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University of California, Riverside

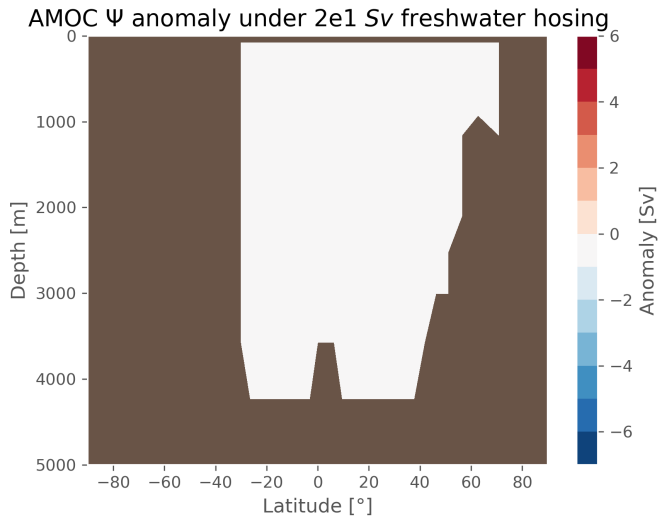
GEO266: AMOC Freshwater Hosing

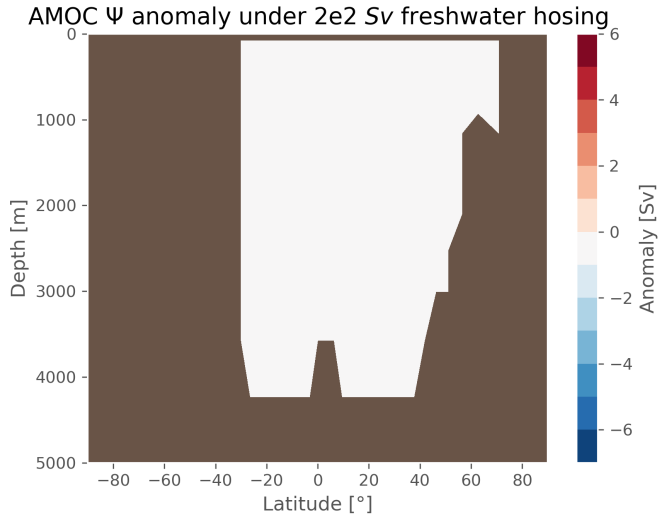
Sandy H. S. Herho

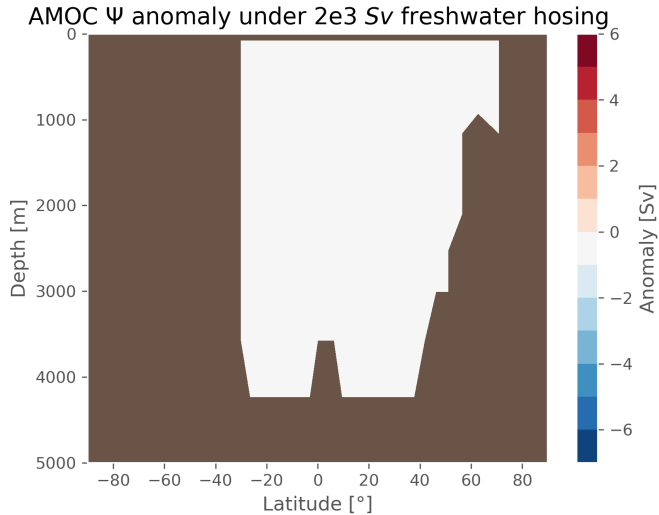
October 16, 2023

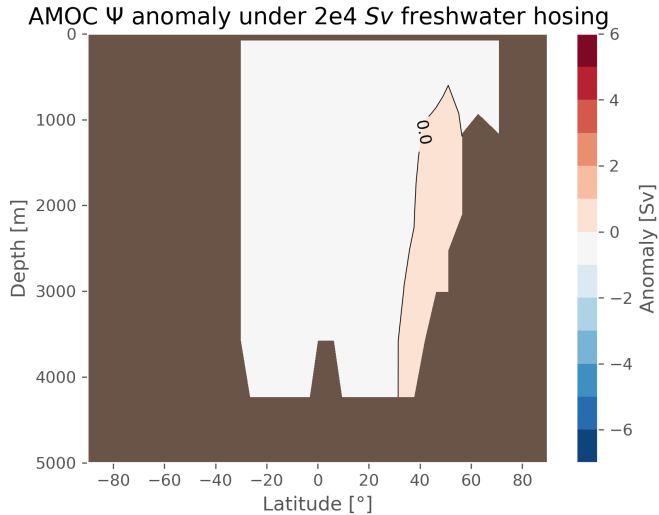
Experiments were conducted by introducing freshwater input at intervals spanning from 2×10^1 to 2×10^{17} Sv (with 10^n Sv increments, $n = 1, \dots, 17$) at the coordinates $i = 22$, $j = 33$, and $k = 16$ in the CGenie Muffins version. Throughout this experiment, atmospheric CO₂ levels remained at pre-industrial level (278 ppm). Each experiment was executed with a 100-year duration and maintained a temporal resolution at an annual scale.

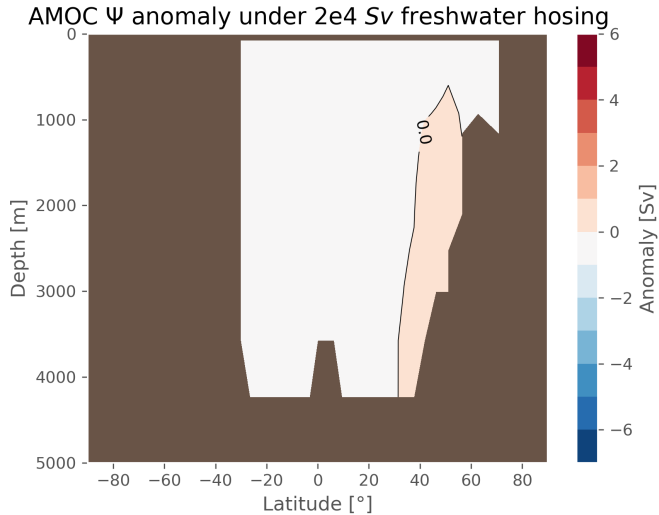
Anomalies were calculated based on the temporal average AMOC meridional stream function (Ψ) in each experiment with a control (zero freshwater input).

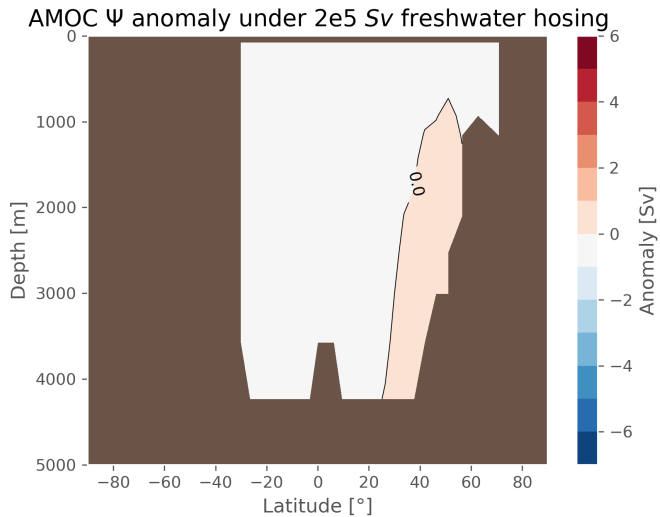


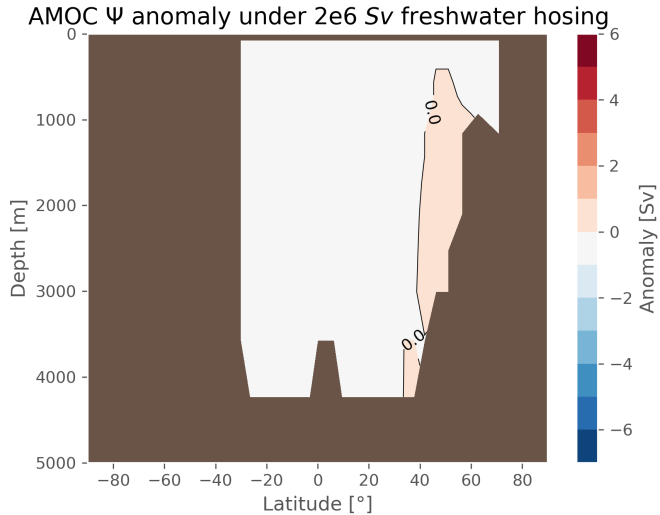


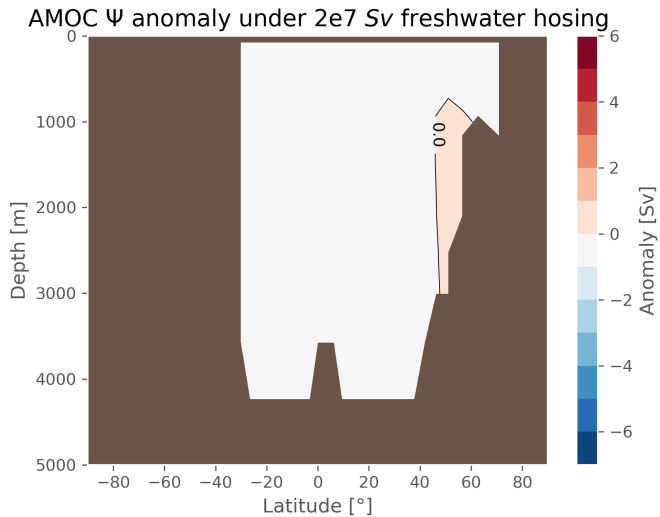


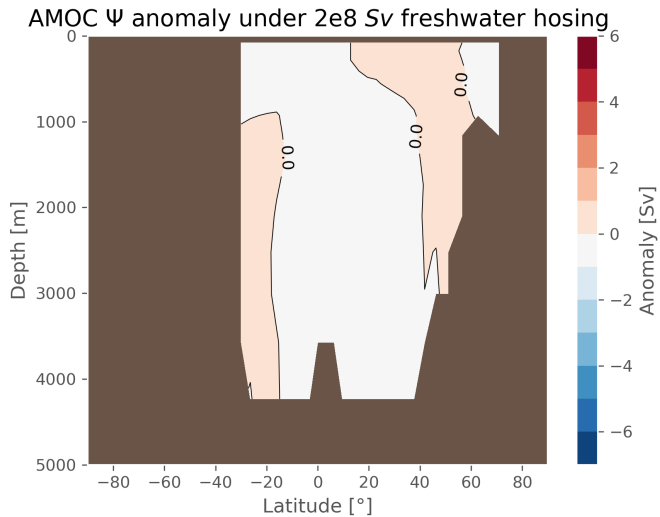


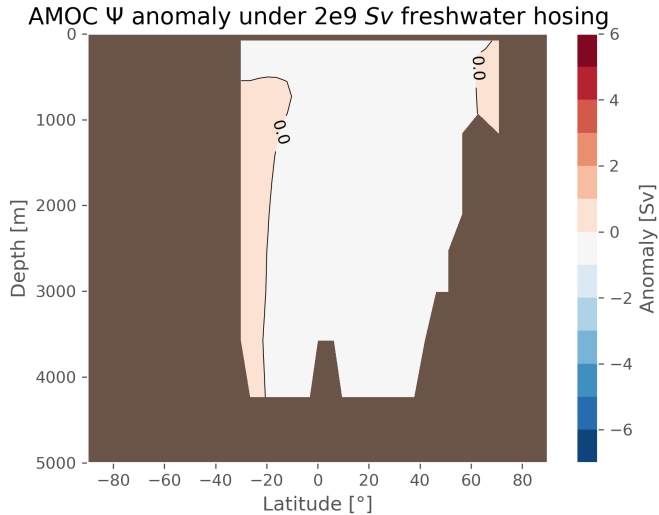


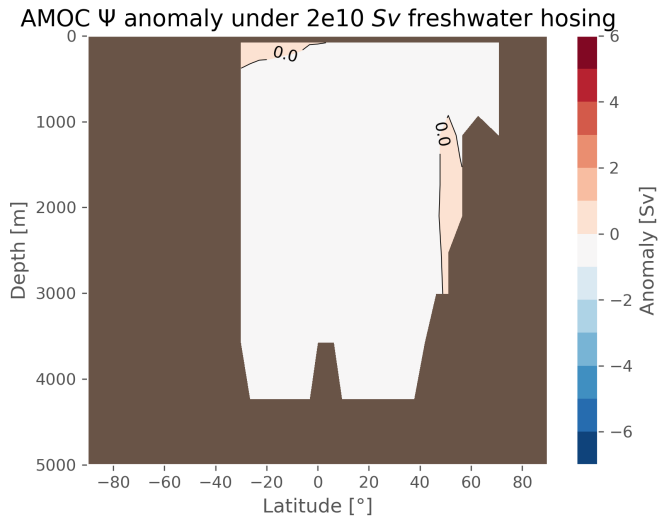


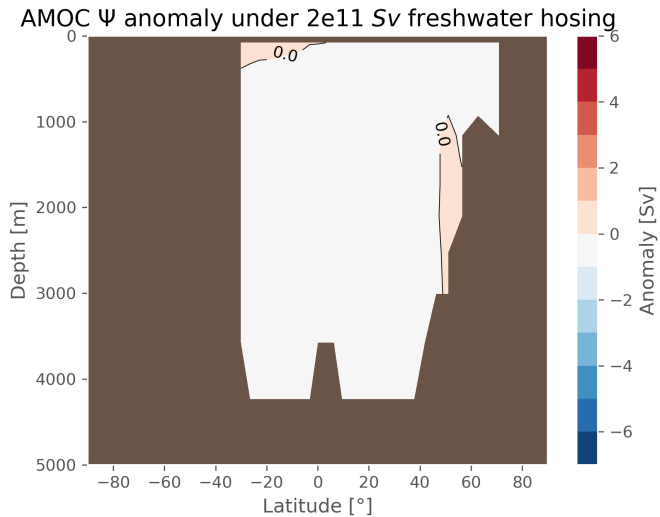


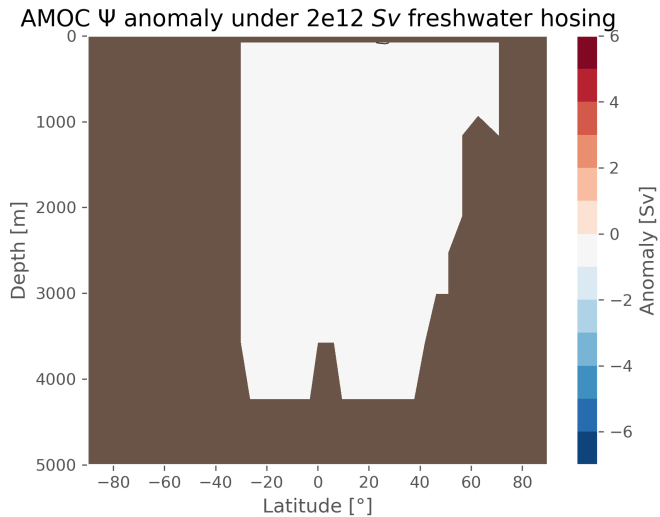


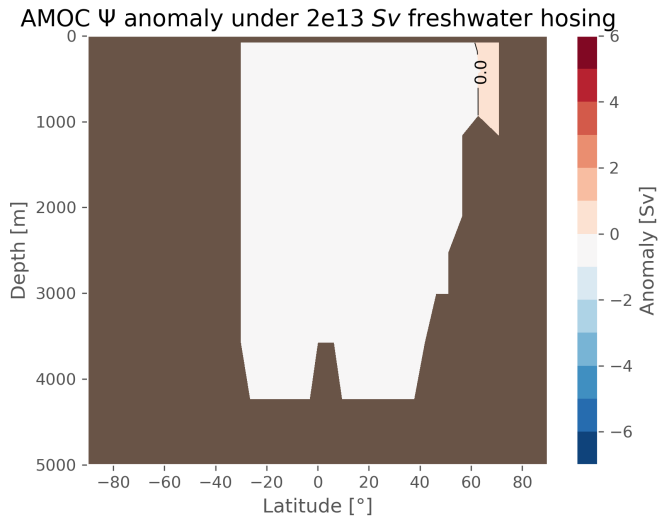


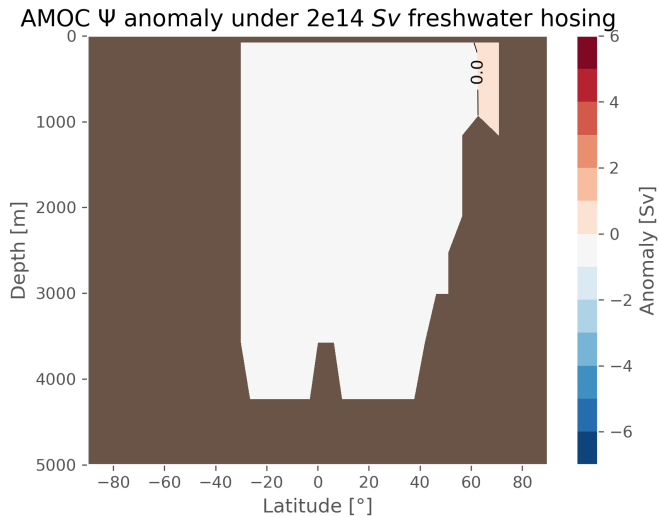


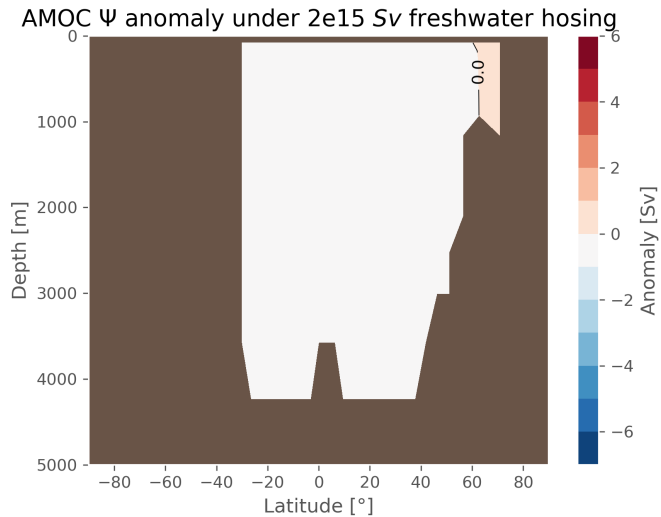


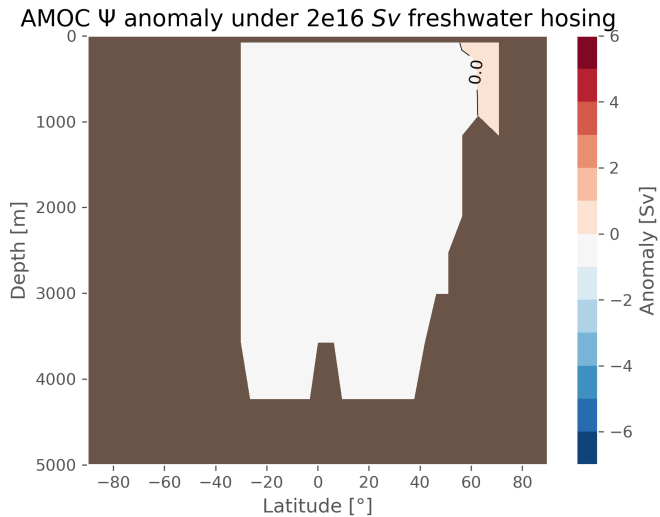


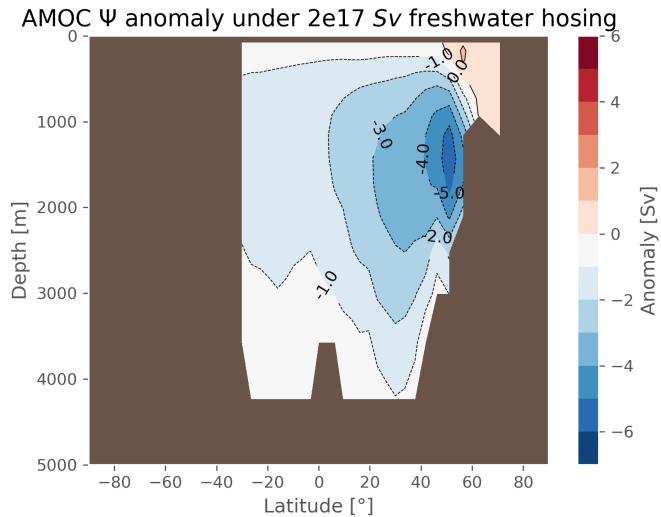






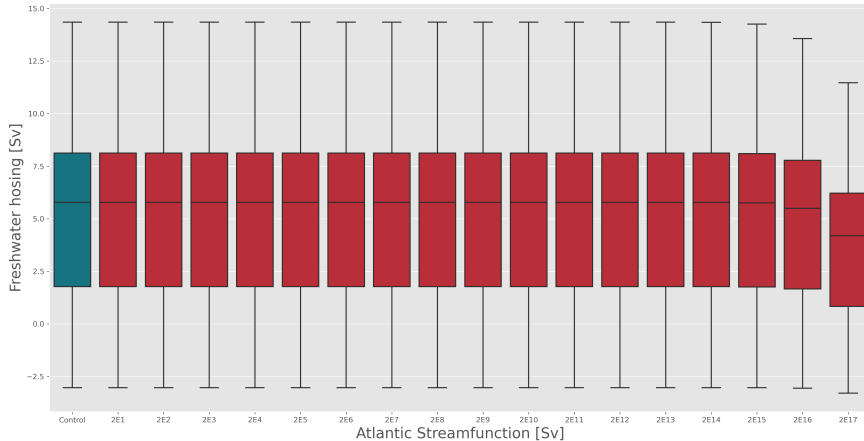






A Mann-Whitney U test was conducted for each grid streamfunction based on the temporal average in each experiment compared to the control experiment. The only experiment that exhibited a significant difference ($U = 54901$, p-value < 0.01) was the experiment involving freshwater hosing of 2×10^{17} Sv.

AMOC streamfunction distribution



- Python code:
https://github.com/sandyherho/muffins_playground/tree/main/lab_hosing_amoc
- \LaTeX Beamer slide: <https://www.overleaf.com/8549483868qctwcvbsybxw>