

Third-Round Reviewer Comment on egusphere-2025-5692

Manuscript Title: The answer is blowing in the wind: seasonal hydrography and mixing of the inner sea of Tierra del Fuego, Southern Patagonia

Authors: Castillo et al.

General Comments

The manuscript has improved substantially, and I am satisfied that the authors have addressed the main scientific concerns raised in my previous review. In particular, the flushing-time calculation is now presented as a first-order estimate for the upper brackish layer, the uncertain freshwater-discharge estimate has been removed from Table 3, and the discussion now recognizes the limitations associated with surface salinity uncertainty and the lack of a validated circulation model. The wind-power comparison has also been corrected by distinguishing mean conditions from strong wind events, which is the appropriate physical interpretation.

I recommend **acceptance subject to technical corrections**. I do not think another full review round is needed. The remaining issues are specific text corrections, but two of them are still physically important because they concern the scope of the renewal claim and the consistency of the length scale used in the seiche discussion.

Major Comments

- **Residual deep-renewal wording.** The Abstract has been corrected and no longer claims a deep-basin renewal time, which is appropriate. However, a related phrase remains in the closing Discussion paragraph, where the fjord is described as being “characterized by slow deep-water renewal and mixing processes.” This is not demonstrated by the present data. The renewal and oxygenation evidence in the manuscript concerns the upper layer and the mooring depth near the fjord head, not the deep basin. Please remove this phrase, or clearly frame it as a general expectation from the fjord literature rather than as a result of this study. For the same reason, the phrase “modulates basin renewal rates” in the Conclusions should be changed to “modulates upper-layer renewal” or similar wording.
- **Incomplete deletion of the barotropic-seiche paragraph.** The response states that the barotropic-seiche paragraph was deleted. This was the right decision, since the 4 h signal is not central to the paper. However, a fragment remains in Section 4.3: the text still refers to a barotropic seiche and gives $c = \sqrt{gh} = 46.4 \text{ m s}^{-1}$, but the argument is not completed. This is confusing and implicitly brings back the same $L \approx 165 \text{ km}$ scale discussed in the previous rounds. Please either remove these remaining sentences entirely, or complete the calculation and justify why the seiche domain differs from the $L = 75 \text{ km}$ fjord scale used for the wind and exchange diagnostics.
- **Freshwater Content caveat.** The added caveat about CTD-SRLD salinity uncertainty is useful and should remain, but the current wording is unclear. The phrase “but

the along-fjord FWC estimations” appears incomplete, and “longer uncertainty” should be “larger uncertainty.” Please rewrite this sentence so that the point is clear: summer upper-layer salinity from the seal-borne data is less well constrained than temperature, and this uncertainty propagates into the along-fjord Freshwater Content estimates.

Minor Comments

- The Abstract could be slightly more precise by indicating that the wind-power comparison applies to strong wind events, not to mean summer winds.
- Since the flushing times are now explicitly first-order estimates, Table 3 should avoid excessive precision. Reporting T_F as approximately 7 d and 9 d, or simply as order one week in the text, would be more consistent with the uncertainty of the calculation.

Summary Recommendation

I recommend **acceptance subject to technical corrections**. The revised manuscript now supports its main conclusion with a more consistent physical argument. The remaining changes are limited to removing the unsupported deep-renewal wording, cleaning up the leftover seiche fragment, and clarifying the FWC uncertainty caveat. These corrections should be straightforward for the editor to verify.