

Global wind measurement system using Doppler Wind Lidar and Imaging FTS

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We propose global wind measurement system by using Doppler Wind Lidar (DWL) and FTS on Geostationary satellites. Wind as atmospheric circulation is the most important element in climate and weather studies. Air- and ship-traffic are also using wind information as most prioritized one to ensure their safe operation. Current systems cannot measure global distribution of winds. Recent progress of DWL technology made precise wind measurement possible in three-dimensional manner, limited to narrow swath over its orbit. A DWL-satellite was already launched by European Space Agency, and NASA is also planning to launch. In Japan, NICT and JAXA are studying DWL. Also, recent geostationary weather satellite made possible to distinguish wind distribution by altitude using water vapor band imagery. Measurement error is still large. The basic concept is to combine DWL and FTS on Geostationary satellites to complement each other. To cover the globe using geostationary orbit, we need about four satellites at each region. Using current weather satellite network is the most demanded approach. NASA, ESA and JAXA/NICT can make a strong network to maintain data from spaceborne DWLs to calibrate the results of retrieved wind from imaging FTS on Geostationary satellite. The requirement of spacial resolution for the system is 1km horizontal resolution, 300m height distribution, <1m/s windspeed accuracy and wind vector.

Keywords: wind, Geostationary Satellite, lidar