



How well can polar middle atmosphere descent rates be derived from remote sounding measurements?

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The rates of descent of middle atmospheric (stratosphere and mesosphere) air above the winter poles are often derived using trace gas measurements made by remote sounding instruments, particularly satellite instruments and ground-based microwave instruments. The derivations are based on the assumption that vertical motion of air above the poles is the predominant cause of changes in the concentration of the measured trace gas.

To ascertain how well and over what scales the above assumption holds, the Specified Dynamics Whole Atmosphere Community Climate Model (SD-WACCM) is used over several recent winters to separate the tendencies of carbon monoxide concentrations in the middle atmosphere. A recent carbon monoxide data set from the ground-based Kiruna Microwave Radiometer (KIMRA) and data from the satellite-borne Microwave Limb Sounder (MLS) are used to evaluate how different are the derived descent rates, when accounting for influences on trace gas concentrations other than pure vertical motion.