General comments

The authors have equipped the non-hydrostatic, limited area model COSMO with stable water isotope tracers, using a storm over the eastern US as a test case. To the best of my knowledge, this is the highest-resolution model to so far be equipped with stable water isotope tracers. They have made a fine choice in using the Gedzelman and Lawrence [1990] data as a first test-case. The paper is well-written, technically precise, and the results are strong. Overall, this is a valuable contribution, but the comparison between COSMO, IsoGSM and the GL90 measurements needs to be expanded. I recommend publication in ACP after the following comments are addressed.

I have two major comments. First, more comparison should be done between COSMO and IsoGSM in simulating the isotopic observations of GL90. In the Abstract (P26522-L16) and Introduction (P26523-L15-onwards), the authors emphasize the potential value of COSMO model compared to coarse resolution GCMs. The PDFs of precipitation δ18O in Figure 4 hint at the improvements gained from a higher resolution isotopically-equipped model. Beyond that, however, we do not get a sense of the gains for the most interesting details of the case study. It would be informative to see the relevant IsoGSM data plotted in Figures 5, 6 and 7. How does the IsoGSM compare in capturing the large decreases in precipitation δ18O at the AVP site and vapor δ18O at the RDU site on January 20, for example?

Second, additional comparison should be done with GL90, both in terms of the data presented and in interpretations of the isotopic behaviour. How representative were the results for AVP in Figure 6 of all stations in GL90, for example? I suggest either examining stations at either extent of the domain, or, ideally, aggregating the stations for which precipitation amount data can be readily obtained into 3 or 4 synoptically-representative groups and analysing the mean signals for each. Related to the comment below, for whatever stations or regional signals considered, it would be informative to also plot the temperature and, if possible, phase of precipitation, in the time series. These are likely available from the NCDC DS3505 dataset (from which the precipitation data in Figure 6 were presumably obtained).

Intepretation-wise, the authors state at P26524-L21 the authors list height of precipitation formation, convective vs. stratiform precipitation, and rain-vapor interactions beneath the cloud base as the factors listed by GL90 as important in controlling isotopic composition. The influence of cloud and precipitation formation height is handled (P26542-L23 to P26543-L5). The other two influences should be expanded upon, specifically:

- P26536-L3: It is noted that modeled convective contributions during the storm are minimal. How does this compare to GL90?

- P26543-L6 onward: How do the results of the sensitivity experiment compare to GL90's interpretation? Do GL90 ascribe the same importance to the below-cloud precipitation/vapor interaction (and role of precipitation phase), compared to the height of precipitation formation?

Specific comments

- P26536-L20, Fig 4: Were the PDFs for the models computed using only grid points collocated with the stations from GL90, particularly for COSMO? This was not clear from the figure caption, and is important in comparing the precipitation statistics directly. If the model fields were not sampled at

the station points, might this have contributed to the difference in PDF tails (P26537-L7), and between the modeled snow δ18O and the West Virginia snow core? Also, in estimating the distribution parameters, an explanation should be provided as to why precipitation δ18O was not weighted by precipitation amount. For an isotopic average, at least, this is standard practice.

Technical corrections

- P26526: Consider moving footnotes into main body of text.

- P26530-L4 and elsewhere: Steward (1975) should be Stewart (1975)

- P26534-L6: 'switched of' should be 'switched off'.

- P26535-L3: awkward mix of tense between 'moves' and 'intensified'

- P26535-L21: change 'easterly' to 'eastward?'

- AT P26538-L29, change 'northeasterly' to 'northeastern'.

- P26539-L7: Instead of 'are consistent with', suggest using 'in fair agreement with'.

- P26539-L18: 'was only little rainfall' to 'was little rainfall'

- P26545-L17: 'southerly part' should be 'southern part'? In general, check for consistency in using these terms to describe direction and location.

- P26558, Fig 1 caption change 'orography' to 'topography