"Seasonal Changes in Titan's Southern Stratosphere"

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In August 2009 Titan passed through northern spring equinox, and the southern hemisphere passed into fall. Since then, the moon's atmosphere has been closely watched for evidence of the expected seasonal reversal of stratospheric circulation, with increased northern insolation leading to upwelling, and consequent downwelling at southern high latitudes. If the southern winter mirrors the northern winter, this circulation will be traced by increases in short-lived gas species advected downwards from the upper atmosphere to the stratosphere.

The Cassini spacecraft in orbit around Saturn carries on board the Composite Infrared Spectrometer (CIRS), which has been actively monitoring the trace gas populations through measurement of the intensity of their infrared emission bands (7-1000 micron). In this presentation we will show fresh evidence from recent CIRS measurements in June 2012, that the shortest-lived and least abundant minor species (C_3H_4, C_4H_2, C_6H_6, HC_3N) are indeed increasing dramatically southwards of 50S in the lower stratosphere. Intriguingly, the more stable gases (C_2H_2, HCN, CO_2) have yet to show this trend, and continue to exhibit their 'summer' abundances, decreasing towards the south pole. Possible chemical and dynamical explanations of these results will be discussed, along with the potential of future CIRS measurements to monitor and elucidate these seasonal changes.