

# **Intraseasonal Ozone-circulation Relationships in the Arctic Stratosphere**

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Changes in stratospheric ozone have well-known influences on the circulation, and changes in the circulation can simultaneously adjust ozone. This two-way influence between ozone and the circulation may be important for the variability of stratospheric circulation on a range of time scales. We investigate this possibility on the intraseasonal time scale by addressing the impact of Arctic stratospheric circulation extremes on the spatial distribution of ozone. More specifically, we apply composite analysis to reanalysis data to document how stratospheric sudden warming events, final warming events, and vortex intensification events affect the 4-dimensional distribution of stratospheric ozone. We find that each circulation event is associated with specific anomalies in the spatial and temporal distribution of ozone. The anomalies establish well before the mature phase of the event, they persist for many weeks, and they change their sign over the course of the event. The anomalies are consistent with the actions of planetary waves on the transport and mixing of ozone. Our results reveal a significant amount of temporal and spatial intraseasonal variability in ozone, which may play an important role for simulating the stratospheric circulation.

Key words: ozone, stratospheric sudden warming, final warming, vortex intensification