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Biogeosciences Discussions

Interactive comment on "Application of a Lagrangian transport model to organo-mineral aggregates within the Nazaré canyon" *by* S. Pando et al.

Anonymous Referee #2

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General comments: This paper presents a modeling approach to the study of particle transport in a Portuguese canyon: the Nazaré canyon. The model implementation uses a lagrangian transport model coupled to a coastal circulation model. The downscaled solution is an implementation of MOHID, a well known modeling tool. The approach followed by the authors allows the study of physical processes affecting aggregates in complex coastal regions. The authors put an impressive and substantial effort in the implementation of the model, using a methodology which was followed by others authors like Leitão et al. (2005), Vaz et al. (2009) or Mateus et al. (2012). This model implementation can be very useful to study the dynamics of coastal systems, establishing sets of different scenarios to explain/study a great amount of different hypothesis

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Discussion Paper

regarding the dynamics of particulate matter in the coast.

In general, this manuscript is well written and structured, being easy to understand by the reader. However, it presents some problems, which need to be clarified in order to merit publication in Biogeosciences. In the following I will present some doubts and suggestions in an attempt to make the paper more clear. Authors are encouraged to consider the suggestions in a positive way and if they disagree with some of the suggestions, the reviewer expects feedback. At the present state the paper should be rewritten in order to be considered for publication and my recommendation is major revision.

Specific comments: The introduction is too extensive, presenting huge paragraphs and a great number of references. A proper introduction should be written by presenting the problem/issue in study; the main advances in the study of the proposed issue, the methodology followed and finally a brief paragraph containing the main objectives of the paper. This manuscript presents a huge amount of references (67). The number of references should be reduced, because there is no need to present 5 or 6 references to emphasize an idea or a characteristic of the study region. In general the study area is well described. However, the oceanographic features of the study area should be highlighted. That is, the authors should describe velocity patterns and the tidal circulation in the study area to produce a more complete picture of the physical features that control the advection of particulate matter in the canyon. At the end of the section 2.4 (Model setup for the Nazaré canyon), the author state that the nested levels are validated allowing the linkage to the lagrangian transport model. Where are the validation results? There is any paper/thesis or report where they are referred? If not you should present some validation results, concerning tidal propagation and velocity patterns. If you don't have data to compare you should refer this.

Section 3 (Results) presents some problems that I would like to discuss with the authors. The main problem here is a question of terminology. The concept of residence time is not well used by the authors. The residence time is a number and presents no

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dynamic features. That is, the residence time is an average amount of time that a particle or set of particles spends in a particular system or place (is only a number). The results depicted in figures 3, 4 and 5 are the temporal evolution of the particle fraction in each emission box not the residence time. Therefore the authors should take this into account and should revise this whole section. Moreover, the results presented in figures 3, 4, and 5, reveal that the chosen location for the emission/monitoring boxes presents a high particle fraction. The values are always rather high (ranging between 0.7-0.9), revealing that the particles are advected back and forth to outside/inside the box. So you cannot refer a residence time here. All the results show a significant difference between the 2000 μm OMAs and the other two classes. However, the there is no answer to these differences? Which canyon characteristic modulates the behavior of this size class of OMA? I would like to see a clear justification to this. What is the purpose of showing distance and displacement results? The OMS velocity in each box is presented in kmy-1. Why? The SI units are m/s (or cm/s). What is the probable justification to a velocity difference of the order of 500 km/y between the different class size of OMAs?

Here I present some doubts and suggestions regarding the submitted manuscript. In general, this model implementation can produce sound results if properly presented. The authors should describe more thoroughly the main oceanographic features of the canyon, and try to link these oceanographic features to the obtained results of the lagrangian model.

Interactive comment on Biogeosciences Discuss., 10, 447, 2013.