

## ***Interactive comment on “Ice melt, sea level rise and superstorms: evidence from paleoclimate data, climate modeling, and modern observations that 2 °C global warming is highly dangerous” by J. Hansen et al.***

**J. Hansen et al.**

jeh1@columbia.edu

Received and published: 13 October 2015

Response to SC C5469: ‘Model Errors’, Nabil Swedan, 30 Jul 2015

Swedan seems not to understand that the melting of icebergs occurs in the ocean. At present the mass of freshwater from melting of ice shelves (above the equilibrium rate) is comparable to the mass of ejected icebergs – and it will increase, the melting rate increasing (more or less linearly) with the ocean temperature, each 0.1°C making a big difference. Nevertheless, as ice sheet disintegration increases, most of the water flux

C7959

from Antarctica seems likely to be in icebergs.

Swedan says we assume that the thermohaline circulation is driven by... We do not make any such assumptions. We are solving the fundamental equations for ocean and atmospheric circulation, conservation of energy, etc. The model does a good job of producing the circulations, and it is tested in its sensitivity, including tests of its ability to simulate freshwater effect on AMOC (LeGrande, A.N., G.A. Schmidt, D.T. Shindell, C.V. Field, R.L. Miller, D.M. Koch, G. Faluvegi, and G. Hoffmann, 2006: Consistent simulations of multiple proxy responses to an abrupt climate change event. Proc. Natl. Acad. Sci., 103, 837-842).

Swedan wonders about conservation of energy. In fact, the original developer of our atmosphere-ocean model always has given priority to exact conservation principles. Enough.

---

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 20059, 2015.