

Balloon Borne Instrument for Daytime Thermospheric Wind Observation

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Thermospheric winds are critically important for spaceweather and ionosphere research. Ionosphere has a great impact on communication and navigation systems. The traditional way to measure the thermospheric wind is by ground based Doppler remote sensing of the atmospheric visible emission called airglow at night. It is very difficult to measure daytime thermospheric wind due to high solar scattering, which overwhelms the very weak airglow signal. Supported by NASA, NCAR develop a balloon borne Fabry Perot interferometer called HIWIND (High Altitude WIND observation) for day and night thermospheric wind observations. HIWIND avoids the high solar scattering problem by flying at 40 km where the solar scattering is only 0.1 % of that at the sea level. HIWIND made its first flight in June 2011 from Kiruna, Sweden to Northern Canada. During the HIWIND flight, ground based incoherent scatter radars at EISCAT provided simultaneous ionosphere observations. The success of the HIWIND instrument opens a new window to explore the thermosphere. The concept can be used on other high flying platforms.