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Southeastward Dust Transport during the 16-24 March 2006 Asian Dust Event

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Synoptic analyses and regional dust models are applied to analyze the dust measurements obtained during the Asian dust events from 16 to 24 March, 2006, in order to understand the controlling mechanism leading to the dust transport far southeastward of the continent. The southeastward transported dust concentrations measured over Taiwan are traced back to their source areas. By tracing the dust loaded air parcels, the synoptic characteristics of the dust event during generation, transport, and dissipation are inspected and compared with an eastward transported event.

It has been found that the synoptic mechanism, rather than the emission intensity, leads to the high dust concentration far southeastward off the continent. Most southeastward moving dust clouds are generated behind the surface front in the descent regions and then transported behind a deep lower-level trough, in which the prevailing northerlies or northwesterlies lead to the southeastward dust transported into the tropics. Without a deep lower-level trough, the dust clouds tend to be transported eastward. Surface lidar observations also show descent of the dust concentrations during their southeastward transport.

After moving offshore, the anticyclonic circulation in the leading edge of the surface high circulates the dust parcels ahead of the high-pressure center in a southwestward direction towards the seashore off the Southeast China. With the deceleration of the wind speed, the dust clouds then slowly dissipate over the tropics of the Western Pacific, thus providing nutrients to the marine phytoplanktons.