Point-to-point replies to the review report

We would like to thank the editorial team and the referees for the attention given to our manuscript and for providing an evaluation of our work. Our responses to their comments are provided below.

For clarity, Editor and Referees' comments are shown in bold font and the authors' replies in *italic*.

Referee's comments: *Our reply*

Editor:

Dear Authors,

Thank you for you submission to ESSD. I am happy to begin the open discussion and review phase.

I have noted a few change suggestions on the attached manuscript. However, these are generally very minor and can be addressed during your revisions.

Our Reply: Thank you for the consideration given to our work and for reading the manuscript carefully. We have taken into account all your suggestions and addressed them as detailed below.

The only other request I have would be to also consider making the code you developed / applied to generate the datasets also available, which would favour the reproducibility of the dataset and the application of the method elsewhere.

Our Reply: Thank you for your suggestion, it is right. This is also our goal, and we are working toward that purpose. However, we have started developing the surface water storage dataset at the global scale and for that, the code is being modified in order to enable the easy computation elsewhere and taking into account certain particularity of different regions. At this stage, we will not be able to make it available due to the ongoing work and surely, later on, after being sure of the capability of the code to run properly for other regions, we will make it available to the public on a repository. However, we would like to remind that all datasets we have created for this study are available and all results are therefore reproducible.

1. **Line 35, The SWS estimates are evaluated against satellite precipitation data and in situ river discharge and, in general, a relatively good agreement is found between the three hydrological variables at the basin and sub-basin scales (linear correlation coefficient > 0.5).**

Our Reply: Following your suggestion about the verb "evaluate", we have replaced it by "assess" and the word "good" by "fair". The sentence is now as follow:" The SWS estimates are assessed against satellite precipitation data and in situ river discharge and, in general, a relatively fair agreement is found between the three hydrological variables at the basin and sub-basin scales (linear correlation coefficient > 0.5)."

2. **Line 39, The SWS estimates clearly reveal the widespread spatial distribution of this severe event (less than 40% of the mean maximum), in accordance with the large negative anomaly observed in precipitation over that period.**

Our Reply: We have modified the words. The sentence is now:" The SWS estimates clearly reveal the widespread spatial distribution of this severe event (~40% deficit as compared to their long-term average), in accordance with the large negative anomaly observed in precipitation over that period. "

3. **Line 45, The dataset of the CRB's SWS is available for download at https://doi.org/10.5281/zenodo.7299823 (kitambo et al., 2022b), Please capitalise.**

Our Reply: The change has been made and the reference is now correctly written: " The dataset of the CRB's SWS is available for download at https://doi.org/10.5281/zenodo.7299823 (Kitambo et al., 2022b)."

4. **Line 63, The amount of water stored through large floodplains and wetlands is a key component to understand the exchange between the main river channel and the dissolved and particulate material (sediment and organic matter) (Melack and Forsberg, 2001; Ward et al., 2017). Furthermore, they also act as a regulator…**

Our Reply: Modified. The sentence is now: " The amount of water stored through large floodplains and wetlands is a key component to understand the exchange between the main river channel and the dissolved and particulate material (sediment and organic matter) (Melack and Forsberg, 2001; Ward et al., 2017). Furthermore, it also acts as a regulator…"

5. **Line 80, …when the amount of water in rivers and floodplains was found ~70% below its long-term average. Insert "to be"**

Our Reply: Inserted. The sentence is now: "…when the amount of water in rivers and floodplains was found to be ~70% below its long-term average."

6. **Line 105, Recently, Frappart et al. (2021) proposed a densification of the network of VSs by including water elevation variations over the floodplains…VSs This needs defining on first use at L103.**

Our Reply: Agreed. The sentence is now as follow at L103: "At the basin scale,…at 350 virtual stations (VSs) from the Environmental Satellite (ENVISAT)…"

7. **Line 117, Thus, in this study, we use two approaches to estimate, for the first time, the unprecedented estimates of spatio-temporal variations of CRB's SWS over the period 1992-2015. Revise language (repetition)**

Our Reply: Following your suggestion, we have removed "unprecedented estimates of" and the sentence is now:" Thus, in this study, we use two approaches to estimate, for the first time, the spatio-temporal variations of CRB's SWS over the period 1992-2015."

8. **Line 121, The second approach relies on the methodology developed by Papa et al. (2013) using the relationships between elevation from digital elevation models and surface water area variations… Please try and keep the terminology consistent;**

above you use "surface water extent", here "surface water area", but I think these are the same thing. Please clarify and modify as necessary.

Our Reply: Thank you for pointing this out. Yes, it is the same thing. We have changed the word "area" into "extent". The sentence is now: "The second approach relies on the methodology developed by Papa et al. (2013) using the relationships between elevation from digital elevation models and surface water extent variations…"

9. **Line 123, Section 3 describes the datasets and section 4 the methodology used in this study. Capitalize S.**

Our Reply: Thank you, modified. The sentence is now:" Section 3 describes the datasets and Section 4 the methodology used in this study."

10. **Line 124, An evaluation is performed comparing the developed SWS with other independent datasets such as historic and contemporary river discharge and precipitation data. Looking at correlations with associated variables such as precipitation and discharge data is certainly sensible and can provide a plausibility check, but since these are not the variable you derive, I'm not sure it really counts as a strict evaluation. Independent SWS data would be required for that. Perhaps consider an alternative term to "evaluation here" if possible.**

Our Reply: Thank you for your suggestion. We have replaced the word "evaluation" by "assessment". The sentence is now:" An assessment is performed comparing the developed SWS with other independent datasets such as historic and contemporary river discharge and precipitation data."

11. **Line 126, Section 6 presents an application case of the dataset. We investigate the spatial distribution of the major drought that occurred across the basin at the end of 2005 and early 2006. Merge these two sentences > "...in which the spatial distribution.....2006 is investigated."**

Our Reply: Following your suggestion, we have merged the two sentences. The sentence is now:" Section 6 presents an application case of the dataset in which the spatial distribution of the major drought that occurred across the basin at the end of 2005 and early 2006 is investigated."

12. **Line 127, Section 7 presents the repository on which the SWS dataset can be accessed freely, and finally, section 8 provides the conclusions and future perspectives.**

Our Reply: We have changed "on" into "from" and capitalize "s". The sentence is now:" Section 7 presents the repository from which the SWS dataset can be accessed freely, and finally, Section 8 provides the conclusions and future perspectives. "

13. **Line 147, The central part of the basin is characterized by an internal drainage basin, the Cuvette Centrale, where the river system is dominated by large wetlands and floodplains, with flat topography and the predominance of three cover of the tropical rainforest (Bricquet, 1993; Laraque et al., 2009, 2020). This does not make sense to me. Typo?**

Our Reply: Thank you for pointing this out. Following your suggestion, we have made the changes and now the sentence is as follow: " The central part of the basin is characterized by an internal drainage basin and a large tropical rainforest, the Cuvette Centrale, where the river system is dominated by large wetlands and floodplains, with flat topography (Bricquet, 1993; Laraque et al., 2009, 2020)."

14. Line 150, In the highland of the Bangweulu region, there are several lakes characterized by small depths (less than 10 m) where lake Bangweulu is the largest (~2 000 km^2)… I think you mean "of which"?

Our Reply: Yes, thank you for pointing this out. The sentence is now:" In the highland of the Bangweulu region, there are several lakes characterized by small depths (less than 10 m) of which lake Bangweulu is the largest (~2 000 km^2)…"

15. Line 154, The Upemba depression contains a mosaic of lakes (e.g., Upemba Lake) and wetlands that can reach seasonally ~8 000 to ~11 840 km^2…. Add "in extent".

Our Reply: Added. The sentence is now:" The Upemba depression contains a mosaic of lakes (e.g., Upemba Lake) and wetlands that can reach seasonally ~8 000 to ~11 840 km^2 in extent. "

16. Line 163, We used the estimates of surface water extent (SWE) derived from the Global Inundation Extent from Multi-Satellite (GIEMS-2), that provides global coverage at monthly time step… Replace by "which"

Our Reply: Replaced. The sentence is now:" We used the estimates of surface water extent (SWE) derived from the Global Inundation Extent from Multi-Satellite (GIEMS-2), which provides global coverage at monthly time step… "

17. Line 164, …water bodies including wetlands, rivers, lakes at 0.25° spatial resolution at the Equator (on an equal-area grid, i.e., each pixel covers 773 km^2; Prigent et al., 2007, 2020). It could be more useful to give the pixel side length in km at the equator here instead.

Our Reply: Following your suggestion, we have added the pixel size length in km beside the one in degree. The sentence is now:" …water bodies including wetlands, rivers, lakes at 0.25° (~27 km) spatial resolution at the Equator (on an equal-area grid, i.e., each pixel covers 773 km2; Prigent et al., 2007, 2020)."

18. Line 224, For that, the global canopy height dataset, ASTER and ALOS were all resampled to 90 m spatial resolution. Using what resampling approach?

Our Reply: We have inserted the method used. The sentence is now:" For that, the global canopy height dataset, ASTER and ALOS were all resampled to 90 m spatial resolution using the nearest neighbour resampling method."

19. Line 240, By the availability of water extent and level estimates at two consecutive measurements epochs, the lake water volume anomaly is calculated under the assumption that the lake morphology is regular and has a pyramidal shape. I think

that further details are required here on how the lake morphology / geometry was treated (e.g. gradient of the banks) and how the calculation was done.

Our Reply: Thank you for your suggestion. Following your comment, we have modified the section 3.5 by adding further details. Now, the section 3.5 is as follow:" Over the largest lakes of the CRB, time series of monthly water storage anomaly for Lakes Bangweulu, Kivu, Mweru, Tanganyika, Upemba (see Fig. 1 for their locations; Fig. S2 for their time series) are estimated using surface water extent and water level time series obtained from HydroSat database (accessible at http://hydrosat.gis.uni-stuttgart.de/ [Tourian et al. 2022]). After collecting the simultaneous lake water area and height measurements, the empirical relationship between lake surface water level and area is developed. This model represents the bathymetry of the lake for the part which is captured by remote sensing observations. By assuming that the lake has a regular morphology and a pyramid shape between two consecutive measurement epochs, the lake water level-area-storage model is developed. Finally, time series of lake water storage anomaly are calculated using the developed model and lake water level or surface extent measurements."

20. **Line 249, …and from the Environmental Observation and Research project (SO-HyBam; https://hybam.obs-mip.fr/fr/, last access: 07 November2022).**

Our Reply: Modified. The sentence is now:" …and from the Environmental Observation and Research project (SO-HyBam; https://hybam.obs-mip.fr/fr/, last access: 17 May 2023)."

21. **Line 273, …the hypsometric curve approach following the methodology of Papa et al., (2013) and Salameh et al., (2017).**

Our Reply: Removed. The sentence is now:" …the hypsometric curve approach following the methodology of Papa et al. (2013) and Salameh et al. (2017)."

22. **Line 321, (2) The next step corrects the behavior of the FABDEM hypsometric curve (Fig. 4) to avoid overestimation of SWS at the pixel level. For each GIEMS-2 pixel, the established area- elevation relationship enables us to derive the elevation amplitude (i.e., Similar to the amplitude of SWH) from the corresponding average minimum and maximum of SWE. What does this mean? Why is this correction needed? Please expand.**

Our Reply: Thank you for pointing this out. This correction is needed in order to avoid overestimation of surface water storage at the pixel level. To make the sentence clear, we modified the sentence as follow:" To avoid the overestimation of SWS at the pixel level from the unrealistic amplitude, this step corrects the behavior of the FABDEM hypsometric curve (Fig. 4). For each GIEMS-2 pixel, the established area- elevation relationship enables us to derive the elevation amplitude (i.e., Similar to the amplitude of SWH) from the corresponding difference between the average minimum and maximum of SWE over 1992 to 2015."

23. **Line 624, …URL/DOI: https://doi.org/10.5281/zenodo.7299823 (kitambo et al., 2022b).**

Our Reply: Modified. The reference is now:" …(Kitambo et al., 2022b)."

Referee #1:

The authors have constructed a much-needed data set on the surface water storage and its changes over the Congo River Basin. Their data set can now be used as a baseline for future related data sets, and importantly, in water balance modeling efforts. I look forward to the authors or perhaps other researchers using this data set in comparisons with forthcoming SWOT measurements. Such comparisons will be rather important for the SWOT mission calibrations and validations. Please note that the authors of this manuscript are well-known and deeply respected for their research in the Congo and in surface water dynamics.

The manuscript proceeds in a seamless, logical fashion; nothing is missing nor does anything need to be added. Other referees might find important details that need clarification. I support publication of the manuscript.

Our Reply: We appreciate your very positive feedback on our work. We are glad that you have highlighted the fact that this dataset can now be used as baseline for future research in the Congo basin, to support modeling efforts and will be useful for related datasets, particularly the forthcoming SWOT measurements. Thank you to support the publication of this manuscript.

Referee #2:

This manuscript presents a long-term monthly surface water storage dataset for the Congo Basin that was derived from multi-satellite data and/or DEM data. This is an unprecedented long SWS dataset with very high temporal resolution, which can be useful for hydrological studies in this basin. While the results look convincing, and the manuscript is well structured and nice presented, I have several comments that might be helpful for the authors to further improve the manuscript.

Our Reply: We would like to thank the Reviewer for carefully assessing our work. We are pleased that you highlighted the fact that this dataset will be useful for hydrological studies in the Congo Basin. Your comments are very useful and we have considered all the corrections you suggested. It results in an improved manuscript.

1. Figure 3, there is no 4.2.1, 4..2.2..in the main text.

Our Reply: You are right, thank you for your observation that helps us to add these sections title in the main text. We have added sub-section 4.2.1, 4.2.2, 4.2.3, and 4.2.4 in the Section 4.2 Hypsometric Curve Approach Using Digital Elevation Models.

The structure is now as follow (only the name of the Section and sub-sections are reported here):

4.2 Hypsometric Curve Approach Using Digital Elevation Models

4.2.1 Establishment of the hypsometric curve (area – elevation relationship)

4.2.2 Correction of the hypsometric curve

4.2.3 Establishment of the area – surface water storage relationship

4.2.4 Monthly time series of surface water storage variations

2. **Line 291, Is the hypsometric approach the same with the hypsometric curve approach in Line 310? These terms are confusing. If they are not the same, and some descriptions about the hypsometric approach here so that the readers may roughly understand how it works.**

Our Reply: Thank you for the comment that helps us to clarify the statement about the two terms. Yes, the principle of the two terms is the same but with different variables involved. To avoid any confusion, we have added the term "curve" and some details have been added.

The sentence "…with reference to a map of minimum surface water levels estimated over 1995–2015 using the hypsometric approach (Frappart et al., 2012)." has been changed into "…with reference to a map of minimum surface water levels estimated over 1995–2015 using the principle of the hypsometric curve approach between SWH from radar altimetry and SWE from GIEMS-2 to take into account the difference of altitude in each cell area of GIEMS-2. (See Frappart et al., 2012 for more details)."

3. **Line 323, what does the average minimum mean? Annual average? Please clarify.**

Our Reply: Thank you for the comment. The average minimum mean stands for the average of the minimum of each year over the considered period and the annual average stands for the average of the mean of each year over the considered period. To make it clear, the sentence is now "…from the corresponding average minimum and maximum of SWE." has changed in "… from the corresponding difference between the average annual minimum and the average annual maximum of SWE over the period 1992-2015."

4. **Figure 4, black line and grey line are not easy to distinguish. Maybe use another color to update one of them.**

Our Reply: Following your comment, we have changed the color of the lines and the figure caption. Figure 4 and its caption are now as follow:

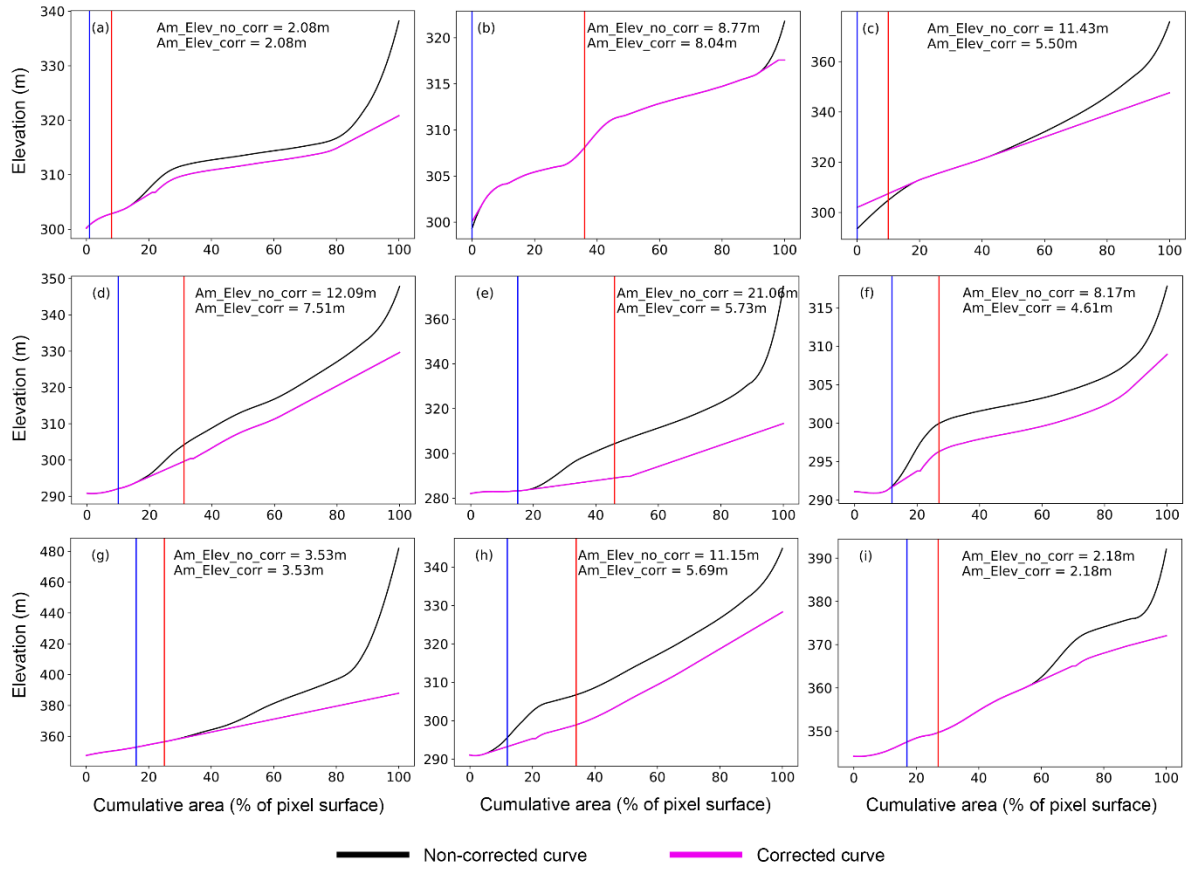


Figure 4: Correction of hypsometric curve from FABDEM by calculating the STD (m) of elevation over 5% flood coverage windows (see details of the procedure in section 4.2.2). Black and magenta curves stand respectively for non-corrected and corrected hypsometric curve. Am_Elev_no_corr (from non-corrected curve) and Am_Elev_corr (from corrected curve) are the elevation amplitude derived from the average minimum (blue line) and maximum (red line) coverage of surface water extent observed by GIEMS-2 over 1992-2015. (a) to (i) represent different pixel of GIEMS-2 in which the hypsometric curve is derived.

5. **Line 375, what does the lowest level of storage refers to? Was it determined by the GIEMS-2 observations or by the DEM data? As most of the DEMs do not have terrain information under the water, therefore, it may be important to know how much water were there when the DEM was acquiring. I guess this may also affect the lowest level of storage? Therefore, I suggest the authors to add some discussion about this issue in Section 8 or somewhere.**

Our Reply: Thank you for the comment. Indeed, it is a very important point to be discussed. The lowest level of storage refers to the level zero of storage from which the variation of the storage is started to be accounted for. It is determined by the minimum of SWE from GIEMS-2 observations for each pixel. Following your advice, we add some discussions related to the lowest level of storage (in 4.2.4 Monthly time series of surface water storage variations):

"Finally, the hypsometric curve of the area-SWS relationship is combined with the monthly variations of SWE from GIEMS-2. This enables thus the estimation of SWS for each month by intersecting the hypsometric curve value with the GIEMS-2 estimates of pixel coverage for that month (Fig. 5). Note that with such method, the lowest level of storage refers to the level zero, determined by the minimum of SWE from GIEMS-2 observations for each pixel, from which the variation of the storage is started to be accounted for. Thus, the estimated SWS represents the increment above the minimum storage.

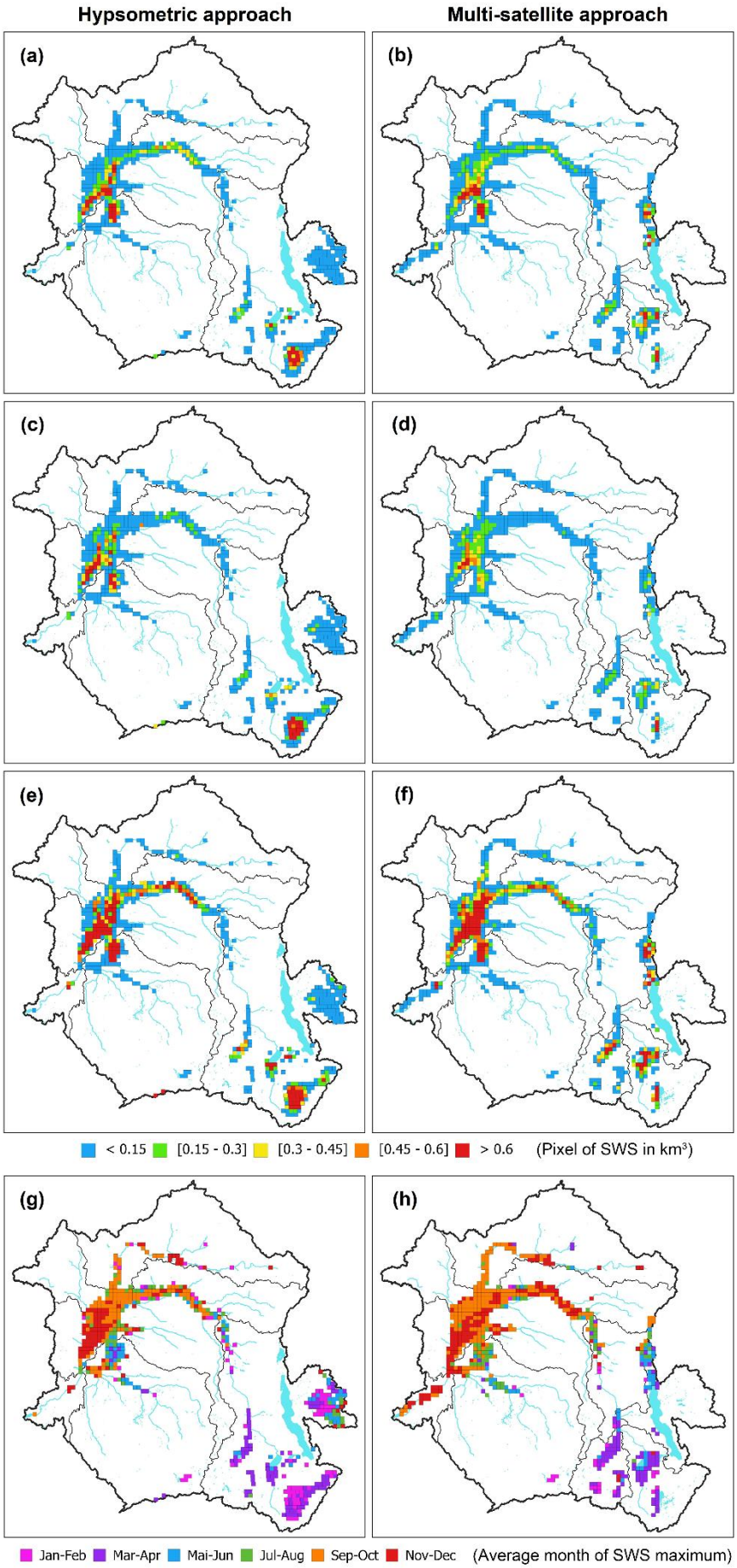
It is worth noting that, in the attempt of determining the extreme low storage values of exceptional drought years, it can be a potential source of uncertainties in a sense that DEM's values should have produced credible elevation data for those periods at the lower part of the hypsometric curve. Such information is unfortunately difficult to assess."

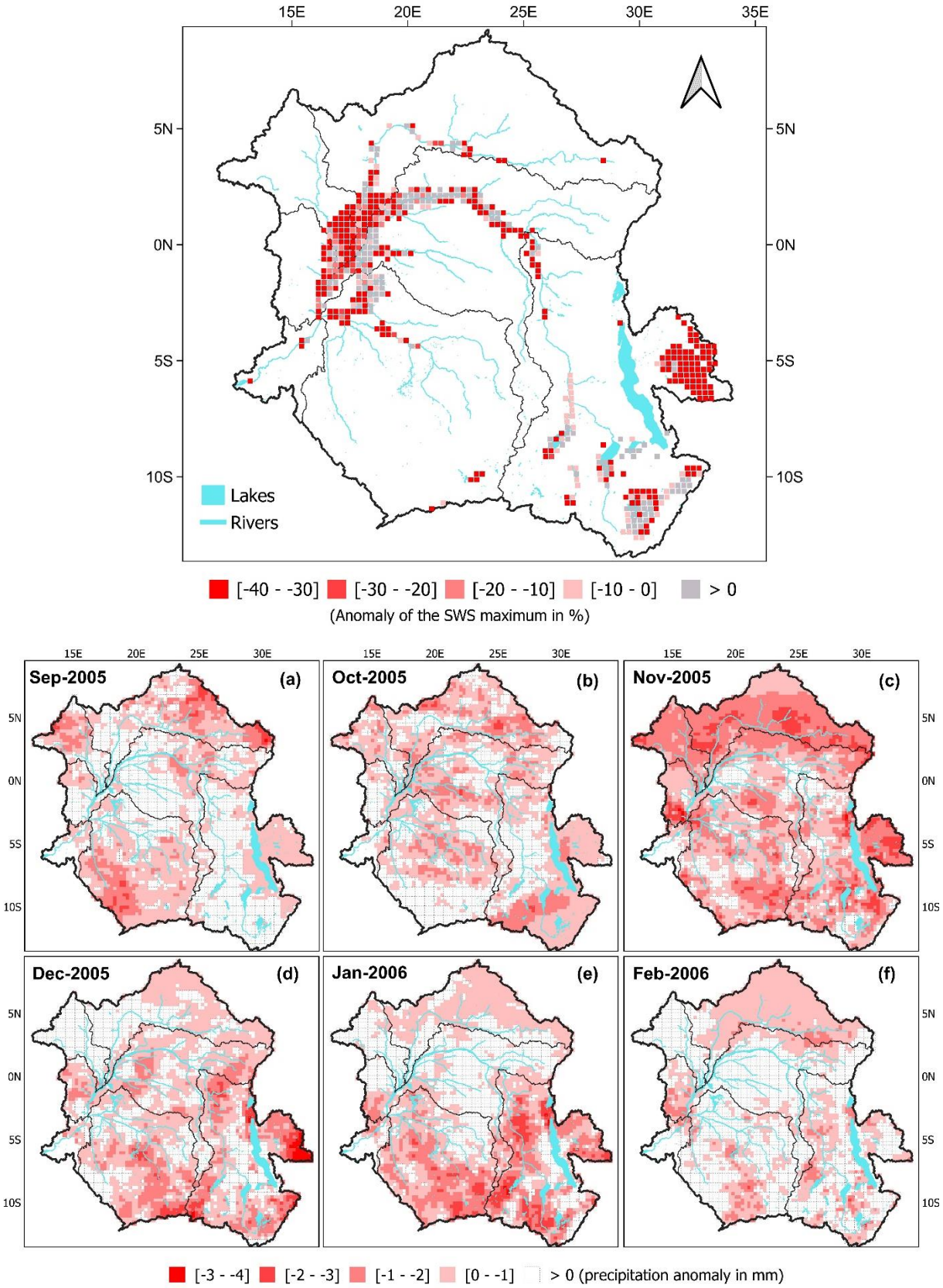
6. Line 675, SWOT has already been launched. Therefore, Delete "to be".

Our Reply: Regarding your suggestion, we have deleted "to be" and added "on the 16th of December". The sentence is now as follow: " …Surface Water and Ocean Topography (SWOT) satellite mission, launched on the 16th of December 2022,…"

7. Figure 7, 10 and 11, the legend should be more standardized. The legend should have a name so that the readers can understand the maps clearly and directly.

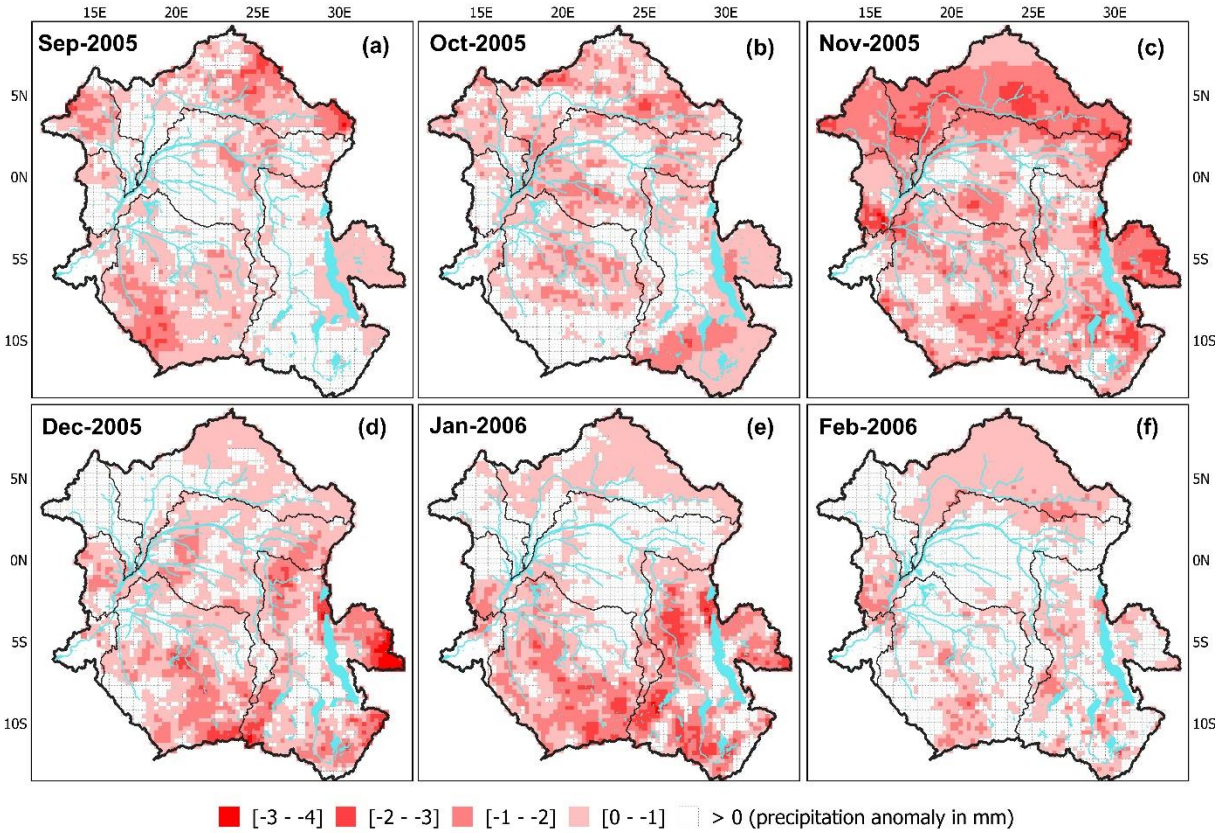
Our Reply: Following your comment, we have standardized the legend. Figure 7, figure 10 (now figure 11 due the insertion of the new figure 9 on TWSA comparison with SWS), and figure 11 (now figure 12) are now as follow:


Hypsometric approach
Multi-satellite approach
(a)
(b)
(c)
(d)
(e)
(f)
< 0.15
[0.15 - 0.3]
[0.3 - 0.45]
[0.45 - 0.6]
> 0.6
(Pixel of SWS in km³)
(g)
(h)
Jan-Feb
Mar-Apr
Mai-Jun
Jul-Aug
Sep-Oct
Nov-Dec
(Average month of SWS maximum)



8. Figure 11f, Feb-2006.

Our Reply: Following your comment, we have changed in figure 11f "Fev-2006" in "Feb-2006". Figure 11 (now figure 12) is now as follow:



9. For Figure 4 and Figure 5, what does the subfigure number (a-i) mean? Please clarify in the figure captions.

Our Reply: Thank you for your comment. We have added in the figure captions 4 and 5 a sentence to clarify the meaning of the subfigure number (a-i). Figure captions 4 and 5 are now as follow:

Figure 4: Correction of hypsometric curve from FABDEM by calculating the STD (m) of elevation over 5% flood coverage windows (see details of the procedure in section 4.2.2). Black and magenta curves stand respectively for non-corrected and corrected hypsometric curve. Am_Elev_no_corr (from non-corrected curve) and Am_Elev_corr (from corrected curve) are the elevation amplitude derived from the average minimum (blue line) and maximum (red line) coverage of surface water extent observed by GIEMS-2 over 1992-2015. (a) to (i) show different pixels of GIEMS-2 in which the hypsometric curve is derived.

Figure 5: For the same GIEMS-2 pixel as in Fig. 3, the Surface Water Storage profile, i.e., the relationship between SWS within each GIEMS-2 pixel and the fractional inundated area of 773 km2 in percentage (abscissa – right ordinate) obtained from the area-elevation relationship (abscissa – left ordinate). Magenta, green, orange colors are respectively the curve of SWS from the formulas (3), (4), and (5). The grey curve stands for the corrected FABDEM

hypsometric curve. The blue (red) line is the average minimum (maximum) coverage of surface water extent observed by GIEMS-2 over 1992-2015. (a) to (i) represent different pixels of GIEMS-2 in which the hypsometric curve is derived.

10. It is good to see that there is evaluation against independent datasets in Section 5.2. However, I think a time series comparison or correlation analysis with the precipitation and discharge is not convincing enough to showcase the reliability of this dataset, especially in the perspective of spatial information. Is it possible to compare the SWS with the GRACE products? Or maybe validate some of the SWE results with Landsat observations at least?

Our Reply: Thank you for your valuable comment. We note that the GIEMS-2 SWE dataset we use has been already compared with others existing SWE dataset, including SAR data and other passive microwave and visible/IR observations (Prigent et al., 2007; Pham-Duc et al., 2017; Aires et al., 2018; Prigent et al., 2021; Fleischmann et al., 2022).

Prigent, C., F. Papa, F. Aires, W.B. Rossow, and E. Matthews (2007), Global inundation dynamics inferred from multiple satellite observations, 1993-2000, *J. Geophys. Res*., 112, D12107, doi:10.1029/2006JD007847.

Pham-Duc B., C. Prigent, F. Aires and F. Papa (2017), Comparisons of global terrestrial surface water datasets over 15 years, *J. Hydrometeor.*, 18, 993–1007, doi:10.1175/JHM-D-16-0206.1.

Aires F., C. Prigent, E. Fluet-Chouinard, D. Yamazaki, F. Papa and B. Lehner (2018), Comparison of visible (G3WBM and GSWO) and multi-satellite (GIEMS-D3) global inundation datasets at high-spatial resolution, *Remote Sens. of Environ.*, 216, 427-441, doi.org:10.1016/j.rse.2018.06.015

Prigent, C., Jimenez, C., Bousquet, P. Satellite-derived global surface water extent and dynamics over the last 25 years (GIEMS-2). J. Geophys. Res. Atmos., 125, e2019JD030711. https://doi.org/10.1029/2019JD030711, 2020.

Fleischmann A.S., F. Papa, A. Fassoni-Andrade, J.M. Melack, S. Wongchuig, R. C. D. de Paiva, S.K. Hamilton, E. Fluet-Chouinard, R. Barbedo, F. Aires, A. Al Bitar, M.P. Bonnet, M. Coe, J. Ferreira-Ferreira, L. Hess, K. Jensen, K. McDonald, A. Ovando, E. Park, M. Parrens, S. Pinel, C. Prigent, F. Resende, M. Revel, A. Rosenqvist, J. Rosenqvist, C. Rudorff, T.S.F. Silva, D. Yamazaki and W. Collischonn (2022), How much inundation occurs in the Amazon River Basin? *Remote Sens. of Environ*, 278,113099, https://doi.org/10.1016/j.rse.2022.113099.

Following your advice, we have decided to perform the comparison of our SWS dataset with GRACE data. Firstly, we have added a new part in section 3.6 that describes the GRACE data we use. The comparison is shown in a new Figure 9 and discussion are presented in section 5.2. All the new material related to GRACE data are as follow:

3.6.3 Total Water Storage Anomaly from the Gravity Recovery and Climate Experiment mission

The Gravity Recovery and Climate Experiment (GRACE) is a joint NASA and German Aerospace Center (DLR) mission launched in March 2002 (Tapley et al., 2004) and, together with its successor GRACE Follow-On (GRACE-FO) launched in 2018 (Tapley et al., 2019), provides estimates of changes in water storage at the basin scale. For the analysis in this study, we used data from GRACE/GRACE-FO Mascon data available at http://grace.jpl.nasa.gov (Wiese et al., 2016,2018). The mascon data provides surface mass changes with a spatial sampling of 0.5 degrees in both latitude and longitude (Watkins et al., 2015). From this dataset, we obtained time series of Terrestrial Water Storage Anomaly (TWSA) over the CRB through area weighted aggregation of those grid cells in basins.

In the section 5.2 on ***Evaluation against independent datasets****, we have added the following comments: "Figure 9 displays the comparison at the basin level between the aggregated normalized SWS anomaly and TWSA from GRACE. Both variables, show a similar interannual variability during the common period of availability of data (i.e., 2002 to 2015) presenting a fair correlation of r = 0.84 (lag = 1; p value < 0.01; Fig. 9a). It is worth to mention as well that both datasets capture the bi-modal patterns. Figure 9b presents the deseasonalized normalized anomaly for the two variables (r = 0.4; lag = 0; p value < 0.01), showing quite similar variations, especially in the long-term variability. We also notice the higher magnitude of the normalized SWS anomaly as compared to the normalized TWSA. At the seasonal time-scale, Fig. 9c reveals a similar behavior, with the two peaks depicted in the two variables, one in November-December and one in April. The lowest level of the SWS happens in July that is one month ahead of TWSA minimum."*

We also inserted the figure 9 and its related caption as shown below.

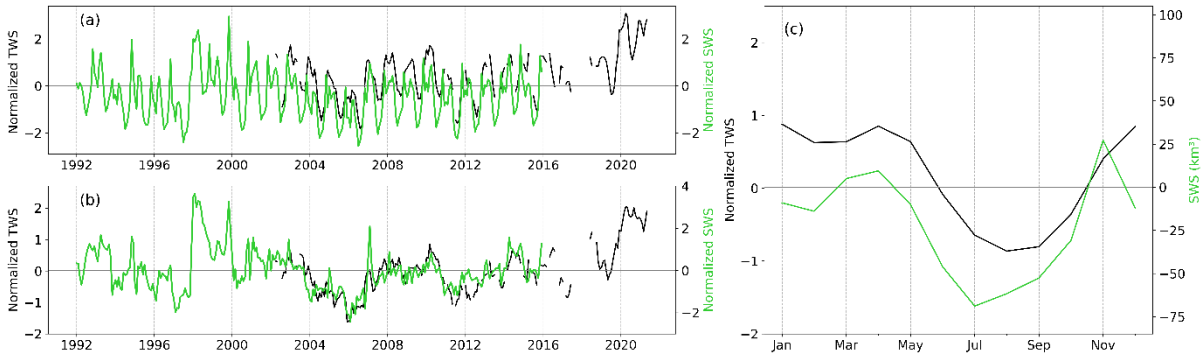


Figure 9. Comparison between the monthly aggregated normalized surface water storage anomaly and the normalized Terrestrial Water Storage Anomaly over the basin (for comparison purposes, SWS and TWSA were normalized by dividing their time series of anomalies by the standard deviation of the raw series). (a) For the entire Congo basin, the green and black line represent respectively the SWS anomaly variations from hypsometric curve (over 1992-2015, from FABDEM) and TWSA. (b) Deseasonalized normalized anomaly for SWS (green) and

TWSA (black). (c) Normalized mean annual cycle for TWSA (black) (except for SWS, in green) calculated over the same period of data availability of the two variables, SWS and TWSA.

11. I understand that it may not be mandatory, but I believe the readers would be happy to see that the related programming codes (e.g. the hypsometric curve approach) could also be publicly available.

Our Reply: Thank you for your suggestion, it is right. This is also our goal, and we are working toward that purpose. However, we have started developing the surface water storage dataset at the global scale and for that, the code is being modified in order to enable the easy computation elsewhere and taking into account certain particularity of different regions. At this stage, we will not be able to make it available due to the ongoing work and surely, later on, after being sure of the capability of the code to run properly for other regions, we will make it available to the public on a repository. However, we would like to remind that all datasets we have created for this study are available and all results are therefore reproducible.