

Hydrol. Earth Syst. Sci. Discuss., referee comment RC1
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Comment on hess-2021-315

Anonymous Referee #1

Referee comment on "A combined use of in situ and satellite-derived observations to characterize surface hydrology and its variability in the Congo River basin" by Benjamin Kitambo et al., Hydrol. Earth Syst. Sci. Discuss.,
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This paper reports on a synthesis analysis of EO altimetry data, surface water extent and in situ gauge data for the Congo Basin. It includes a large number of virtual stations derived from multiple missions (and adjusted to the same datum) and covers the whole basin spatially. The findings cover the surface water dynamics of the CRB in detail, including variations in WSE amplitudes and SWE extent, their seasonality and lag when compared to the gauged outlet of the basin.

This is an important paper in a relatively poorly studied basin. It is impressive in its scope and thorough in its analysis. It is well written and illustrated carefully. It has a detailed and considerate literature context covering previous work. While some results importantly confirm previous studies, this paper also uncovers new findings and detail that will be incredibly valuable to the science community that study the basin.

A few suggested minor changes are listed below, but other than these small typos there is a lot to recommend publishing this paper and no doubt it will become an important reference point for future work.

Some Specific Comments:

1. Line 39: something is missing in this sentence "ranging from 0-1 month in its vicinity downstream the basin up to 3 months in remote areas and small tributaries." – maybe it should be "ranging from 0-1 month in its vicinity in downstream parts of the basin and up to 3 months in remote areas and small tributaries."
2. Line 49, "40.500" should be "40,500"
3. Where "CRB" is used at the start of a sentence, it would be better to say "The CRB"
4. Line 208: "uncertainties ranging between few centimeters" should be "uncertainties ranging between a few centimetres" (note spelling of units)
5. Figure 2(d): end bracket on the key seem to be the wrong way around. Should be [xx-yy] instead of [xx-yy[.

6. Line 243: this sentence seems like it is missing something "surveyed by a ten of static and cinematic GNSS campaigns" Where there 10 campaigns? If so remove "a" and "of".
7. Line 252: "we merged them in a same reference" would be better as "we merged them to the same reference"
8. Line 335: "The variation of amplitude in the southern is similar" - should this say southern part?
9. Figure 4(a) and Figure 5: end bracket on the key seem to be the wrong way around. Should be [xx-yy] instead of [xx-yy]. Please also check all other figures.
10. Line 426: "sub-basin which hydrology might" should be "sub-basin where the hydrology might"
11. Line 464: "complement each other individual result" should be "complement each other's individual result"
12. Line 520: "all over the various tributaries" should be "over all the various tributaries"