

1 SUPPLEMENTARY SECTION

2 As indicated in the its caption, Figure S1 shows the three domains considered in this
3 study. These domains were created in order to specify values of parameters (ϕ_0 , c_0 , λ_s) required
4 to calculate the volume of pore water and the temperature of sediments on a global scale. These
5 parameter symbols refer to the porosity of sediments at the sediment-water interface porosity
6 (ϕ_0), the sediment compaction length scale (c_0) and the thermal conductivity of the solid phases
7 in sediments (λ_s). See Table 1 for their values and the main text for the equations that they are
8 used in.

9 Figure S2 summarizes the methods section in the main text in a single image in order to
10 communicate the series of actions that were taken to carry out the calculations that form the
11 results of our manuscript.

12 The panels shown in Figure S3 essentially combine the two key results in this
13 manuscript: the global distribution of temperature in marine sediments and the volume of pore
14 water in marine sediments. The combined result depicts the volume of pore water in the same
15 temperature intervals shown in Figure 1 and Table 2. Unlike the sediment thickness shown in
16 Figure 1 and corresponding volumes listed in Table 2, the volumes of pore water are not greatest
17 at the higher temperatures. This is because although there is a greater thickness of sediments at
18 the higher temperatures, the porosity and thus the volume of pore fluids decreases exponentially
19 with depth according to the porosity model that we have adopted (Eq. 1).

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21 SUPPLEMENTARY FIGURE CAPTIONS

22 **Figure S1.** Illustration of the shelf, margin and abyss domains considered in this study. The
23 location of the continental margin boundaries was adopted from Vion and Menot (2009): shelf

environments (dark gray) roughly correspond to water depths < 200 m, with the exception of the Antarctic region where shelf area corresponds to water depths < 500 m; areas deeper than ~ 3500 m are taken to be abyssal plain (white). The remaining light gray regions correspond to the continental margin.

Figure S2. Overview of the workflow used to describe the model, characterize the domains and carry out the calculations required to generate the maps shown in Figures 1 & S3 and the data displayed in Table 2.

Figure S3. Volume of pore water in global marine sediments in discrete temperature intervals. In each panel, the volume of marine sediment pore water within the indicated temperature range is given for a particular grid cell. Note that the scale, and therefore the color palette, for each panel is different, especially that for the coldest (< 0 °C) pore fluids and those ranging from $0 - 60$ °C.

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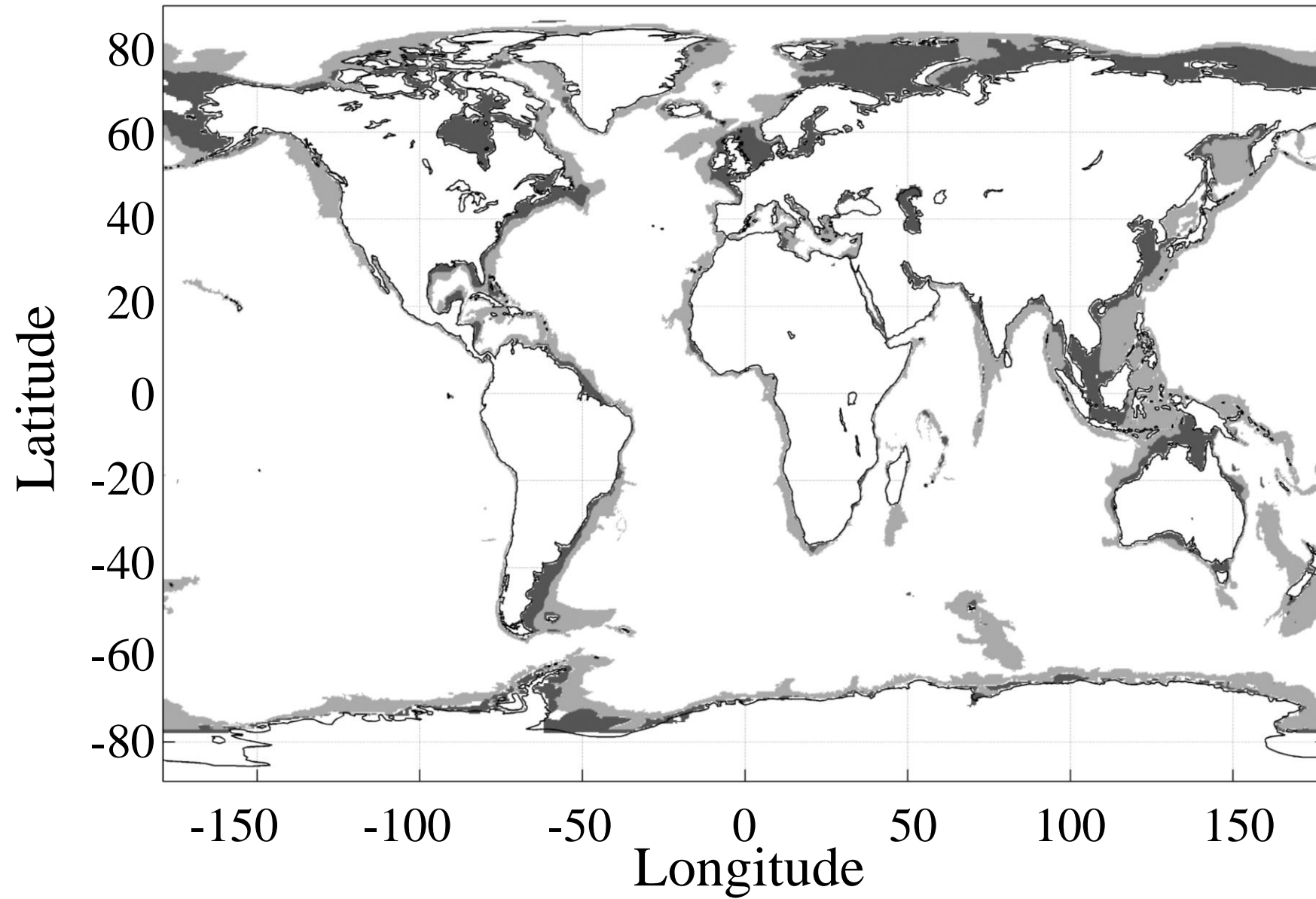
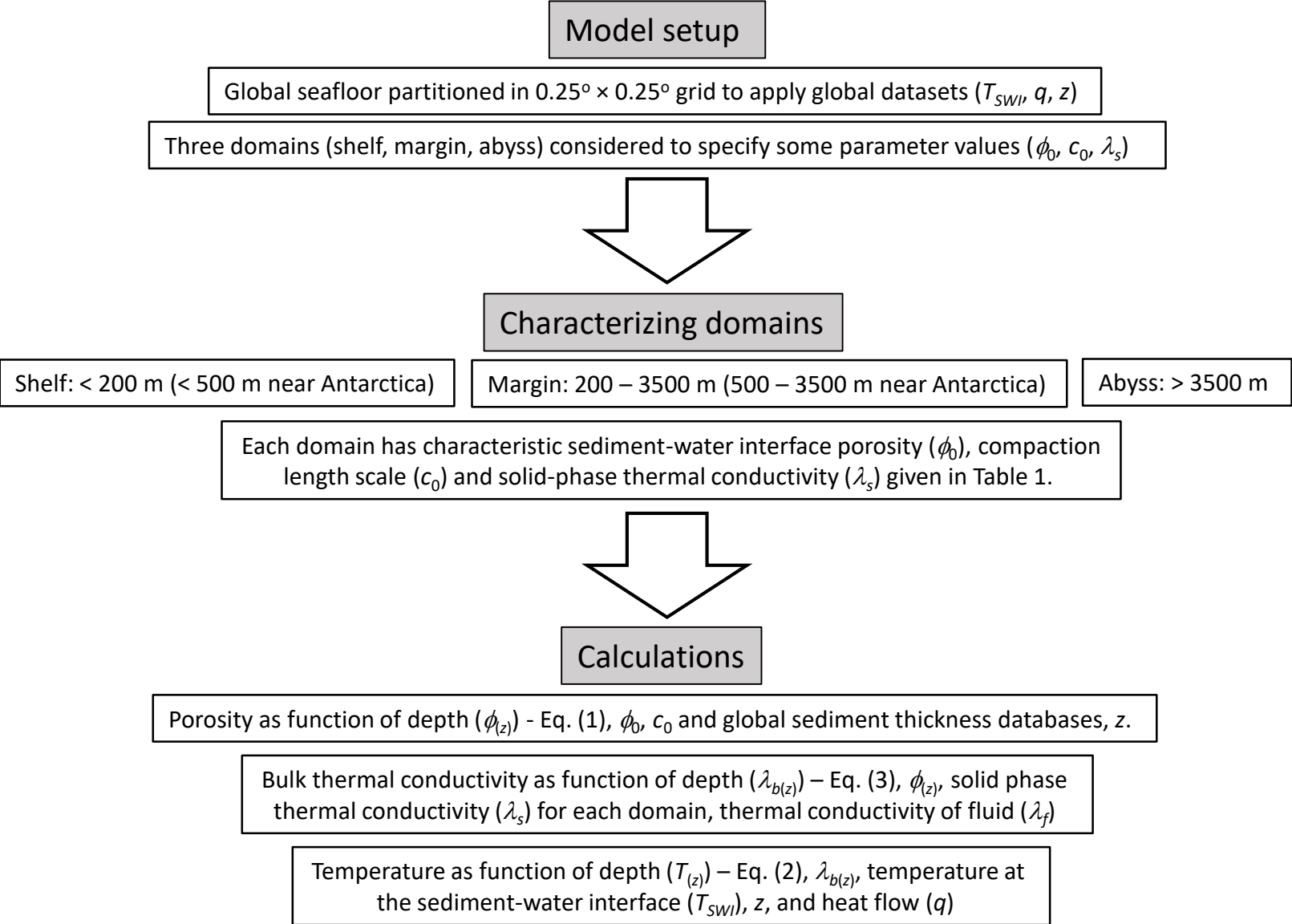
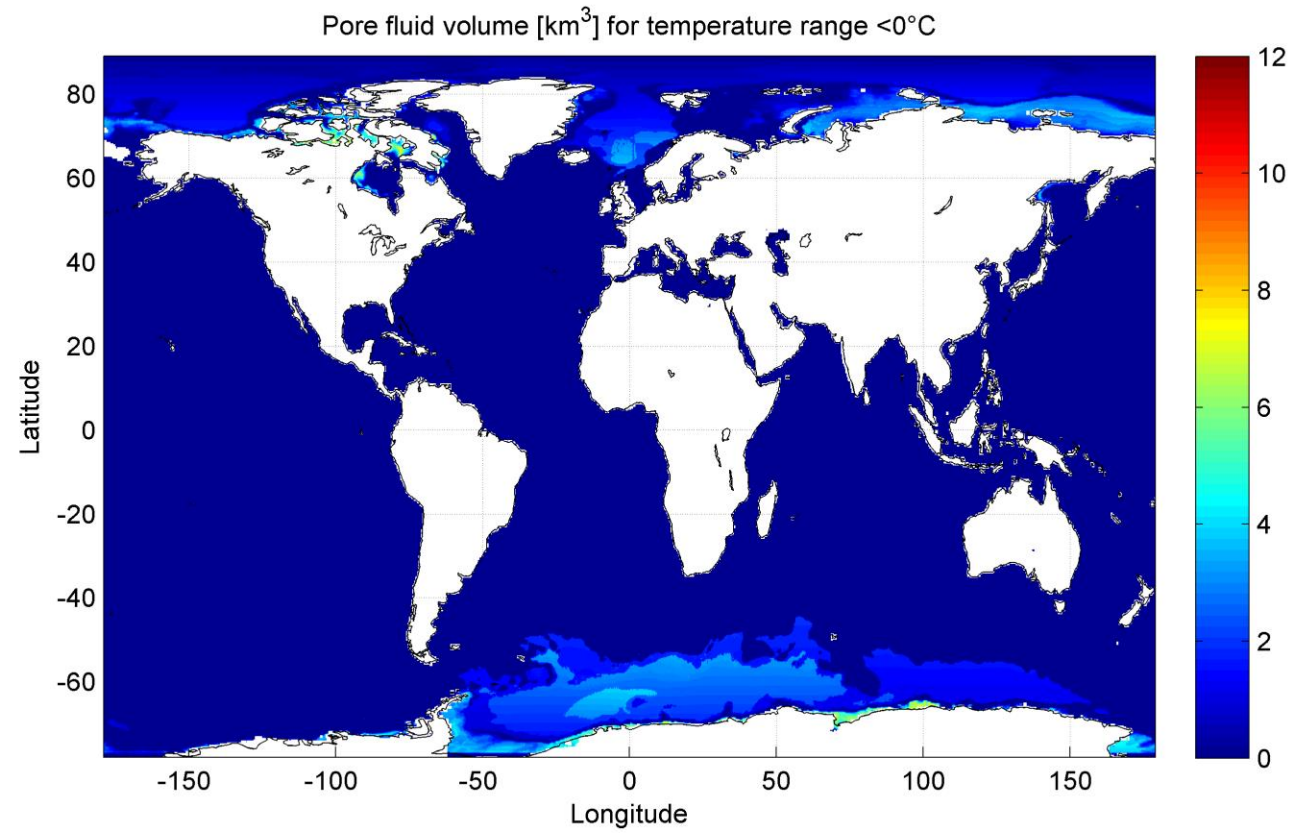


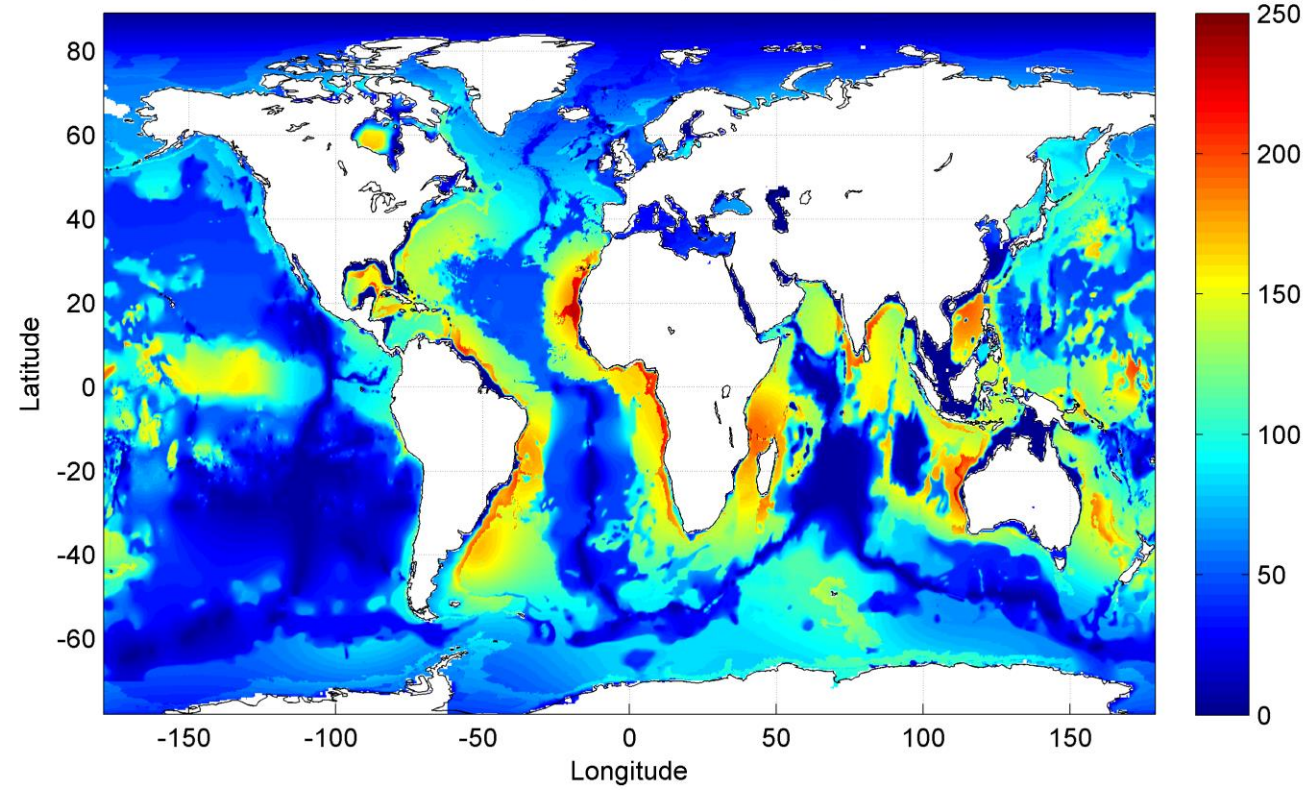
Figure S2. Workflow



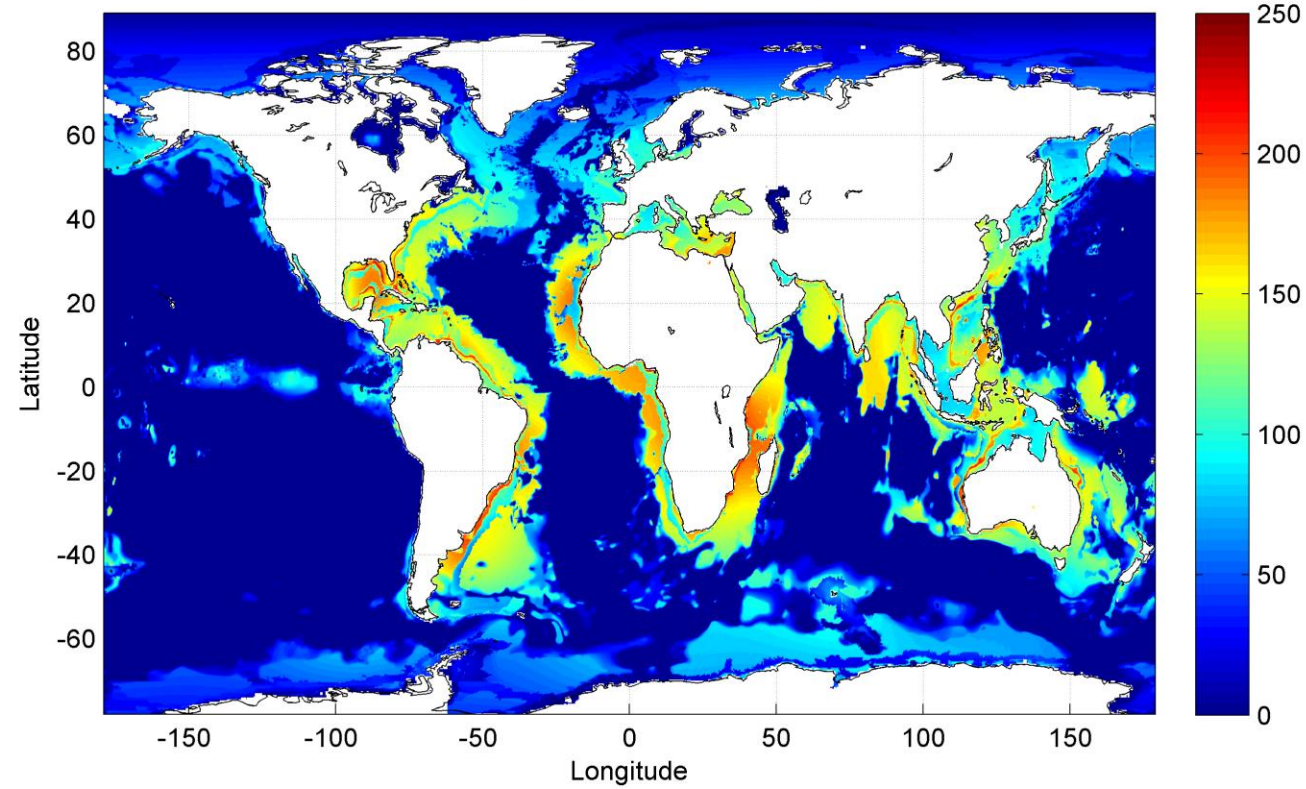
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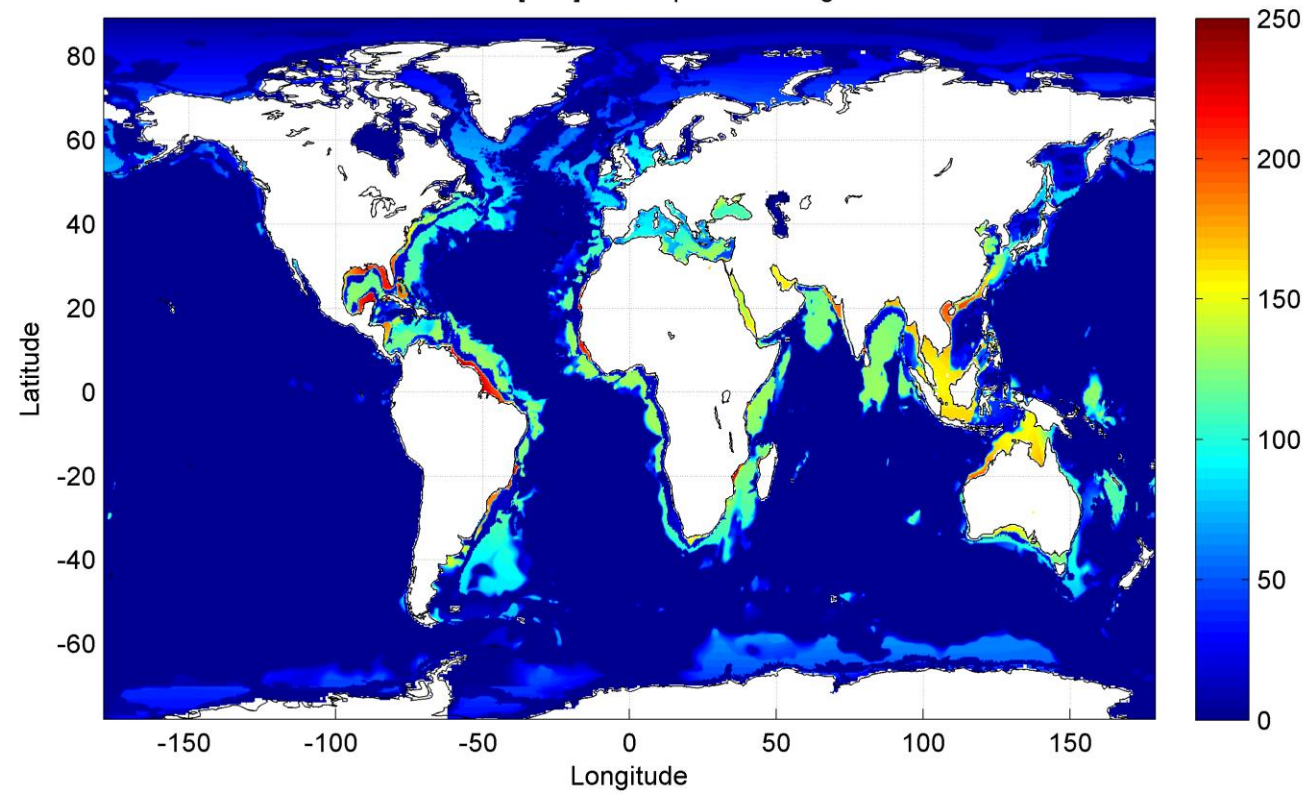
Pore fluid volume [km³] for temperature range 0-20°C



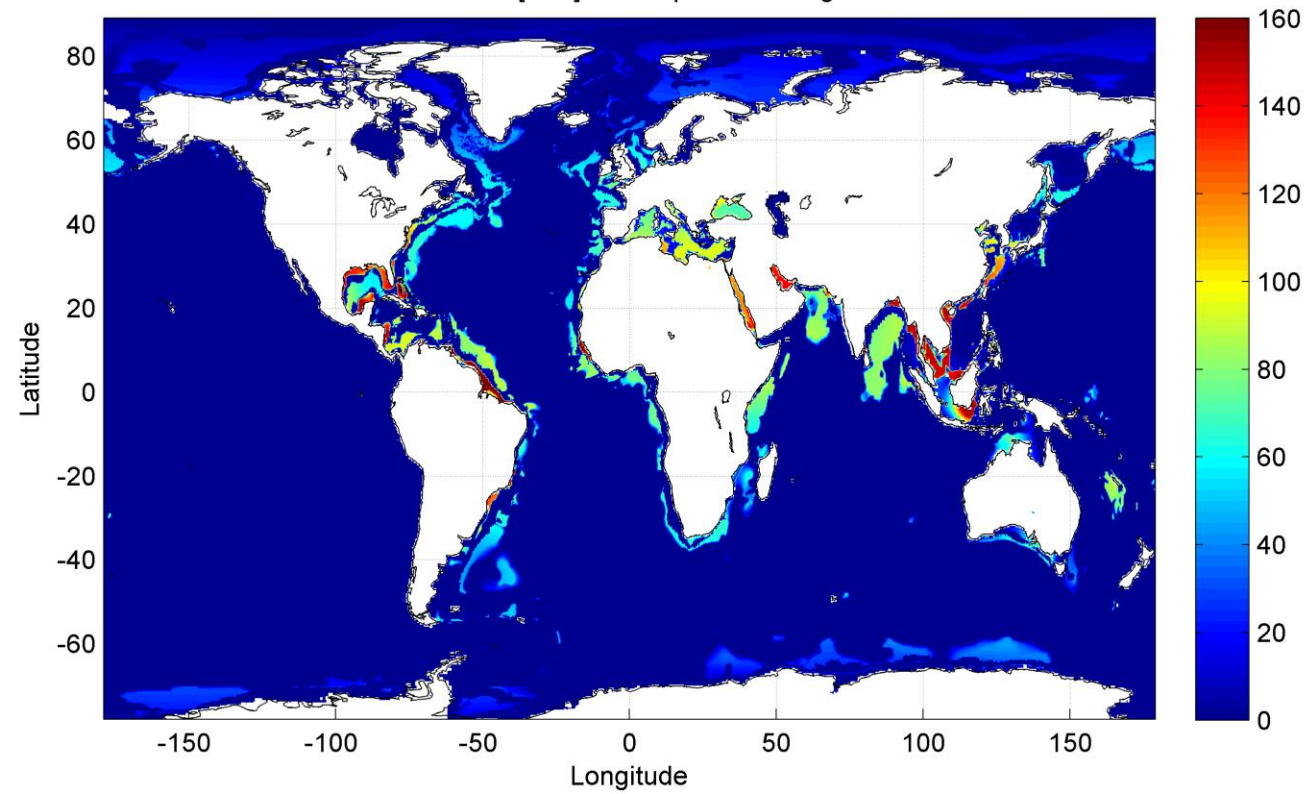
Pore fluid volume [km³] for temperature range 20-40°C



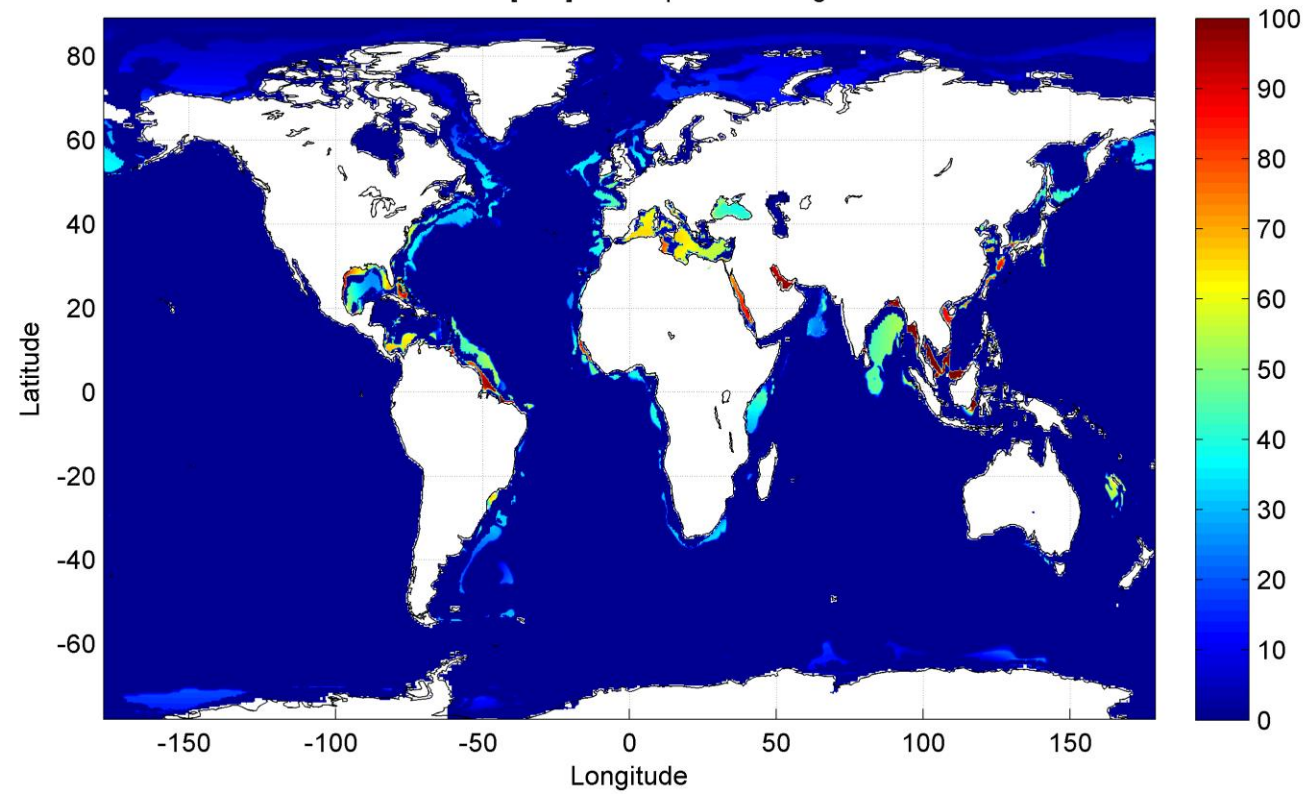
Pore fluid volume [km³] for temperature range 40-60°C



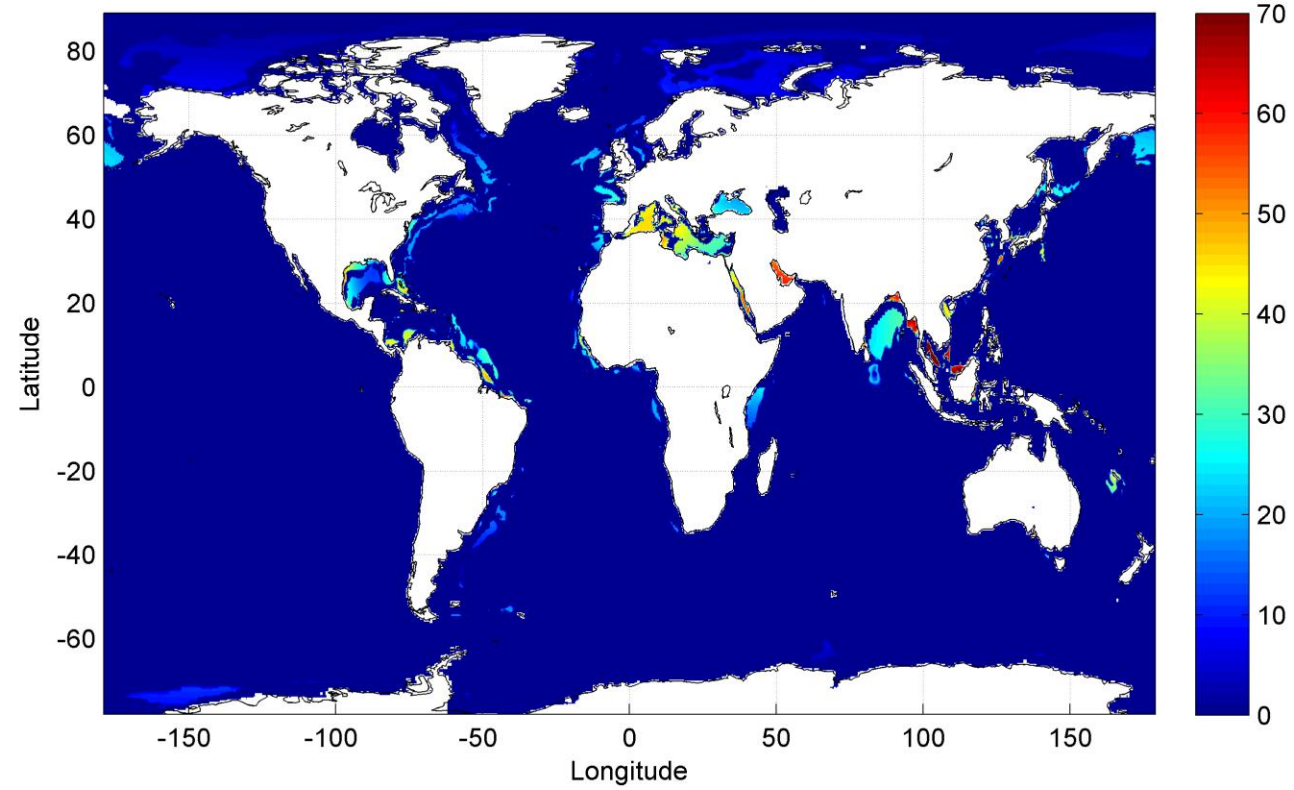
Pore fluid volume [km³] for temperature range 60-80°C



Pore fluid volume [km³] for temperature range 80-100°C



Pore fluid volume [km³] for temperature range 100-120°C



Pore fluid volume [km³] for temperature range above 120°C

