

Response to reviews, Nov 2023

We thank both reviewers for their last comments. We considered all of the suggested last edits.

Referee Aurelien Podglajen

Report 1:

I thank the authors for taking my comments into consideration and recommend the paper be accepted for publication. I only have a few further, very minor suggestions.

line 146: "Quasi-lagrangian super-pressure balloons are an additional platform" -> "Weather balloons and quasi-Lagrangian super-pressure balloons are additional platforms" since the first 3 papers cited use weather balloons.

line 471: "semi-Lagrangian" -> "quasi-Lagrangian"

line 639: 'building upon...., the budget analysis is often neglected': Don't you mean 'except for the study by and a few others (?), the budget analysis is often neglected' ?

Thanks for carefully looking at the text again, we considered all suggestions.

Referee Maximilien Bolot

Report 2:

General comments:

The revised manuscript has been significantly improved and my concerns have been addressed. I recommend publication of the study after the minor technical fixes listed below. The only point which can be debated in my opinion is the role of vertical transport in setting final dehydration and the high occurrence frequency of cirrus in the TTL. Multiple studies (Gage et al. 1991, Sherwood 2000, Holton and Gettelman 2001, Hartmann et al. 2001, Fueglistaler et al. 2004) indicate that air masses around the tropopause over the maritime continent, where the coldest temperatures are found, descend rather than ascend. This region plays an important role in determining the water vapor mixing ratio of tropical troposphere-to-stratosphere transport, highlighting the role of horizontal transport through Lagrangian cold traps. However, I do not think that this point is central to the paper and thus do not recommend further modification. Maybe at line 439 you could write: "Upward vertical motion and very low temperatures maintain high relative humidity in the TTL [...]"

Technical corrections:

Line 149: reel down -> reel-down

Line 720: "Isotopes proved particularly useful in studies of the role of deep convective transport,

formation of tropical cirrus of both convective and in situ origin". Something seems wrong with the

sentence. Did you mean: "[...] studies of the role of deep convective transport in the formation of

tropical cirrus of both convective and in situ origin”?

Line 743: “While first such trends have been already detected, [...]”. I’m not sure about the English.

Perhaps “While the first evidence of such trends has been detected, [...]” would be clearer

Thanks for carefully looking at the text again, we considered all suggestions.