

**The role of Antarctic sea ice on the variability of the Antarctic Intermediate Water**

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Antarctic Intermediate Water (AAIW) has a relevant role on climate, not only because it occupies the upper branch of the global thermohaline circulation, but also because a significant percentage of the anthropogenic CO<sub>2</sub> is stored in the corresponding AAIW layers. Therefore, understanding how the AAIW has been changing is a relevant issue to better understand the ocean's role on climate change. Since 1950, the AAIW is getting fresher (AOKI et al., 2005), mostly due to Antarctic sea-ice changes. This work aims at understanding the role of sea-ice relative to these observed changes of the AAIW, using results from two ocean models simulations. We used temperature and salinity data from NCAR Community Climate System Model (NCAR CCSM v4) with and without an interactive coupled ice model. Trends for salinity minimum associated with the AAIW and temperature relative to the isopycnal crossing the salinity minimum (found to be 27.3kg.cm<sup>-3</sup>) were analyzed. Variability patterns were obtained at 15°S/25°W, 25°S/25°W and 40°S/25°W. Results show little differences between the two experiments with respect to changes in the salinity minimum (i. e. trends) and its variability obtained through EOF analysis. None of the experiments were able to produce the observed freshening of the AAIW reported by Durack, Wijffels, 2010 and Helm et al. 2010. Nonetheless, the AAIW warming was verified in the simulations results. These results also show that in these experiments the variability of the AAIW was more related to the model forcings than to the presence or absence of the interactive coupled sea-ice model.