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Asymmetrical Expansion of Bright Clouds from Saturn's 2010 Great White Storm

Saturn's great white storms play an important role in its atmosphere. In 2010, such a storm occurred in the northern hemisphere and encircled the whole planet with its clouds (Fischer et al., 2011; Sanchez-Lavega et al., 2011; Fletcher et al., 2011). An interesting phenomenon is that the storm-related bright clouds expanded to the south but not to the north. so that the bright clouds passed over the storm head on the northern side when it encountered the storm tail (Sanchez-Lavega et al., 2011, 2012; Sayanagi et al., 2013; Garcia-Melendo et al., 2013). Based on the wind and temperature fields retrieved from the Cassini ISS and CIRS observations (Sayanagi et al., 2013; Achterberg et al., 2014), we explore the mechanism behind this unsymmetrical expansion of bright clouds. Our analyses suggest that the large meridional gradient of the quasi-geostrophic potential vorticity, which can serve as a barrier of cloud mixing, can help explain the unsymmetrical expansion.

Biography:

Aaron Studwell completed his Doctor of Philosophy in Atmospheric Sciences at the University of Houston. His research focused on planetary atmospheres, specifically Saturn's global-scale dynamics and long-term patterns. After completing his doctoral work, Dr. Studwell founded an atmospheric science consulting company, ExoConsulting, in Norman, Oklahoma, USA. Their work is currently focused on business development with their partner companies, along with conducting atmospheric science research.

He has over twenty years of experience in energy weather and marine forecasting, along with air quality meteorology. Aaron was one of the first meteorologists in the energy trading sector, working in senior research and forecasting roles. He was also the Vice President of Air Quality at a leading environmental firm, providing leadership and technical guidance to a team of atmospheric scientists. Before returning to academia full-time, he was the Marine Team Lead for DTN-Wilkens Weather, where he oversaw the company's marine forecasting operations.

Aaron graduated from Texas A&M University with a Master of Science in Meteorology and from the University of Michigan with a Bachelor of Science in Aerospace Engineering. He holds active memberships in the American Geophysical Union and the American Meteorological Society.