# Whole Atmosphere Observation over Tibet with APSOS System

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To understand the whole neutral atmosphere and the coupling from lower to upper atmosphere, a synthetic system called "Atmospheric Profiling Synthetic Observation System (APSOS)" has been completed, funded by the National natural Science Foundation of China (NSFC) since 2012. It is a system mainly consisted of five lidars devoting to observe the vertical structure of atmospheric temperature, wind, air density, water vapor, ozone, $CO_2$, $SO_2$, $NO_2$, aerosol, cirrus cloud, and sodium layer with high vertical and temporal resolution, a W-band Doppler dual polarized radar, a THz radiometer, and a composite optical receiving telescope with equivalent diameter of 2-meter. Seven research institutes and universities have been engaged in this project. APSOS was deployed at Yangbajing(YBJ) station, 4300m ASL, and about 90km north of Lhasa in late 2017. Since then, observations with this system have been operated in different seasons. In this paper, we will present the system techniques, data and retrieval system, preliminary results of the atmospheric vertical structure of temperature, water vapor, GHGs, high clouds, ozone, aerosols, as well as wind profiles from the troposphere to mesopause.

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