Atmospheric Chemistry and Physics Discussions

Atmos. Chem. Phys. Discuss., referee comment RC2
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Comment on acp-2022-282

Anonymous Referee #2

Referee comment on "Detection of Stratospheric Air Intrusion Events From Ground-based High-resolution 10Be/7Be by Accelerator Mass Spectrometry" by Xu-Ke Liu et al., Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2022-282-RC2, 2022

Review of ACP-2022-282

"Detection of Stratospheric Air Intrusion Events From Ground-based High-resolution 10Be/7Be by Accelerator Mass Spectrometry" by Liu et al.

This paper describes the acquisition, analysis, and validation of a year-long record of the Be-10/Be-7 ratio in rainwater and air samples from the Chinese Loess Plateau, and uses these measurements to estimate the importance of stratosphere to troposphere transport (STT) in this region. The authors analyze the samples with accelerator mass spectrometry, which improves the sensitivity and reduces the sampling time to about 1 day, and use the Be-10/Be-7 ratio to decrease the impact of surface contamination. The technical aspects of the measurements appear to be thoroughly considered with considerable attention devoted to the difficult problem of correcting for the large background created by surface dust.

The details of the measurements will no doubt be of interest to some, but unfortunately the study really doesn't tell us anything new about STT or atmospheric processes in general and is therefore not suitable for publication in ACP. The measurements confirm the well-established fact that STT occurs year-round with a peak in the spring at northern midlatitudes, and that it occurs primarily through discrete intrusion event such as tropopause folding that occur on timescales ranging from a few hours to several days, although the sampling time of the measurements described here is still too long to tell us anything about the dynamics of specific events. It has also been established that STT is responsible for roughly half of the free tropospheric ozone budget (Royal Society, 2008), but the conclusions about surface ozone presented here are not directly supported by the Be-10/Be-7 measurements.

Royal Society (2008), Ground-level ozone in the 21st century: future trends, impacts and

policy implications, 148 pp.