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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.

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If the system is closed (isolated) then it is ... not open.

Therefore no heat flows into or from it.

2nd Law: The entropy of an isolated system never decreases.

Radiative heat transfer:

Between any two surfaces one cold, and the other one warmer, radiative heat exchange

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is taking place. No matter is needed in between (e.g. Sun - Earth), but may be present (e.g. air between cloud and ground surface).

The net heat transfer is in proportion of the difference of each surface temperature at the power of four.

Emitted radiation from any surface:

$Q = \sigma \cdot A \cdot T^4$ (Stefan Boltzmann equation, based on Planck's law)

Heat exchanged between two parallel black body surfaces:

$\Delta Q = \sigma \cdot A \cdot (Th^4 - Tc^4)$

Where:

Q is the heat flux from a surface at temperature T, and ΔQ the net heat transfer between the two surfaces [W m-2]

σ is the Stefan-Boltzmann constant, $5.670\ 373 \times 10^{-8}$ [W m-2 K-4]

A is the area of the surface [m2]

T, Th and Tc are the absolute temperatures, hot and cold. [K]

As in other heat transfer mechanisms (conduction, convection) net heat flows from warm to cold until temperatures reach equilibrium.

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

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