

I have read the revised manuscript of «30 months dataset of glider physico-chemical data off Mayotte Island near the Fani Maoré volcano» by Heumann et al., and their response to the reviewers' comments.

I am generally satisfied by the answer to my comments and their improvement of the manuscript.

Here are some specific comments :

I11 vertical speed

Done

I15 department → territory

Done

I28 website url in ()

Done

I28 This marine and terrestrial observatory

Done

I31 preservative

Done

I35 A new volcanic structure of 800m formed

Done

I46 has yet to be determined

Done

I71 equipped

Done

I81 a way to compensate

Done

I87 at sea near the eastern

Done

I93 SeaBird's GPCTD and RBR's Legato

Done

I97 1MHz AD2CP from Nortek (... specifications ... integration)

Done

I105 on average

Done

I106 What is a radial navigation? Navigation at fixed heading toward a central waypoint?

Yes, this refers to navigation at a fixed heading toward a central waypoint : "consisting on

a navigation at fixed heading toward the central point of the Horseshoe structure”.

L120 represents a substantial amount of data

Done

L124 While data are average to 30s interval, this represents about 5m at a typical glider vertical velocity. This should be mentioned here. Specifically for ADCP, what is the impact of such an averaging when computing vertical profile of horizontal velocities at 2 dbar?

Yes, indeed. While data are averaged to 30-second intervals, this corresponds to approximately 5 meters of vertical resolution at a typical glider ascent or descent speed. As a result, fine-scale vertical structures or sharp shear zones may be partially smoothed, although the resolution remains adequate for capturing broader vertical patterns of current variability. This has been updated in the manuscript.

L132 thermal lag effect was addressed using

Done

L136 salinity data

Done

L136 I am surprised that the authors mention they used salinity measurements directly from the Legato, as with the thermal lag correction procedure, they should have used conductivity from the sensor and recompute salinity. As this is not central to the paper, I am not raising an issue here.

You are absolutely right. We do use conductivity measurements from the Legato sensor to recompute salinity as part of the thermal lag correction procedure. I am sorry that this was not made clearer in the original version of the manuscript : For the sensor pair LEGATO CTD and AROD-FT, the data are processed internally by the sensors. Dissolved oxygen data are directly available in $\mu\text{mol/kg}$ while salinity data is also computed from the conductivity data using the same correction algorithm applied to the GPCTD.

L139 different regimes = up- and downcasts?

No, this refers to the different sensors used. This point has been clarified in the revised manuscript : To face with this issue, the time-series was split into discrete segments according to the different sensors operated.

2.2.2 I suggest to have a subsection for CH4 and another one for CO2.

Done

L145 give number of average profiling speed. Has the vertical speed of the glider tried to be as small as possible in order to limit the effect of the slow response of the sensors?

The average profiling speed is about 10 to 15 cm/s. While reducing the vertical speed would help limit the effect of the slow response of certain sensors, this is constrained by the glider's operating requirements. In particular, the glider needs to maintain a minimum pitch angle typically $10/15^\circ$ to ensure stable flight. Moreover, for ADCP measurements, the manufacturer recommends a pitch angle of around 18° , which we adopt for optimal data quality. As a result, we cannot significantly reduce the glider's vertical velocity without

compromising its ability to glide properly and collect reliable ADCP data.

L150 I suppose that $dt=1s$ here, right?

Yes, that is correct. The time step $dt=1s$ refers to the raw measurements, while $dt=30s$ corresponds to the sub-sampled dataset.

L158 uplift and downlift phases = up- and downcasts

Done

L163 6 min gives about 70m for typical glider vertical speed. You should discuss the implication of such long lag on the final measurements. This can be especially important near inflection points.

You are right. The estimated sensor response time implies that CH_4 measurements are subject to a significant temporal smoothing, particularly during phases of rapid vertical variation such as near inflection points in the profiles. This limitation is now explicitly mentioned and discussed in the revised manuscript : “the estimated sensor response time implies that CH_4 measurements are subject to a significant temporal smoothing, particularly during phases of rapid vertical variation such as near inflection points in the profiles”.

L172 unknown

Done

L179 This upper error estimate of 10cm/s seems rather arbitrary. Do you have a way to quantify this more seriously and objectively? For instance by comparing with satellite measurements? Or giving numbers on the statistic

We acknowledge that the upper error estimate of 10 cm/s remains approximate at this stage. A dedicated study is currently underway to more rigorously quantify this uncertainty by comparing glider-derived current measurements (in multi-YO configurations) with data from a CIAM frame equipped with four ADCPs, deployed in the Mayotte area between September 2021 and September 2025. However, results from this comparison are not yet available. Regarding satellite-derived surface currents, we note that the glider measurements represent averages over periods exceeding 10 hours during multi-YO missions, which introduces a smoothing effect that limits the direct comparability with higher-resolution satellite data.

L181 here and after : water-current → current

Done

L187 I am missing an histogram of the time between surfacing in order to trust those currents measurements. Certainly tidal currents, which seem to be of importance, would be aliased by the methodology with 10h dives. If the sampling keeps going, I would suggest to aim for systematic 12h dives.

We do our best to adapt the glider navigation to the environmental conditions, which makes it difficult to systematically achieve 12-hour multi-YO dives at all times. However, we acknowledge the value of such sampling in reducing potential aliasing of tidal currents, and this point will be carefully considered in future mission planning.

L204 $O(1mm/s)$... $O(1cm/s)$

Done

I217 there are to date no

Done

I236 when the glider rarely ascended in an alarm state.

Done

Fig.3 : what is the size of the Gaussian filter?

The Gaussian filter applied corresponds to a 7×7 kernel, based on the chosen sigma of 1.5.

L283 Maybe mention the oligotrophic state of the area and its link to biological activity (ie primary production) and effects on O₂.

Thank you for this suggestion. We have added a mention of the oligotrophic state of the study area and its link to biological activity and oxygen patterns : “The study area, located off the coast of Mayotte, is generally characterized by oligotrophic conditions, typical of tropical oceanic regions (Ternon et al., 2014). Such conditions are associated with low concentrations of nutrients in surface waters, which constrain primary production and consequently limit biological oxygen supersaturation. Nevertheless, the presence of detectable surface O₂ saturation suggests that, despite low nutrient availability, the prevailing light conditions and water column stratification support moderate phytoplankton activity in the upper layer.”

Fig. 5 Temperature-Salinity ... annotated

Done

I304 scarcer than below [you still have a significant amount of profile at this depth]

Done

I329 associated independently

Done

I354 which scale the ascent velocity

Done

I381 I feel that I have missed this point in the former section. Where did you describe or mention the impact of mesoscale structure on as anomalies?

The impact of mesoscale structures on anomalies was mentioned in the manuscript in the description of deeper hydrological variability. Specifically, we noted that disruptions in the vertical distribution of temperature and salinity below ~100 m, such as those observed between June and July 2022 (between the gray dotted lines in Fig. 3), can be attributed to the general circulation or mesoscale variability.

L382 worth to investigate

Done

I383 Please be more precise while listing the list of processes. This list is rather confused. Trapping of what by what? Upwelling due to what process?

Thank you for this comment. We have clarified the list of processes in the revised manuscript to make it more precise: e.g., trapping of gas bubbles in stratified layers, lateral dispersion by mesoscale flows, vertical diffusion of dissolved gases, or upwelling induced by topographic features or internal waves.

Fig. 10 : The velocities numbers are too small to be read on paper. What is the justification of using SLA instead of ADT to describe the currents?

The velocity numbers in Fig. 10 have been enlarged to improve readability on paper. Regarding the use of SLA rather than ADT to describe the currents: we chose SLA because our focus is on the temporal variability of the surface circulation associated with mesoscale and submesoscale processes. SLA captures the anomalies relative to the long-term mean dynamic topography, which is appropriate for highlighting such variability. Using ADT would include the mean circulation, which is not the primary focus of this analysis.

L399-403 : Are you going to update the database once you can properly calibrate the CH₄/CO₂ measurements? This would add significant value to this work.

Thank you for this suggestion. The database will indeed be updated accordingly for the time period covered by this study once the CH₄ and CO₂ sensor calibrations are finalized. Additional datasets will also be made available as the mission is ongoing. Since the project is funded by the French government, all validated data will be made publicly accessible.

L413 (e.g., GEORGE

Done

We sincerely thank you for your thorough review and constructive feedback, as well as the second reviewer for their valuable comments. Your suggestions have significantly contributed to improving the clarity and quality of the manuscript. We appreciate the time and effort dedicated to this review process.