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Numerical Analysis of total nitrate deposition over marginal seas of Japan

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In China, due to the expanded economy growth, anthropogenic NOx emissions increased more than twofold between 2000 and 2010. Aerosol nitrate and gas-phase nitrate produced from NOx deposite above ocean during long-range transport process, and the impacts on ocean-ecosystem are apprehensive. In this study, on the basis of regional chemical transport which can treat the detailed behavior of air pollutants, we investigated the deposition of total nitrate from atmosphere into marginal seas of Japan. Analyzed period was on the year from 2002 to 2004. Chemical transport model can well reproduce the atmospheric concentration and wet deposition amount by comparing the ground-based observation dataset of EANET. Above East China Sea (ECS), three-year averaged deposition amount of total nitrate was 252 Gg-N/year. Dry and wet deposition process respectively accounted 60% and 40%. Deposition amount of fine-mode nitrate and coarse-mode nitrate respectively attributed 22% and 50%, and the rest of 28% was gas-phase nitrate. During these period, anthropogenic NOx emissions from China was 5377 Gg-N/year, therefore, the deposition amount of total nitrate over ECS was corresponded to 4.7%. Taking into account that the deposition amount above China was 2039 Gg-N/year, the deposition amount over ECS was identified as 7.5% against to anthropogenic NOx emissions from China. In the conference presentation, we would like to present the analyzed results over Sea of Japan, Yellow Sea, and Pacific open oceans, and discuss the correspondence with anthropogenic NOx emissions from China.

Keywords: marginal seas of Japan, aerosol nitrate, gas-phase nitrate, deposition amount, chemical transport model