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Climate of the Past Discussions

Interactive comment on "Water vapour source impacts on oxygen isotope variability in tropical precipitation during Heinrich events" *by* S. C. Lewis et al.

Anonymous Referee #1

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This paper by S. C. Lewis and colleagues is a valuable modeling study on oxygen isotope variability in tropical precipitation during Heinrich events. The authors use the GissE model enhanced by explicit isotope modeling and vapor source identification to identify the major controls on the isotopic composition of precipitation for various low-latitude sites during an idealized Heinrich event ("hosing experiment"). They rigorously compare their model results to available proxy data. The study is well outlaid and clearly provides sufficient new material and in- sights to warrant publication in Climate of the Past.

There are a few minor issues, only, where I would like to see some revisions of the

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Interactive Discussion

Discussion Paper

authors before publication:

- The major results are all based on one VSD-enabled model experiment with a rather short simulation period of 5 years. In contrast, the available proxy data represent a mean climate state over several decades or even longer periods. How well is this mean climate state represented by this short simulation and how large is the year-to-year variability in the major model results regarding the identified major vapor source regions for the different data sites?

- The selection criteria for the proxy data used in this study remain somewhat unclear. E.g., in Fig. 1 & 2 the authors use as an Antarctic record the Byrd data, only. Even if the polar records are not the focus of this study: Why did the authors include the Byrd record in their analyses, but not some newer Antarctic data, too?

- In Table 3 it is stated that 27% of the precipitation at the GRIP and Byrd site stem from continental recycling. These numbers seem unrealistic high for both polar regions. Once again: Even if the polar records are not the focus of this study, how trustworthy are the VSD results for low-latitudinal regions if this tracing method gives erroneous results for high-latitudinal sites in Greenland and Antarctica?

- The color scale of the lower left plot in Fig. 6 differs from the other three plots in this figure and should be reversed in a revised manuscript version.

Interactive comment on Clim. Past Discuss., 6, 87, 2010.