

Fine Aerosols at Mauna Loa Observatory during ACE-Asia, Spring 2001

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The Asian Pacific Regional Aerosol Characterization Experiment (ACE-Asia) during spring 2001 offered an opportunity to sample aerosols well downwind of the Asian continent. In ACE-Asia, we and our Asian and U.S. collaborators operated 21 sampling sites including the mainland of China (3), Taiwan (1), Korea (3), and Japan (3), most using continuously sampling three-stage (2.5 to 1.15, 1.15 to 0.34, and 0.34 to circa 0.1 μm D_p) 3-DRUM (Davis Rotating-drum Unit for Monitoring) and eight-stage (circa 12 to 5.0, 5.0 to 2.5, 2.5 to 1.15, 1.15 to 0.75, 0.75 to 0.56, 0.56 to 0.34, 0.34 to 0.26, and 0.26 to 0.09 μm D_p) 8-DRUM impactors. Time resolution was typically 6 hours, although time resolution as low as 1 hour is available as needed. The easternmost ACE-Asia site was at Adak Island, almost directly north of MLO and thus offering a north-south transect line to catch Asian outflow.

In Figure 1, we present the typically crustal elements aluminum, silicon, potassium, calcium, and iron in the submicron size mode for March 22 through April 29, 2001. The concentrations are quite low, roughly 2% of those seen in Japan in this period in Figure 2. In Figure 3, we present some of the soil data but with sulfur/10 and fine chlorine, a measure of the potential influence of upslope winds and seasalt at MLO. In the period March 23 though early April, sulfur was a major component of the aerosol, in association with slow (10-day) isentropic trajectories from the Chinese mainland south of Shanghai. The data are similar to the Taiwan 8-DRUM data. Some of the late-April soils pass over Japan.

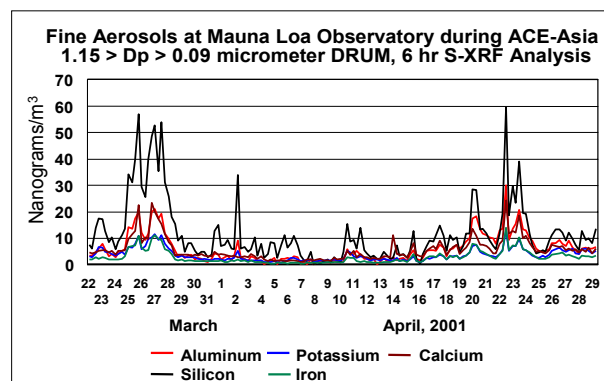


Figure 1. Typically crustal elements in the submicron size mode at MLO, March 22-April 29, 2001.

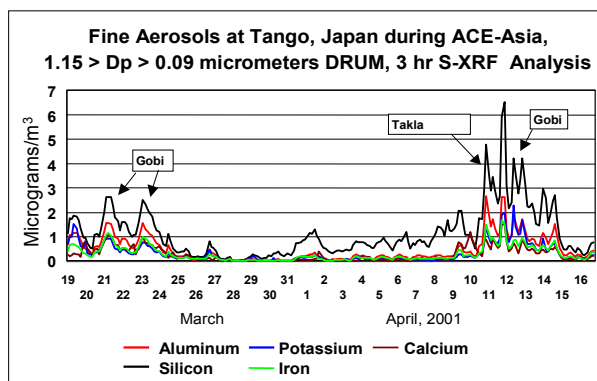


Figure 2. Elements as in Figure 1, but at Tango, Japan, March 19-April 26, 2001.

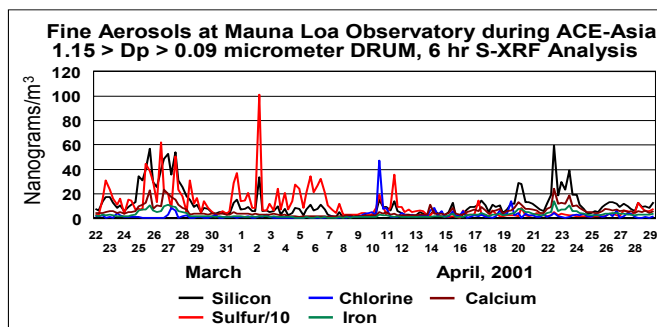


Figure 3. Some of the soil data from Figure 1 plus sulfur/10 and fine chlorine at MLO, March 22-April 29, 2001.