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Aerosol and cloud-droplet properties over the East China Sea influenced by the Asian pollution

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Using an aircraft the measurements of aerosol particles and cloud microstructures were made over the ocean around the south of Kyushu Islands of Japan during the Asian Atmospheric Particulate Environmental Change Experiment 3/Asia Pacific Regional Aerosol Characterization Experiment (APEX-E3/ACE-Asia) during the period of 17 March to 13 April 2003. Results demonstrated that polluted air from the Asia continent could penetrate several hundreds of kilometers over the oceans and clouds forming in that air had significantly altered microphysical properties. Based on the number concentration of aerosol particles with diameters between 0.3 and 5μm, two cases were investigated: 22 March 2003 was termed a "clean" case and 12 April 2003 as a "polluted" case. Single particle analysis of particles was also carried out by electron microscopy. The particles in the polluted marine boundary layer were characterized by the presence of sulfate particles with traces of potassium and heavy metals. The cloud droplets in the polluted marine boundary layer exhibited a larger number concentrations than those in the clean boundary layer, along with the decrease in the droplet size. The present study demonstrated that polluted air from the Asia continent could penetrate several hundreds of kilometers over the oceans and clouds forming in that air had significantly altered microphysical properties.

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