# Global wind profiling with space-based Doppler wind lidar for improvement of numerical weather prediction

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Wind is one of key meteorological elements describing the atmospheric state as well as pressure, temperature, and humidity. Global wind profile observation is important to significantly improve the initial conditions essential for numerical weather prediction (NWP) and other meteorological studies. Although space-based observation system is a very important role in NWP, current space-based wind observing system has a problem that it is biased to observation related to temperature and water vapor compared with wind observation. The World Meteorological Organization wants to develop a global wind profiling system. Space-based Doppler Wind Lidar (DWL) can provide global wind profiles, which is a promising technique to fill the current gap. Under the circumstance, ESA launched the first space-based DWL Aeolus in August 2018. Since target mission period of Aeolus is three years, many NWP and science communities want continuous global wind profile observation. The working group on Japanese space-based DWL has made feasibility study for the space-based DWL for future global wind profiling since 2011. In 2017, ANA Holdings Inc. proposed to apply for optimizing aviation route using wind data improved by the future space-based DWL wind measurement at the space business promotion event S-Booster 2017. The proposal won the grand prize at S-Booster 2017, and the space-based DWL for the space business has been spotlighted since the event. The proposal is based on the global wind profile observation with the space-based DWL. The purposes of the global wind profile observation are to improve the precision of NWP and to contribute to understandings of mechanism of natural disasters and climate change and to new applications of wind data use.

Keywords: Lidar, Doppler Wind Lidar, space-based observation, global wind profiling