



## **Objective analysis of the stratospheric polar vortex**

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The circulation of the stratosphere is dominated by a vortex centered in the winter pole. Changes in the location and strength of the vortex are intimately related to tropospheric anomalies and the stratosphere-troposphere coupling. Historically, the evolution of this stratospheric circulation has been carried out by examining the zonal wind through more or less indirect methodologies as Fourier analysis or elliptical diagnosis. In this work we propose a direct study of the vortex by looking for geostrophic streamlines of maximum velocity encircling the entire hemisphere. This scheme allows to compute, on a daily basis, vortex characteristics hardly accessible with other methodologies as average latitude, strength, rupture dates (spring onset) or dominant wave number. By using the 50 hPa NCEP/NCER reanalysis geopotential, a new vortex climatology has been constructed revealing profound differences between hemispheres. The northern hemisphere vortex is weaker and more unstable and its rupture date is highly time-dependent but no long-term trends were detected. On the contrary, its counterpart in the southern hemisphere is stronger and can be found through the entire year. The southern hemisphere vortex has suffered significant changes during the second half of the 20th century, with a tendency to greater velocities and equatorward latitudes.