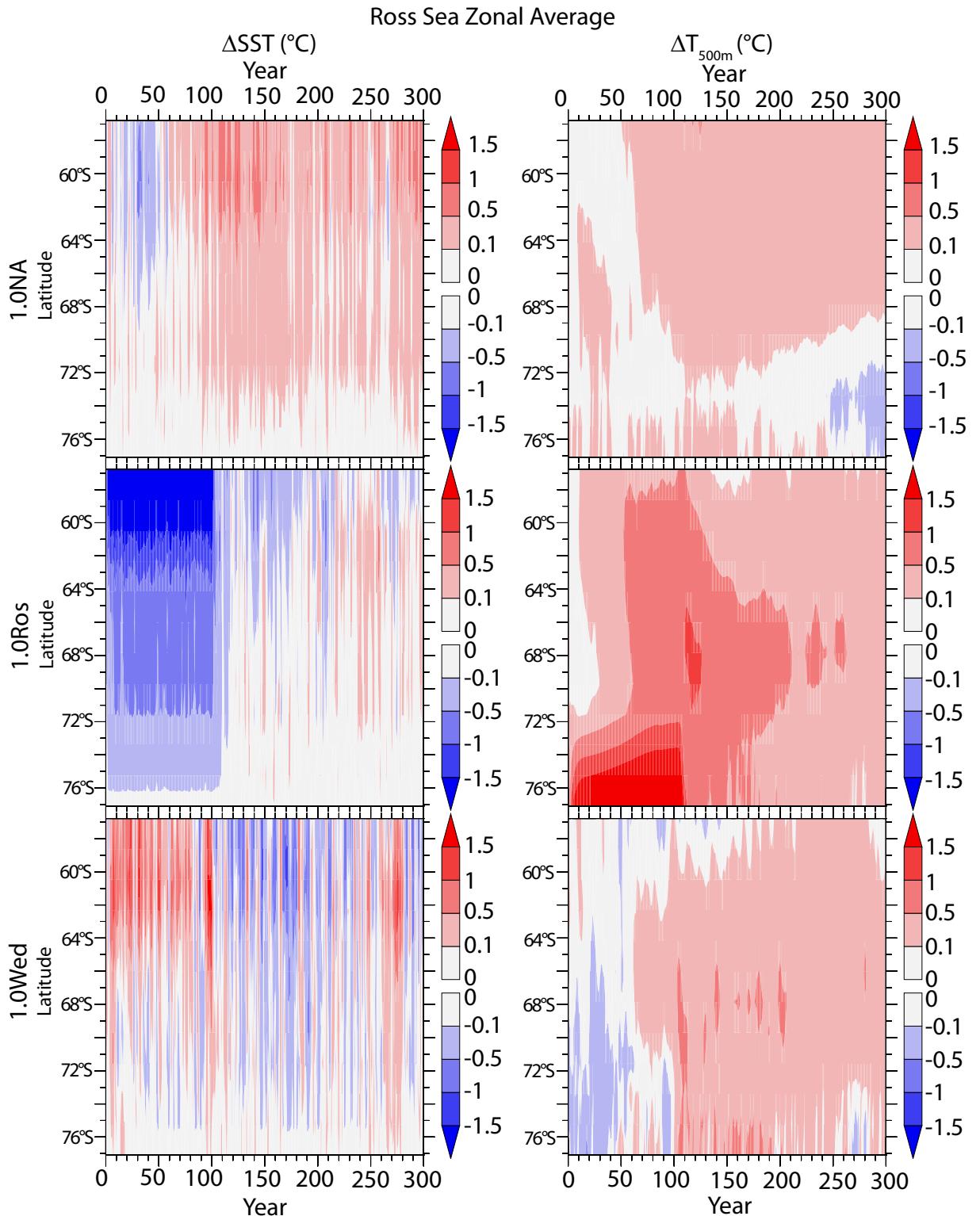
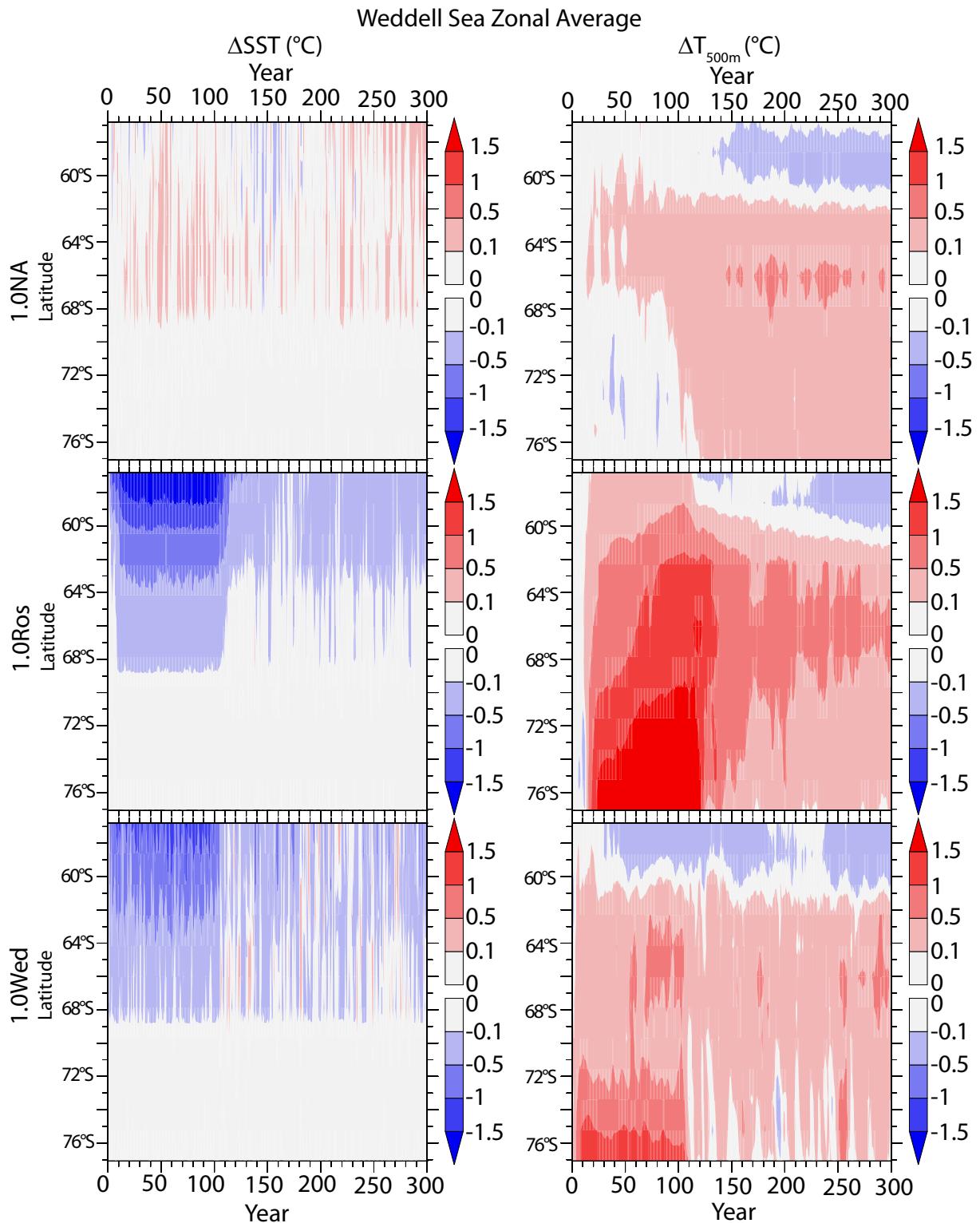


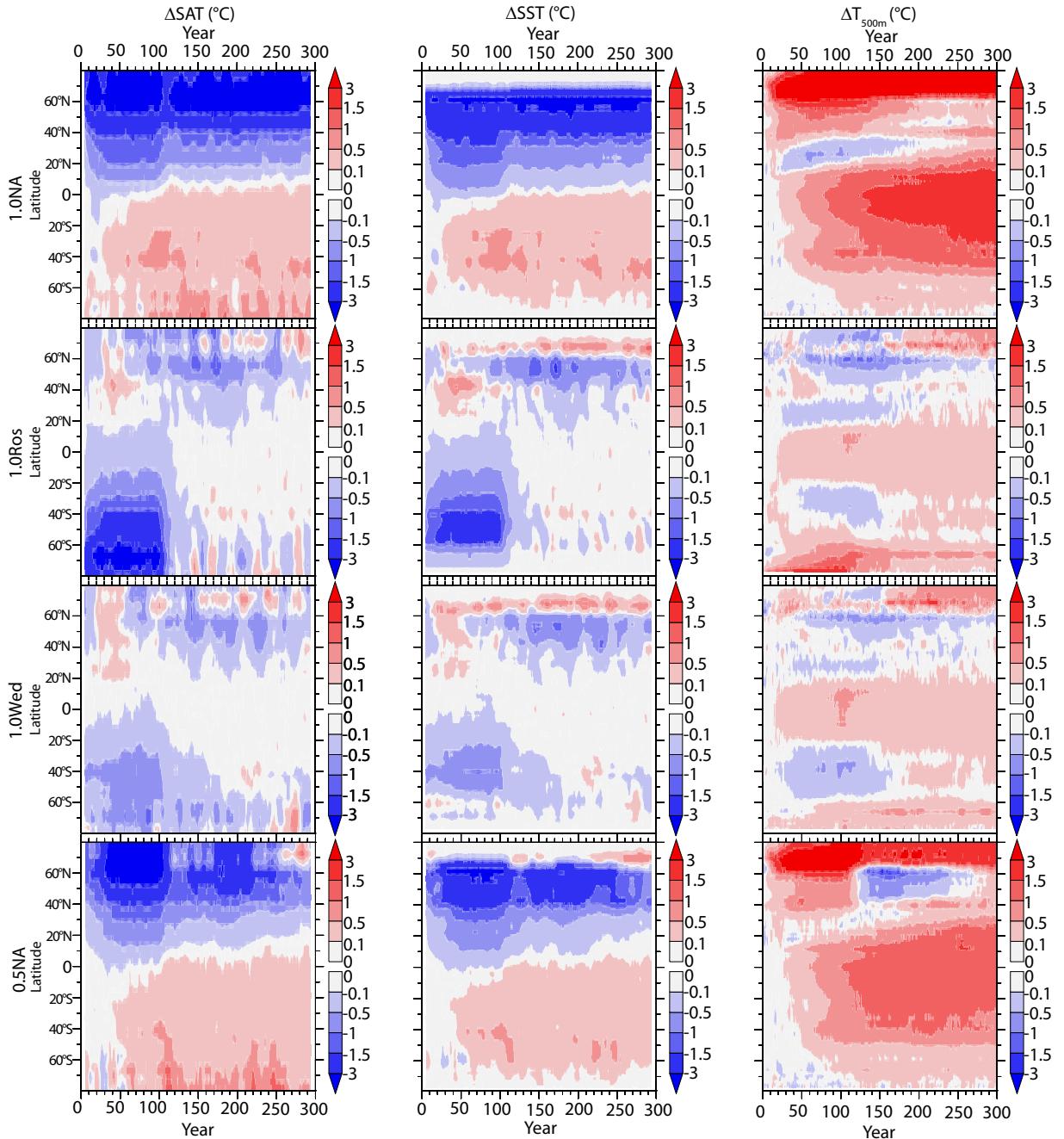
**Figure R 1:** Timeseries of the maximum strength of the AABW below 3000 m in the Pacific and Indian Oceans. The green curve is the Control, purple is the 1.0Wed and the black and red curves are the ensemble averages of the 1.0NA and 1.0Ros experiments, respectively.



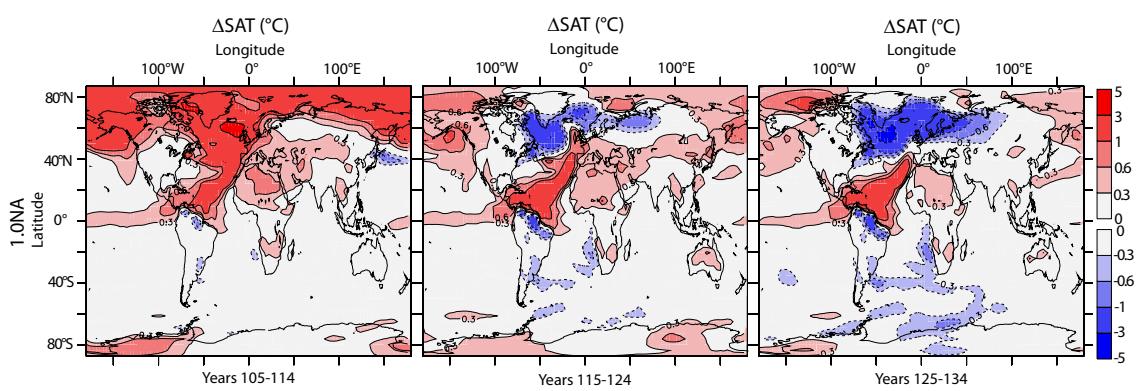
**Figure R 2:** Ross Sea zonally averaged temperature anomalies at the sea surface (left) and at the depth=500m (right) for the experiments 1.0NA, 1.0Ros and 1.0Wed from top to bottom. Freshwater perturbation lasts for 100 years in each experiment.



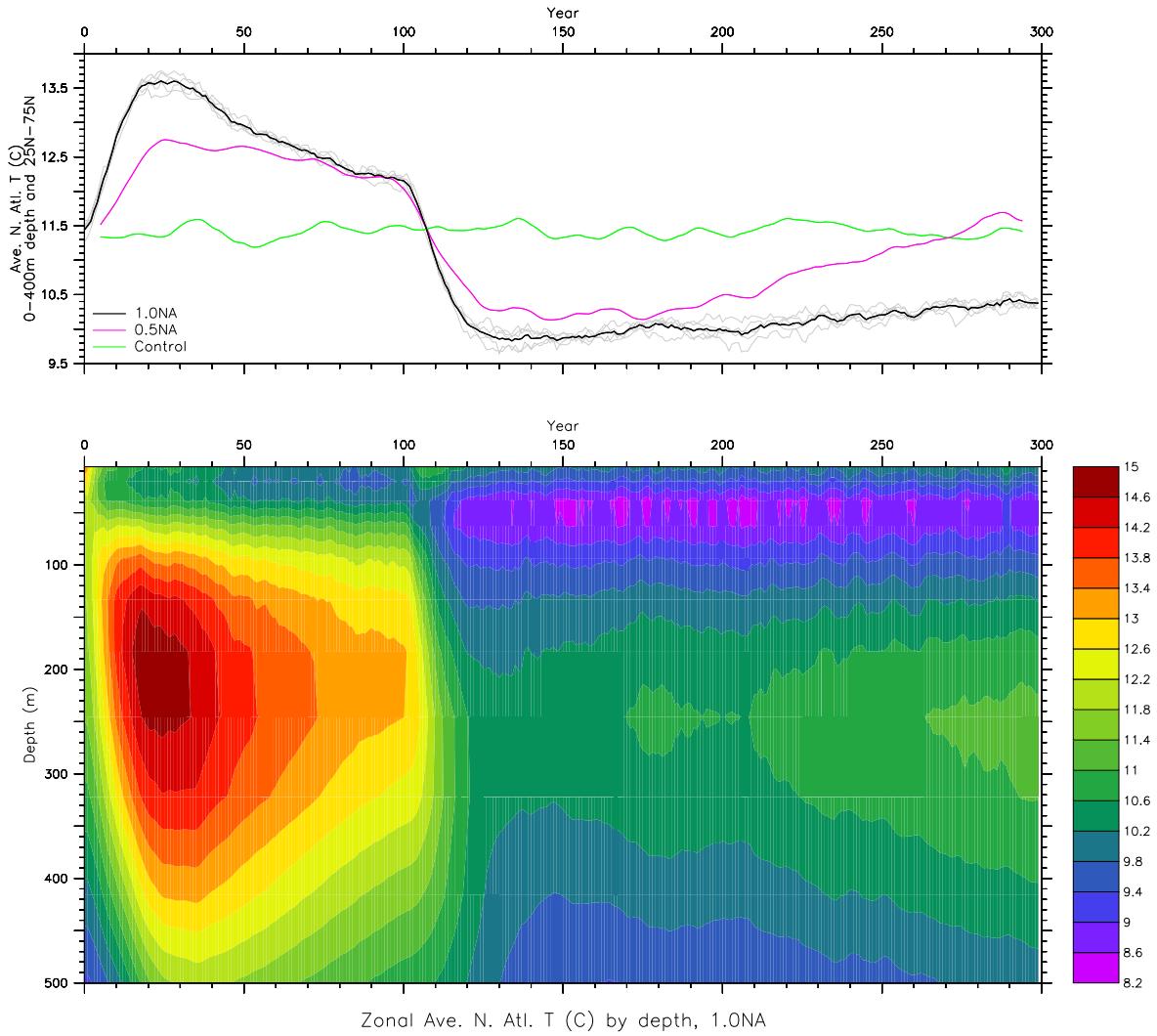
**Figure R. 3:** Weddell Sea zonally averaged temperature anomalies at the sea surface (left) and at the depth=500m (right) for the experiments 1.0NA, 1.0Ros and 1.0Wed from top to bottom.



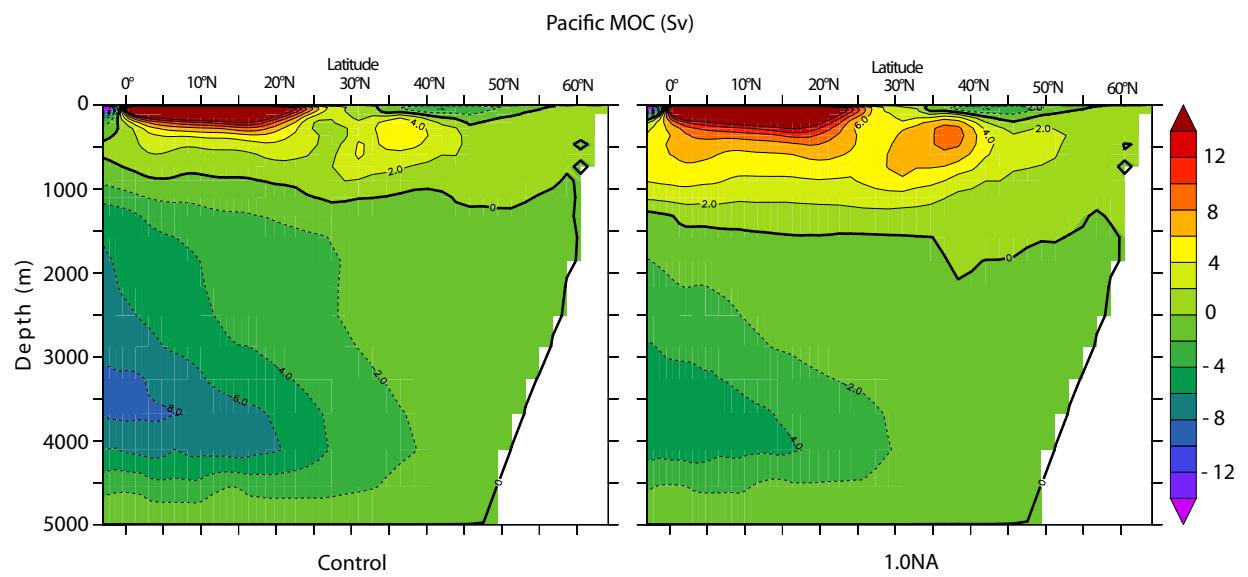
**Figure R 4:** Zonal averages of the anomalies in the SAT ( $^{\circ}\text{C}$ ), SST ( $^{\circ}\text{C}$ ), and water temperature ( $^{\circ}\text{C}$ ) at the depth of 500 m are shown in the columns from left to right, respectively. From top to bottom are the experiments 1.0NA, 1.0Ros, 1.0Wed, and 0.5NA.



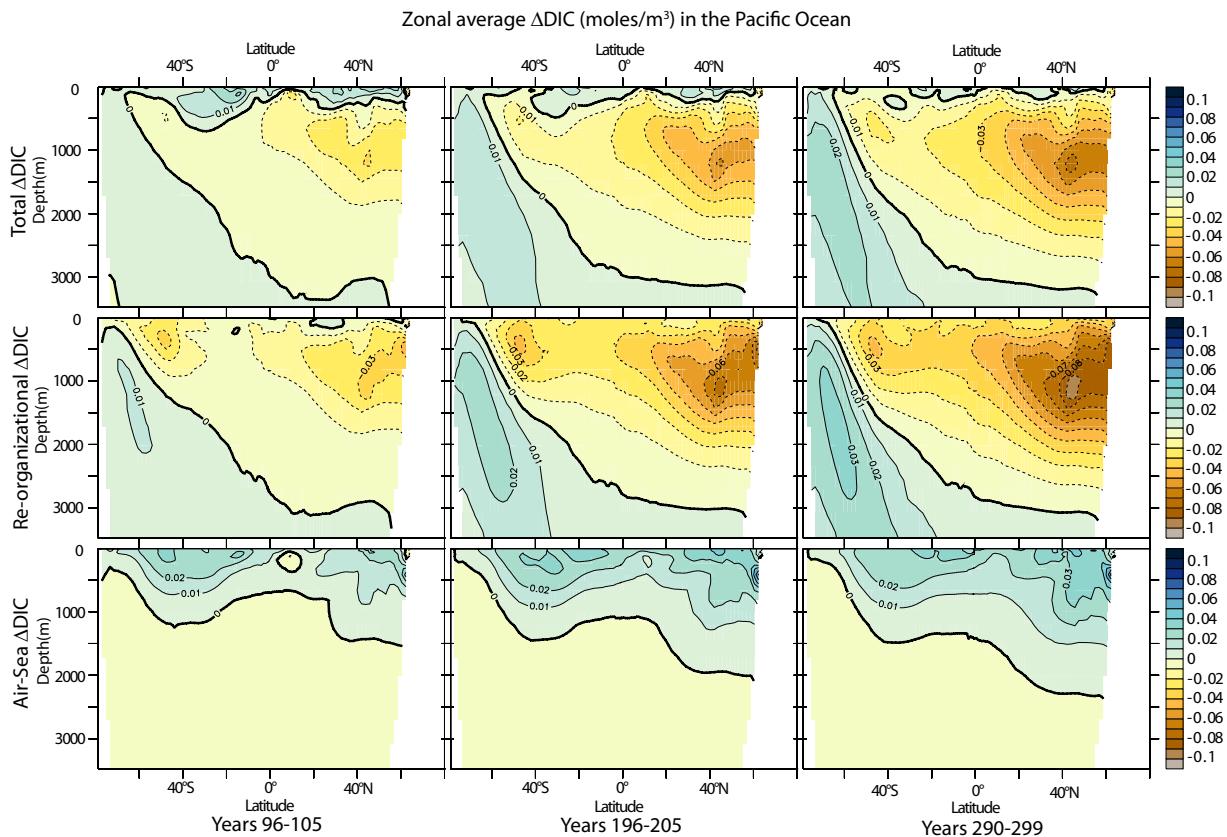
**Figure R 5:** SAT anomalies ( $^{\circ}\text{C}$ ) with respect to the end of the perturbation (years 95-104) in the experiment 1.0NA. Where the temporary warming and the subsequent cooling occur can be seen clearly.



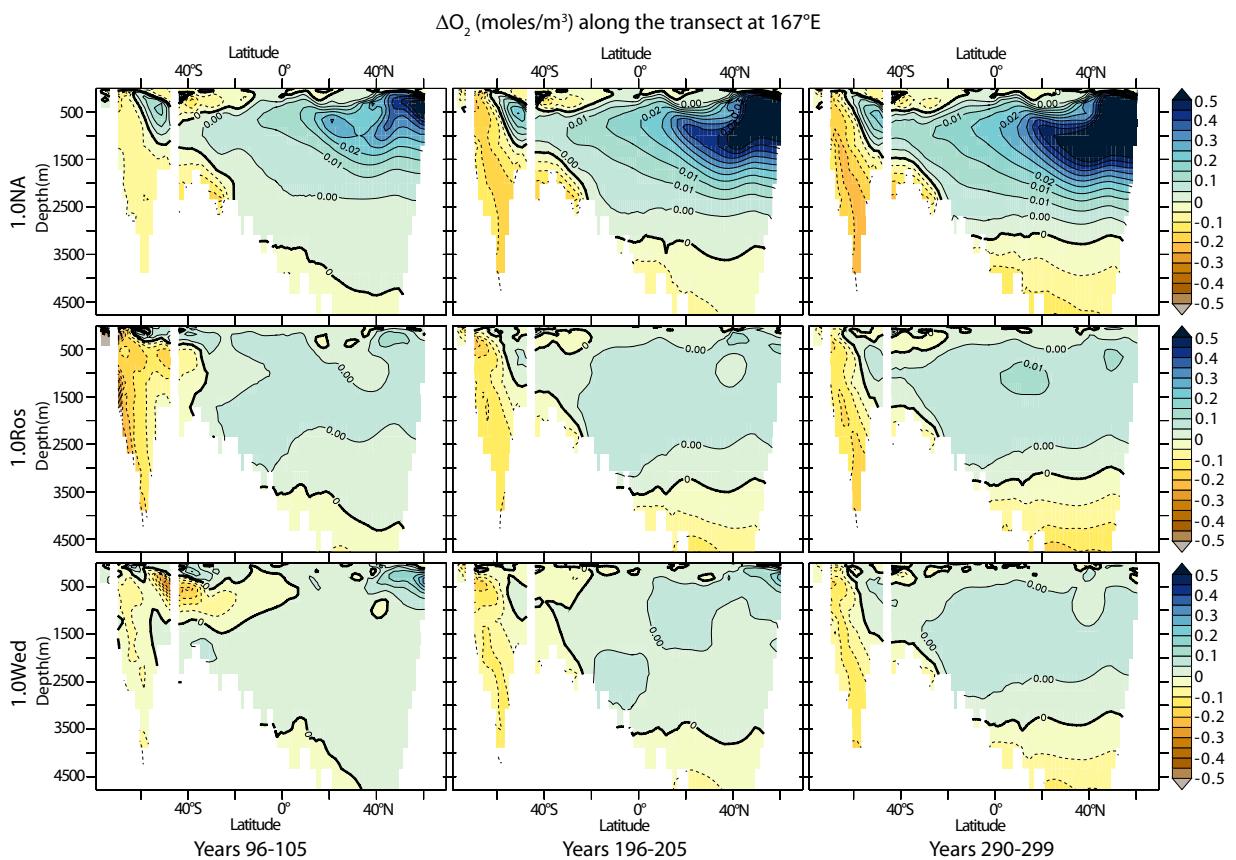
**Figure R.6:** At the top is the average water temperature up to the depth of 400m in the North Atlantic ( $25^{\circ}\text{N}$ – $75^{\circ}\text{N}$ ) for the experiments 1.0NA (black) and 0.5NA (pink) and the Control (green). Below is the zonally averaged water temperature in the first 500m of the North Atlantic for the 1.0NA experiment.



**Figure R 7:** MOC in the Pacific for Control (left) and in the 1.0NA at years 96-105 (right).



**Figure R.8:** DIC concentration anomaly (moles/m<sup>3</sup>) in the Pacific Ocean for 1.0NA. The panels, from top to bottom, show the changes in total DIC, only re-organizational change, and change only due to air-sea gas exchange, at the years (decadal averages) 101, 201, and 295 (left to right).



**Figure R 9:** Top to bottom,  $O_2$  concentration anomaly (moles/m<sup>3</sup>) along the transect at 167°E for the experiments 1.0NA, 1.0Ros, and 1.0Wed, at the years 101, 201, and 295 (left to right).