

Salinity Changes in the Southern Ocean

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Salinity plays an important role in controlling the density of water in the Southern Ocean, and hence the ocean circulation. The aim of this project was to find possible mechanisms for changes in Southern Ocean salinity using ocean model output, which could help explain what may cause observed salinity changes. We found that in the model, there is a seasonal salinity cycle that is driven by seasonal variations in ice melt. We also found that precipitation, ice melt and evaporation are the largest surface freshwater contributors to the Southern Ocean, and small fractional changes in any one of them, particularly precipitation or evaporation, could lead to significant trends in salinity. We saw the largest standard deviations in freshwater sources in precipitation, ice melt, and northward transport, indicating that these could be responsible for interannual variability in salinity. Finally, we found a non-physical drift in salinity below the surface layer of the Southern Ocean, suggesting that future work using this data should focus on the top layer of the ocean, or should aim to otherwise eliminate the effect of the drift on results.

