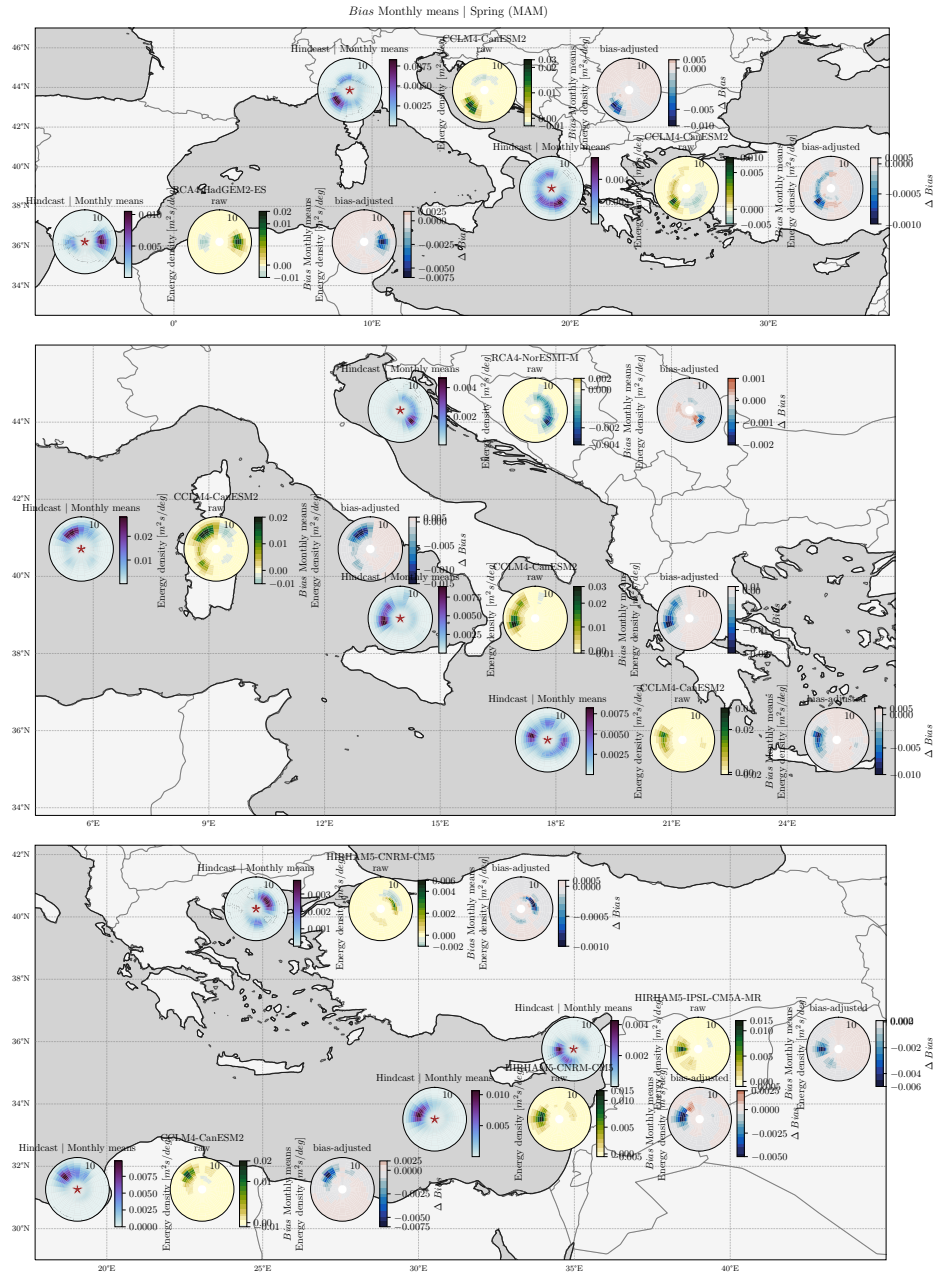


# **Supplementary Information to "Ocean wave spectra bias correction through energy conservation for climate change impacts"**

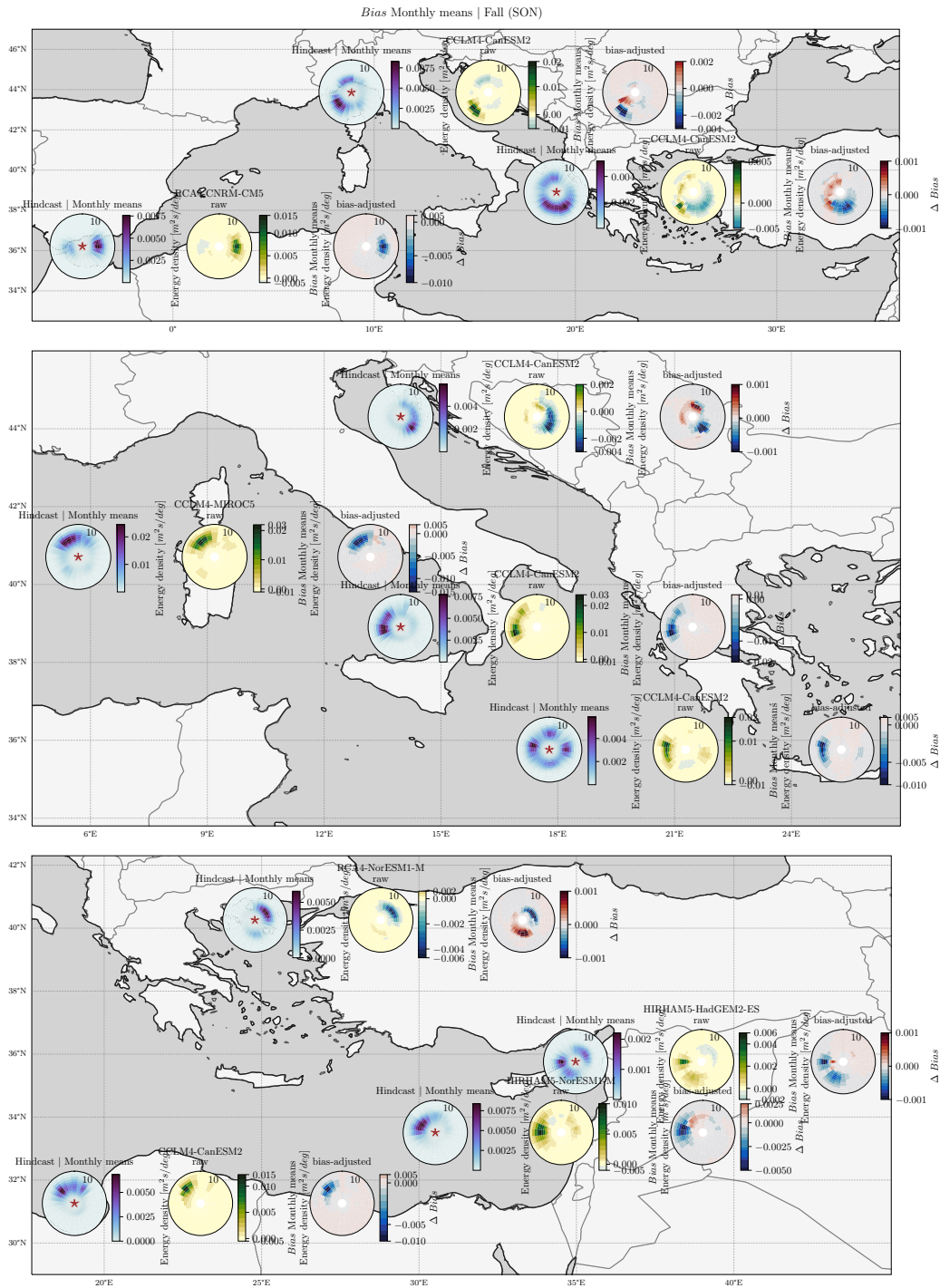
Andrea Lira Loarca<sup>1</sup> and Giovanni Besio<sup>1</sup>

<sup>1</sup>Department of Civil, Chemical and Environmental Engineering, University of Genoa. Via Montallegro 1, 16145, Genoa, Italy

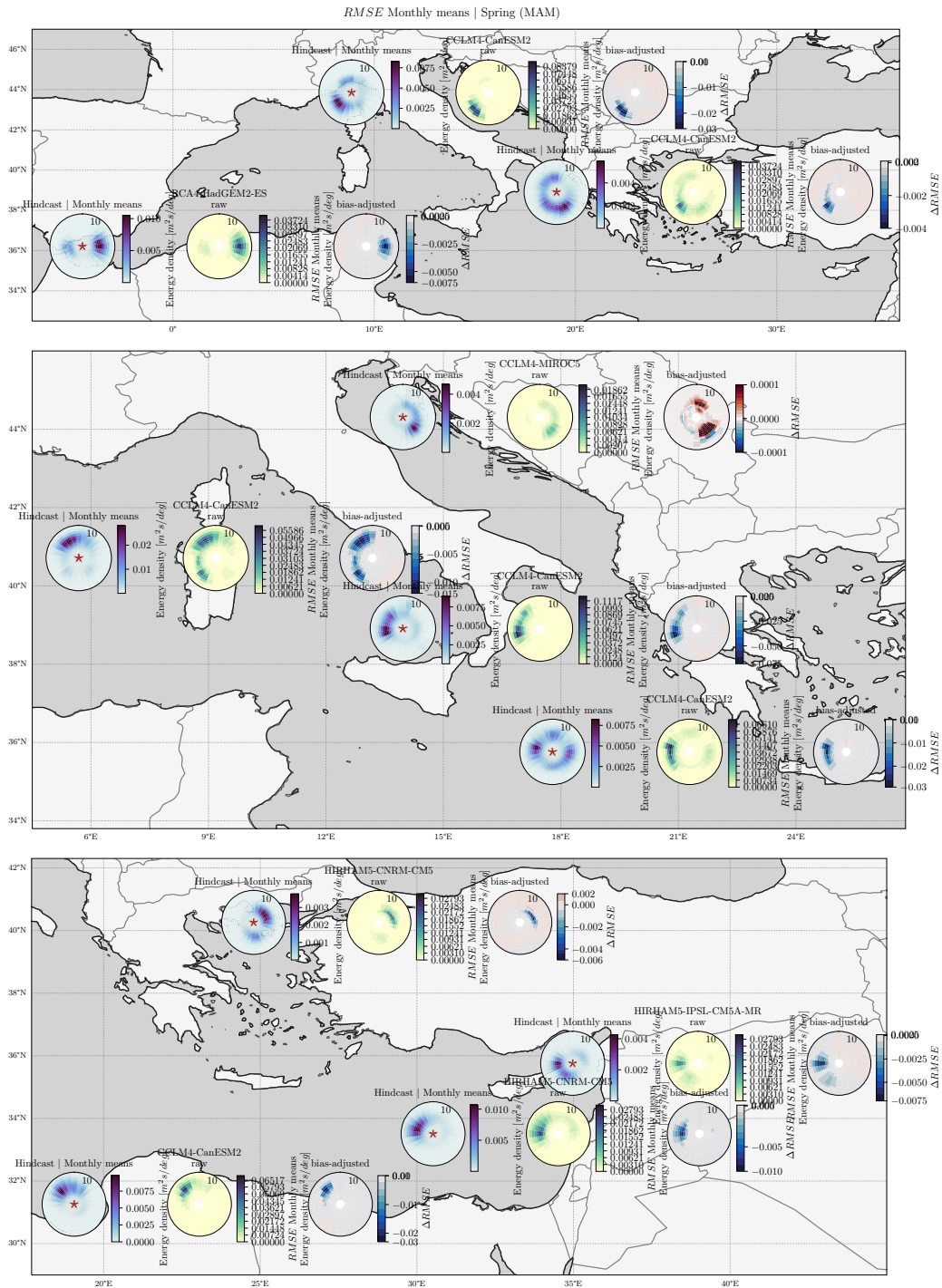
**Correspondence:** Andrea Lira Loarca (andrea.lira.loarca@unige.it)



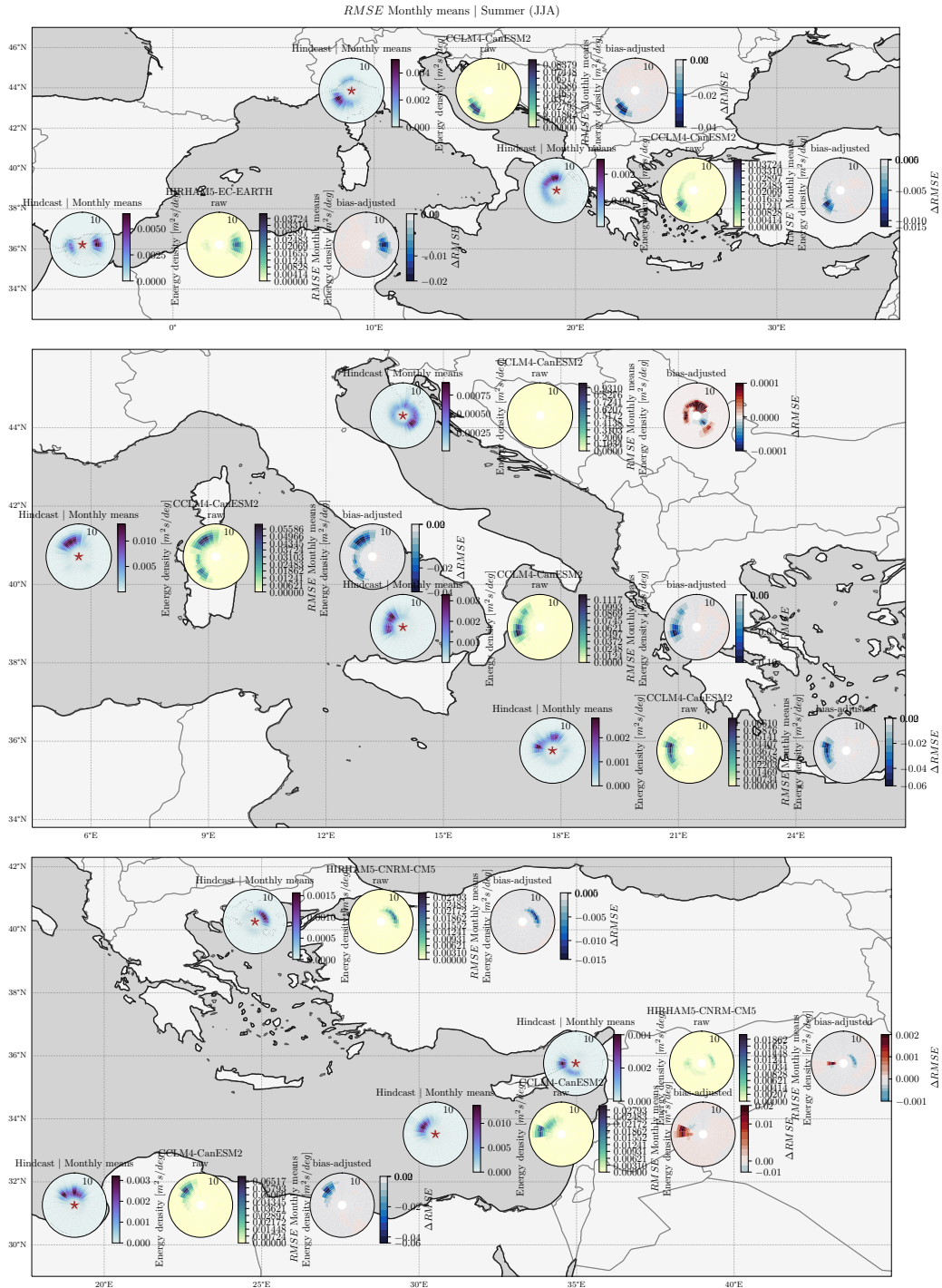
**Figure S1.** Spring (March, April and May) mean of the wave spectrum monthly means for hindcast and *Bias* between GCM-RCMs and hindcast for the baseline period (1979 – 2005) and different locations in the Mediterranean Sea. For each location: spring mean of the hindcast wave spectrum monthly means for the baseline period (left), *Bias* between the raw (middle) and bias-adjusted (right) GCM-RCM and hindcast.



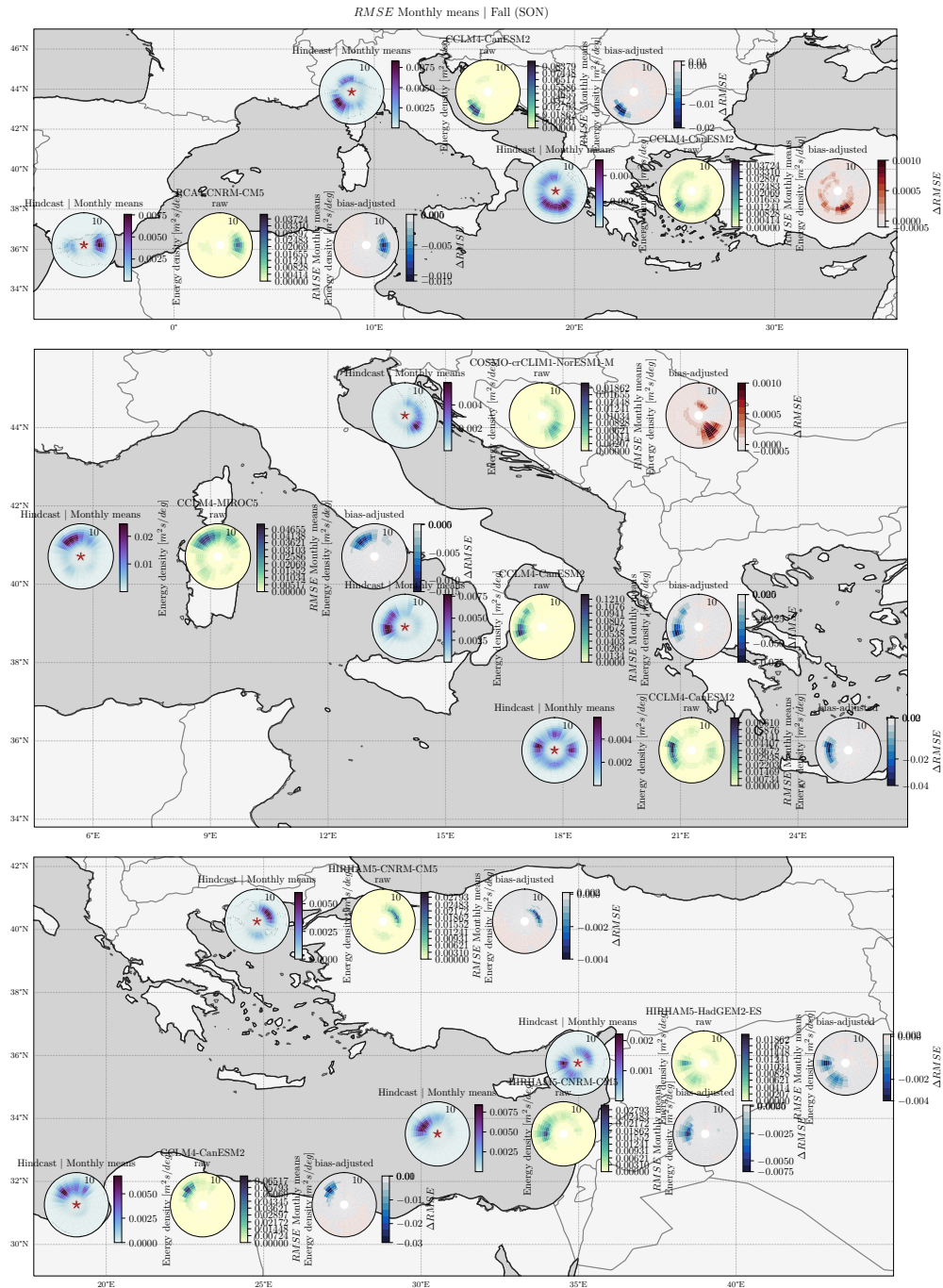
**Figure S2.** Fall (September, October and November) mean of the wave spectrum monthly means for hindcast and *Bias* between GCM-RCMs and hindcast for the baseline period (1979 – 2005) and different locations in the Mediterranean Sea. For each location: fall mean of the hindcast wave spectrum monthly means for the baseline period (left), *Bias* between the raw (middle) and bias-adjusted (right) GCM-RCM and hindcast.



**Figure S3.** Spring (March, April and May) mean of the wave spectrum monthly means for the hindcast and  $RMSE$  between GCM-RCMs and hindcast for the baseline period (1979 – 2005) and different locations in the Mediterranean Sea. For each location: spring mean of the hindcast wave spectrum monthly means for the baseline period (left),  $RMSE$  between the raw (middle) and bias-adjusted (right) GCM-RCM and hindcast.

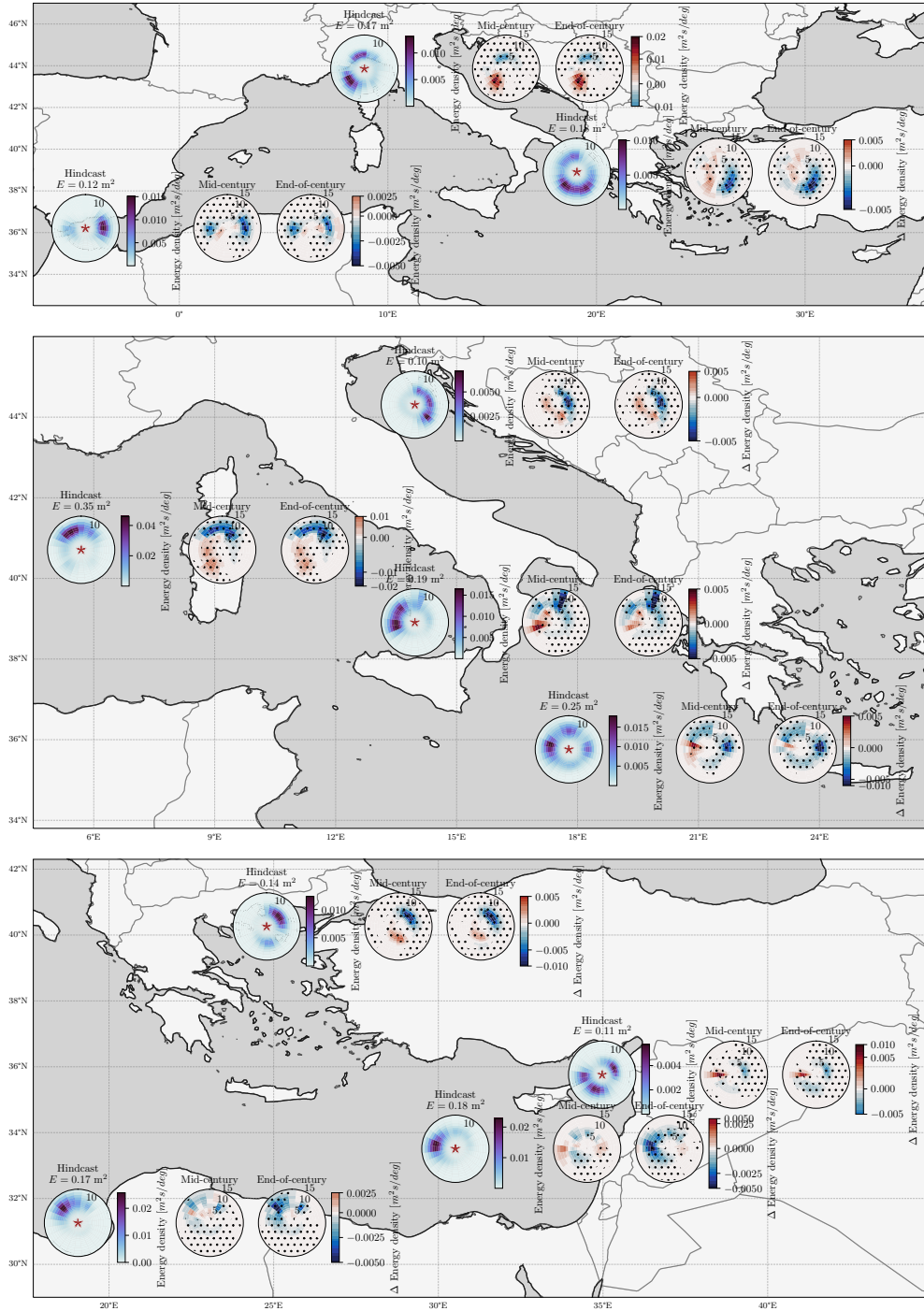


**Figure S4.** Summer (June, July and August) mean of the wave spectrum monthly means for the hindcast and *RMSE* between GCM-RCMs and hindcast for the baseline period (1979 – 2005) and different locations in the Mediterranean Sea. For each location: summer mean of the hindcast wave spectrum monthly means for the baseline period (left), *RMSE* between the raw (middle) and bias-adjusted (right) GCM-RCM and hindcast.

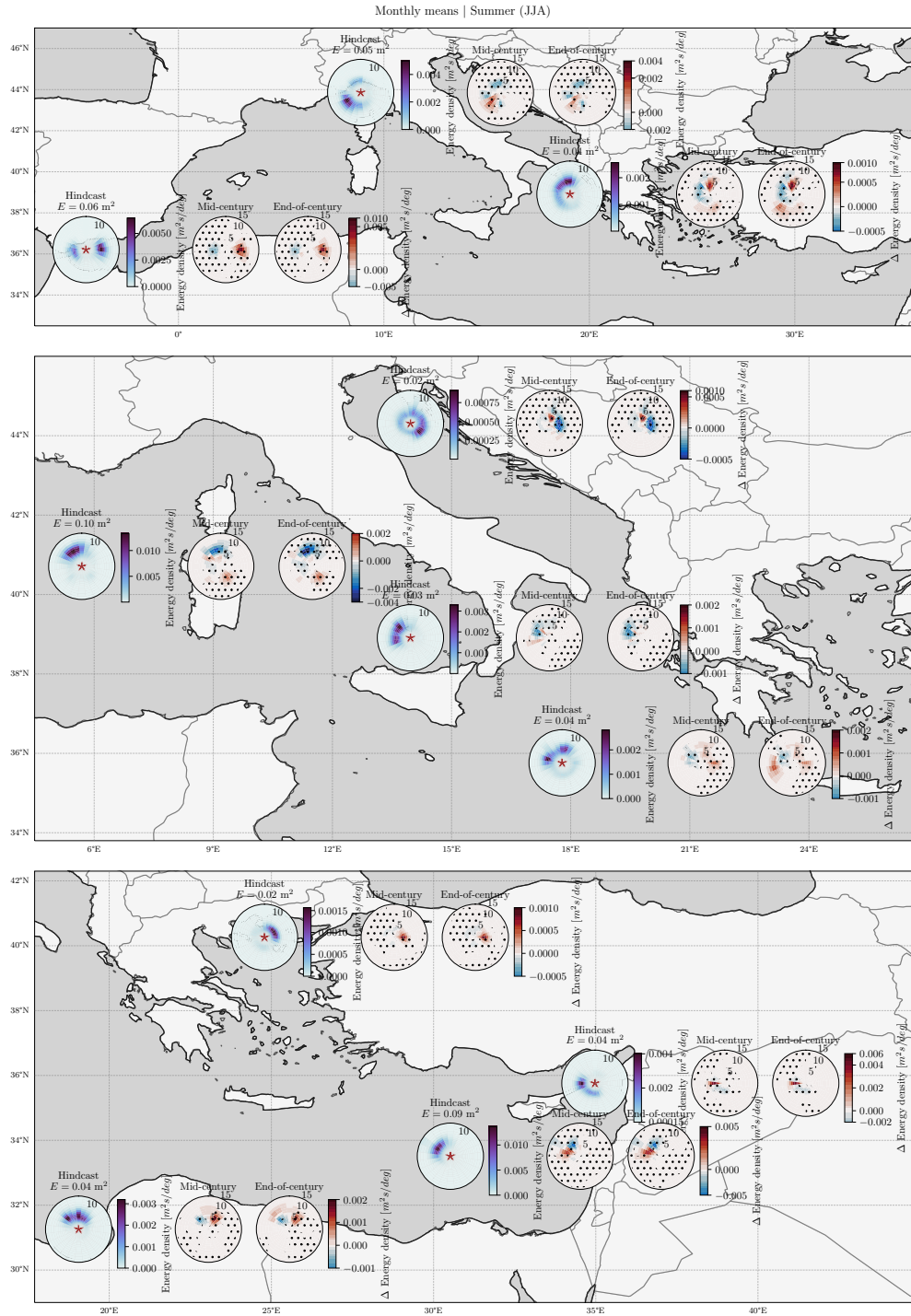


**Figure S5.** Fall (September, October and November) mean of the wave spectrum monthly means for the hindcast and *RMSE* between GCM-RCMs and hindcast for the baseline period (1979 – 2005) and different locations in the Mediterranean Sea. For each location: fall mean of the hindcast wave spectrum monthly means for the baseline period (left), *RMSE* between the raw (middle) and bias-adjusted (right) GCM-RCM and hindcast.

Monthly means | Winter (DJF)

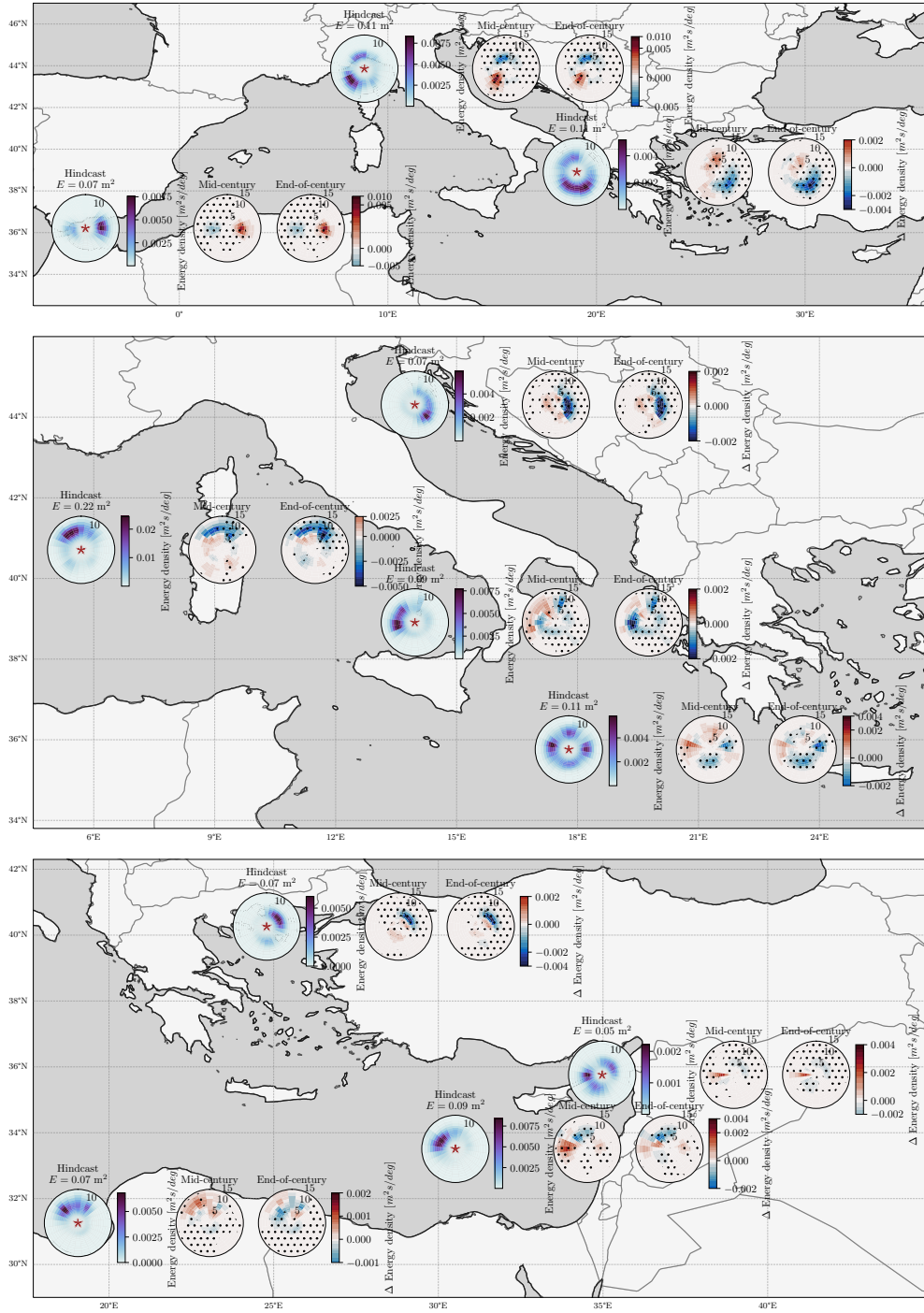


**Figure S6.** Winter mean of the hindcast wave spectrum monthly means, ensemble mean for baseline conditions, changes between the multi-model bias-adjusted ensemble mean with respect to baseline period for mid-century (2034 – 2060) and end-of-century (2074 – 2100) conditions, for all the analyzed locations in the Mediterranean Sea.

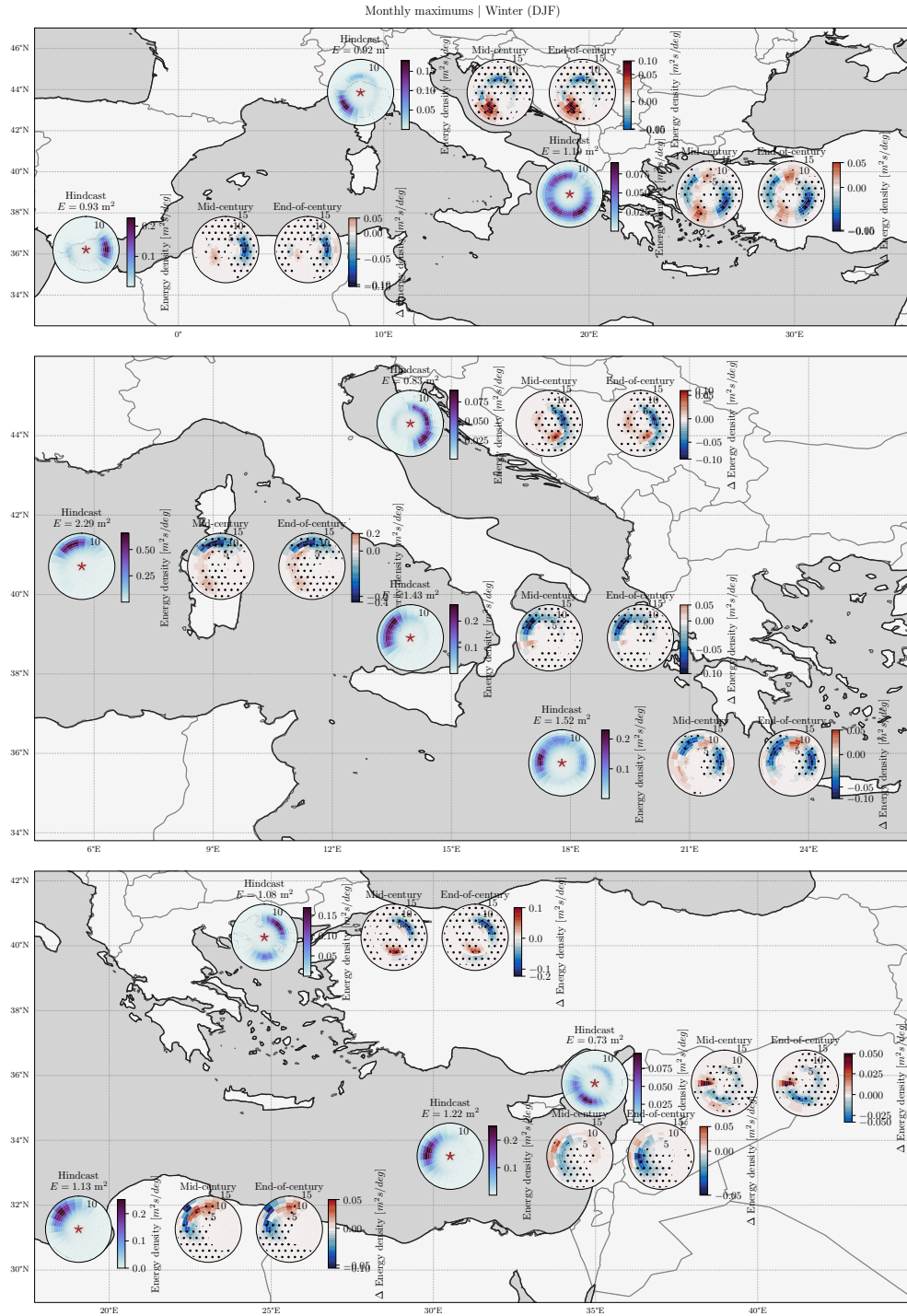


**Figure S7.** Summer mean of the hindcast wave spectrum monthly means, ensemble mean for baseline conditions, changes between the multi-model bias-adjusted ensemble mean with respect to baseline period for mid-century (2034 – 2060) and end-of-century (2074 – 2100) conditions, for all the analyzed locations in the Mediterranean Sea.

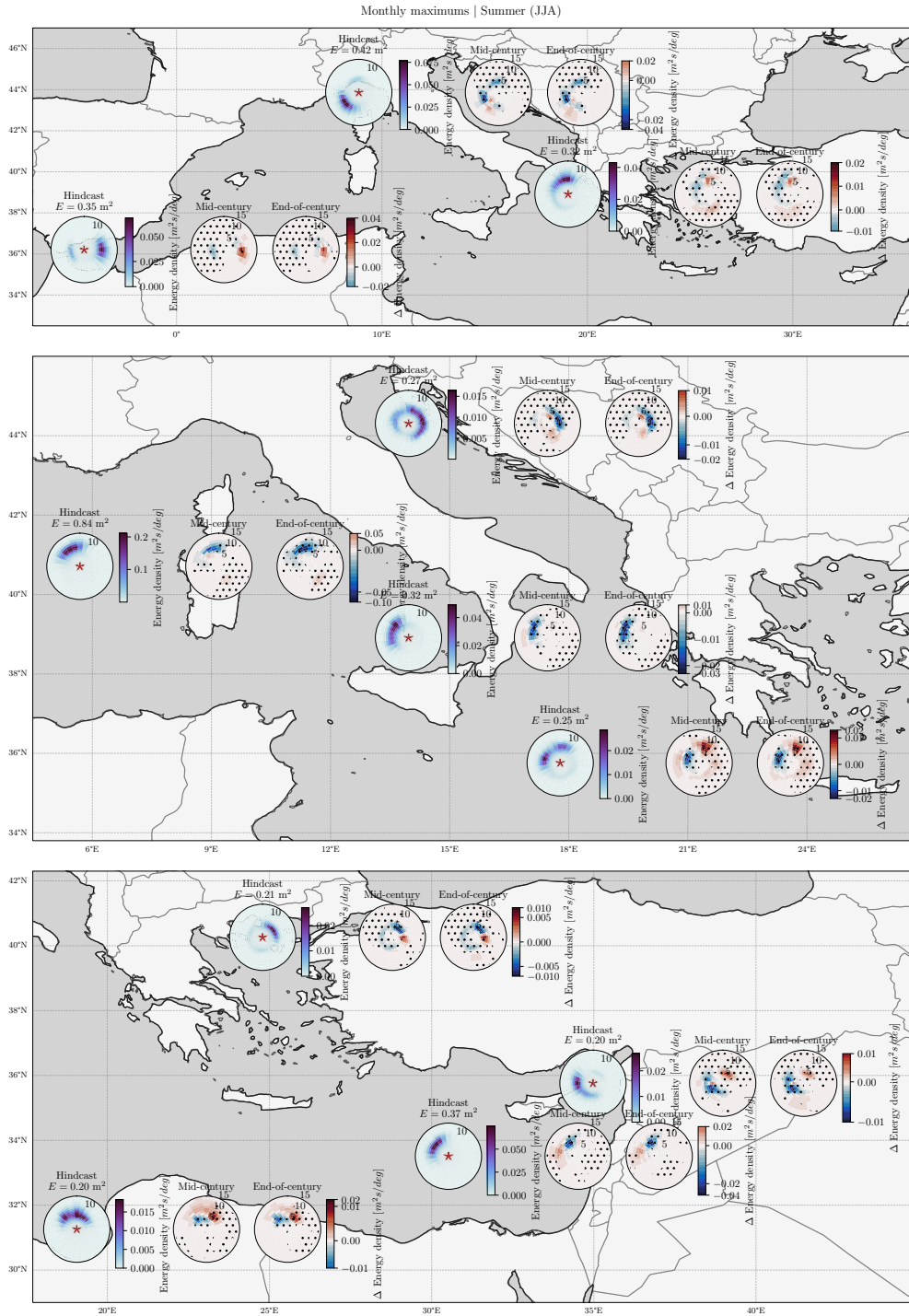




**Figure S8.** Fall mean of the hindcast wave spectrum monthly means, ensemble mean for baseline conditions, changes between the multi-model bias-adjusted ensemble mean with respect to baseline period for mid-century (2034 – 2060) and end-of-century (2074 – 2100) conditions, for all the analyzed locations in the Mediterranean Sea.

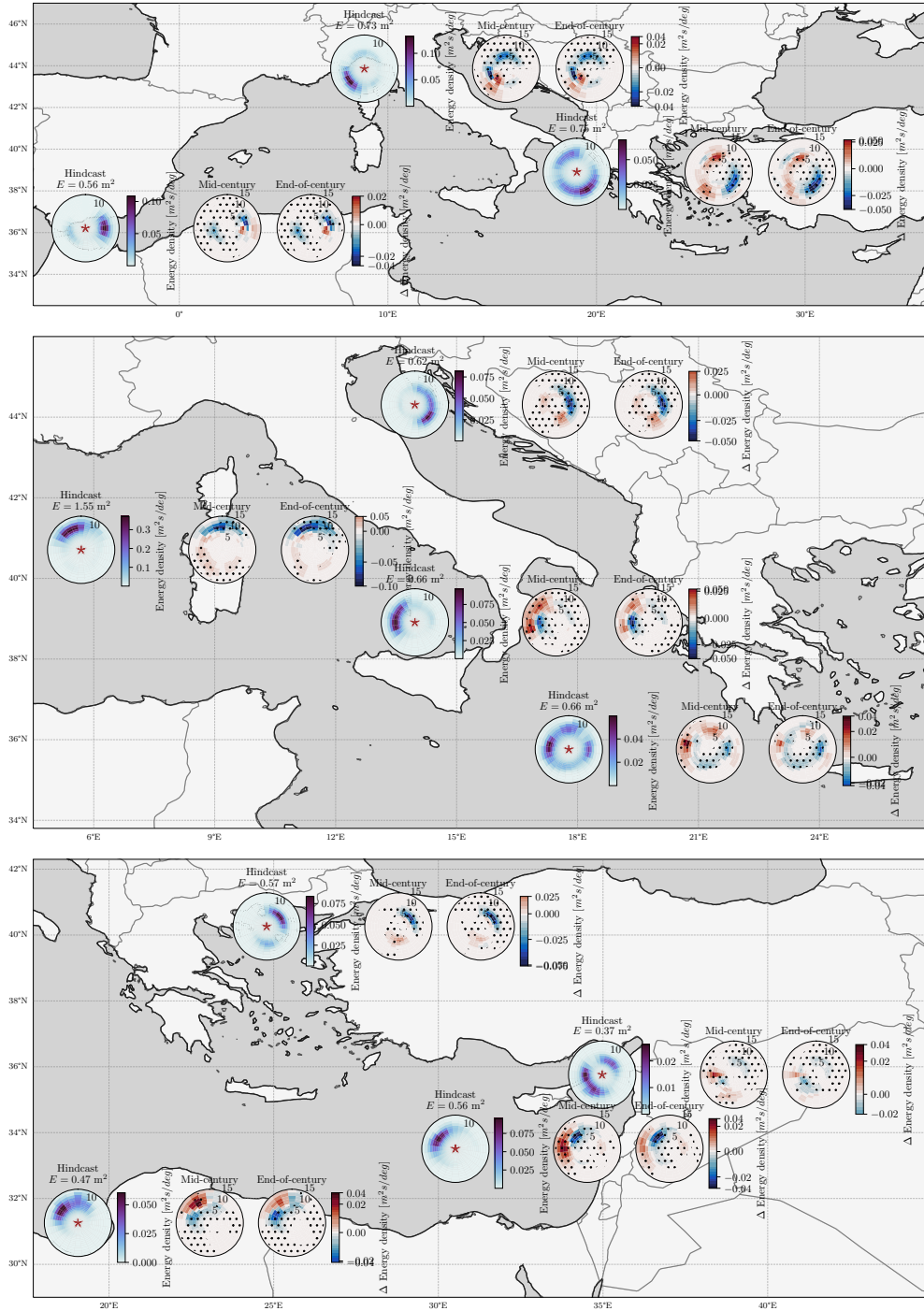


**Figure S9.** Winter maxima of the hindcast wave spectrum monthly means, ensemble mean for baseline conditions, changes between the multi-model bias-adjusted ensemble mean with respect to baseline period for mid-century (2034 – 2060) and end-of-century (2074 – 2100) conditions, for all the analyzed locations in the Mediterranean Sea.



**Figure S10.** Summer maxima of the hindcast wave spectrum monthly means, ensemble mean for baseline conditions, changes between the multi-model bias-adjusted ensemble mean with respect to baseline period for mid-century (2034 – 2060) and end-of-century (2074 – 2100) conditions, for all the analyzed locations in the Mediterranean Sea.

Monthly maximums | Fall (SON)



**Figure S11.** Fall maxima of the hindcast wave spectrum monthly means, ensemble mean for baseline conditions, changes between the multi-model bias-adjusted ensemble mean with respect to baseline period for mid-century (2034 – 2060) and end-of-century (2074 – 2100) conditions, for all the analyzed locations in the Mediterranean Sea.