Characterizing the Asian Tropopause Aerosol Layer (ATAL) using satellite observations, balloon measurements and a chemical transport model

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Summary

ATAL observations have revealed a seasonal maximum of aerosol in the UTLS associated with the Asian monsoon. The Asian Tropopause Aerosol Layer (ATAL) has been independently validated using backscatter scindos flown out of China and from India.

Limited in situ measurements of composition (CARIBIC) indicate that the ATAL is composed primarily of carbonaceous and sulfate aerosol. Elevated SO2 (~30 ppt) found in monsoon outflow in the UTLS (in HALO EVM campaign).

Transport of pollution in the Upper Troposphere by Asian Monsoon

Batal 2015: Balloon-borne measurements of the ATAL

3 weeks – July/August 2015 – 30 locations/4 locations/9 hotspots involved

水分露湿の傾向はUTLSのHIフライトに影響

COBALT

OBS-H2O

Ice cloud

Total ozone/WWW

Maximal of aerosols measured by COBALT found in vicinity of old smoke plume

Color index (BL, blue line) between COBALT backscatter channels distinguishes aerosol (low values from red to blue 1.1-3.9 km)

Enhanced water vapor (~3 km) 27-18 km likely due to convective transport of moisture upstream

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