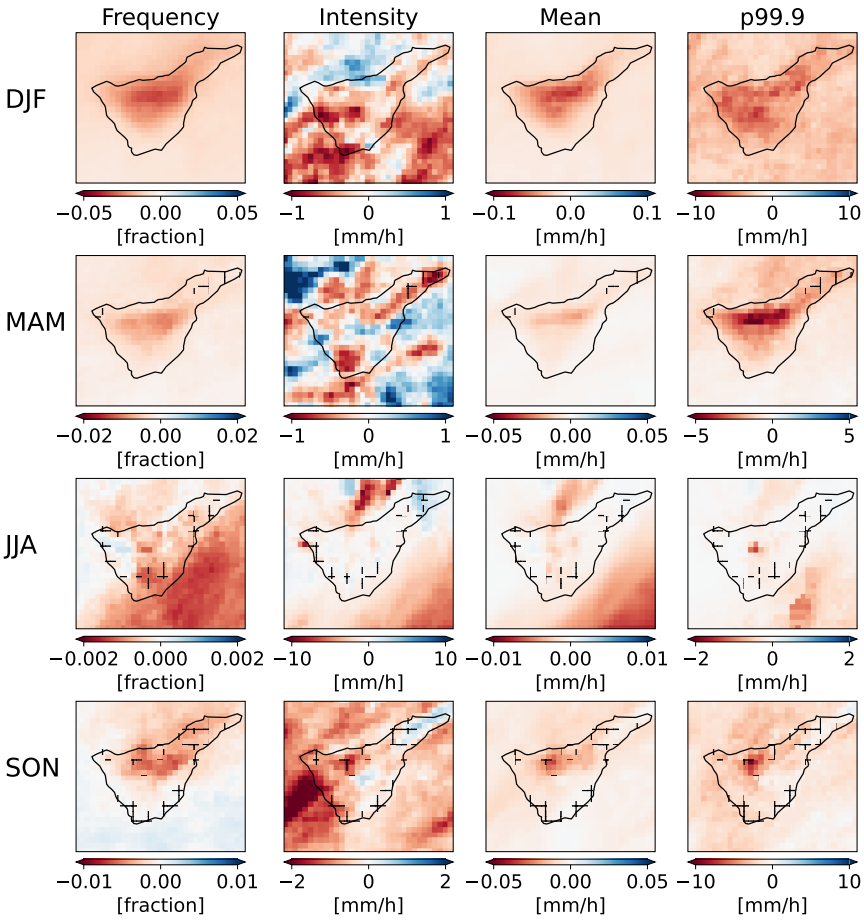


Figure A.22: Same as Fig. A.20 for CMCC over Tenerife.

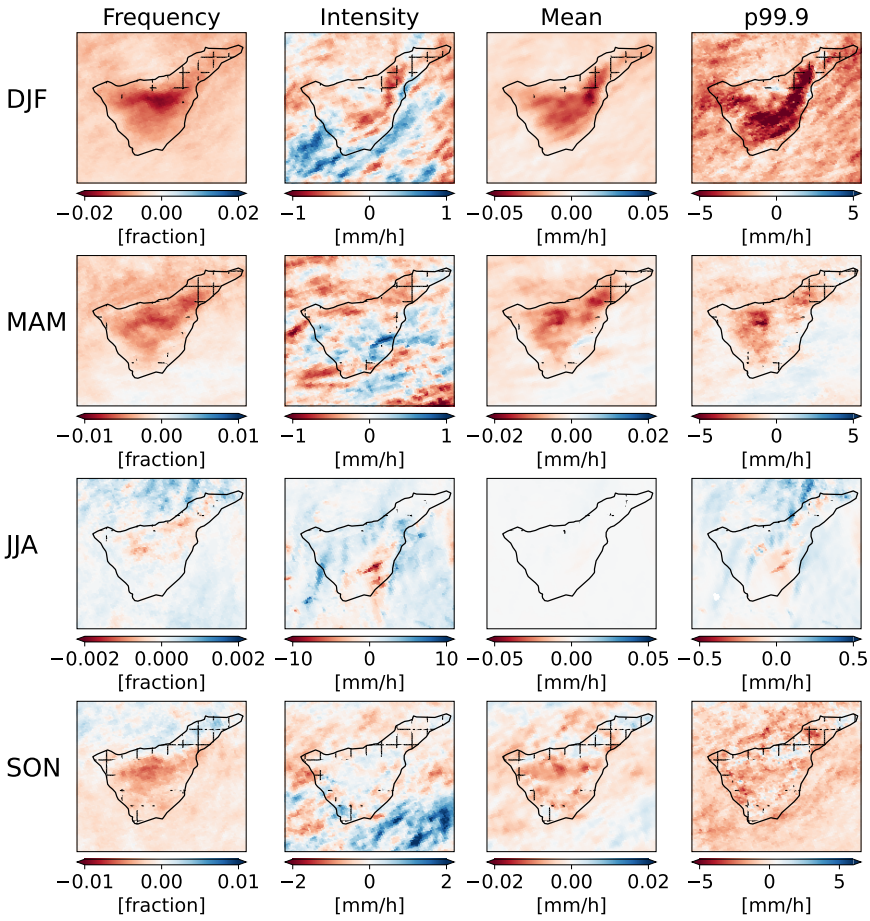


Figure A.23: Same as Fig. A.22 for ETH.

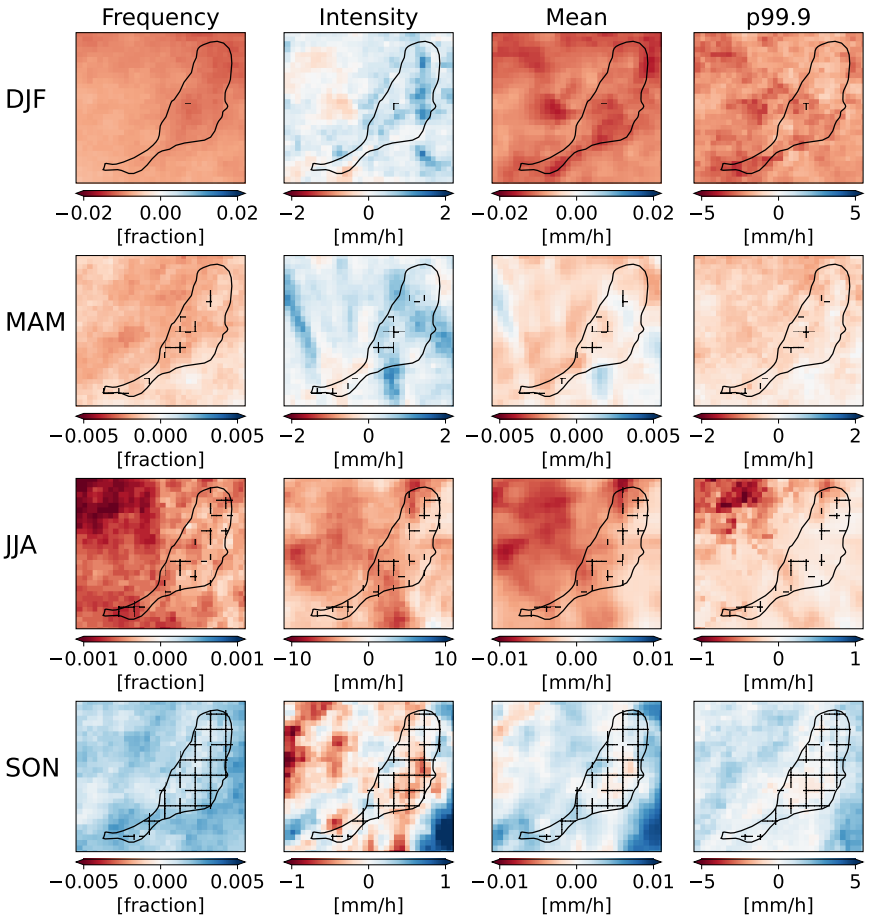


Figure A.24: Same as Fig. A.20 for CMCC over Fuerteventura.

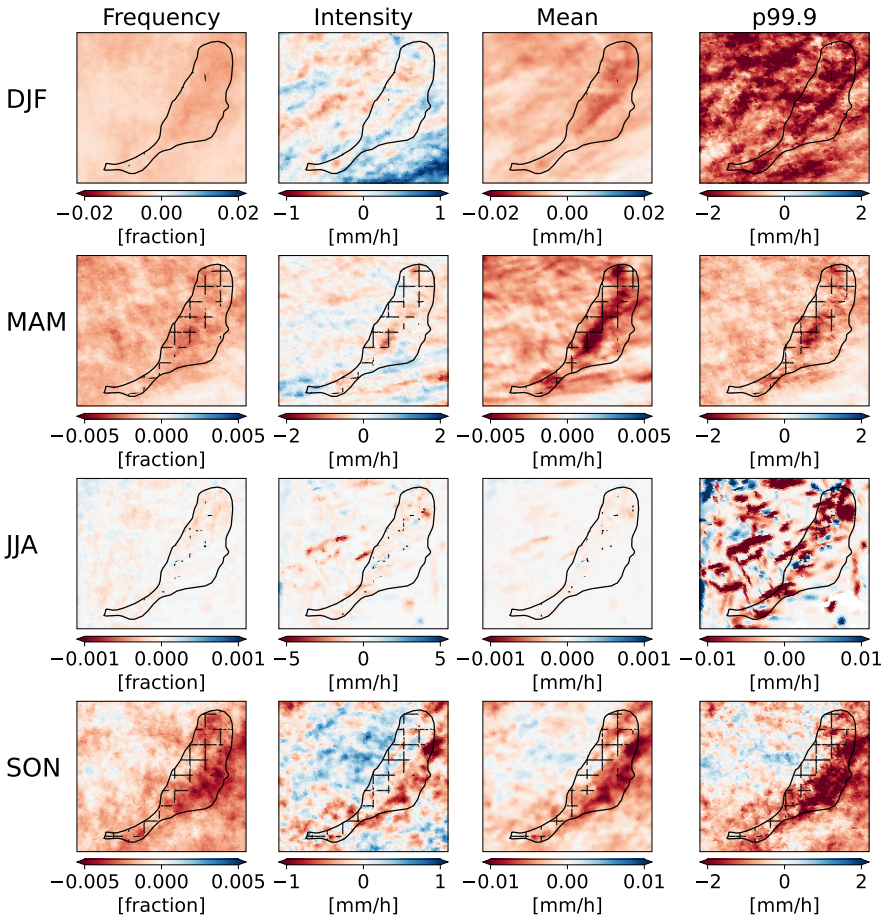
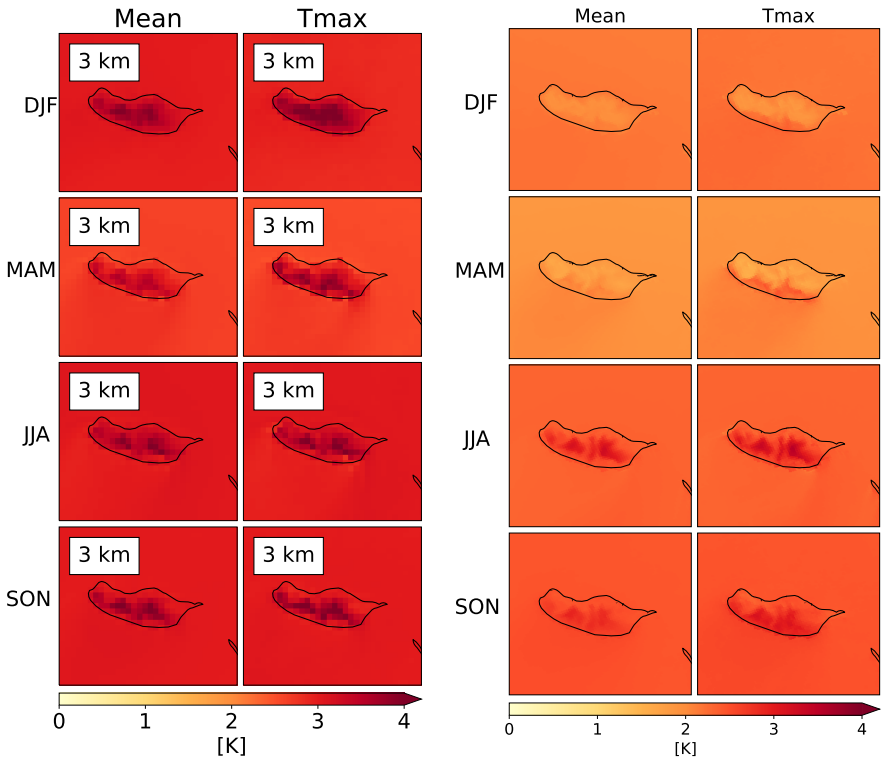


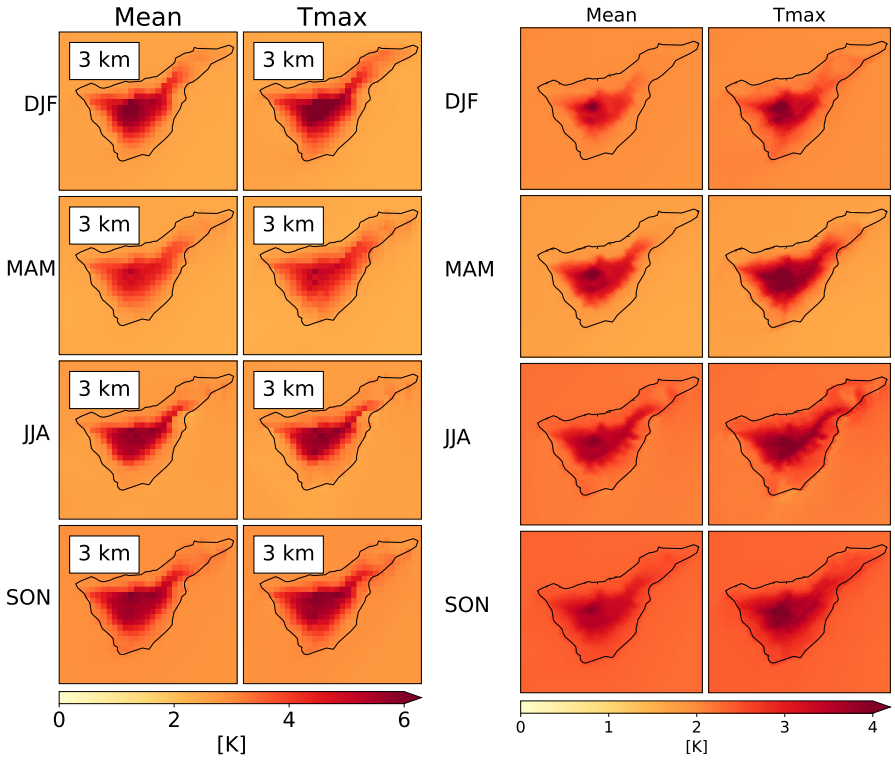
Figure A.25: Same as Fig. A.24 for ETH.

A.5 Temperature projections



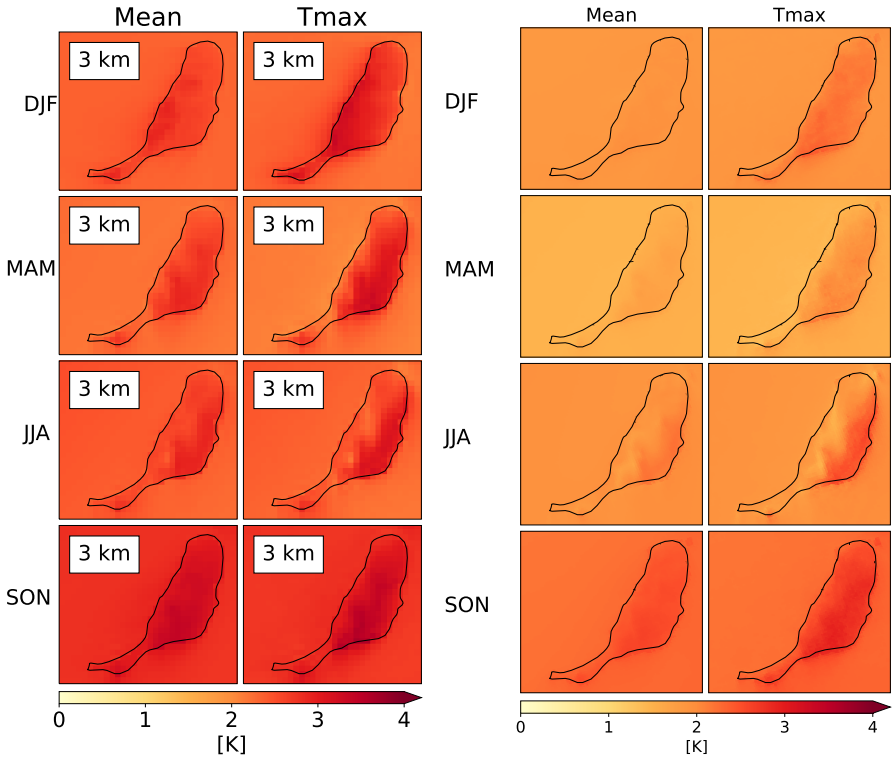
(a) CMCC (b) ETH

Figure A.26: Changes in 2-meter temperature (Mean) and mean of all daily maximum temperatures (Tmax) for each season as projected by (a) CMCC and (b) ETH models for the island of Madeira. The far-future signals of the 3 km and the 1 km models were calculated over the periods 2090-2099 vs 1996-2005 and 2106-2115 vs 2006-2015, respectively. The color shadings show the temperature difference in Kelvin.



(a) CMCC (b) ETH

Figure A.27: Same as Fig. A.26 for the island of Tenerife.



(a) CMCC (b) ETH

Figure A.28: Same as Fig. A.26 for the island of Fuerteventura.

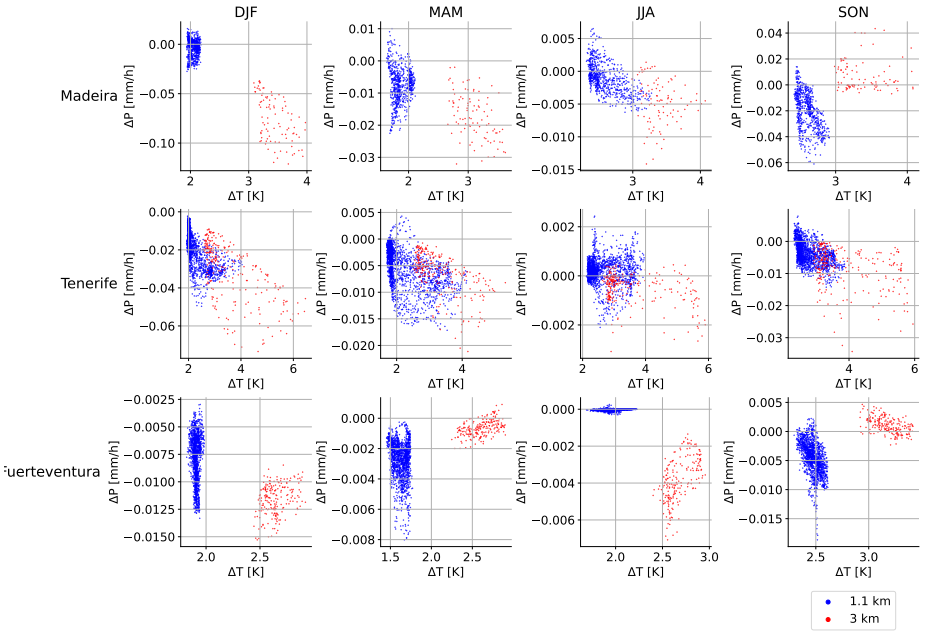


Figure A.29: Change in mean precipitation vs change in 2-meter mean temperature over each island and for each season. Each dot (blue for ETH, red for CMCC models) represents the difference between future and present-day climates in both seasonal mean temperature and heavy precipitation over a land grid cell (with a land fraction above 50%).