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黄砂粒子とその海洋大気中での変化：最近の電子顕微鏡による観察結果

Dust particles and their variations in the marine atmosphere: Recent results of electron microscopic analysis

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Abstract

It has been confirmed that dust particles play important roles in climate change, atmospheric mass cycles, and ecosystem development, due to their atmospheric dispersion in global scale. Asian dust which is originated from the arid and semi-arid areas in Asian continent is frequently blown to the North Pacific and sometimes even to North America. As dust particles disperse in the atmosphere, they uptake gaseous species and coagulate with other particles besides gravitational settlement. Consequently, dust particles appearing in Japan usually show very different characteristics from those around the source areas.

Dust particles collected in China and Japan were analyzed individually by using electron microscopes. The shape, size and elemental composition of each particle were applied to characterize the particles precisely and investigate their changes when they flied from China to Japan in the marine atmosphere. Three recent results are reported in this article. (1) At the coastal areas of China, dust plumes did not mix with air masses which were abundant in anthropogenic pollutants, and dust particles rarely showed natures of having been modified by anthropogenic pollutants. (2) Combination with sea salt in the marine atmosphere is very likely the process responsible for the consistence of mode sizes of dust particles at different areas. (3) Dust particles could significantly change the chlorine chemistry in the marine atmosphere. Implications of these results in climate change and ecosystem development are discussed with respect to recent topics on dust.