

GENERAL COMMENT: This paper investigates the effect of extremely bright ice resulting from the presence of salt deposits under Snowball Earth conditions. Such ice, characterized by an exceptionally high albedo, would amplify global cooling because it forms in low-latitude regions, which receive the highest levels of solar insolation. Consequently, the temperature of the Snowball Earth state would be even lower, making the exit from this climatic state more difficult.

This effect is quantified using an energy balance model (EBM) in which the albedo is determined solely by the surface albedo (cloud effects are not included), with ice properties varying as a function of temperature and the presence or absence of snow cover.

The paper presents novel results using a clear methodology to address a specific Snowball Earth–related problem. None of the issues identified during the review raise concerns about the validity of the results presented.

SPECIFIC COMMENTS (ordered by importance)

1. Surface conditions formalism. The formalism used to describe the surface conditions (lines 28–44) is limited to temperature and the absence of snow ($P-E < 0$). However, the results of Jason C. Goodman (2006) clearly show that surface water is primarily of meteoric origin and therefore very low in salinity, except between approximately 0–3° latitude (see meteoric ice vs. marine ice, Fig. 2 in the paper).

This important point is only briefly mentioned (line 110) and the appropriate reference is not cited. The relevant study is:

Goodman, J. C. (2006), Through thick and thin: Marine and meteoric ice in a “Snowball Earth” climate, *Geophysical Research Letters*, 33, L16701.
<https://doi.org/10.1029/2006GL026840>.

Given the importance of this issue for the process investigated in the manuscript, this point deserves more attention and should be discussed in greater detail.

1. Additional Figure

A figure similar to that presented by Goodman (Fig. 3), showing solar radiation, albedo, and temperature, would be useful. This figure could distinguish two cases: with and without the salt crust. It could also serve as an opportunity to summarize the boundary conditions used in the model (e.g., absence of continents, no-clouds, solar constant used, etc.).

2. Figure 1 X-axis addition

For Fig. 1, adding a second X-axis corresponding to CO₂ concentration would be useful, in addition to the radiative forcing. This can be easily computed at first order using the relationship provided by:

Kiehl, J. T., & Dickinson, R. E. (1987), A study of the radiative effects of enhanced atmospheric CO₂ and CH₄ on early Earth surface temperatures, *Journal of Geophysical Research: Atmospheres*, 92(D3), 2991–2998. <https://doi.org/10.1029/JD092iD03p02991>

Addressing these points would further strengthen the paper, particularly the discussion of marine ice (salt deposits) vs meteoric ice.