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Environmental Assessment of Ozone Concentrations Caused by the Constructions of Residential and Industrial Complexes on in a Suburban Area in Busan, Korea

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The effects of the constructions of residential and industrial complexes on surrounding ozone concentrations in a suburban area in Busan, Korea were numerically investigated. A computational fluid dynamics model including a full tropospheric NOX-OX-VOC chemical mechanism from the Goddard Earth Observing System (GEOS) –Chem (CFD-Chem) was coupled to the local-scale meteorological model (CALMET) to produce diagnostic meteorological fields. As the input data of the CFD-Chem model, detailed emissions for point-, line-, and area-sources including emissions by ships and airplanes were established. For validation, the CALMET-CFD-Chem coupled model simulated the air quality concentrations in the 0.8 [U+F0CD] 0.8 [U+F0CD] 0.4 km3 domain and the simulated concentrations were compared to the measured concentrations at the air quality measurement system. For the environment assessment of ozone concentrations, a target area with the 18 [U+F0CD] 15 km2 horizontal extents was selected. For 16 inflow directions, detailed airflows were simulated and, then, the air quality concentrations were simulated for the given airflows, background concentration, and emission data. We investigated the effects of the constructions of residential and industrial complexes, by comparing the simulated ozone concentrations before the constructions with those after the constructions.