第242回 物質循環談話会
2025年7月25日(金)10:40-12:10
大会議室 （理学部C棟2階）

SPEAKER: Dr. Minseok Kang
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TOPIC: Comparative assessment of methane ebullition in a rice paddy by chamber and eddy covariance methods

Methane (CH_4) emissions from rice paddies occur through multiple pathways, with ebullition (i.e., bubble release from water body) being a significant but hard-to-quantify component. A robust understanding of ebullitive flux is vital for accurate greenhouse gas budgets. We conducted a comparative field study at a single rice paddy site to evaluate CH_4 ebullition contributions using two techniques. The first approach employed a portable trace gas analyzer coupled with an automated chamber system. This setup provided high temporal resolution measurements and allowed direct differentiation of CH_4 transport pathways by capturing discrete ebullition events. The second approach utilized an eddy covariance (EC) system with high-frequency CH_4 and H_2O measurements, applying a scalar similarity method (Iwata et al., 2018, Boundary-Layer Meteorology) to partition total fluxes into ebullitive and diffusive components. The chamber method yielded detailed, plot-scale flux data and clear separation of ebullition vs. plant-mediated emissions, whereas the EC method offered continuous monitoring over a broader spatial footprint. Both methods consistently revealed pronounced seasonal variation in ebullition-derived CH_4. Ebullition fluxes were elevated during early rice growth under continuous flooding, and markedly suppressed during the mid-season drainage period. After re-flooding, ebullitive emissions resumed in tandem with plant growth, with both methods capturing congruent timing and relative magnitude of these changes. The agreement in temporal patterns and trends between the chamber and EC measurements provides strong cross-validation of ebullition estimates. This comparative approach improves understanding of CH_4 ebullition in rice paddies and strengthens confidence in pathway-specific flux estimates, supporting more accurate greenhouse gas budgeting and CH_4 mitigation strategies.

＜キーワード＞
メタン放出、水田、渦相関法、チャンバー法、放出経路分離

☆☆☆興味のある方はお気軽に御参加下さい。専門分野以外の方にも理解できるように
話をしてもらいます。☆☆☆

◆ 共催：信州大学 山岳科学研究所