

Interactive comment on “Simulated enhancement of ENSO-related rainfall variability due to Australian dust” by L. D. Rotstayn et al.

Anonymous Referee #2

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To date, most studies of dust impacts in the climate system have focused on the major dust sources in the Northern Hemisphere. This paper provides a refreshing look at potentially regionally important dust-climate interactions over Australia, representing a useful contribution to the literature. I find no major flaws in the paper, and so I recommend acceptance pending minor revisions and some additional analysis that will further elucidate the mechanisms invoked by the authors.

Major Comment

The authors argue that the dust aerosols, depending on the phase of ENSO, can act to either enhance or suppress precipitation. The authors need to present figures and an analysis of moisture convergence, net radiation at the surface and top of the atmosphere, vertical velocity, stability, etc, comparing NODUST and DUST during El C827

Nino and La Nina years. If the authors are right, then dust should have a significant impact on the moisture budget and dynamics and we should be able to see this. Presenting these results will help bolster confidence in the model and the author's proposed mechanisms. To fit this analysis in, the authors can probably excise some of the current figures or condense them to a brief sentence or two in the manuscript. Specifically, I suggest the following changes:

- Eliminate Figure 1
- Show just the regression coefficients and combine Figures 6 and 7.
- Isn't Figure 8 the same as Figure 7? If not, it may be labelled wrong. Regardless, this figure could also be merged with 6 and 7.
- Figure 13 is probably not necessary.

Other

-A personal style preference: I think the final paragraph of the introduction is really unnecessary. The paper is well written enough without the need for a superfluous table of contents.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 1595, 2011.