Biogeosciences Discuss., 10, C9034–C9036, 2014
www.biogeosciences-discuss.net/10/C9034/2014/

Biogeosciences Discussions
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Interactive comment on "Ecosystem function and services provided by the deep sea" *by* A. R. Thurber et al.

Anonymous Referee #2

Received and published: 3 March 2014

The manuscript provides a useful overview over ecosystem function and services provided by the deep sea. I am generally happy with it and have found only a few minor details that need to be fixed.

One aspect I'm not happy with is the extremely uncritical approach to waste dumping (chapter 2.4). For example, there is no biological or geochemical process (neither in the deep sea nor anywhere else) that would speed up the decay of radioactive materials, but the manuscript (indirectly) seems to suggest this. In the search for secure locations for the disposal of nuclear waste, it's the policy in Germany that the locations should allow a 'secure' disposal at least for several tens of thousands of years. With the turnover times of deep-sea water being 'just' over 1000 years, the deep sea does certainly not seem to be a good place to dump nuclear waste. Another case is the

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dumping of ammunition: after WW II a huge amount of ammunition, including chemical ammunition, was dumped in the Baltic Sea. This ammunition still poses an (occasionally deadly) threat to local fishermen, as well as beach-strolling tourists. Of course the Baltic Sea isn't exactly deep sea, but with increased deep-sea fishing the threat is all the same. Furthermore, waste disposal poses a threat to several other services mentioned in the manuscript, including bioprospecting and the various uses of supposedly pathogen-free deep water mentioned on top of p. 18212. I understand that it is not the purpose of the manuscript to make a strong statement against various (potential and real) threats of commercial activities in the deep sea, but the potential danger of deep sea waste disposal should at least be outlined in the same way as it has been done for the dangers of deep-sea oil drilling (chapter 3.2).

Further points: p. 18197, line 24: Here you could also cite: Treude, T., Kiel, S., Linke, P., Peckmann, J. and Goedert, J.L., 2011. Elasmobranch egg capsules associated with modern and ancient cold seeps: A nursery for non-seep marine predators. Marine Ecology Progress Series, 437: 175-181.

p. 18200, line 25: add Red Sea for additional deep-water masses

p. 18203, line 22: at a rate faster than at which. . .

p. 18206/7: I didn't understand what you're saying here. Who 'benefits' when higher predators with accumulated toxic substances are harvested; the remaining 'prey fishes'? Or the people who eat those higher predators? Please rephrase.

p. 18207, lines 2, 3: strange phrasing: "deep-sea fish live much longer when they are harvested". Aren't they dead when they are harvested?

p. 18207, line 7: I think this event is better known as 'Deepwater Horizon' oil spill. As the paper seems to be aimed at policy makers and a broader public, a well-known name should be used here.

p. 18208, lines 22: northern North Atlantic

p. 18209, lines 9, 10: estimates of global methane hydrates vary greatly; I think this uncertainty should be mentioned here, instead of picking just one value.

p. 18210, lines 3, 10, 11: in the geological and mining literature these deposits are abbreviated VMS – for 'volcanogenic massive sulfides'

p. 18210, line 12ff: see general comment about waste disposal

p. 18210, on CO2 deposition: perhaps the idea to mine methane hydrates and replacing them with CO2 hydrates could be mentioned

p. 18215, too many 'yet' in the last sentence

Interactive comment on Biogeosciences Discuss., 10, 18193, 2013.