



Mesospheric intrusion and anomalous chemistry during and after a major stratospheric sudden warming

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A realistic major stratospheric sudden warming (SSW) event is simulated in the National Center for Atmospheric Research's Whole Atmosphere Community Climate Model. The event is highlighted by a rapid vertical displacement of the polar stratopause, which plunges down into the mid stratosphere at the onset of the SSW, and then abruptly reforms near 75km. The SSW is accompanied by a strong equatorward and downward residual circulation between 40-60 km. The descent occurs mainly through the core of the highly displaced vortex and is accompanied by the intrusion of carbon monoxide rich air (peeling away from the mesosphere as the vortex collapses) into the mid-latitude, lower stratosphere. We also report the effects of the SSW onto the secondary and tertiary ozone maxima. The former shows an abrupt amplitude decrease at the time of the high altitude stratopause reformation, while the latter shows significant altitude variations in response to vertical residual velocities.