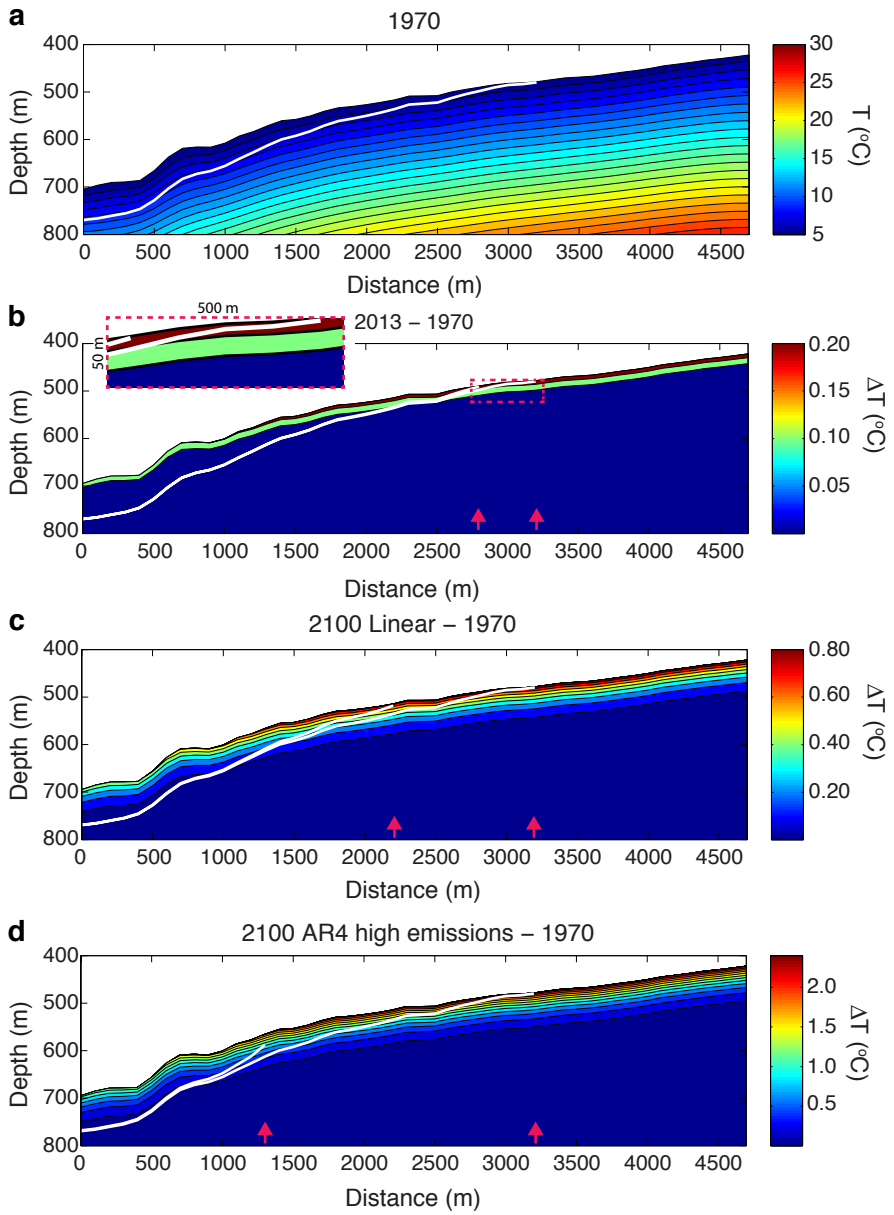

Supplementary Figure 1. Sediment thermal simulations for bathymetric transect P2. **a**. Initial subseafloor temperature distribution in 1970 based on the regression (see Methods) and a basal heat flow of 60 mW/m [Booth-Rea et al., 2008]. The white line is the base of the gas hydrate stability zone (BGHSZ) in the sediment column for Structure I gas hydrate and hydrostatic pressure following the methods outlined in Tischenko (2005). **b**. The simulated change in sediment temperature between 1970 and 2013 and corresponding shift in the BGHSZ. The BGHSZ shoals over a broad area in response to warming, accompanied by a retreat of its landward edge (indicated by red arrows). **c**. Simulated change in sediment temperature between 1970 and 2100 based on the linear extrapolation of seafloor temperature. The upper white line is the BGHSZ in 2100. **d**. Simulated change in sediment temperature between 1970 and 2100 based on the high-emissions AR4 extrapolation. The upper white line is the BGHSZ in 2100 and the lower white line is the BGHSZ in 1970.