Spatial assessment of atmosphere-ecosystem exchanges via micrometeorological measurements and footprint modelling
Preliminary results of eddy covariance measurement at Haean, 2010

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Objectives

- To understand the sensible and latent heat fluxes in such a complex terrain as Haean Basin, South Korea

- To better understand the energy exchange above farmlands (flooded and unflooded fields) during the whole growing period including monsoon seasons in Korea

- To determine reliable evapotranspiration and net ecosystem exchange (NEE) of carbon above farmlands

- To determine reliable information about near surface atmospheric stratification conditions, including convective events in Haean Basin
Method
Site Selection

Major Crops in Haean:
- Rice: 24%
- Potato: 12%
- Radish: 21%
- Cabbage: 14%
- Bean: 6%
- Codonopsis: 2%
- Onion: 2%
- Broccoli: 2%
- Fruit: 5%
- Etc.: 10%
- Sesame: 2%
Site Selection

Pie chart showing major crops in Haean:
- Rice 24%
- Potato 12%
- Radish 21%
- Cabbage 14%
- Bean 6%
- Onion 2%
- Broccoli 2%
- Codonopsis 2%
- Etc. 10%
- Fruit 5%
Site Selection
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Dept. of Micrometeorology

Altitude Rice Field, Haean, Korea

Aspect Rice Field, Haean, Korea

Slope Rice Field, Haean, Korea
Potato field
Rice field
Schedule

- Arrival
- Rice growing
- Potato growing
- Monsoon
Schedule

- **Arrival**
- **Preparation**
- **Rice growing**
- **Potato growing**
- **Monsoon**

Timeline:
- May 01
- May 31
- Jun 30
- Jul 30
- Aug 29
- Sep 28
Schedule

- **Arrival**
- **Preparation**
- **Eddy covariance measurement**
- **Rice growing**
- **Potato growing**
- **Monsoon**
Schedule

- **Arrival**: May 01
- **Preparation**: May 31
- **Eddy covariance measurement**: Jun 30
- **Rice growing**: Jul 30
- **Potato growing**: Aug 29
- **Monsoon**: Sep 28
Schedule
Data quality: potato

- Flag($u^*$)
- Momentum flux
- Flag(HTs)
- Sensible heat flux
- Flag(LvE)
- Latent heat flux
- Flag(wCO2)
- CO2 flux

Mauder and Foken (2004)
Data quality: potato

Mauder and Foken (2004)
Data quality: potato

Flag(u*)

Momentum flux

Flag(HTs)

Sensible heat flux

Flag(LvE)

Latent heat flux

Flag(wCO2)

CO2 flux

Mauder and Foken (2004)
Potato field
Potato field
Potato field

Fluctuation of fluxes - large AGC Contamination of LICOR
Data quality: rice

- Flag 1-3
- Flag 4-6
- Flag 7-9

- Flag(u*)
- Sensible heat flux
- Latent heat flux
- CO2 flux

- Jun 01
- Jun 11
- Jun 21
- Jul 01
- Jul 11
- Jul 21
- Jul 31
Rice field
Footprint at potato field

Land use

Sensible Heat

Latent Heat

CO2
Future work
Thank You
Data processing

Flux corrections

- Coordinate rotation (Planar fit)
- Buoyancy correction (Schotanus/Liu)
- Density correction (WPL)
- Spectral correction (Moore)

(Mauder and Foken, 2005)