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Organization: Dep. of Atmospheric Sciences

Category: Ocean and Atmospheres

Paper ID: 57-OOA-A1945

Title: (OA16) Effects of late sea-breeze on ozone distributions in the Busan metropolitan area in Korea

Abstract: The late sea-breeze (its onset time is after 1200 LST) and its impacts on ozone concentration distributions were investigated during April to September from 1998 to 2002, in Busan, South Korea, using the surface ozone concentrations (obtained at 9 monitoring sites), local meteorological variables (obtained near the shore), together with synoptic data. The urban scale ozone concentration was also simulated using the MM5/UAM-V to better understand the role of late sea-breeze in Busan. The results from observation study showed that most of the late sea-breeze occurred when weak offshore synoptic flow (northwesterly) suppressed development of sea-breeze, and the ozone concentration level and frequencies exceeding ozone standard increased with the onset time of sea breeze. We also found that the late sea-breeze clearly induces relatively weak wind speed and high temperature during the daytime. As a result it enhances the photochemical ozone accumulation and delays the occurrence time of the averaged maximum ozone concentrations. In addition, the late sea-breeze was found to enhance the recirculation of urban ozone and its precursor in Busan. The results of simulation for high ozone episode (24 August, 2001) by MM5/UAM-V revealed that local circulation associated with the late sea-breeze occurred under the influence offshore synoptic wind, and it significantly increase the ozone concentration level in the late afternoon. The simulated horizontal and vertical distribution of ozone concentration indicated that urban pollutants can be transported to the sea with the land breeze, accumulated over the sea after sunrise, and returned to the land in the afternoon with the late sea breeze, suggesting both the relationship between late sea-breeze and recirculation and the importance of late sea-breeze effects influencing severe ozone pollution in Busan, Korea.

Presentation Mode: Poster

Keywords: late sea-breeze, ozone distributions, MM5, UAM-V

Status: Pending.

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