

Interactive comment on “Archive of bacterial community in anhydrite crystals from a deep-sea basin provides evidence of past oil-spilling in a benthic environment in the Red Sea” by Yong Wang et al.

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The paper by Wang et al describes the microbial community associated with anhydrite crystals in a deep sea sediment basin located at more than 2 km depth in the Red Sea. According to the authors the microbial communities detected could verify past oil-spilling events to a relatively good accuracy. The microbial communities were investigated using metagenomic tools and the authors found that alkane-degrading *Alcanivorax* species were dominant in the metagenomes coinciding with the past oil-spill. Several metabolic alkane-degradation pathways were detected. The microbial commu-

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nity of the anhydrite crystals were investigated using fluorescent in situ hybridization for identification of *Alcanivorax* cells that contained *alkB* genes. The chemistry and biological parameters of the sediment core from which the anhydrite crystals originated, differed with depth. A clear peak in organic carbon content and a significant peak at specific depth corresponding to the oil-spill. The authors conclude that the organic carbon stored in the sediments, e.g. as anhydrite crystals, is slowly released for the benefit of the whole sediment microbial community. The text as a whole is quite clear and the subject is interesting. The materials and methods could benefit from more information. I would also like to see some more of the genome of the *Alcanivorax* and some metabolic pathway maps. The fact that a new uncultured *Alcanivorax* has been detected could be discussed more as well as its role in carbon cycling in deep sediments.

Specific comments; L115, how did you get the supernatant? Did you let the solids sedimentate first or did you use centrifugation? L175, give more information about what you did with R and which packages you used. L178, what is HMM L203, what label did you use? Did you have a nonsense probe to check for unspecific labeling? L223, MQ water? L234-251, check the figures. I think the reference to Fig 2 should be Fig 3 and vice versa. L255 ->, did you get any sequences from the blanks and if so, what did you do about it? Results&Discussion, I would like to see some figures with the *Alcanivorax* genome and relevant metabolic maps. How does the *Alcanivorax* interact with the rest of the microbial community?

Typos; L58, change 'were' to 'are' L81, do you mean 'found', not 'located'? L137, correct 'grounded' to 'ground' or 'homogenized'

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