Transport of Mineral Aerosol From Asia Over the North Pacific Ocean

MITSUO UEMATSU,¹ ROBERT A. DUCE,¹ JOSEPH M. PROSPERO,² LIQI CHEN,¹a JOHN T. MERRILL,¹ and RAY L. McDONALD³

Concentrations of atmospheric aluminum—a good indicator of mineral aerosol—have been measured weekly, between January 1981 and March 1982, at the seven stations of the SEAREX Asian Dust Network in the North Pacific. A seasonal transport pattern was found at most of the sites, with high Al concentrations from February to June and low concentrations from July to January. There was a latitudinal gradient in the mean annual atmospheric dust concentration, with the greatest concentrations occurring in the mid-latitudes. When coupled with statistics of dust storms in Asia and of Kosa (dense dust hazes traced to Chinese origins) in Japan, the data suggest that the dust collected in the network was transported by the westerlies from arid regions in Asia. It is estimated that 6-12 x 10⁶ tons of Asian dust are transported annually to the central North Pacific; larger quantities are probably deposited over the western North Pacific, closer to the Asian sources. This atmospherically transported mineral aerosol is a significant source of sedimentary material for the North Pacific.

¹ Center for Atmospheric Chemistry Studies, Graduate School of Oceanography, University of Rhode Island, Kingston, Rhode Island 02881.
² Rosenstiel School of Marine and Atmospheric Science, University of Miami, Miami, Florida 33149.
³ Department of Chemistry, University of Hawaii, Honolulu, Hawaii 96822.

Copyright 1983 by the American Geophysical Union.

Paper Number 3C0294.
0148-0227/83/003C-0294$05.00