

## Thermospheric neutral wind profile in daytime and moonlit midnight by Lithium release experiments

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Neutral wind profiles were observed in lower thermosphere at about between 90 km and 130 km altitude by using resonance scattering light of sunlit and moonlit Lithium (Li) vapor released from sounding rockets in daytime and midnight (almost full moon condition) in 2013. As a target of the Daytime Dynamo campaign, Li release experiment was operated at Wallops Flight Facility (WFF) of NASA, U.S.A. in July, 2013, while the same kind of experiment in midnight was carried out in Uchinoura Space Center (USC) of JAXA, Japan also in July 2013. Since imaging signal-to-noise (S/N) condition of the both experiments was so severe, we conducted to apply airborne observation for Li tracers imaging so as to reduce the illuminating intensity of background skies as an order of magnitude.

Two independent methods for calculating the wind profile were applied to the image sequences obtained by the airborne imaging by special Li imagers aboard the airplanes in order to derive precise information of Li tracers motion under the condition of single observation site moving along the aircraft path in the lower stratosphere. Slight feedback motion of the aircraft 3-axes attitude changes (rolling, yawing and pitching) was considered for obtaining precise coordinates on each snapshot. Another approach is giving a simple mathematic function for wind profile to resolve the shape displacement of the imaged Li tracers. As a result, a wind profile in daytime thermosphere was calculated in a range between 20 and 95 m/s with some fluctuated parts possibly disturbed by wind shears. In this paper, we will introduce the method of wind profile calculation and final result of the profiles.

Keywords: Thermosphere, Neutral wind profile, Lithium release, Airborne observation, Method, Sounding rocket