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Hydrology and Earth System Sciences Discussions

Interactive comment on "Global multi-scale segmentation of continental and coastal waters from the watersheds to the continental margins" *by* G. G. Laruelle et al.

Anonymous Referee #2

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The authors present a global multi-scale segmentation of continental and coastal waters from the watersheds to the continental margins.

The paper is generally well written and follows a clear structure, although it is quite lengthy in many places and I would suggest more concise sections, especially section 3 is very long compared to the rest of the paper. Maybe have results and discussion as separate sections.

When I read the abstract I got the impression that the authors were proposing a 'new' global scale segmentation composed of three different layers that "includes the whole

aquatic continuum with its riverine, estuarine and shelf sea components." However, when reading the paper more carefully it seems that the authors have used existing layer created in separate form previously and aggregated those to one single database. This should be stated in the abstract.

Also it should be made clearer in the Introduction why each of the three levels are needed?

Why is the MARCATS level needed? It is essentially an upscaling of the COSCAT units if I understand correctly.

Was any of the listed parameter values in tables 1 to 3 validated or compared to other existing estimates, models or indeed observations, other than the relatively crude global estimates already stated in the text? Or is this the first time such numbers (such as freshwater residence times, watershed surfaces, freshwater discharge, etc) are presented? I imagine some alternative estimates or observations would exist for some of those parameters at least for some locations around the globe?

The authors should highlight some of the important implications their data could highlight (for the first time maybe?). For instance, with their data, can they allude to what implications there are on a global level for example of the different freshwater residence times?

Section 3.2 gives a little bit of assessment and compares some of the numbers obtained to previous estimations, which is very useful, but I feel the assessment of the proposed database is not as complete and insightful as it should be.

Without any sort of validation/error characteristics, these numbers do not say much and actually the suggested value of the created database as suggested by the authors might not be entirely 'realistic' (such as regional analyses and for upscaling and biogeochemical budgets and application in Earth System analysis).

On a related note, which regional analysis do the authors mean (see abstract)?

The results and discussion section is very descriptive in many places and there is not much detail on the actual value these data might provide.

In the conclusion, the authors need to clarify what they mean by:

- "The 0.5 degree resolution of our level I compares to the highest resolution globally available". This is interesting and useful but 50 km resolution is still very coarse and I'm unsure whether stating that at this resolution, "the majority of river networks are properly represented" is adequate?

- "The multi-scale segmentation of the Land-Ocean-continuum provides an appropriate support for the progressive integration of global databases for carbon, nutrients and green house gas characteristics into lateral land-ocean matter flux budgets"; How?

- "robust regional and global budgets of relevance to environmental and climatic research"; how would research communities use these?

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 9, 11319, 2012.