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WINDs Campaign -Lithium Releases from Sounding Rockets in the Thermosphere-

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Though the ionization rate is less than 1% in the region of thermosphere, the dynamics of neutral atmosphere is strongly controlled by the plasma. However, the direct observation on the coupling process between neutral atmosphere and plasma is not yet performed in detail. JAXA/ISAS launched successfully S-520-23 and S-520-26 sounding rockets from Kagoshima Space Center (KSC) on September 2, 2007 and January 12, 2012, respectively. The rocket experiments are called WINDs (Wind measurement for Ionized and Neutral atmospheric Dynamics study) Campaign. The purpose is to investigate the neutral atmosphere - plasma coupling process in the thermosphere and ionospheric E and F-regions. The rocket installed Lithium Ejection System (LES) as well as instruments for plasma drift velocity, plasma density and temperature and electric and magnetic fields. The atomic Lithium gases were released at altitudes between 150km and 300km in the evening for S-520-23 and at altitude of ˜100km in the morning for S-520-26. The Lithium atoms scattered sunlight by resonance scattering with wavelength of 670nm. The neutral winds and atmospheric gravity waves in the thermosphere were estimated from the movements of Lithium clouds observed by CCD imagers on ground. From the diffusion of Lithium clouds, we estimated neutral density and temperature in the thermosphere.

Keywords: IT coupling