

***Interactive comment on* “The sensitivity of the energy budget and hydrological cycle to CO₂ and solar forcing” by N. Schaller et al.**

Anonymous Referee #3

Received and published: 30 April 2013

Review of the article “The sensitivity of the energy budget and hydrological cycle to CO₂ and solar forcing” by N.Schaller, J.Cermak, M.Wild and R.Knutti.

The article is devoted to studying the responses in energy budget and some components of hydrologic cycle to various forcings. The main tool used in the article is NCAR’s CCSM3.5. A significant amount of technical work was invested in the article and I am sure this was a very nice learning experience for the authors. Important model assessment of future changes in the components of energy budget is the main outcome of the article. Although I have to admit that the results do not sound too exciting to me – the article deals only with the question ‘HOW’, not ‘WHY’. Analysis of the physical mechanisms behind the modeled changes and non-additivity (or non-linearity) of the response would greatly improve the article. The article should be published after

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addressing some questions (see below).

1. Why would responses to forcings of different magnitudes be linearly additive in a system with strongly non-linear feedbacks: snow and ice albedo, ocean circulation etc? 2. Analysis of how changes in snow, ice, ocean circulation etc associated with each of the forcing impact the non-linearity should be considered (maybe not in this article). Some discussion will be useful. 3. The title and the abstract should reflect the fact that the article deals with model output and it is only one model that is being used in the analysis. Otherwise the title sounds too general. 4. Some English proofreading is probably needed.

Interactive comment on Earth Syst. Dynam. Discuss., 4, 393, 2013.

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