Ocean Sci. Discuss., 9, C1783–C1787, 2013
www.ocean-sci-discuss.net/9/C1783/2013/

Ocean Science Discussions
Open Access

Interactive comment on "Fine-scale features on the sea surface in SAR satellite imagery – Part 2: Numerical modeling" *by* S. Matt et al.

Anonymous Referee #2

Received and published: 25 July 2013

GENERAL COMMENTS The manuscript is aimed at using three different models to study three types of oceanic phenomena, namely ship wakes, internal waves, and low density plumes. So it is within the scope of the journal. Unfortunately the significance of the scientific task and the results obtained are questionable. The way in which the material is provided and model approximations also arise lots of questions. Everything seen in the figures should be carefully explained and discussed. Afraid this manuscript should not be accepted. I would recommend the authors to continue their research in order they could get more reliable and exciting results. Probably more connections with 'real life' and real SAR imagery would be helpful.

SPECIFIC COMMENTS

Abstract

Full Screen / Esc
Printer-friendly Version
Interactive Discussion
Discussion Paper

...companion paper... - it is a bad style to mention a paper which has not been accepted yet.

Introduction

Introduction should be more logical.

In particular, more logical connection between 2d and 3d paragraphs is needed.

...important practical applications... - wonder which ones.

...interaction with ambient ... stratification... - First, stratification cannot interact with anything. Second, I cannot see the ways of a plume to interact with ambient waters except diffusion. Clarifications are needed. Third, stratification is just a density vertical gradient. Please use the term correctly.

Buoyancy-driven surface currents, such as propagating river or rain-formed plumes... - Plumes are currents???

These currents contribute to water mass exchange by horizontal advection and enhanced vertical mixing. - Any currents do that.

These buoyancy-driven flows are a type of organized structure that resembles a classical gravity current. - Now plume is a gradient current...

Fujimura et al. (2011) showed that as in the case of the ship wake - Now all of the sudden there is a talk about ship wakes.

Near-surface gravity currents may also interact with an ambient stratification in a resonant way, leading to a fragmentation of the near-surface plume - Again a mixture of everything.

Methods

I would recommend to reduce the description of the first two models and at least briefly discuss M4S model.

OSD

9, C1783–C1787, 2013

The boundary conditions ... were set to periodic - What does exactly it mean?

Results

Ship wakes - What exactly do you mean? What is a ship wake? How does it appear into being? How does it evolve? What are its characteristics? What is its model approximation? How can they be seen in the fields of horizontal velocity and other parameters?

We found that cold subsurface water may be brought to the surface through the circulation in the ship wake - Wasn't that known before?

This sea surface signature in the temperature field may be detected by infrared sensors of the sea surface. - What kind of sensors?

Figure 2 - What is the difference between upper and lower panels (visible one)? What is a red area in the center?

which is a proxy for a SAR image - Ship wakes in SAR imagery can look darker or brigther than the ambient water, can have one or two 'branches', can be visually displaced relative to the vessel. Which exactly case do you mean? By the way, if you considered those cases in the paper and explained the difference, it would be really an interesting research.

In the case of a near-surface thermal stratification, the wake surface signature appears slightly wider and more pronounced than is the case without stratification (Fig. 4) - Wasn't that logical and expected? How could that be seen from Figure 4?

The model is initialized with a temperature anomaly in the near-surface layer, simulating a rain-formed plume - Why do you use temperature anomaly instead of salinity one??? They are completely different from an oceanographic point of view.

This parcel of low density water then propagates in the upper layer of the water column as a buoyancy-driven current. - Can't see any reasons for this structure to propagate.

OSD

9, C1783–C1787, 2013

A plume is a very stable structure in all the respects. And it is the LOW density plume! Is low density causing pressure on high density in Figure 7??

The flow exhibits features of a classic gravity current, including the gravity current head and a tail region, where Kelvin-Helmholtz overturns are apparent and contribute to mixing (Fig. 7). Strong statement. Any basements? In the caption of Figure 7 only internal waves are mentioned.

This then leads to a resonant interaction between the internal waves and the near-surface current, which results in a fragmentation of the low density plume. - Another not obvious statement.

The fragmentation becomes apparent as a banding pattern on the sea surface in the velocity field (Fig. 8). - What is that in Figure 8? The flow moves in the opposite directions?

References

Please try to cite only published works (not which 'in preparation'). For the key points of the work you would cite not only your own publications, but also someone's else.

TECHNICAL COMMENTS

...lead to information... - strange phrase.

2001; 2010 and some more cases - should be a comma instead of ;

An abbreviation 'SAR' has been clarified twice.

rain-formed or rain formed? One consistent version is needed.

We argue... - not sure that it is what the authors meant.

the article - usually this is referred to as a 'paper'.

All the variables used in the formulas should be explained.

OSD

9, C1783–C1787, 2013

Some commas are missing.

is concerned with - need to check.

Table 1 does not contain variable information and can be omitted.

Figures 3-5 probably could be combined.

Figures 6 and 11 are not too informative and can be omitted or combined with others.

Interactive comment on Ocean Sci. Discuss., 9, 2915, 2012.

OSD

9, C1783–C1787, 2013