

NUMERICAL SIMULATION OF THE DUST DISPERSION AND MESOSCALE CIRCULATIONS IN THE TARIM BASIN

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We investigate the dust dispersion at the Taklimakan desert in the Tarim Basin, one of the key sources of aeolian dust in East Asia. Dust events in the Taklimakan desert, including dust haze and blowing dust, have rather long-lasting feature, in contrast to those in the Gobi desert which occur in phase with the passage of synoptic cyclone. A relationship between the local circulation system and the dust dispersion is focused on. Numerical simulations are conducted for several dust events in spring seasons from 2000 to 2002. The Regional Spectral Model (RSM) of the Japan Meteorological Agency (JMA) is employed (the equivalent horizontal grid size is 20km). The dust emission model proposed by Shao (2001) and the Lagrangian dispersion model are coupled with RSM to simulate regional dust transport. The model reasonably simulates time variations and spatial distributions in the surface wind field. Three characteristic types of mesoscale flow over the Tarim Basin can be distinguished in the simulation. The dust dispersion at the Taklimakan desert is dependent on not only the surface wind intensification, but also the vertical motions arising in or between these circulations. We can say that formation of the various types of the flow contributes to the relatively persistent dust suspension in the Tarim Basin. Closer examination shows that the developments of these local circulations are closely related to the large-scale flow field behind the surface low-pressure system.