Dear, thank you very much for your comments and suggestions, they are particularly relevant. We addressed in the present document the different comments and hope we will together improve the manuscript.

If there are still some unclear sections, or if you have new suggestions, please feel free to respond us.

My general remark is that this analysis would **benefit from analysing salinity profiles** as well. **Fjords tend to have a well defined stratification not only due to temperature but also due to freshwater discharge. Riverine and precipitation preconditioning on monthly to seasonal timescales could play some role in the observed MHW seasonality and intensity but this is not discussed.**

We understand your general comment that this work would benefit from an analysis of salinity and freshwater inputs (and more generally from a subsurface analysis). As you noted, these factors strongly influence fjords' stratification and even the main Inner Sea. However, we believe that it would be more appropriate to dedicate an entire paper to this topic. Each fjord responds differently to seasonal variations (but as well from local weather) in salinity/freshwater inputs, and we do not think that it would be possible or meaningful to generalise these processes across the whole study area. We will however have a look to the salinity data available in some fjords and see if some of them are available during the occurrence of some MHW events, and if relevant, we will add it to the results/discussion. In any cases, we planned a future paper that will address this subject in detail, together with the development of subsurface MHWs.

L83: why 900 meters specifically?

900 m (0.08°) was our computational limit. In DIVA, the calculation time increases in a non-linear way, and we reached our computer limits. We would have like to increase by a 100m the resolution as there are 2 straits of the sea that were not possible to resolve (connections between two fjords). However, apart from these 2 straits, the 900 metres horizontal resolution does resolves all fjords and channels.

L145: how exactly was seasonal interpolation performed to create a seasonal climatology? Mean / running average over JFM, AMJ, etc?

How was the second interpolation "realized" to generate a monthly climatology?

Reviewer1 also mention the lack of precision of the methodology. We propose to modify the manuscript as follow:

L145 to 150 ("First, a seasonal interpolation has been performed to create a seasonal climatology… with the in situ data to refine the results into a monthly climatology.") would be replaced by this text:

To generate a fine-scale spatio-temporal climatology from in situ surface and subsurface data, we first performed a seasonal interpolation by grouping the months into standard seasons (January-February-March, April-May-June, July-August-September, October-November-December). For each season, only the in situ observations corresponding to the relevant months were used. This approach addresses the lack of in situ data in some areas of the sea and the absence of samplings during certain periods, and produces a representative average seasonal state of the temperature that captures the main patters of variability at the seasonal scale. The final product is a climatology with a seasonal temporal resolution.

Then, a monthly climatology was performed by refining the seasonal field. For each month, the corresponding seasonal grid was used as a background field, and added all available in situ data for the specific month to increase spatial and temporal variability. This two-steps approach ensured that the monthly climatology remains physically consistent with the larger seasonal patterns while capturing the finer monthly variability. The outcome of this step is a set of twelve monthly climatology fields (monthly temporal resolution), each providing a mean state for every pixel of the study area. For both seasonal and monthly climatologies, vertical and horizontal resolution are the same, and data processing is equal.

Then, L167-168 ("To overcome the monthly climatology and have a daily one, a 90-day moving average was calculated for each grid cell.") would be replaced by this paragraph:

MHW detection requires a climatology at a daily time resolution, to compare with daily temperature data in order to follow on a daily-basis the evolution of the MHW. To convert this monthly climatology into a climatology with a daily time scale resolution, each monthly field was expanded over the corresponding number of days for each month (for instance, the January values were repeated 31 times, February 29 times, March 31 times, etc.) This produces a continuous sequence of 366 daily values for each grid point. Finally, to smooth the resulting daily time series, and to ensure a realistic and gradual transition between months, a 90-day moving average was applied. This temporal filter reduces abrupt changes at the boundaries between months and provides a smoothed daily climatology, yielding one representative value per day of the year. This methodology provides a consistent and realistic daily climatological dataset, which can be used for comparison with daily temperature products. In the revised manuscript, we will not call it "daily climatology" anymore.

L166: I am not sure I understand how do you perform a 90-day moving average over a monthly climatology? Monthly climatology means you have 12 values. How do you do 90-day rolling mean?

Please, see the above response.

Section 2.3, L201: I think the readers would benefit not only from calculated bias, but from a scatter plot SAT DATA vs IN SITU DATA. This would allow an estimate where you have over(under) estimations...

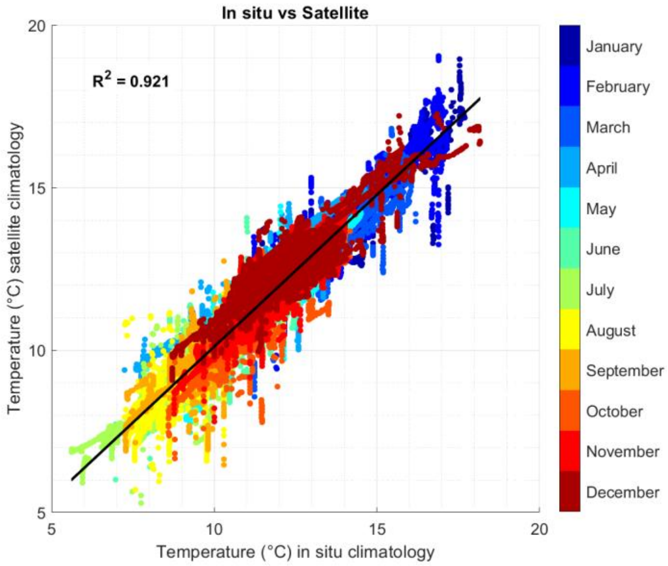

Figure 1: Comparison of the temperature given by the monthly in situ-based climatology (x-axis) and the monthly satellite-based climatology (y-axis). The colours represent the corresponding month of the observation.

This figure represents the correlation (linear regression) between the monthly climatology calculated from in situ data (DIVA) and a monthly climatology calculated from satellite data (MODIS AQUA 2003-2023). They are the datasets used to calculate the bias (L201-204). This figure would show the coherence between the two datasets, and that although a bias between the two datasets exists, they are coherent. We also look at this same plot but with the longitude and latitude instead of the monthly distribution. It appears that the satellite detects higher variations in the fjords and channels (such as the Chonos Archipelago) than the in situ climatology.

Section 2.5. I would suggest to either write

Qi = Qs + Qb + Qe + Qc,

where the last three fluxes can be negative or positive. Also define when a specific term is positive or negative. For example, is Qb negative when ocean is losing heat to the atmosphere? If so, then Qs-Qb = Qs + |Qb|? Otherwise this can lead to a very usual confusion which could easily be avoided.

Indeed, Q_B, Q_E and Q_C are negative when the ocean is losing heat to the atmosphere (that's why we wrote it that way but we understand the possible confusion).

To avoid any confusion, we propose to write it $Q_I = Q_S + Q_B + Q_E + Q_C$, and to add the sentence "Q_B, Q_E and Q_C are negative when the ocean is losing heat to the atmosphere" in the first paragraph of section 2.5.

Table 1. Again, I would suggest to add a scatter plot CLIM vs IN SITU.

We would include this figure to the section 3.1.

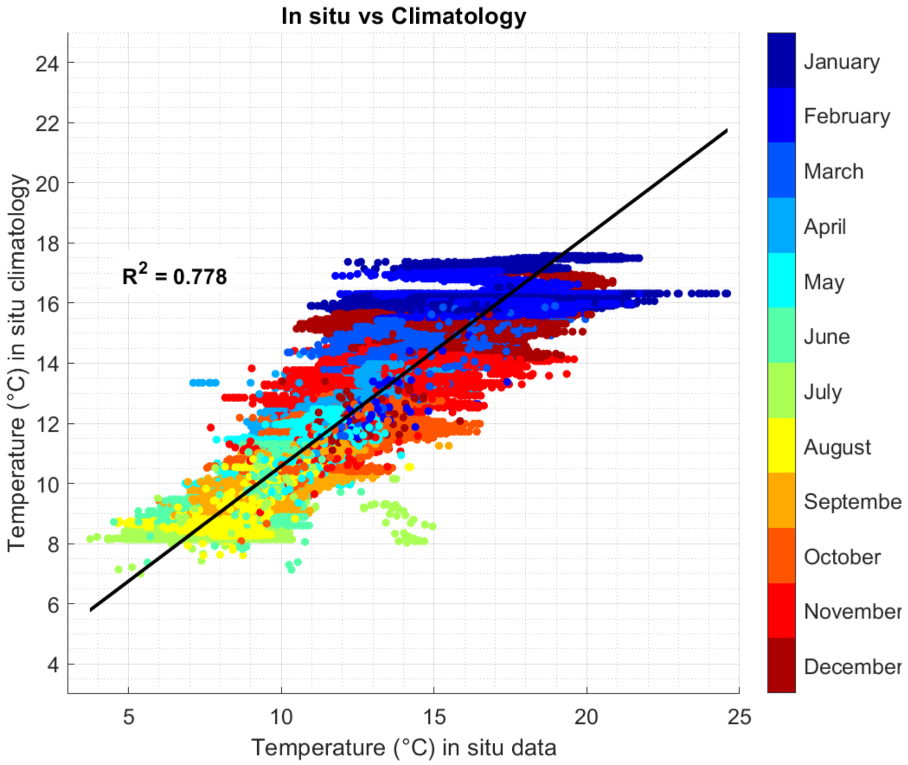

Figure 2: Comparison of the temperature given by the in situ data (x-axis) and the daily climatology build on this same in situ data (surface only). The colours represent the month during which the observations have been sampled.

Figure 8. Is this all computed at the surface? You have 3D data – did you make any analyses of deep marine heatwaves at other depths?

While the climatologies were generated at multiple depths, the analysis of MHWs presented in this study is limited to the surface layer, based on satellite-derived SST data.

The inclusion of the full-depth climatology in the manuscript serves for two purposes:

1) To make the dataset available for future research, including by local scientists and stakeholders who may require information at depth, particularly in regions where surface data alone do not adequately represent ocean conditions.

2) To provide fundamentals for future investigations into subsurface MHWs, which we plan to pursue (in this work, we would like to include analysis of the stratification, salinity, freshwater inputs, etc).

L380-390: Here I am wondering about the riverine input into the fjord? Freshwater induced stratification could boost a surface MHW by inhibiting vertical mixing through the pycnocline. This could explain why the most enclosed regions of the fjord exhibit the highest intensity. I think it would be very welcome to check salinity fields here.

The same comment goes to **Figure 9:** is there a clear summer halocline? What are the density profiles in the fjord? This could yield a clear salinity-based mechanism of why summer exhibits more MHWs than other seasons.

Indeed, you are very likely to be right. The fjords are strongly influenced by the salinity/stratification, which would undoubtedly affect the development, persistence and intensity of MHWs. We believe that this topic deserves a dedicated paper, as there is a great deal to explore regarding salinity dynamics in the different basins/fjords. Nonetheless, we will add a few reflexions about the stratification of the water column and its relation with MHW development to address this issue, see **in bold** the modifications we will do to the paragraph from L377 to 391 below.

"The mean intensity over the last 20 years is basin dependen**t**~~cy~~ (Fig. 8B): the highest intensities can be seen in the most enclosed areas: Reloncaví Sound with a mean intensity of 2°C (with a west-east gradient), in Aysén Fjord with a higher intensity at its head (more than 2°C), and the highest intensity is found in Puyuhuapi Fjord with an average intensity of 2.5°C in its centre**. These regions also correspond to the ones with the highest seasonal temperature amplitude, and the most stratified basins, especially during summer months (Fig. 5A, 5D).** ~~(these regions correspond to the places with the highest seasonal temperature amplitude)~~. A coastal zone along the western coast of Chiloé, excluding Chacao Channel, is also highlighted. In contrast, the lowest intensities are found in Corcovado Gulf and in the Chonos Archipelago, with values below 0.5°C, aligning with the regions with the lowest temperature amplitude. **They correspond to regions of generally low stratification, with a water column relatively homogeneous during most of the year, especially in Corcovado Gulf.** Examining the average maximum intensity of MHWs, similar patterns emerge (Fig. 8C): maximum intensities are found in enclosed areas **with strong stratification**, reaching up to 5°C in Aysén and Puyuhuapi Fjords and 4°C in Reloncaví Sound. The lowest maximal intensities, below 2°C, occur in Corcovado Gulf and Chonos Archipelago. Within the fjords, the intensity is generally higher in the most enclosed regions**, i.e. their head, where the stratification if the highest,** and diminishes towards their mouths**, as the stratification and seasonal amplitude diminishes. For instance, at Puyuhuapi's head, the temperature varies from 17°C to 12°C from the surface to 20m depths in summer, whereas in its centre, the temperature varies from 16°C to 12.5°C from surface to 20m depth, explaining that MHW could be more intense at its head than at its mouth (Gröger et al., 2024).** When looking at the MCSs (Fig. 8F), the intensity patterns are comparable. Intensities remain relatively mild in the Inner Sea of Chiloé and Chonos Archipelago (above -1°C), and stronger in the Reloncaví Sound (between -1.5°C and -1 °C), Comau, Puyuhuapi and Aysén Fjords (about -1.5°C and reaching -2.5°C at Puyuhuapi's head). **The regions experiencing the strongest MCSs are also the regions with he highest temperature amplitude and the highest stratification.** For the maximum intensity (Fig. 8G), again, a similar pattern can be observed as for MHWs with a maximum intensity peaking at -5°C in Puyuhuapi Fjord and Reloncaví Sound, while most of the other parts of the study area experience maximum intensities above -2°C."