Seasonal heaving within the Kermadec Trench deep western boundary current predominantly driven by local Ekman pumping seasonal anomalies

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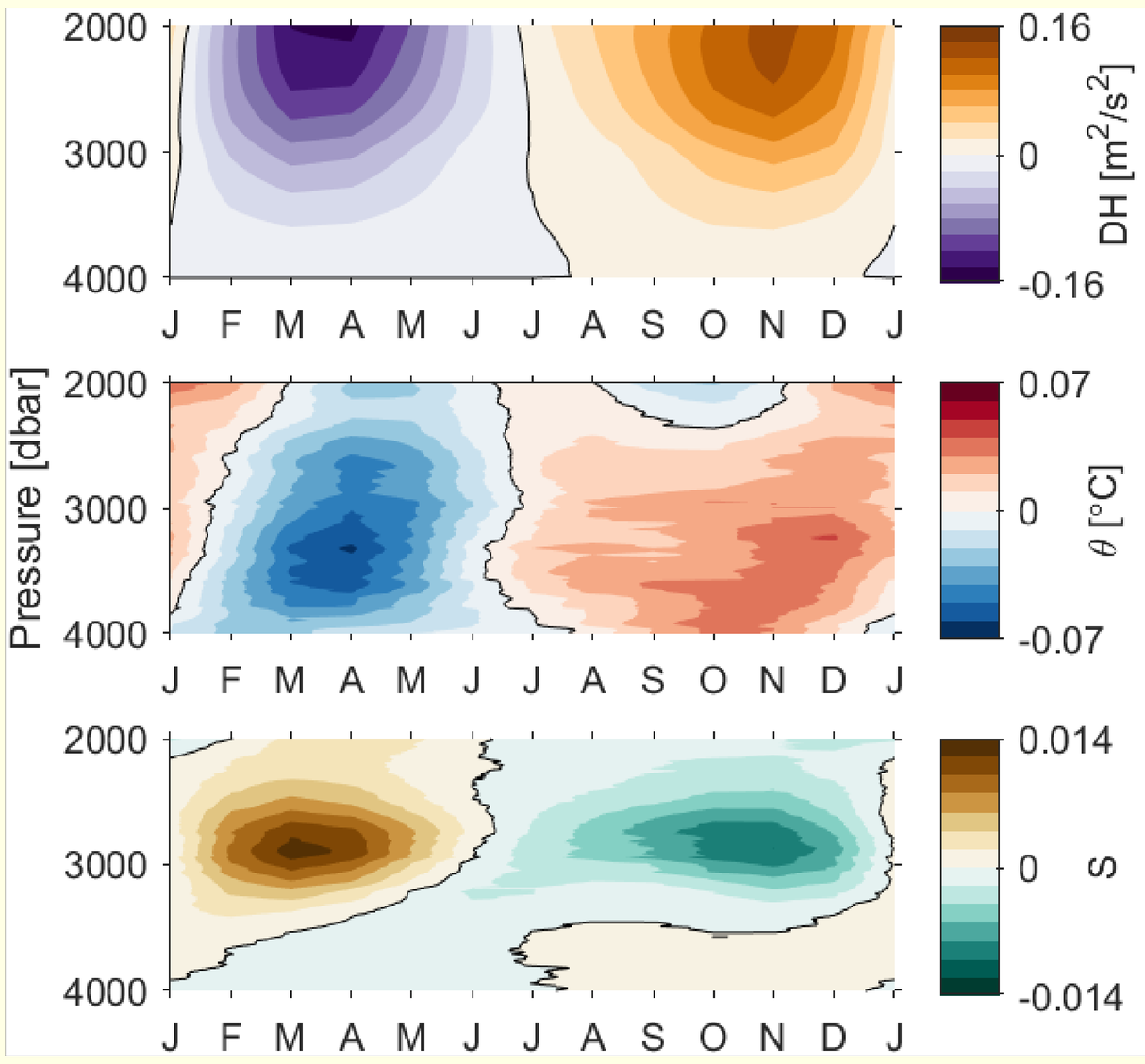
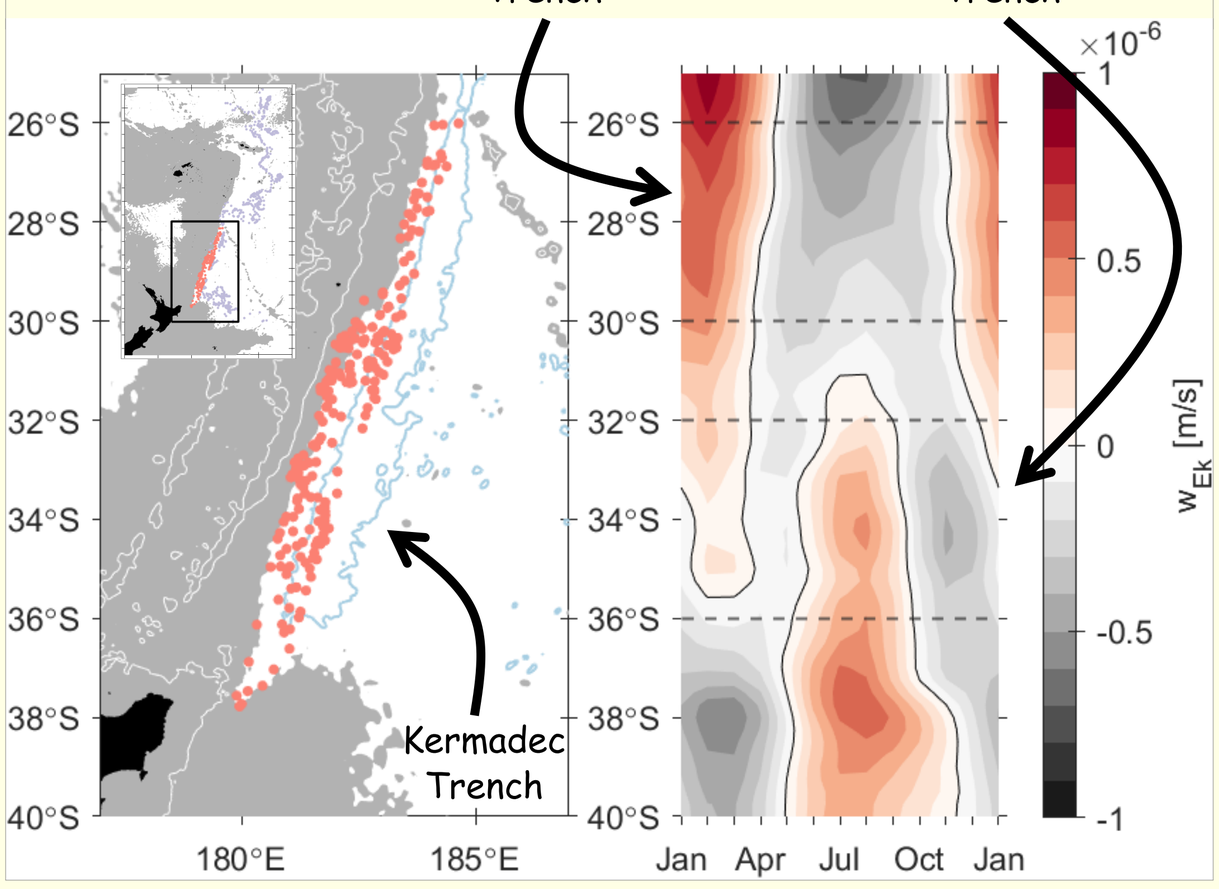
Temperature and salinity profiles collected by Deep Argo floats measuring between the sea-surface and 6000-m were used to study the deep western boundary current of the Southwest Pacific Basin as it flows equatorward through the Kermadec Trench.

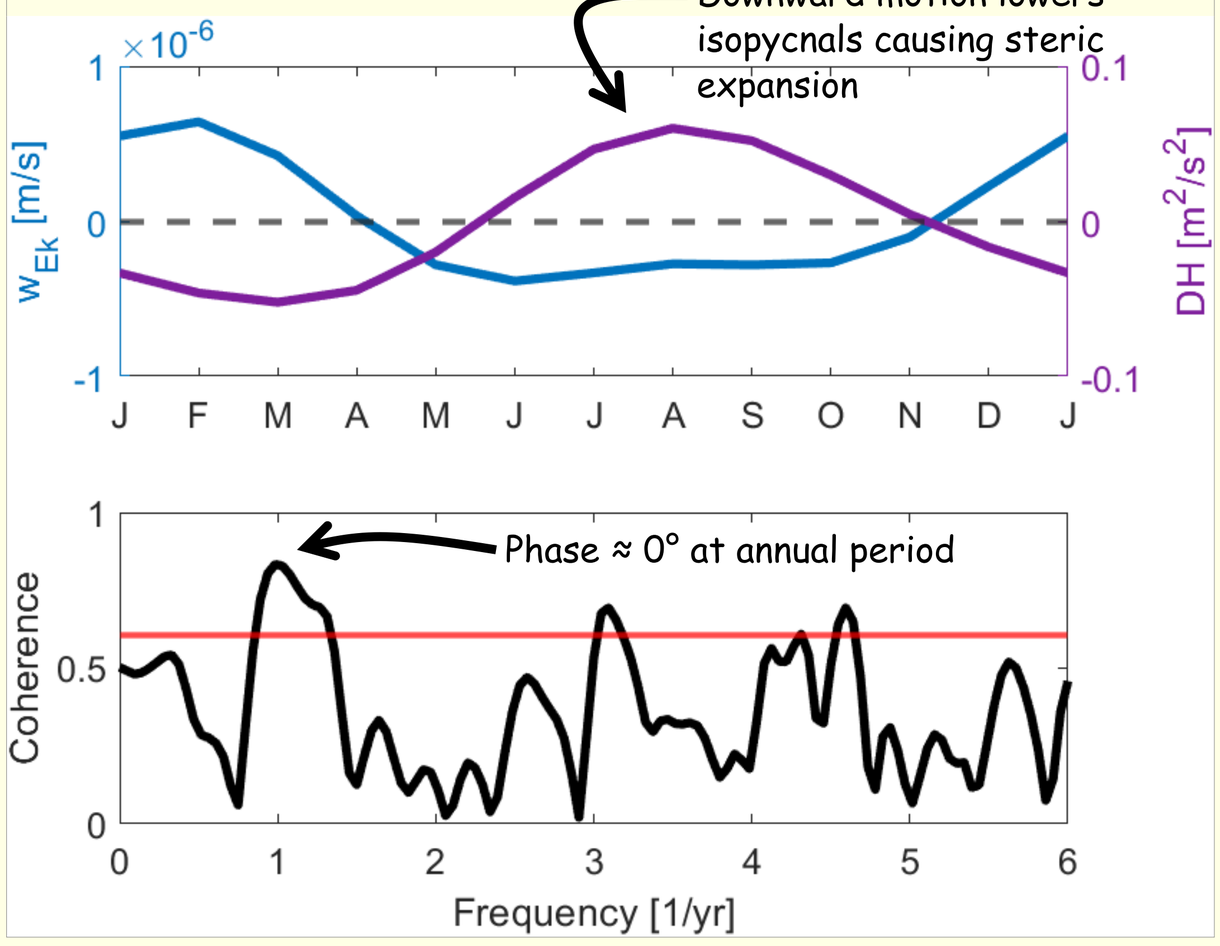


Observed seasonal changes in deep-ocean dynamic height, temperature, and salinity were predominantly due to heave (isopycnal displacement) rather than spice (water mass property changes).

The Kermadec Trench spans two different seasonal wind regimes, but limited Deep Argo coverage means these regions cannot yet be individually examined by observations.



An eddy-resolving ocean reanalysis demonstrated a deep-ocean seasonal cycle in the northern Kermadec Trench that was consistent with local Ekman pumping seasonal anomalies.



Possible Implications

1. Seasonal heaving may induce a seasonal cycle in deep western boundary current transport.
2. Shifting wind patterns (as a result of climate change) are likely to influence the deep-ocean on relatively short time scales.

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