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Discussions

Interactive comment on "Reconstructing bottom water temperatures from measurements of temperature and thermal diffusivity in marine sediments" *by* F. Miesner et al.

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This paper presents a method for calculating the seasonality of bottom water temperatures at a point over the ocean floor using as input snapshot measurements of the vertical temperature profile of the marine sediments underneath. The idea is interesting and probably easy to generalise to time scales longer than just the seasonal cycle. I presume that for the calculation of inter-annual or longer variability, one would need to use deeper and deeper sediment data, which might not be feasible to obtain with the present generation of heat flow probes, though. This paper is very much a description of work in progress, as suggested by the unusually lengthy section on future

work at the end of the manuscript. However, I feel that the presentation of the inversion algorithms and the discussion of the three test cases is novel and detailed enough to warrant publication. A few comments follow.

2392 7. I expect that the steady state heat flow would be the time-independent component of the total vertical heat flux. Therefore, it should be in principle possible to determine this flow by averaging over long enough periods of time. I fail to see why the bottom water temperature itself needs to be constant in order to calculate the geothermal heat flow. 12. Reconstruct temperatures where? 18-19. This statement is irrelevant here. 24-ff. These statements are entirely uninformative. Either provide quantitative information or say nothing. Your hopes for future work have no place in an abstract.

2394 6. I thought you were interested in the bottom temperatures.

2396 23. You must define T_{total} and $u(x,t)$ before line 4, so that your reference to zeroflow- condition at the lower boundary makes sense. 26. $h=150$ W/mЁЕ2? The units of h according to (3) are simply 1/m.

2398 2. Please provide a reference for this figure. 5. What is the heatflow value for this example?

2399 11. "can then be calculated".

2402 25-ff. For real data, it is not clear what an "exact", noise-free solution would be. What criterion do you use for stopping when using real data?

2403 3. Explain what a "regularization scheme" is. 7. Replace "chapter" by "section".

2404 13. You need to be more specific here. What changed from one execution of the algorithm to the next? The noise in the data?

2421-2422 In these figures, the model thermal diffusivity is obtained by linearly interpolating between measured data points, correct? There is no actual model for the diffusivities.

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