

환경 및 응용기상 분과 [P-217]

Urban Methane Point Source Detection with EMIT Satellite Observations

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Methane is a key greenhouse gas contributing to global warming, making it essential to identify its point sources accurately. This study evaluates the capability of the EMIT satellite instrument to detect methane sources in urban industrial areas in South Korea. EMIT (Earth Surface Mineral Dust Source Investigation) observations were compared with ground-based mobile measurements, informed by domain knowledge of potential emission sites such as power plants and industrial complexes. A strong spatial correspondence was found, with both methods consistently detecting elevated methane concentrations at these locations. A quantitative comparison further confirmed this consistency. Ground-based enhancements increasing from below 300 ppb to above 300 ppb corresponded to EMIT enhancements rising from 55 ppm-m to 359 ppm-m. Despite the challenge of satellite observations due to surface heterogeneity, the use of ground-based validation methods and domain knowledge has demonstrated the potential of satellite-based methane source detection within complex urban environments. This integrated approach enhances the applicability of hyperspectral satellites for detecting major methane emission sources in complex urban areas and is expected to play an increasingly important role in future methane monitoring research.

Keywords: Methane, Satellite, EMIT (Earth Surface Mineral Dust Source Investigation)

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