Second Review of Paper ACPD **15** (2015), 34439-34496

Fast descent routes from within or near the stratosphere to Earth´s surface,

by H. Itoh and Y. Narazaki

April 2, 2015

General Remarks

The paper has significantly improved. It is interesting and deserves publication. However, quite a few more amendments are necessary or should be considered:

Details

(1) Line 67: I suggest replacing "there" by "at high-lying sites" because work outside Tibet is cited.

(2) Line 69: "Better: "systematic deepest STT studies"

(3) Line 70: Add "(e.g., Eisele et al., 1999)" as suggested before: here, some knowledge on the rare penetration into the PBL is summarized and a counter example is given.

(4) Lines 74-75: "also investigated": I do not understand "also" since these references are not related to any work mentioned before in your text. This is a recent development in the U.S. related to air quality. I suggest removing "also".

(5) Lines 76-78: Some statement like "Identifying the descent down to the surface is a challenge." is missing here. Then you can continue "Even in this study...".

(6) Line 80: Add colon: "question: Can"

(7) Line 83: Extend: "The problem is to find a way how "

(8) Lines 83-89: This paragraph is not well written. I seems to suggest that trajectory calculations are the method of choice. Then this opinion is revoked. I suggest to jump directly into what has be done: "We decided to apply an approach based on both ....". H_2O would have been another good supporting tracer as one can see from the routine radiosonde measurements.

(9) Line 97: "extended air travel durations"

(10) Lines 98-99: "are not observed with": You certainly mean "are not provided by".

(11) Line 102: "are put together".

(12) Line 130: "is generally high" seems to be more an expectation than the result of that study as far as I remember. Please, have a look at that paper again.

(13) Line 135: "By using ^{7}Be and H_2O thresholds ..."

(14) Line 230: Move citation in the final sentence of this paragraph up to here and delete the final sentence.

(15) Sec. 3.2 needs revision:

(16) Line 258: First of all the number of cases should be specified here, the total number of trajectories.

(17) The role of z_1 is unclear; where are the other z_i related to it?

(18) Lines 261: "However, the 7Be concentration does not necessarily correspond only to z_1": why should it, why this sentence?

(19) Line 270: Why plural when there is just a single altitude, z_1?

(20) Line 277: “The case numbers... “

(21) Line 303: “is the most important task”

(22) Line 303: “... is investigated in Sec. 4.2.3.”

(23) Line 315: “maximum-descent”

(24) Line 316: Do you mean “corresponds to”??? “Followed by” does not make sense.

(25) Line 317: “slow” seems to contradict the figures.

(26) Line 326: “the last two days of travel.”

(27) Line 343: “to reach finally” (no split infinitive, please)

(28) Line 347: “Case studies”

(29) Line 353: “Afterwards”

(30) Line 356: “The features represented by this case are typical....”

(31) The paragraph starting at line 358 read much like there is a lot of mystery about the mechanism. Tropopause folding is quite normal. Please, rewrite in a more direct way.

(32) Line 399: “northerly air flow”?

(33) Line 403: Already written in line 356! I do not complain, but the authors should be aware. One could improve the sentence by starting “The similarity of the routed ....”. Then it refers what was already said.

(34) P. 14 or Sec. 5: As said before, I am missing a brief discussion on the penetration into the layer just above the ground (PBL during daytime). In a manuscript not yet published and in earlier work cited by Eisele et al… (1999) this is explicitly discussed. The results suggest that the penetration is almost impossible after the onset of convection. Even if a related study with your data would be beyond the scope of your paper a few words are mandatory.

(35) Lines 581-582: Fig. 22 does not give any idea of the mechanism that transports the air mass to the surface. Consider moving the introduction of the figure to the top of the paragraph. In general, as said, some of potential ideas about “These disturbances” are missing. How can trajectories work in the presence of daytime convection?

Figures:

Mark the position of Fukuoka (at least on busy figures where the geographical contour cannot be distinguished).

Fig. 3, line 4: What “higher altitude”? Average of the upper per cent? Highest in that ensemble?