Geosci. Model Dev. Discuss., 6, C724–C725, 2013
www.geosci-model-dev-discuss.net/6/C724/2013/

Geoscientific Model Development Discussions

Interactive comment on "δ^{18}O water isotope in the *i*LOVECLIM model (version 1.0) – Part 2: Evaluation of model results against observed δ^{18}O in water samples" *by* D. M. Roche and T. Caley

Anonymous Referee #1

Received and published: 4 June 2013

This manuscript describes the validation of the d18O isotope enabled model iLOVECLIM with respect to present day observations of the isotopic composition of precipitation and ocean. Given the limited complexity of the atmospheric model (a single moist layer), generally good model-data agreement is observed. The evaluation is very thorough, and model-data mismatches are clearly identified and, where possible, explained. Although acceptance should of course be conditional on acceptance of Part I, the following comments are of a minor nature:

Page 1500 line18. If I understand correctly, snow fractionation assumes the tropopause temperature (Part I). Does the temperature at the tropopause depend upon the surface

orography? I'm not clear how the isotopic composition of Greenland precipitation can be a function of altitude in the model?

Figure 3 illustrates that precipitation weighting gives Antarctic d18O in the range -10 to -50 per mil. (Note that the y-axis is labeled "mean annual d18O" – am I correct in understanding that this data is precipitation-weighted (page 1502 line 10)? If so, please re-label the axis.) The range of Antarctic d18O values is broadly consistent with observations (Masson-Delmottte et al 2008). To what extent are the Antarctic observations better representative of pptn-weighted d18O than annual averaged data? (e.g. from MD 2008: "Surface snow-sampling procedures differ significantly from one site to another. In some cases, shallow snow cores or pits, typically 1 m deep, were sampled and one or several measurements were performed."). Could this explain some of the model-data mismatch? I understand that the failure was explained in Part I as probably arising from a numerical artifact, so perhaps the authors feel any such statements would be meaningless? How does the isotopic composition of Greenland and Antarctic snow (which integrates the pptn-weighted signal) compare with observations?

P 1496 line 20: H218O repeated

P1502 line 1: refer reader to fig 4

P1505: refer reader to appropriate figures.

P1505: line 27 latter, not later

Fig 5 caption: for clarity, restate that all data are normalised about their annual average.

Interactive comment on Geosci. Model Dev. Discuss., 6, 1495, 2013.