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Understanding Stratospheric Air Motions using an Atmospheric Tape Recorder KENNETH MINSCHWANER, New Mexico Tech, GLORIA MANNEY, NorthWest Research Associates, and New Mexico Tech, HUI SU, JONATHAN JIANG, NASA Jet Propulsion Laboratory — The primary mode for the flow of air in Earth's stratosphere is the Brewer-Dobson circulation, which is characterized by upward motion in the tropics, a general flow towards higher latitudes, and downward motion at the poles. This circulation exerts a major influence on the distributions of stratospheric compounds such as ozone, water vapor, methane, nitrous oxide, and many other long-lived trace gases. The strength of the circulation, as assessed from vertical wind speeds in the tropics, is very difficult to quantify using direct measurements since speeds are so slow, on the order of tens of meters per day. A unique tool for quantifying this ascent is the "tropical tape recorder" - the upward propagation of seasonal variations imprinted on water vapor and carbon monoxide mixing ratios at the base of the tropical stratosphere. We will present results from the tape recorder signal using measurements from the NASA Microwave Limb Sounder satellite instrument, including vertical wind speeds and their connection to the radiative energy balance of the stratosphere.

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