

Interactive comment on “Small river plumes off the north-eastern coast of the Black Sea under average climatic and flooding discharge conditions” by Alexander Osadchiev and Evgeniya Korshenko

Anonymous Referee #1

Received and published: 7 March 2017

Review of Small river plumes off the north-eastern coast of the Black Sea. ... By Osadchiev and Korshenko

Overall: This is a generally well-written paper on an interesting and novel topic. The effects of small rivers have been noted for some time (e.g. Milliman & Syvitski, 1992). This new manuscript employs a well-validated numerical modelling approach to illustrate the importance of event-driven discharges from small rivers, how they affect the coastal system very differently to predictions based on mean discharges, how small rivers can alter the coastal system dramatically compared to just considering the domi-

C1

nant river sources, and including the effects of both the salinity of the coastal water and the delivery and transport of fine sediments. The results are novel and very interesting.

General suggestions: While the focus is on salinity and suspended sediments, what are the consequences for the nutrients coming down the rivers? Global, catchment-model-based estimates of annual river discharges and nutrient loads (e.g. the NEWS 2 database, see Mayorga et al., Env. Modelling Software, 2010) which, for the majority of rivers around the world, represent the best information currently available. These models tend to provide discharges and loads in an annual mean sense – so what are the implications of this new work, for both suspended material and also for nutrients? It struck me that one big difference between the few large rivers and the many smaller ones would be river length and, possibly, the catchment type being drained. It would be worth some sensible speculation in the discussion to consider the implications of the work for the use of such global databases.

There is some discussion (page 34, lines 9-13 or so) on trends in event-driven discharges. Are these climate-change driven or local regional natural variability? Either way, it could be clarified, but also the possible climate-driven changes to more extreme events generally could be drawn out more here.

More detailed suggestions: The validation of the satellite-derived suspended material data with river discharge could be more robustly demonstrated, e.g. plots of $\ln(C)$ vs $\ln(Q)$ for large and small rivers, and a demonstration that the correlation coefficients are significant.

Some of the details in the model configuration could perhaps be edited out, as there are sufficient published studies that have already set up the model that can provide these.

Section 6.1 seemed a bit out of place. Either the validation of the model should be part of the methods, or it should at least occur at the start of the results section.

C2

The continuous along-shore low salinity plume (line 10, page 18) is noted as being 5 – 15 km in width. How does this compare to the local internal Rossby radius?

Page 21, lines 11-12. Check the sediment load numbers – they are different by 2 orders of magnitude, and they don't seem consistent with the statement immediately following about the "real" system being 25% greater.

There is heavy use of abbreviations in the manuscript (e.g. RCBS, GCR) which gets confusing at times. My preference is to avoid abbreviations unless they are very widely accepted – the text flows better without the reader having to keep reminding themselves what an abbreviation stands for.

The manuscript will need some careful checking for editing/clarification of English – though it is generally very well written.

Interactive comment on Ocean Sci. Discuss., doi:10.5194/os-2017-1, 2017.