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Rayleigh lidar measurement of an unusual stratospheric temperature profile following the major stratospheric warming of 2002 at a low southern latitude station

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Temperature profiles between 30 and 65 km have been obtained in São José dos Campos, Brazil (23° S, 46° W) with a lidar operated at 589 nm since 1993. The long-term knowledge of this temperature profile has allowed us to know its average climatology as well as the nighttime evolution. During the period of late September-early October, 2002 we observed profiles which differ considerably from the average for the same period in other years. Specially, a profile obtained on the night of October 2, 2002 called our attention by presenting an unusual stratospheric inversion layer with a decrease of 8-10 K between 38-to 42 km. Subsequent analysis showed that this period coincided with an unprecedented major southern hemisphere stratospheric warming at high latitude. Analysis of additional SABER temperature data and comparisons with NCEP reanalysis data showed that planetary waves associated to this unusual stratospheric warming extended their effects to lower latitudes and affected the profile measured at a single station.