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BOOK REVIEW

Monitoring and modeling the Deepwater Horizon oil spill: a record-breaking enterprise, edited by Y. Liu, A. MacFadyen, Z.-G. Ji and R.H. Weisberg, Washington DC, AGU, 2011, Geophysical Monograph Series, Volume 195, 271 pp., ISBN 978-0-87590-485-6

The Deepwater Horizon (DWH) incident occurred in April 2010, and less than two years after the wellhead was finally capped, this book was published comprising a collection of more than 20 scientific articles primarily derived from special sessions at the AGU 2010 Fall Meeting. It covers a great deal of interdisciplinary research, which makes it exciting to read. This includes operational monitoring, starting from 'normal' observations of both surface contamination and hydrocarbon concentration at various water depths, and continues with different aspects of numerical and laboratory modelling of the trace of the crude oil (driven by the Loop Current of the Gulf of Mexico) and of its accumulation at certain depths, respectively.

An oil spill of this dimension caused a severe threat to the environment, even at greater distances, and as a consequence, the monitoring and modelling efforts presented herein had to be interdisciplinary. In fact, apart from the demonstration of how state-of-the-art science can support decision-makers and the clean-up on the open sea and/or prevention along the coast, this interdisciplinarity is the strength of the book.

The articles appear in a sequential order 'from surface to subsurface'. They are not grouped into separate chapters, although such a grouping is provided to some extent in the Introduction. But since remote-sensing data have been used at various places throughout the book, such a separation would have been difficult to make. New remote-sensing aspects demonstrated herein are multi-sensor studies, which use data acquired in different regions of the electromagnetic spectrum and take advantage of the multi-polarization capabilities of recent radar sensors. But it is also clear that, with a broken wellhead at 1500 m depth, satellite or airborne remote sensing (being capable of monitoring only the water surface or upper water layer) can aid the monitoring only up to a certain extent. Therefore, and as a logical consequence, state-of-the-art numerical modelling must be the key tool for the tracking of the hydrocarbon pollution. Consequently, the main emphasis is put on the modelling tasks.

Nonetheless, this book also clearly demonstrates that none of the applied techniques, remote sensing, *in-situ* sampling, or numerical modelling, can stand on its own. Only the (optimized) combination of them, usually achieved through data assimilation, can provide those results, which are needed for an optimum response to an oil pollution incident of that size. Within this framework, it seems that one of the most challenging remaining tasks is to monitor the quantity of oil, namely the spill's thickness at various locations within this gigantic oil spill.

Image analysis techniques did not seem to be an issue discussed here, and I understand that the detection of the exact location of the boundary of the DWH spill was of minor interest in many cases. Although these techniques are the most challenging task of

operational oil pollution monitoring, where much smaller amounts of crude oil are usually observed, apparently they were not part of the research efforts undertaken in the frame of the Macondo blowout and reported herein. What I was missing, though, is one or two contributions providing a condensed description of the incident, and containing some general facts on the clean-up, but also on oil production in the Gulf of Mexico. Less than two years after the oil rig sank, most readers remember details, but I am afraid that in a short while, some facts will be confused – although hopefully not with those from another similar incident. The Introduction provides a brief summary, but more details can only be found here and there in some of the articles. In this frame, some concluding remarks on the lessons learnt or on the overall fate of coastal and/or deep sea oil production would have been a welcome addition.

In summary, I enjoyed reading this book, not only because of the above-mentioned interdisciplinary aspects and the wealth of interesting results, but also because it demonstrates how this large amount of excellent research, with collaborations of scientists from all over the world, has been performed in a very timely manner. I am sure that *Monitoring and Modeling the Deepwater Horizon Oil Spill* should be of general interest to researchers in the field of modelling and pollution monitoring, but also to environmental agencies and decision-makers.

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