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Burst of Unusual Quasi-10 day Wave During the 2019 Southern Sudden Stratospheric Warming

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An unusual sudden stratospheric warming (SSW) occurred in the Southern hemisphere in September 2019. Ground-based and satellite observations show the presence of a transient westward-propagating quasi-10 day planetary wave with zonal wavenumber one during the SSW. The planetary wave activity maximizes in the MLT region approximately 10 days after the SSW onset. Analysis indicates the quasi-10 day planetary wave is symmetric about the equator which is contrary to theory for such planetary waves.

Observations from MLS and SABER provide a unique opportunity to study the global structure and evolution of the symmetric quasi-10 day wave with observations of both geopotential height and temperature during these unusual atmospheric conditions. The space-based measurements are combined with meteor radar wind measurements from Antarctica, providing a comprehensive view of the quasi-10 day wave activity in the southern hemisphere during this SSW. We will also present the results of our mesospheric and lower thermospheric analysis along with a preliminary analysis of the ionospheric response to these wave perturbations.