

REFeree #1

Thank you for the revision. I have no further comments besides technical corrections listed below:

* please enlarge font size in colorbar labels (both text and tick numbers) in Fig. 9 and 10

Done. We also enlarged the font size in colorbar labels in Fig. S6 and S7.

* avoid repeated parenthesis ")))" in lines 110, 330, 379, 412

Done.

* avoid line breaks just before percent/percentile units (Fig 5 caption, line 298/299, line 430/431) by adding a non-breaking space

Done.

* add non-breaking space between Fig. and number (i.e., Fig.~\ref{...}), see e.g., line 350/351, 365/366, 369/370, 388/389, 392/393

Done.

* add punctuation to equations (commas or full stops) to make them part of the surrounding sentences

Done.

* figures feature italics in label subscripts:

- Fig. 1: r_c , r_v , r_i , r_s , r_g , r_r
- Fig. 2: excess_p , O_p , D_p (note: caption does not mention the subscripts)
- Fig. 3: excess_v , O_v , D_v , r_v (note: caption does not mention the subscripts)
- Fig. 4: r_v , O_v , O_r (note: caption mentions O_p - O_v , but plot has O_r - O_v)
- Fig. 7: O_v , O_p , excess_v , excess_p , $_{eq}$
- Fig. 8: excess_p , O_p , O_v , $_{eq}$ (both on axis labels, and in the legend)
- Fig. 9: $_{eq}$, O_p , O_e , excess_p
- Fig. 10: O_p , $_{eq}$

All these figures have been modified to avoid italics in label subscripts. The figures in the Supplementary Material have also been modified accordingly.

* in Fig. 1, consider using line width, in addition to red color, to highlight isotopic effects (for color blind or b/w printing)

Done.

* the four paragraphs above reference list should have titles (Code availability, Author contributions, Competing interests, Acknowledgements)

This was done by changing the version of the latex template, and by modifying the position of the figures. An appendix has also been created to bring together the tables containing the lists of symbols.

* references: in Ciais & Jouzel 1994, correct DOI URL (now has a bogus <https://doi.org/https://doi.org...>)

Done.

REFeree #2

Thanks to the authors for addressing the reviewer's comments. I find the manuscript to be suitable for publication, though I make several minor (mostly typographical or wording) suggestions below.

Suggestions (2/45 means p. 2, line 45 in the track changes manuscript):

2/31: Since there are a "large number of ... studies", I would suggest adding "e.g.," in the citation to Lee and Bony et al.

Done.

2/45: "one-moment bulk microphysics scheme" --> "bulk microphysics scheme". The Thompson microphysics used in Moore et al. uses a double moment representation of some hydrometeors (cloud ice and rain).

Done.

4/108-9: Does "fast vapor exchanges" mean that the scheme uses saturation adjustment when predicting the deposition onto and sublimation away from pristine ice? My understanding of section 3.3.3 is that the answer is "no", but I'm asking because some older microphysics schemes apply saturation adjustment to both cloud liquid and cloud ice.

The ICE3 microphysics scheme uses saturation adjustment for both cloud liquid and cloud ice.

sec 3 title: How about "Formulation of stable water isotopologues in Meso-NH-ISO"

The title has been modified.

Bergeron process: My understanding of Blossey et al (2010) is that they neglected fractionation during the cloud liquid to vapor to ice transfers of the Bergeron process because the Lin et al microphysics used saturation adjustment for both cloud liquid _and_ cloud ice. While I accept that the authors have chosen this path for the present study, I would encourage them to consider implementing it in the future if using a microphysics scheme that does not use saturation adjustment for cloud ice. Although the "water vapor reservoir" of $H_2^{16}O$ is unaffected by the Bergeron process, fractionation of heavy isotopologues occurs during both the liquid-vapor and vapor-ice transitions with two _different_ fractionation coefficients. As a result, I am not confident that the "water vapor reservoirs" of heavy isotopologues are also unaffected.

In the revised manuscript, we acknowledged that the Bergeron process was associated with isotopic fractionation, and that our hypothesis could biased the results : « Due to this assumption, we may slightly overestimate the isotopic depletion and the d-excess in the upper troposphere. This is not an issue for science applications focusing on surface precipitation or low-level water vapor, but future refinements might be required for applications in the upper-troposphere. »

It is clear that the use of a microphysical scheme that does not assume a saturation adjustment would be more appropriate. This work is an initial and successfull attempt to implement a water stable isotopologue scheme in Meso-NH. As this model now features a two-moment microphysical scheme (LIMA ; Vié et al., 2016 ; Taufour et al., 2024) which does not assume saturation adjustment for ice, it is envisaged that the isotope scheme will be coupled to the LIMA microphysical scheme in the future. A sentence has been added in the conclusion of the revised version of the manuscript.

9/219: "... coefficients _whose_ values follow ..."

Done.

13/334: "Evolution of ... _during_ the 8-hour simulation"

Done.

22/479: "the disequilibrium ... is still positive but weaker than at 1km." I prefer "weaker" to "lower" because the sign of disequilibrium could be either positive or negative.

You are right. It has been modified.

24/fig 10 caption: Could these numbers be quoted in m/s? I'm not sure I've seen fall speed in km/hr before.

Done.

25/532: The "we" in "as we also obtained in our simulation ..." is not needed.

Done.