Geophysical Research Abstracts
Vol. 15, EGU2013-8567, 2013
EGU General Assembly 2013

Potential impacts of West Pacific pattern on Trans-Pacific transports of Asian dust: A case study

Yun Gon Lee and Chang-Hoi Ho
School of Earth and Environmental Sciences, Seoul National University, Seoul, Korea, Republic Of (yungonlee@gmail.com)

Large arid or semiarid highlands in northern China and Mongolia, including the Taklimakan, Gobi, Tengger deserts, Loess Plateau, and Hunshdak Sandy Lands, are the major sources of Asian dust (e.g., Prospero et al., 2002; Washington et al., 2003; Zhang et al., 2008; Gao et al., 2011). Annually, about 800 Tg of aeolian dust from these regions are entrained into the troposphere, of which 30% are accumulated again onto the source regions, 20% spread over the China, and the residual 50% are transported over the Pacific Ocean and beyond (Zhang et al., 1997).
Gong et al. (2006) examined the effects of atmospheric teleconnections patterns such as El Niño-Southern Oscillation (ENSO), Pacific Decadal Oscillation (PDO), Pacific-North America (PNA), and West Pacific (WP) on Trans-Pacific transports of Asian dust. However, the physical mechanism involved in the link between WP pattern and Trans-Pacific transports of Asian dust was not explored, while their positive correlation was suggested. In this study, we investigated major dust cases that the Asian dust were generated over dust source regions and transported to North America during April 7–14 (case 1) and May 1–5 (case 2), 2001. During two cases, there was the opposite pattern of WP (case 1 with positive phase of WP and case 2 with negative phase of WP), whereas other climate indices do not change significantly. In the case 1, the dust veil from source regions was effectively transported to North America by a stronger zonal air flow (40 – 55°N) in Trans-Pacific transports during WP positive phase. On the contrary, in the case 2 during WP negative phase, the dust veil was separated by the anomalous anticyclone over northeastern Japan and the Sea of Okhotsk, thus the minority of dust was travelled to North America. These results imply that WP patterns can be an influential factor in Trans-Pacific transports of Asian dust, especially the beginning stage.