Atmospheric
Chemistry
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Discussions

# Interactive comment on "Contrasting stable water isotope signals from convective and large-scale precipitation phases of a heavy precipitation event in Southern Italy during HyMeX IOP 13" by Keun-Ok Lee et al.

**Anonymous Referee #1**

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General:

The authors present model simulations of isotope ratios, but there is no link to observations. Are the authors suggesting that observations form e.g. the HyMeX IOP 13 could be compared to their model results to gain additional insights? If yes, how? If not, why not just stick to a trajectory analysis? In other words, what additional insights (if any) are gained by using COSMOiso here?

It seems that the authors turn on a convection parameterization at 7 km horizontal

resolution. Are the two parameterizations of microphysical processes consistent between the deep convection parameterization and the "large scale" scale microphysics parameterization? If not, how may this affect the results regarding the isotope ratios? Are the authors sure that the model skillfully represents the partitioning between parameterized and resolved precipitation or does this partitioning depend on details of the model formulation? What might be the effects of not representing this partitioning skillfully on the simulated isotope ratios? If the results were sensitive, would it even be worthwhile to try to improve the partitioning in the model or should one just wait until deep convection parameterizations become obsolete?

I must admit that I do not fully understand the purpose of this manuscript. To me this study raises more questions than it answers. Major revisions will be necessary before I can recommend this study for publication.

Specific points:

1. Title and abstract: based on the title and abstract I would have somehow expected a connection with observations. The title should explicitly state that this is purely a modelling exercise.

2. Given that this is purely a modelling exercise, I would have expected either some sensitivity studies or else a more explicit description on how the model results presented here might be linked to either existing or to future observations.

3. Is the main point of this study a simulation of a quantity that has not been observed or are there fundamental new results that can not be found in the existing literature? If this is the case, these points should at least briefly be discussed in the light of the existing literature.

4. Why was COSMOiso used and not just a simple trajectory analysis?