Ocean Science
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Interactive comment on "Numerical modelling of sediment transport in the Adriatic Sea" *by* A. Guarnieri et al.

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We apologize for the omission of the paper by Harris et al. (2008) "Sediment dispersal in the north-western Adriatic Sea, JGR Vol 113, C11". This paper presents indeed an important work on sediment transport carried out in the same domain and analogous period of time. Its authors are indisputably experts in sediment transport in general, and specifically in the Northern Adriatic region. We are grateful to the referee for pointing this out, thus giving us the opportunity to inter-compare results, which we believe are in close agreement. A detailed comparison of the differences and similarities of the two papers and models will be added in the introduction, discussed in the paper and mentioned in the conclusions.

One of the main differences between Harris et al (2008) and our paper is that we are

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only interested in the fine classes as we are focused on the suspended load, which we validate using in-situ data. We will change the title to reflect this. A proposed new title can be: Numerical modelling of suspended sediments in the Adriatic Sea.

We agree that the complexity of the two modelling systems is comparable (similar wave and circulation model, realistic atmospheric forcing, even if of lower resolution) and that the sediment component of our model exercise is simpler than that of Harris et .al 's (2008) paper: we do not have an active seabed layering and we have introduced some simplifications (i.e. constant and uniform critical shear stress for resuspension; spatially uniform initial bed texture, equal for each of the two classes of sediments considered; two classes of sediments only). However we believe that it is quite important to show that our model is capable of reproducing resuspension and sediment advective processes even considering these simplifying assumptions. Our results show that for fine sediments a very sophisticated bed model is not strictly required to capture the main processes of erosion/resuspension and sediment advection/deposition.

Some more specific replies to the referee's remarks follow: - Coarseness of atmospheric forcing: the results presented in Fig. 2 show that our wind even if lower resolution than the one of Harris et al. (2008) gives and accurate reproduction of bottom orbital velocities if compared with in situ data (fig.2);

- Absence of advection in the boundary layer: this is probably a misunderstanding. Our model treats advection in the bottom boundary layer as in the other vertical layers. The sediment particles, once resuspended, are advected according to the currents. This will be more clearly stated in the corrected paper.

- Comparison to data: we believe the comparison to data is very important and it is an element of strength of our work. We do not think validation it is just "mentioned" in our paper; in fact we compare to observations (i) bottom orbital velocity (fig.2), (ii) currents at 75 cmab (fig. 7c), (iii) sediment concentrations along the water column (fig. 5) and (iv) sediment fluxes (fig 7a and 7b). The validation of suspended sediment concen-

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tration and sediment fluxes are of fundamental importance, since not many modelling papers show them, and it is certainly an added value of our work. Our paper offers probably the most extensive inter-comparison with actual in situ suspended sediments data collected by the WHOI tripod and published by Tryakowsky et al. (2007). Furthermore the explicit comparison with in-situ suspended sediment data is entirely new and this was not carried out in the Harris et al's paper, which only compared Kd490 images with modelled SPM, suggesting good qualitative agreement, especially as Kd490 is not really a measurement of sediment concentration. In the revised version we will reproduce Tryakowsky et al. (2007) relevant pictures to have a clearer model-data inter-comparison (also sediment fluxes and currents), even if this would not be generally necessary since in our figures we used the same physical units as in the literature papers;

- Bora and Sirocco circulation patterns: More information will be given from the point of view of the circulation under these specific conditions. The team has high expertise in the circulation of the Adriatic Sea and will re-organize the discussion on Bora and Sirocco events accordingly;

- Some considerations on the relative importance of resuspension/advection on sediment concentration along the water column and on the relative importance of waves and currents on resuspension will be added in order to outline the differences and complementarities with Harris et al. (2008);

- Considerations on sensitivity to the settling velocities, erodibility, initial bed composition, erosion threshold, etc. will be considered by comparing with Harris et al. (2008) different choices of parameters and different or similar solutions;

- Clumsiness related to English: we will have the final version undergo English mother tongue review prior to new submission;

- Clumsiness related to scientific language: "scientifically-clumsy" expressions will be removed and/or rephrased;

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