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# Background aerosol over the Himalayas and Tibetan Plateau: observed characteristics of aerosol mass loading

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Table S1. The method of mineral matter calculation in the fine aerosols at the HTP stations.

| Source pattern | Abb. | Formula |
|---|---|---|
| Mineral matter | MM | $MM=CaO+MgO+Al_2O_3+Fe_2O_3+K_2O+Na_2O+SiO_2$ $=1.89(Al)+1.66(Mg)+1.21(K)+1.40(Ca)+1.43(Fe)+1.35(Na)+2.14(Si)$ |

*Si content was calculated according to the ratio of Si to Al in the upper continental crust recommended by Rudnick and Gao (2014).*

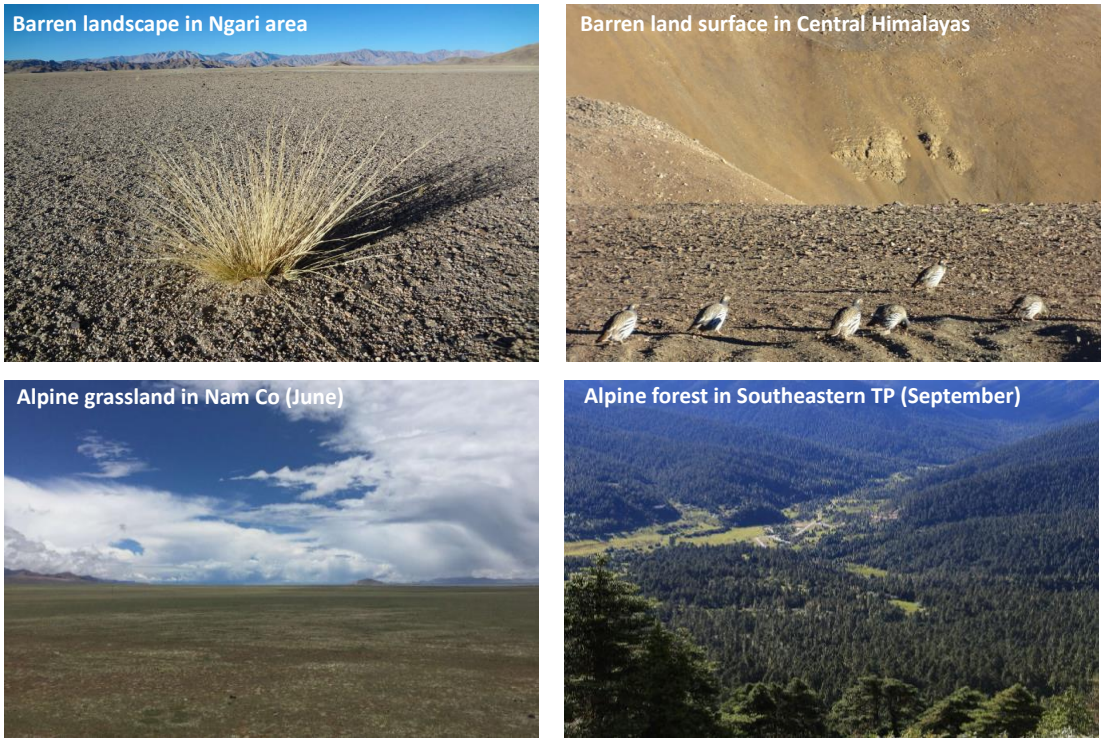


Fig. S1. Typical landscape and land surface characteristics around each of the observation sites in the HTP region, i.e. at the Ngari station, QOMS station, Nam Co station and SET station.

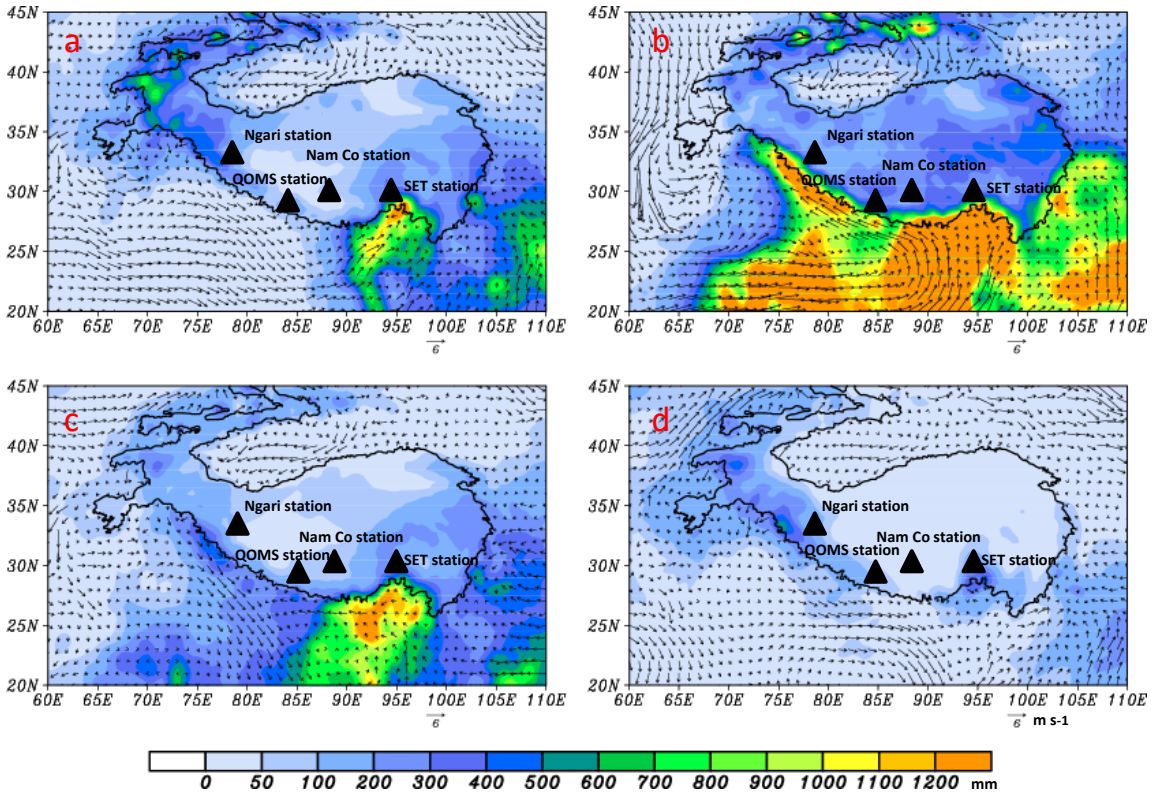


Fig. S2. Spatial distributions of seasonal climatology for the HTP and adjacent areas during the 2011-2013 observation period, including precipitation amount (mm) and wind at 850 hPa (a: March–May; b: June–August; c: September–November; d: December–February). The bold black line marks the geographic location of the HTP, and the black dots indicate the locations of the four stations. Precipitation and wind datasets were derived from the Global Precipitation Climatology Project (GPCP) and Climate Forecast System Reanalysis (CFSR), respectively.

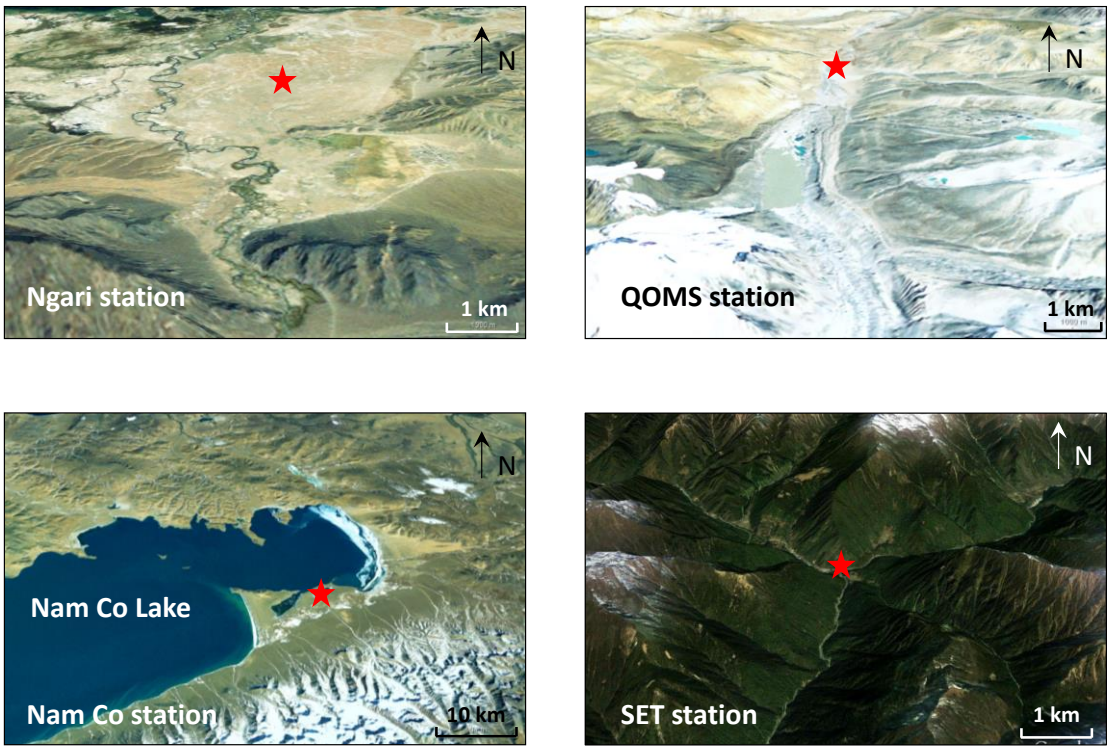


Fig. S3. Local geomorphology around the Ngari station (79°42′E, 33°23′N, 4,264 m asl), QOMS station (86°57′E, 28°21′N, 4,300 m asl), Nam Co station (90°57′E, 30°46′N, 4,746 m asl) and SET station (94°44′E, 29°46′N, 3,326 m asl). Their locations are marked with red five-pointed stars.

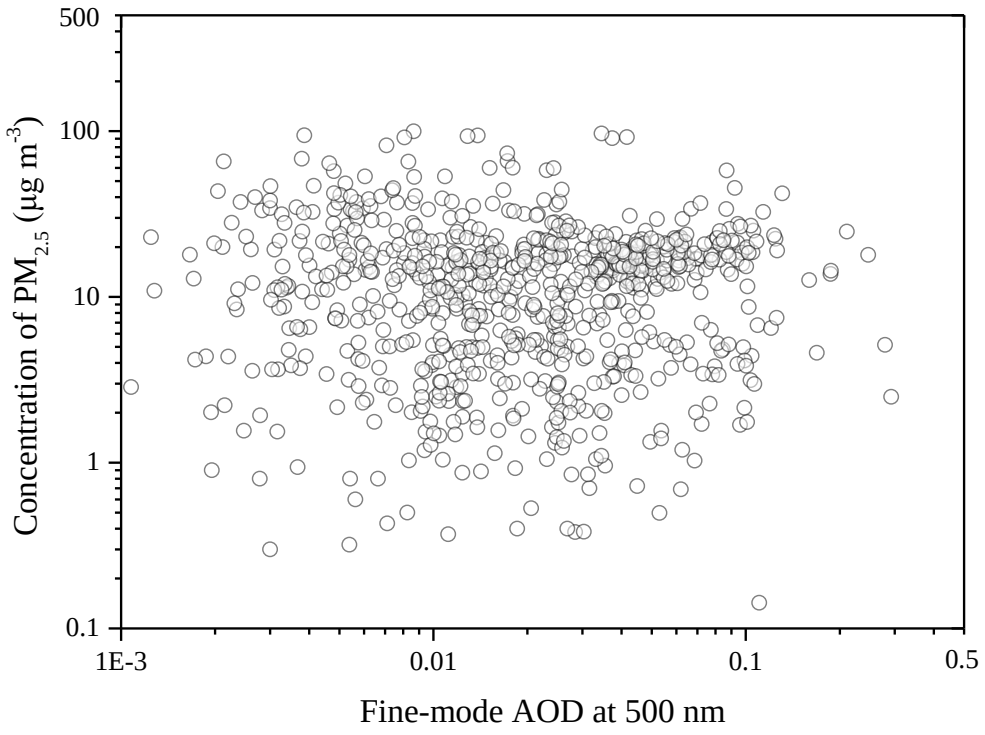


Fig. S4. Comparison between online $PM_{2.5}$ concentrations and AERONET fine-mode AOD (at 500 nm) at the QOMS station for the 2011-2013 period. Hourly averages were used.

## Expanded information about Figure 13

The MISR-AOD (at 550 nm) values in Figure 13a are monthly Level 3 datasets for the 2011-2013 period over the HTP, and were classified based on landscape. The fine-mode AOD (at 500 nm) data for barren and grassland sites were obtained from AERONET results at the QOMS station and the Nam Co station, respectively (Fig. 13b). Fine-mode AOD (at 550 nm) data for the forest area in Figure 13b were estimated, based on monthly MODIS Terra (version 5.1) Level 3 results, using the formula fine-mode AOD (at 550 nm) = AOD (at 550 nm) * fine-mode fraction (at 550 nm). Site land cover classifications are: alpine forest at the SETS station; alpine grassland at the Nam Co station; and barren land cover at the QOMS station.

## Reference

Rudnick, RL, and Gao, S. 4.1-Composition of the continental crust, Treatise on Geochemistry, 2nd edition. Oxford: Elsevier, pp. 4-6, 2014.