

Response to reviewer in red

This manuscript presents analyses of CTD data taken in and over deep ocean trenches by WOCE and GO-SHIP hydrographic section and by full-ocean-depth landers. This revised manuscript adequately addresses the comments raised in the first review. A few, mostly minor suggestions follow, indexed by line number, L, where applicable.

1. L22. Consider changing to "There remote regions are arguably..."

Changed

2. L28. Consider changing to "The volume of water with $z > 6000$ dbar is approximately 0.21% of the..."

This has been changed to:

"The volume of water with depth greater than 6,000 m, is approximately 0.21% of the total ocean, however, it is 45% of the ocean's total depth range (Jamieson, 2015)."

3. L98. Change "and early 2000s" to "and 1990s". The WOCE observation period officially stopped in 1998. Sections occupied after WOCE and before GO-SHIP were under the age of CLIVAR/CO2.

Changed

4. L202-212. The use of a non-negativity constraint does theoretically improve the results for OMP even if the results are positive without it. However, with just T-S variations, 1-1 weighing, and 2 end-members, this analysis isn't really OMP, it's just straight-up end-member mixing, right? Please consider revising the text to reflect that, if you agree.

Yes, we agree, we have modified the starting sentence of the paragraph to make this clear.

"We apply an end-member mixing analysis to the profiles along the western Pacific"

5. L290. Change "statistically" to "statically".

Thank you for picking this up. This has been changed also in the caption for Figure 8.

6. L362. It seems highly unlikely that temporal variations play a substantial role here in the T-S differences observed here (and elsewhere in the report). The deep, abyssal, and hadal waters are quite spatially homogenous, and quite old, in the region. A big offset in salinity here is almost certainly owing to a calibration issue, and not temporal variability.

You are correct. Previously this was referring to the full water column, hence 'temporal changes' were appropriate for the upper waters. "Temporal differences" has been removed.

7. L390. Calibrations for WOCE and GO-SHIP cruises certainly often require departures from the "nominal" cell compressibility coefficient to match CTD and bottle salinity measurements.

Yes correct. We have modified this sentence to reflect the nuance of CTD corrections specific to the instrument.

"The decision was because corrected salinity data still exhibited an increase when the correction was applied, and the conductivity correction is specific to the instrument."

8. L401. Change "data is" to "data are".

Changed