Earth Syst. Dynam. Discuss., 6, C860–C861, 2015
www.earth-syst-dynam-discuss.net/6/C860/2015/

Earth System Dynamics
Discussions

Interactive comment on "Delaying future sea-level rise by storing water on Antarctica" *by* K. Frieler et al.

Anonymous Referee #2

Received and published: 24 November 2015

I am delighted to see that the broad-scale topic of "geoengineering" as a response to global warming is now including questions of how ice-sheet modification might be useful as a mitigation or adaptation. My view is that the entire subject of geoengineering is fraught with moral dilemmas and possible moral hazards, and that it is essential that top-notch scientists objectively consider the various ideas so as to achieve objective, truthful assessments before "crazy" non-scientific and unethical players take "ownership" of the various ideas. It is essential that every idea concerning geoengineering be evaluated for the possibility of "moral hazard", i.e., that the "quick fix" implied by the geoengineering doesn't place undue (or all of the) risk on future generations. Stratospheric aerosol deployment as a mitigation of global warming, for example, is a moral hazard, because it would allow decision makers now to "ignore" global warming while

committing future generations to the necessity of maintaining a stratospheric aerosol injection while they experience extreme risk that was passed to them by prior generations.

This study does an excellent job of explaining the likely processes and outcomes of a geoengineering effort to mitigate sea level rise by quite literally putting the new ocean water onto the top of the East Antarctic ice sheet as new ice. The extraordinarily large cost (several percent of global energy production) and the eventual fact that the sea level rise mitigation is only temporary put important constraints on the idea and allow it to be assessed for "moral hazard" and other aspects of the consequences of this and other geoengineering approaches to global warming.

My view is that there are more geoengineering proposals to explore with ice sheets. This includes "indirect" mitigation of sea level rise by attempting to artificially engineer a shut down of the major ice streams along the Amundson Coast (e.g., by constructing artificial sills in the beds, pumping water out of the subglacial hydrology regime, or by constructing artificial ice rises on any floating ice in the area). Again, all these ideas need to be evaluated by "top notch" scientists who are dispassionate and objective, and it is essential that the studies address the "moral hazard" that is part of this kind of idea.

This paper is well written and is full of interesting comparisons with pumping and piping in, for example, the US where there are issues of piping oil across Alaska and pumping water from New Orleans. This is a fun paper to read and it provides a sobering view of what sea level rise entails and what, even under extremely "science fiction" levels of human technical ability, would be needed to stop it.

Interactive comment on Earth Syst. Dynam. Discuss., 6, 1979, 2015.