

# Sounding water vapor, ozone, and particles during the ASM

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Many studies have suggested that the Asian summer monsoon (ASM) circulation is a key pathway for pollutants to transport from the boundary layer up into the stratosphere. However, all these results are derived from satellite measurements or model simulations, lack of the direct evidence from in situ measurements. During the last ten years, we have launched balloon-borne instruments to measure vertical profiles of water vapor, ozone, and particle over the Tibetan Plateau during the ASM. These measurements provide the first in situ evidence of these parameters within the ASM anticyclone, and finer structure of water vapor (or RHi), ozone, and cirrus in the upper troposphere. These in situ measurements support the results derived from satellite measurements, such as higher water vapor, and lower ozone concentration within the anticyclone. In situ measurements also show enhanced aerosol concentration at the levels of 13-18 km, which support the finding of the Asian tropopause aerosol layer (ATAL) from satellite measurements. Analyses show that the cold point tropopause in the ASM region has a higher average height and potential temperature, and that transition layer over the ASM is similar to the TTL, although the data suggest the ASM transition layer lies at higher potential temperature levels and is potentially prone to the influence of extratropical processes.

Key words: Asian summer monsoon, SWOP, tropopause transition layer, troposphere-stratosphere transport.

## References

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