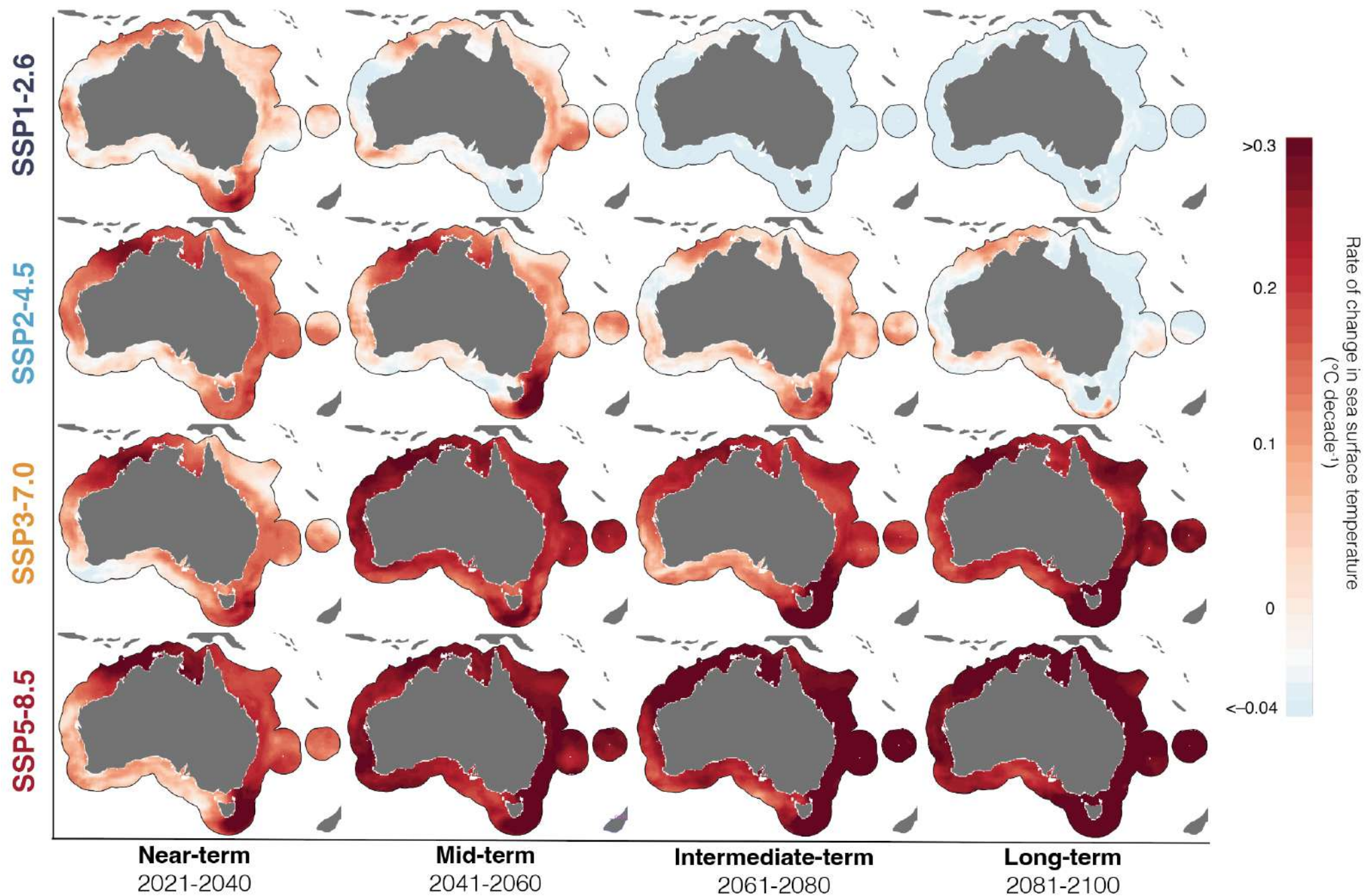
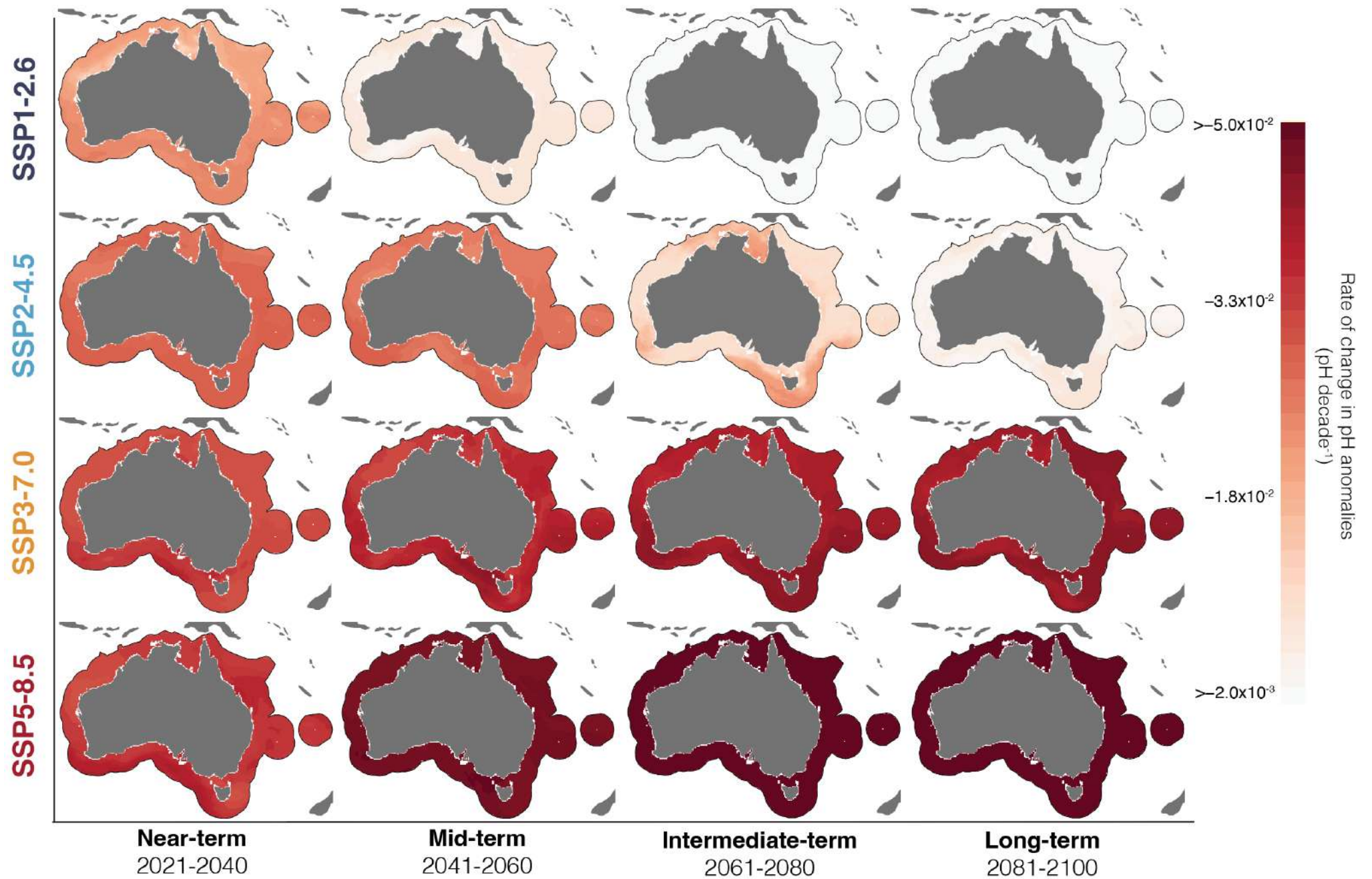


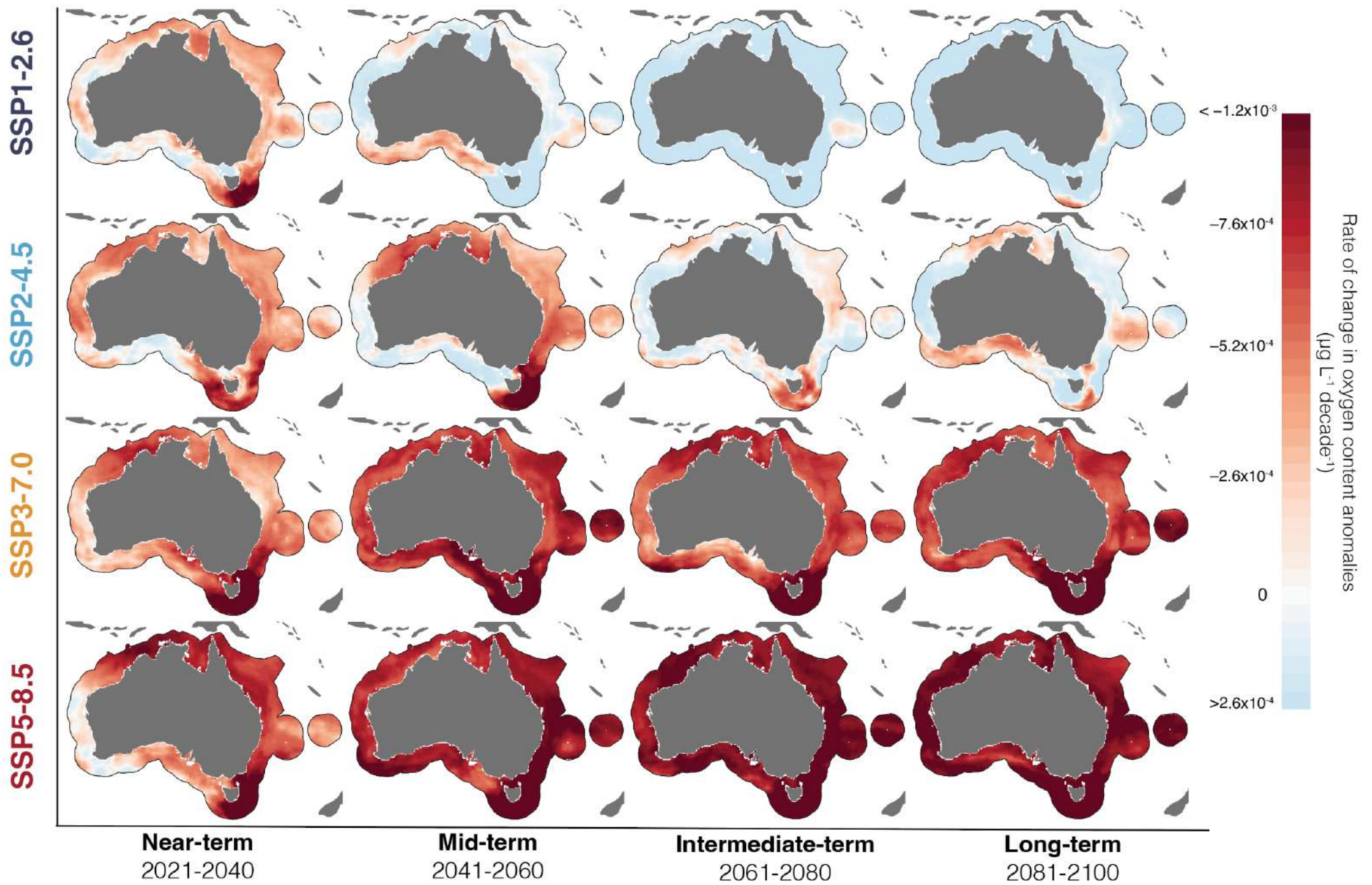
2 **Figure S1** The magnitude of ensemble median decadal climate velocity calculated from annual time series of ensemble medians for each reporting period under four IPCC AR6 emissions scenarios.



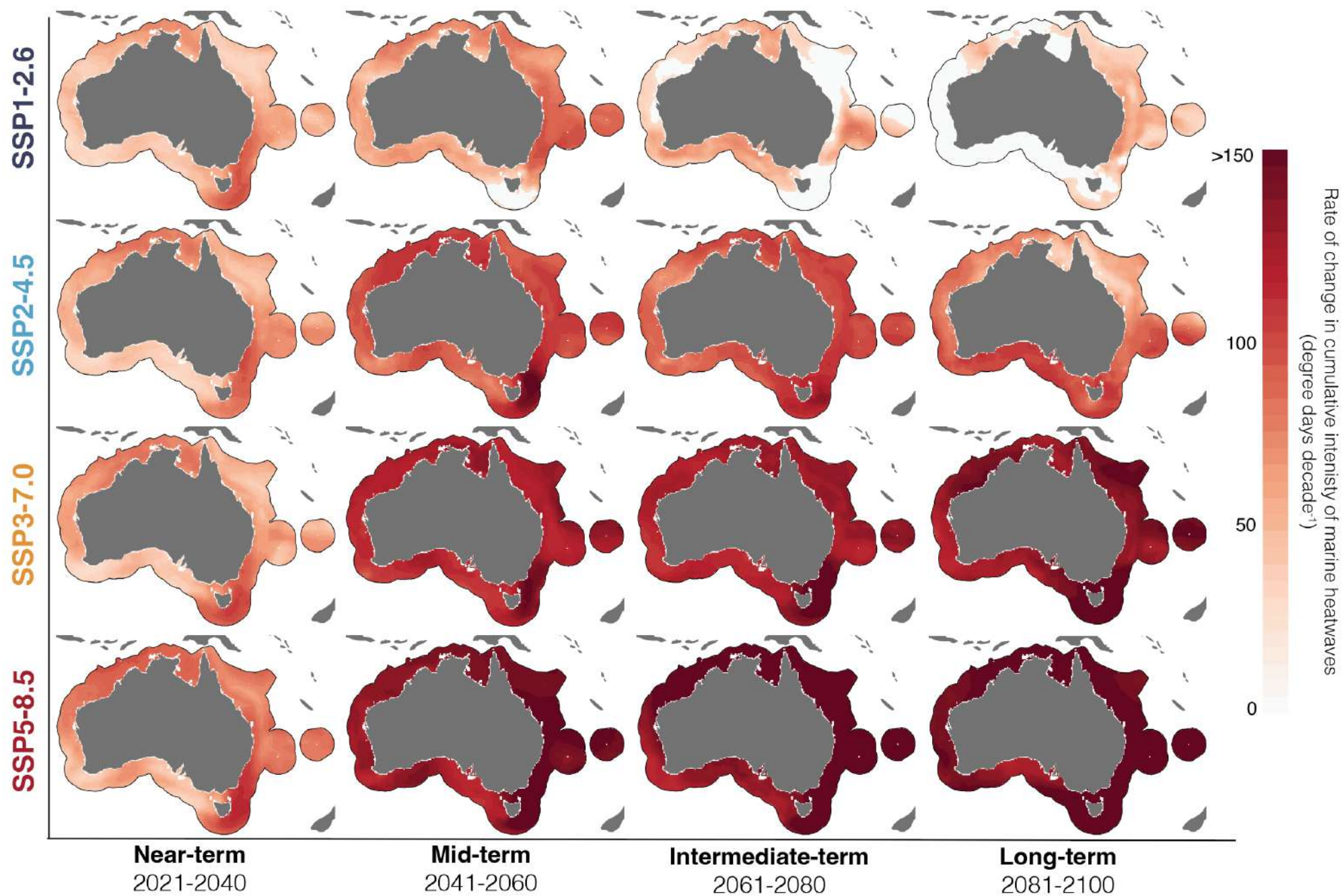
3 **Figure S2** The decadal rate of change in ensemble median sea surface temperature anomalies, relative to the recent period, calculated from annual time series for each reporting period under four IPCC
 4 AR6 emissions scenarios.



5 **Figure S3** The decadal rate of change in ensemble median pH, relative to the recent period, calculated from annual time series for each reporting period under four IPCC AR6 emissions scenarios.

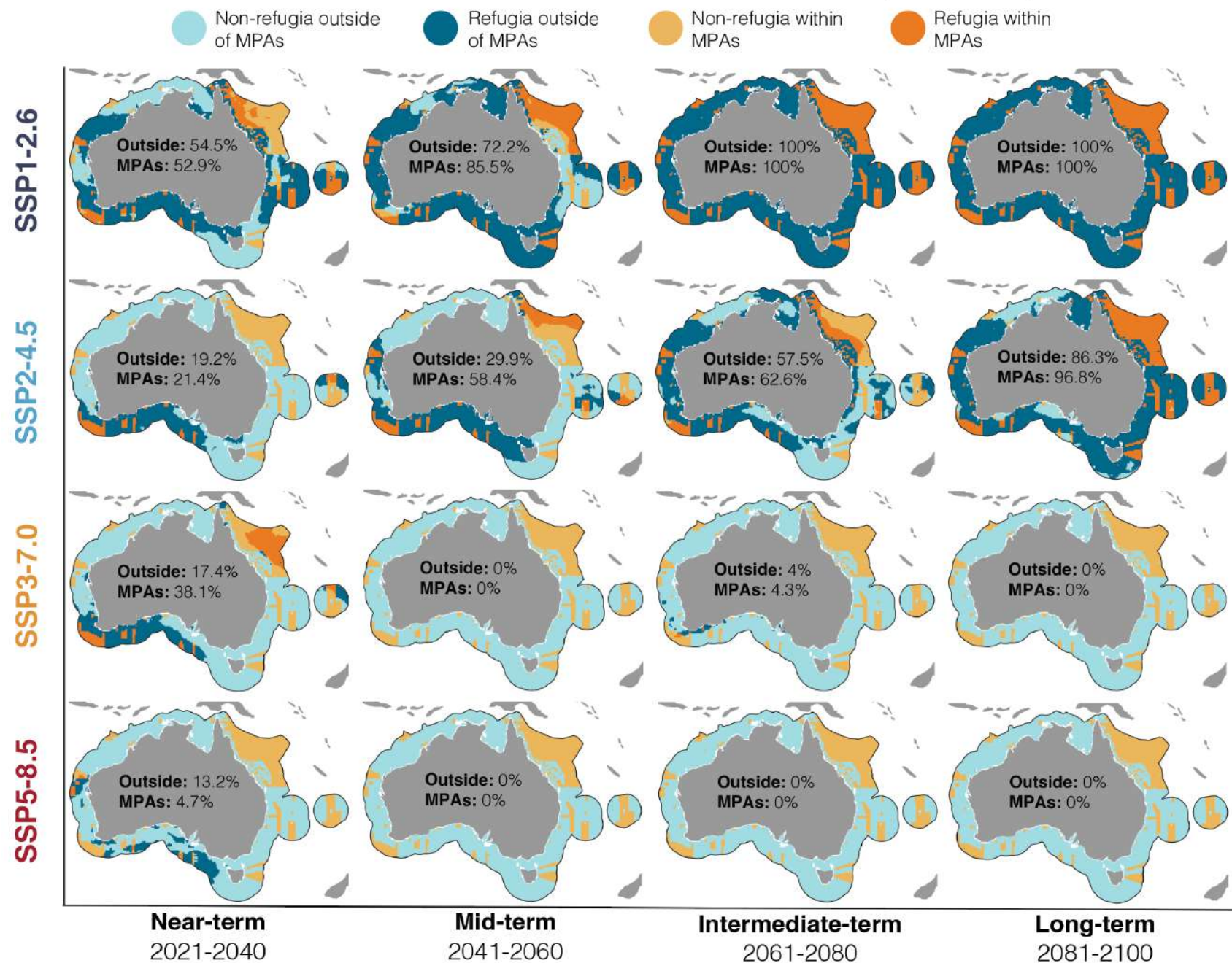


6 **Figure S4** The decadal rate of change in the ensemble median oxygen content, relative to the recent term, calculated from annual time series for each reporting period under four IPCC AR6 emissions
7 scenarios.

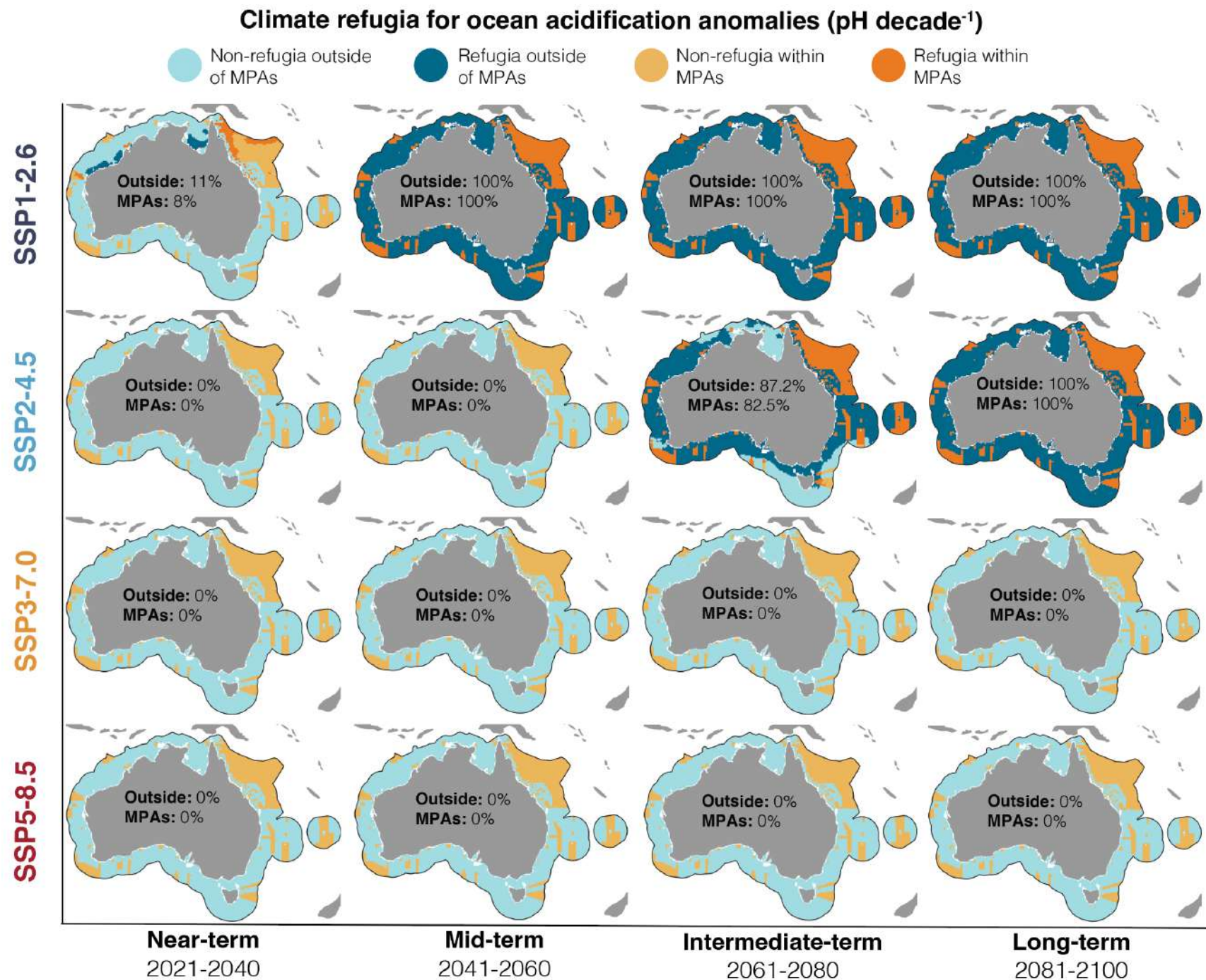


8 **Figure S5** The decadal rate of change in the ensemble median cumulative intensity of marine heatwaves, relative to the recent period, calculated from annual time series for each reporting period under four
 9 IPCC AR6 emissions scenarios.

Climate refugia for sea surface temperature anomalies ($^{\circ}\text{C decade}^{-1}$)

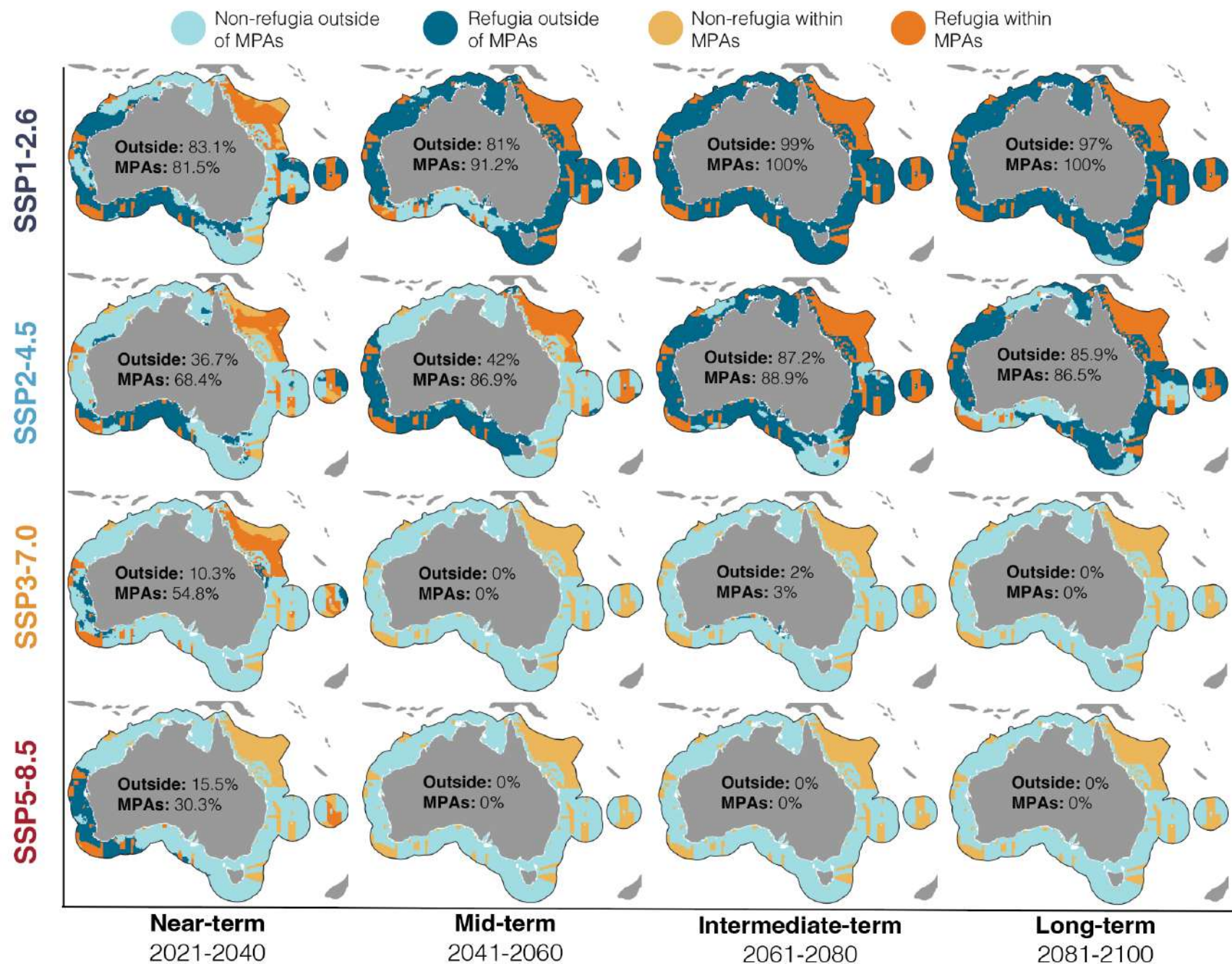


10 **Figure S6** Climate refugia for the decadal rate of change in sea surface temperature (SST) anomalies, and the percentage of each zone that are considered climate refugia. Climate refugia are defined as
 11 $\leq 30^{\text{th}}$ percentile of change in SST, relative to the recent period, calculated from annual time series for each reporting period under four IPCC AR6 emissions scenarios.



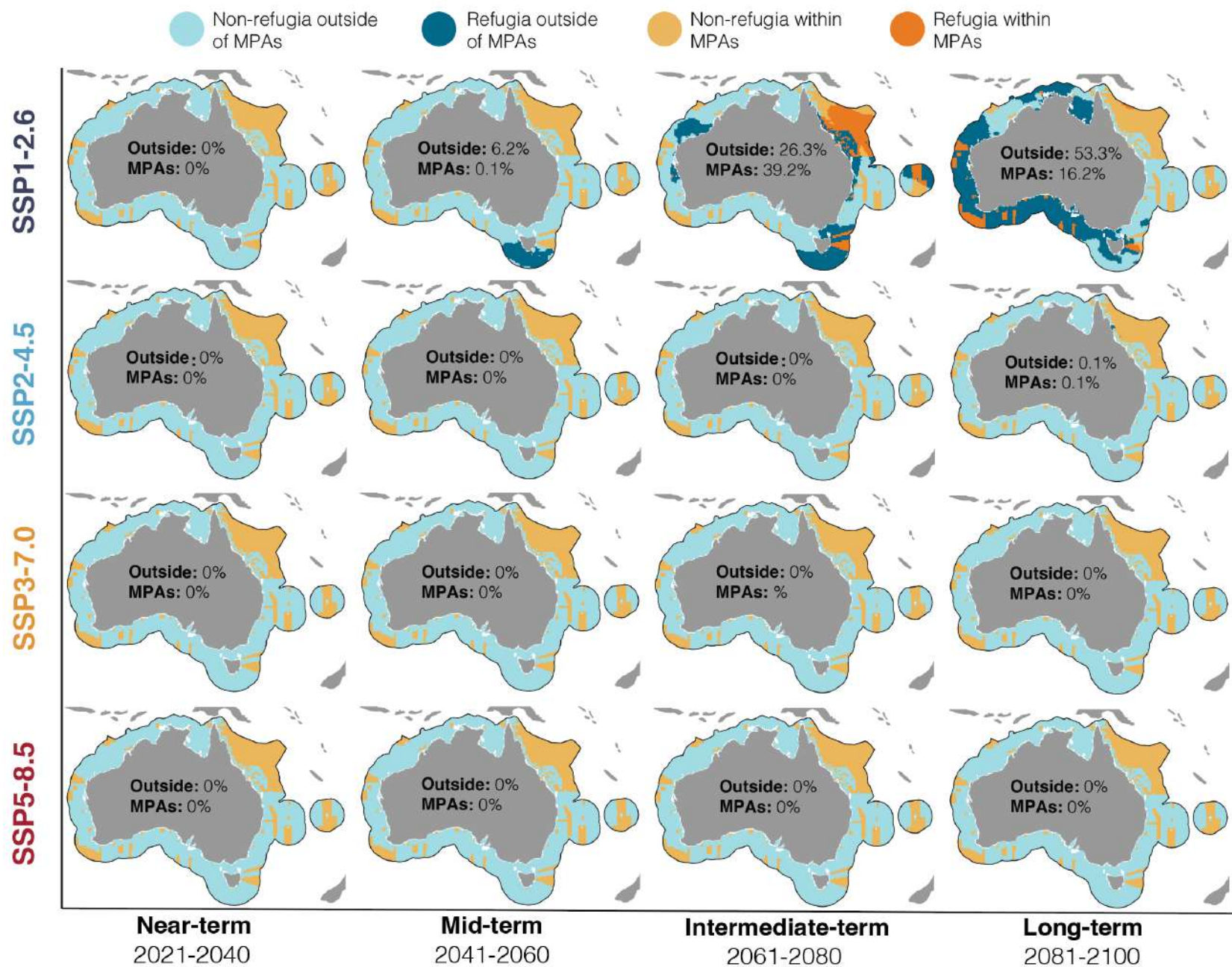
12 **Figure S7** Climate refugia for the decadal rate of change in ocean pH anomalies, and the percentage of each zone that are considered climate refugia. Climate refugia are defined as $\leq 30^{\text{th}}$ percentile of
 13 change in pH, relative to the recent period, calculated from annual time series for each reporting period under four IPCC AR6 emissions scenarios.

Climate refugia for oxygen content anomalies ($\mu\text{g L}^{-1} \text{ decade}^{-1}$)



14 **Figure S8** Climate refugia for the decadal rate of change in oxygen content anomalies, and the percentage of each zone that are considered climate refugia. Climate refugia are defined as $\leq 30^{\text{th}}$ percentile
 15 of change in oxygen content, relative to the recent period, calculated from annual time series for each reporting period under four IPCC AR6 emissions scenarios.

Climate refugia for marine heatwave anomalies (degree days decade⁻¹)



16

17 **Figure S9** Climate refugia for the decadal rate of change in marine heatwaves, and the percentage of each zone that are considered climate refugia. Climate refugia are defined as $\leq 30^{\text{th}}$ percentile of change
 18 in cumulative marine heatwave intensity, relative to the recent period, calculated from annual time series for each reporting period under four IPCC AR6 emissions scenarios.

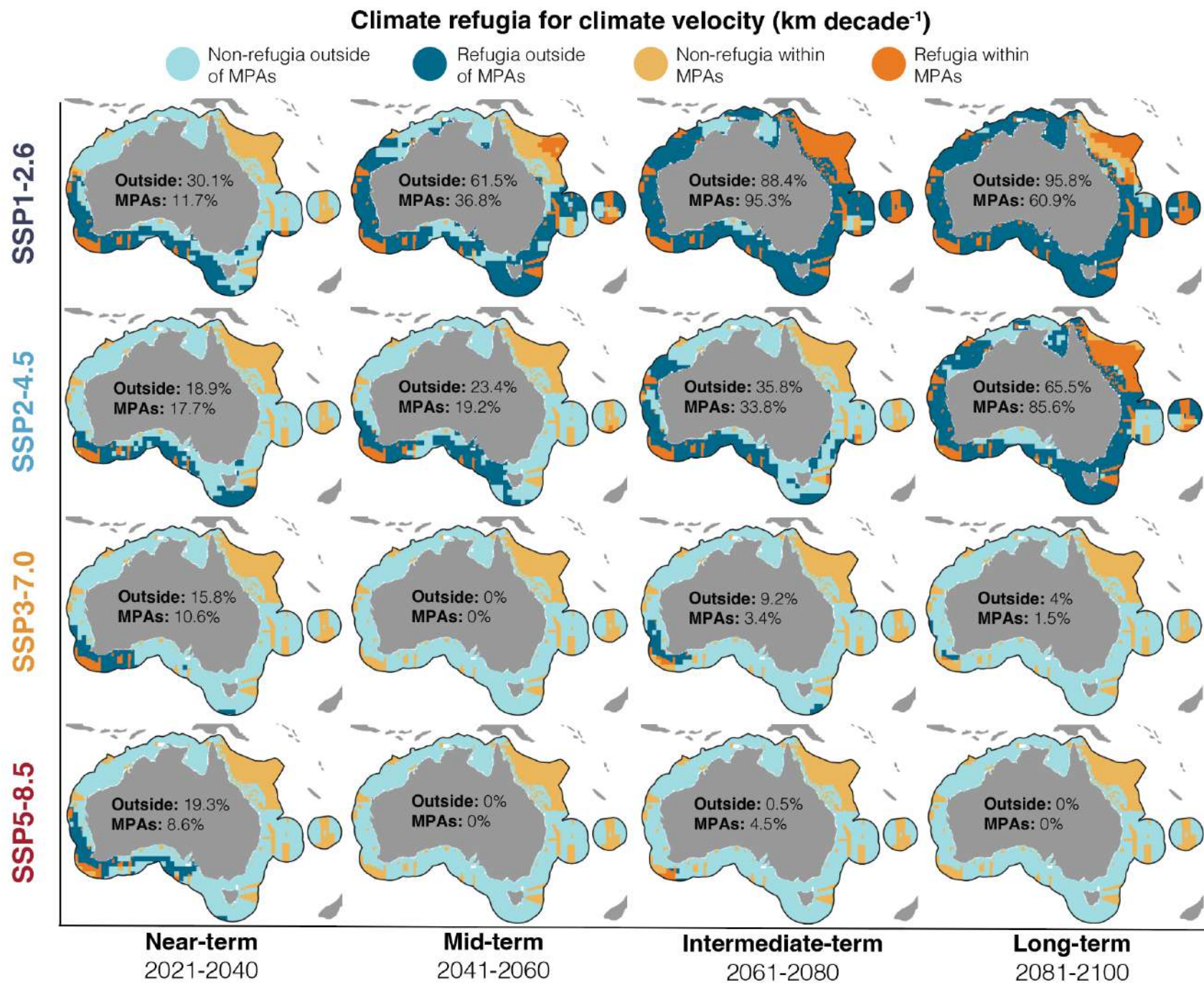
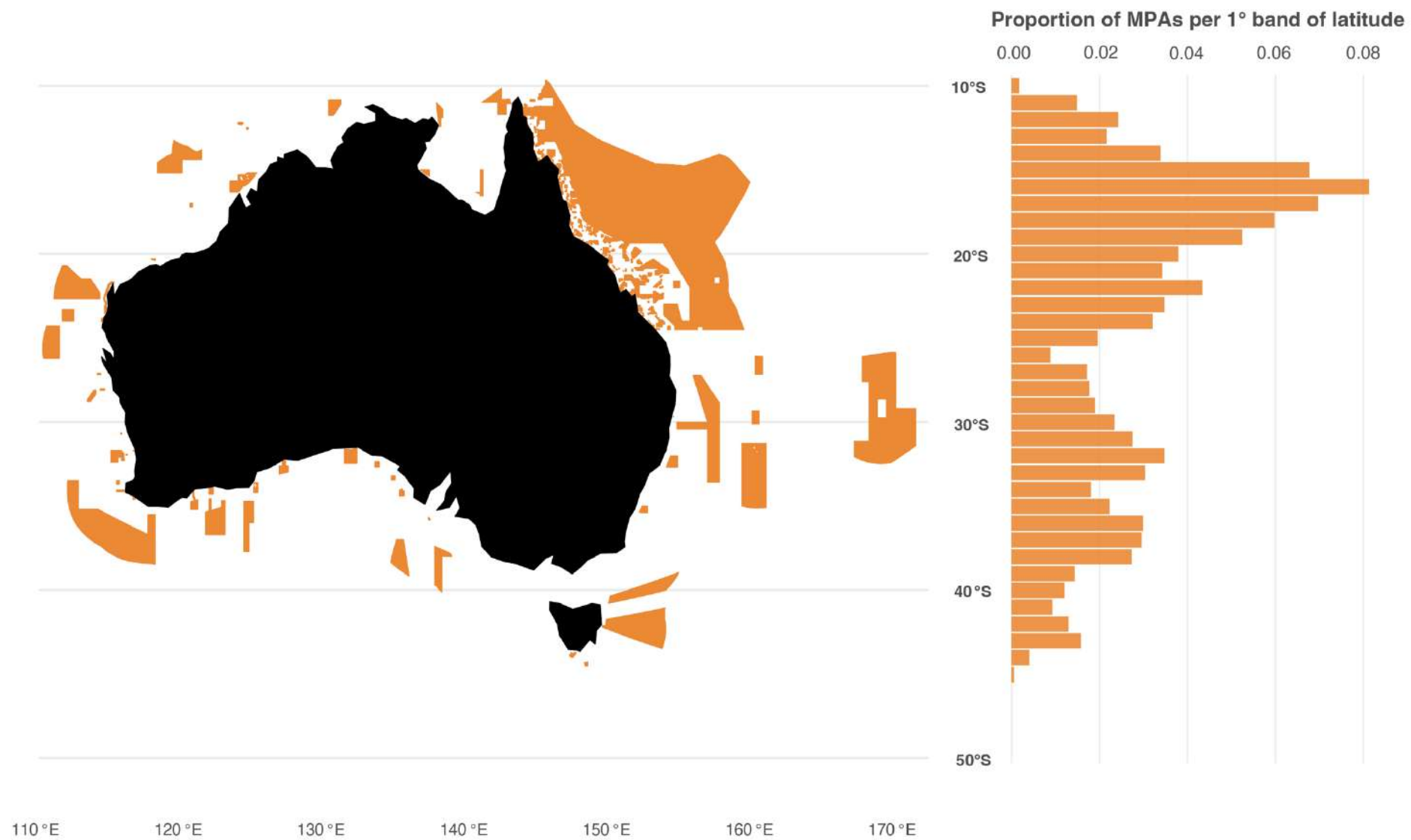


Figure S10 Climate refugia for climate velocity, and the percentage of each zone that are considered climate refugia. Climate refugia are defined as $\leq 30^{\text{th}}$ percentile of change in gradient-based climate velocity (km decade^{-1}), relative to the recent period, calculated from annual time series for each reporting period under four IPCC AR6 emissions scenarios.



22 **Figure S11** Proportion of the MPA network that is located within each 1° band of latitude.