Spatio-temporally continuous evaluation on CH₄ emission from tropical rice production

- 熱帯水稲栽培由来的メタン発生量を時空間連続的に評価する手法の開発

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Introduction

How much rice production contributes to global warming?

Need to mitigate CH₄ emission to stop global warming within 2°C!

The drastic increase is derived from bacteria!

Drastic CH₄ concentration increase in the atmosphere!

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Outlook

Scientific decision making of the whole delta management

Verification with the GHG's observation satellite

Future prediction of CH₄ emission in global scale

Long-term changes of crop cropping frequency and fallow season management

Sites and data collection

Land use of the Mekong Delta in 2012

Multipoint & continuous ground data collection

- Statistical modeling for CH₄ emission estimation with remote-sensible parameters and GIS data
- Train high spatial-resolution satellites data

Outline

Hierarchical Bayesian modeling

Dependent variables to estimate daily CH₄ fluxes in a pixel

Fixed effects (Remote sensible parameters or GIS data)
- Land Surface Water Coverage
- Days after sowing
- Fallow seasons’ water regime
- Fallow seasons’ length
- Soil type
- Straw burning detection

Random effects
- Observation year
- Season
- Location
- Water management

L-band Synthetic Aperture RADAR -ALOS/PALSAR2-

- High-spatial resolution full polarimetric data
→ flooded and non-flooded paddy classification

- SCAN-SAR data
→ Correction of the incidence angle bias

Preliminary results

Daily CH₄ fluxes (mg C m⁻² h⁻¹)

Observed

Estimated

Intensity (σ₀)

Incidence angle

SVM-hyperplane