

Impact of coastal wetlands in West Sea on meteorology and air quality in the Seoul metropolitan area, Korea

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In this study, the impact of coastal wetlands (i.e. tidal flats) on local meteorology and air quality was evaluated using the Weather Research and Forecasting (WRF) meteorological model and Community Multiscale Air Quality (CMAQ) model during winter 2013. The Seoul metropolitan area on the west coast of Korea is a unique coastal city with wide coastal wetlands and high-densities multi-stories buildings, which includes a complex coastline and a number of islands. Coastal wetlands are alternately exposed and flooded, thus the heat content changes and the sea spray aerosol production in coastal wetlands of West Sea are essential to understanding local meteorology and air quality in the Seoul metropolitan area. To analyze the distribution of coastal wetlands, the land cover (LC) was extracted from Environmental Geographic Information System (EGIS-LC). The fractions of coastal wetlands occupy about 6 % of total surface area (7,732 km²). In addition, the values of land surface parameters and the production of sea spray aerosols for coastal wetlands were improved based on measurement in tidal flats of previous studies. Overall, moderate differences in most meteorological variables were shown at the sea adjacent to the coastal wetlands during daytime. In particular, the increases (about 1-2°C) in the near-surface temperature were predicted to occur at some inland locations in Seoul. The effects of sea spray aerosols contributed slightly to the increase of PM₁₀ concentrations around the coastline.

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