

## **Ocean Science Discussions Review**

**2nd April 2012**

**Title:** Oil spills in the Bonifacio strait area, western Mediterranean

**Authors:** Cucco et al, 2012

### **General Comments**

The paper is a presentation of an operational ocean forecasting system designed to provide environmental information regarding oil transport in a particular region of the Mediterranean Sea. The system includes a range of coupled and nested hydrodynamic models, a wave model, atmospheric forcing products, a Lagrangian trajectory module and an oil physics model.

The system provides the capability of analyzing spill scenarios and appears to be a useful tool for management and assessing risk. Hopefully it will be able to provide information to mitigate deleterious environmental impacts of oil spills. The system employs scientifically credible models and techniques in order to assess hydrocarbon dispersion under various weather related sea-states and oceanographic conditions.

There are several areas where this paper could be improved. I think the main one is in terms of model verification and validation of the underlying physics. Since this is an operational system there should be routine error metrics for each of the components. The paper would benefit from a brief section that illustrates and summarizes the error characteristics of the system's hydrodynamics. Operational systems also use data assimilation. It appears from the diagram in Figure 2 that this is done in the coarser domains but not in the nested regional model that is used for the oil transport. Not much is said about the skill of the ocean forecasts in the high resolution domains or the initialization of this. Does each forecast run from cold or warm starts and how is the finer domain corrected and kept in track with observations?

The introduction would benefit from brief comments on the general oceanographic nature of the Strait, marine ecosystems likely to be impacted by oil spill events and any unique and interesting features in this region.

Towards the end, including a discussion on the limitations of the system and scope for improvements will help to improve the balance in article

The paper also needs further work improving the writing. There are numerous English grammar issues.

The web graphical user interface is mentioned several times in the paper, however, is not relevant to the science. I would only mention this once at most.

The system presented is highly technical and complex and the Authors deserve commendation for such an achievement. From a readers perspective, however, it was not entirely clear what the science objective of the article was and what new information or

knowledge was been provided. I think this needs to be spelt out more clearly and promoted more strongly in the article.

One further question I have is how is diffusion dealt with in the backward investigation, since this is an irreversible process?

### **Recommended changes**

- (1) Throughout the text “Bonifacio strait” should be referred to as “Bonifacio Strait”
- (2) Suggest change title to “Oil spill prediction for the Strait of Bonifacio in the western Mediterranean Sea”
- (3) Page 586, Line 13, “has been” to “was”
- (4) Page 586, Line 17, “The marine” to “Marine”
- (5) Page 586, Line 19, GRT not defined
- (6) Page 587, Line 3, Ro/Pax not defined
- (7) Page 587, Line 5, VTS not defined
- (8) Page 587, Lines 5-13, English grammar issues, text needs to be rewritten
- (9) Avoid the use of qualifiers such as ‘good’ and ‘bad’ in scientific writing
- (10) Avoid the use of ‘a lot of’....use ‘many’
- (11) Page 587, Line 15. The sentences reads in such a way that it sounds like the numerical model can reduce environmental impact. Acting on information from the models may help to do this, but models wont do it!
- (12) Page 587, Line 24, avoid starting sentence with ‘Anyway’
- (13) Page 588, Line 1, change “This approach of an oil” to “An approach for an oil”
- (14) Page 588, Line 6, remove ‘of’
- (15) Page 588, Line 20, change ‘have’ to ‘are’
- (16) Page 588, Line 23, change ‘by’ to ‘of’
- (17) Page 588, Line 24, change ‘from the basin to the coastal through the’ to ‘from basin to coastal through a’
- (18) Page 589, Line 1, change ‘by’ to ‘of’
- (19) Page 589, Line 4, remove ‘one’ from the sentence
- (20) Page 589, Line 15, change ‘operationally and not operationally’ to ‘in research and operational applications’
- (21) Page 589, Line 22, change ‘allow’ to ‘allows’
- (22) Page 589, Line 26, remove the ‘,,’ after ‘biodegradation’
- (23) Page 590, Line 10, change ‘to’ to ‘for’
- (24) Page 590, Line 12, change ‘to’ to ‘for’
- (25) Page 592, Line 6, change ‘carbon spillage occurred’ to ‘carbon spillage that occurred’
- (26) Page 592, Line 12, change ‘currents’ to ‘current’
- (27) Page 594, Line 15, remove the word ‘a’
- (28) Page 594, Line 19, change ‘on’ to ‘of’
- (29) Page 595, Line 23, change ‘interesting’ to ‘intersecting’
- (30) Page 595, Line 24, change ‘points’ to ‘locations’
- (31) Page 596, Line 3, add ‘the’ in between ‘in’ and ‘laboratory’
- (32) Page 596, Line 5, change ‘verified’ to ‘verify’
- (33) Page 597, Line 1, change ‘interesting’ to ‘impacting’
- (34) Page 597, Line 7, change ‘on’ to ‘of’
- (35) Page 597, Line 12, change ‘days’ to ‘day’
- (36) Page 597, Line 14, change ‘spills’ to ‘spill’
- (37) Page 597, Line 23, change ‘spills, those’ to ‘spills and those’

(38) Page 597, Line 26, change 'this' to 'these'

(39) Page 598, Line 3, change 'are' to 'is'

(40) Page 598, Line 10, change 'All the described above tools' to 'The tools described above'

(41) Acknowledgements 'thank' to 'thanks'

Figure 2 change "COSTAL' to 'COASTAL' and in caption change 'from the basin to the coastal' to 'from basin to coastal'

Figure 8 caption change 'interested by' to 'where'