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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Forecast, observation and modelling of a deep stratospheric intrusion event over Europe" *by* P. Zanis et al.

P. Zanis et al.

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Reply to the comments of reviewer #1

We would like to thank the reviewer for the helpful comments.

Reviewer 1 pointed that in section 3.3, the interpretation of the radionuclide measurements is a weak point. Hence, following the suggestion of the reviewer we performed a series of changes and additions in this section: A Table (Table 2) was added with summary statistics of the 7Be and 10Be measurements at Zugspitze and Jungfraujoch during 2000 and 2001 for reference values in order to help the discussion of radionuclides measurements during the case study in Section 3.3. Recent results from Jordan et al. (2003) are also referred in the Section 3.3 for comparison purposes. Jordan et al. (2003), using aircraft samples in both the stratosphere and troposphere reported the absence of ratios $<$1.27 in the lowermost stratosphere indicating that ratios ob-

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served in the troposphere, nearer their production ratio of 0.60, are characteristic of tropospheric air with minimal stratospheric influence. Furthermore, the reviewer was right that the discussion of wet scavenging associated with high RH was misleading. We looked precipitation data where they were available. For the case of Zugspitze the precipitation data indicated no precipitation from 20 to 26 June, while on 18 and 19 June there was precipitation (maximum of the whole month on 18th June) resulting possibly in the low daily 7Be concentrations due to wet scavenging. For the case of Jungfraujoch, the low 7Be and 10Be activity concentrations on 20-21 June could be possibly attributed to wet scavenging but there are no precipitation data to prove this possibility. However, the 10Be/7Be ratios stay at high levels on all days, thus providing possible evidence that during occasions of wet scavenging the 10Be/7Be ratio can still be a valid stratospheric tracer although 7Be and 10Be are not. Finally, we added a sentence that these results should be considered with caution because the very low time resolution of the measurements at Jungfraujoch (bi-daily samples), which is long compared to the typical duration of a stratospheric influence, is a limiting factor.

Reply to the comments of Reviewer #2

We would like to thank the reviewer for the helpful comments.

Reviewer #2 suggested that showing one of the hit tables with highlight of the time and location of observations used would help put the data in context.

Following the suggestion of the reviewer we added an example of an intrusion hit Table (Table 1) for Jungfraujoch to facilitate the interpretation of the trajectory plot in Figure 1 (e.g. when exactly and at what altitude a stratospheric intrusion can be expected at a specific measurements site).

Furthermore, we added a few details about the "ozone forecast" from ECMWF in the last paragraph of page 7 in section 2.2 as suggested by the reviewer.

Other changes Finally we would like to inform you that we performed some other

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changes or additions, which are tracked on the previous submitted version. There are also changes in Figures 3 and 5. Specifically, in Figure 3 we used the same times as in Figure 2 for consistency purposes, which we think improves the discussion of the development of the synoptic situation in section 3.1, and we added colour in Figure 5 for better visualisation.

Interactive comment on Atmos. Chem. Phys. Discuss., 3, 1109, 2003.