Annual mass change of the world's glaciers from 1976 to 2024 by temporal downscaling of satellite data with in-situ observations

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Dear editor,

We are very pleased to hear our manuscript has been accepted for publication in ESSD. We are grateful to both the editor and the two anonymous reviewers for their engagement in reviewing this work and all the valuable insights that allowed us to improve the quality of the dataset and manuscript.

In this last version of the manuscript, we have addressed the following few extra points:

- We clean up everywhere in the MS with reference to temporary review links keeping only the publication links and DOI for the final dataset and codes.
- We checked for typos in the text.
- We make sure that all figures are generated at 600 DPI. Figures are larger than their expected final dimensions to avoid quality loss. It is possible to make them at the exact dimensions when we know the size that each figure will have in the final publication.
- To avoid confusion, we decided it is best to remove the citation to the unpublished work from Huss et al. (in prep), and instead briefly explained the methodology for the spatial correlation in density conversion error. For this we added in the revised manuscript:

L323-331: For density conversion, we estimated a spatial correlation function of the uncertainty in the density conversion $\rho_{\sigma_{f_{\rho}}}(d)$ by performing a similar variogram analysis as detailed for annual anomalies (Section 2.2.1) but instead applied to modelled estimates of annual density of volume change for all glaciers globally. These estimates were obtained by pairing a mass balance model (Huss and Hock, 2015) with a firn densification model (Huss, 2013), calibrated on geodetic mass balances (Hugonnet et al., 2021). We find a spatial correlation function of:

$$\rho_{\sigma_{f_{\rho}}}(d) = s_1 e^{-\frac{3d}{r_1}} + s_2 e^{-\frac{3d}{r_2}} \text{ if } d > 0, \text{ else } 1 \tag{15}$$

Where d is the distance between two glaciers, $s_1 = 0.12$, $s_2 = 0.72$ are the partial sills and $r_1 = 200 \text{ km}$ and $r_2 = 5000 \text{ km}$ are the correlation ranges.

And we changed the citation of Huss et al. (in prep) in Table 3 and Table 7 to: *"Spatial correlation following an empirical function in density conversion error* ($\rho_{\sigma_{f_o}}(d)$, EQ 15)"