

비균질한 해남 농경지의 탄소교환에 미치는 토지사용 및 피복변화의 영향에
대한 미기상학 자료의 활용에 관하여

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**Using Tower Flux Data to Assess the Impact of Land Use and Land Cover Change
on Carbon Exchange in Heterogeneous Haenam Cropland**

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Abstract

Land use and land cover change (LULCC) due to human activities directly affects natural systems and contributes to changes in carbon exchange and climate through a range of feedbacks. How land use and land cover changes affect carbon exchanges can be assessed using multiyear measurement data from micrometeorological flux towers. The objective of the research is to assess the impact of land use and land cover change on carbon exchange in a heterogeneous cropland area. The heterogeneous cropland area in Haenam, South Korea is also subjected to a land conversion due to rural development. Therefore, the impact of the change in land utilization in this area on carbon exchange should be assessed to monitor the cycle of energy, water, and carbon dioxide between this key agricultural ecosystem and the atmosphere. We are currently conducting the research based on 10 years flux measurement data from Haenam Koflux site and examining the LULCC patterns in the same temporal scale to evaluate whether the LULCC in the surrounding site and the resulting heterogeneity (or diversity) have a significant impact on carbon exchange.

Haenam cropland is located near the southwestern coast of the Korean Peninsula with land cover types consisting of scattered rice paddies and various croplands (seasonally cultivated crops). The LULCC will be identified and quantified using remote sensing satellite data and then analyzing the relationships between LULCC and flux footprint of CO₂ from tower flux measurement. We plan to calculate annual flux footprint climatology map from 2003 to 2012 from the 10 years flux observation database. Eventually, these results will be used to quantify how the system's effective performance and reserve capacity contribute to moving the system towards more sustainable configuration. Broader significance of this research is to understand the co-evolution of the Haenam agricultural ecosystem and its societal counterpart which are assumed to be self-organizing hierarchical open systems.

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