

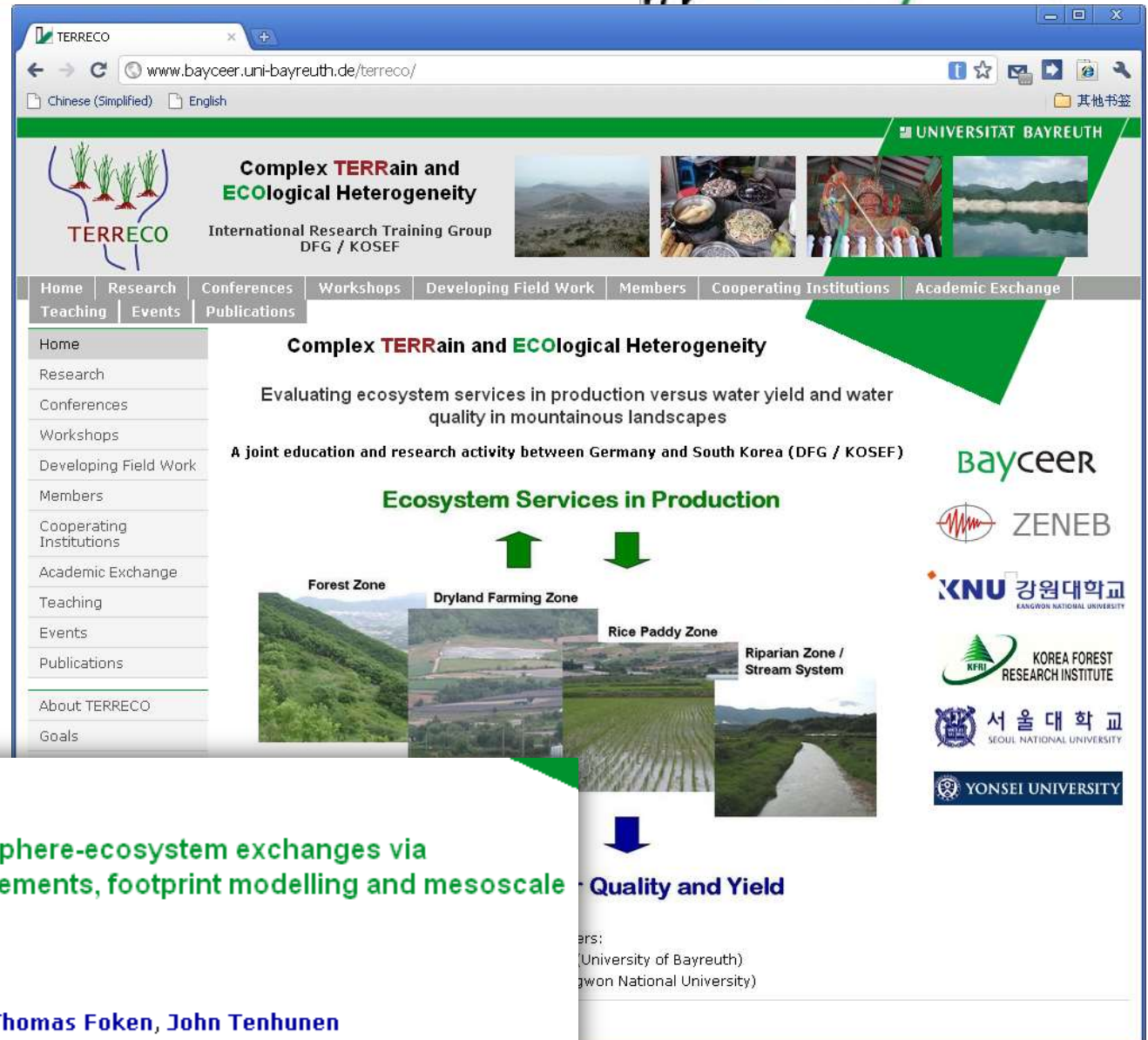
The 2010 experiment in South Korea

Peng Zhao

Johannes Lüers

University of Bayreuth, Germany

TERRECO



The screenshot shows the TERRECO website interface. At the top, there's a navigation bar with links: Home, Research, Conferences, Workshops, Developing Field Work, Members, Cooperating Institutions, and Academic Exchange. Below this, a sidebar on the left lists: Home, Research, Conferences, Workshops, Developing Field Work, Members, Cooperating Institutions, Academic Exchange, Teaching, Events, Publications, About TERRECO, and Goals. The main content area features the title 'Complex TERRain and ECOlogical Heterogeneity' and 'International Research Training Group DFG / KOSEF'. It includes a diagram of 'Ecosystem Services in Production' showing a flow from 'Forest Zone', 'Dryland Farming Zone', 'Rice Paddy Zone', and 'Riparian Zone / Stream System' to 'Quality and Yield'. The website also displays logos for Bayceer, ZENEB, KNU (Kangwon National University), KRFRI (Korea Forest Research Institute), Seoul National University, and Yonsei University.

TERRECO WP 1-02

- Spatial assessment of atmosphere-ecosystem exchanges via micrometeorological measurements, footprint modelling and mesoscale simulations

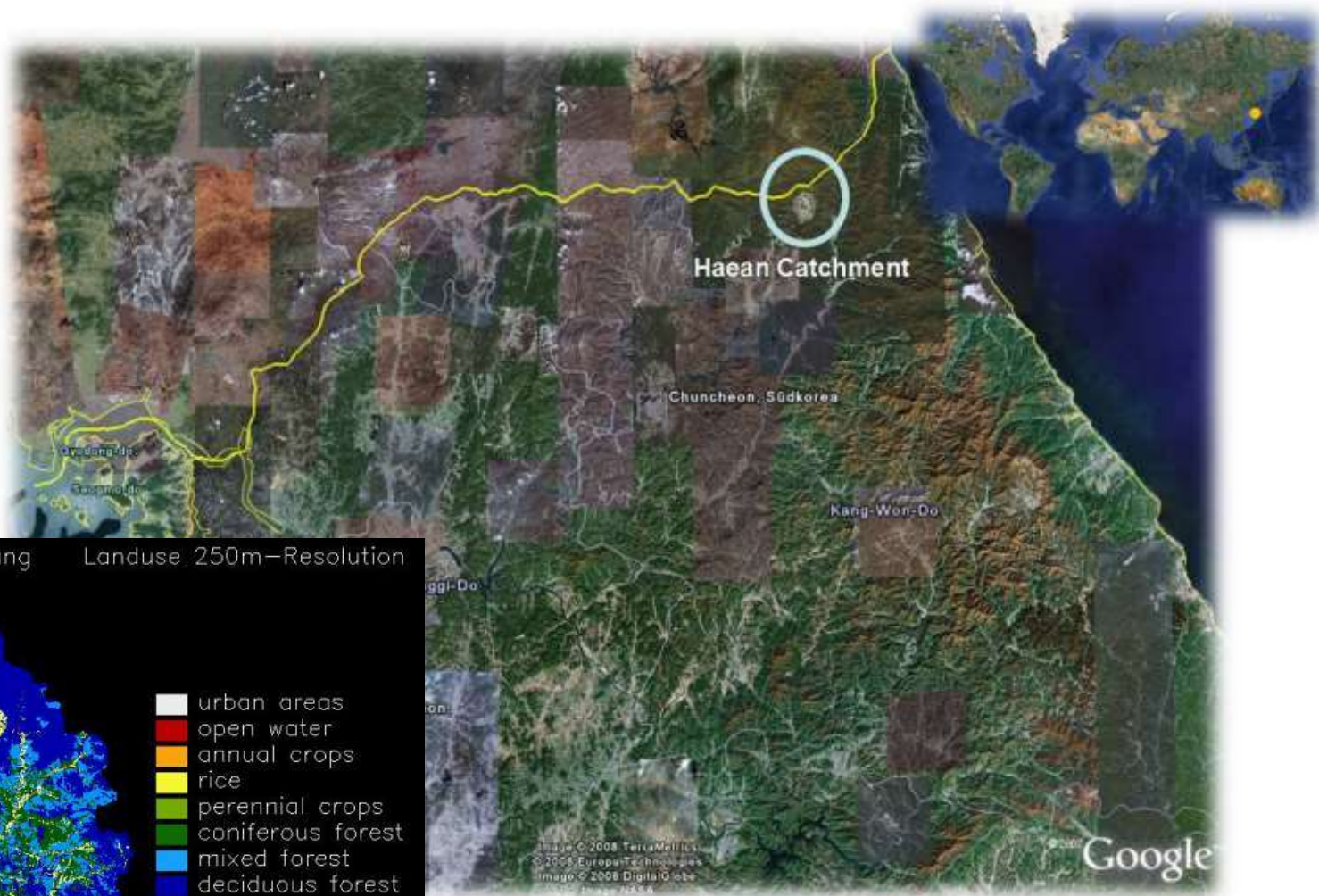
From 03/2009 to 02/2012

Project manager: Johannes Lüers, Thomas Foken, John Tenhunen

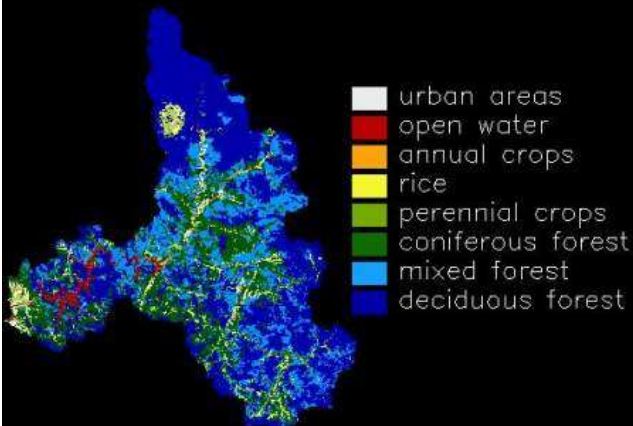
Coworkers: Peng Zhao

Grant: IRTG-WP I TERRECO - Complex Terrain and Ecological Heterogeneity - Evaluating ecosystem services in production versus water yield and water quality in mountainous landscapes - Work Package I

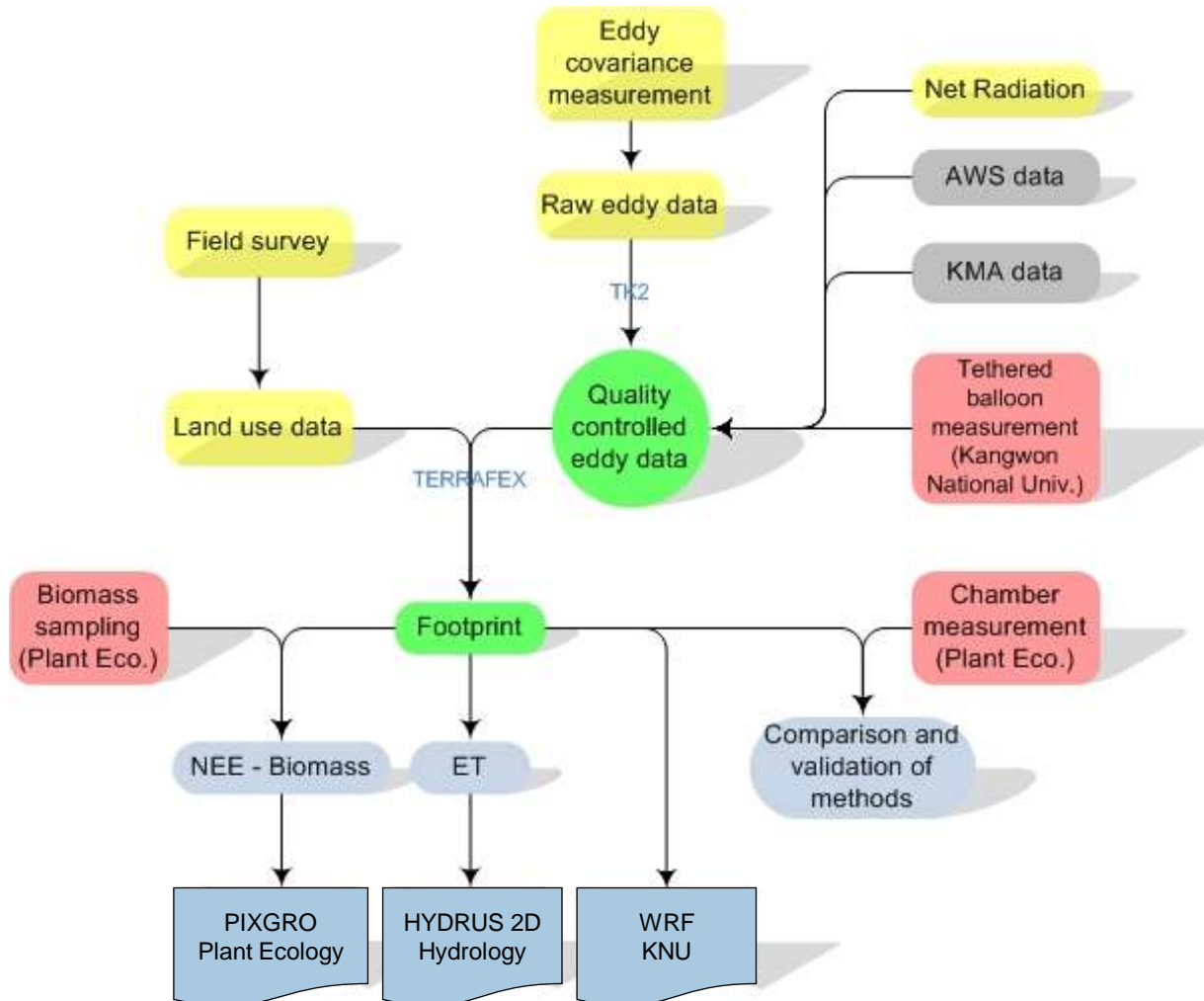
Location



Korea Soyang Landuse 250m-Resolution



Method



Legend:

cooperation

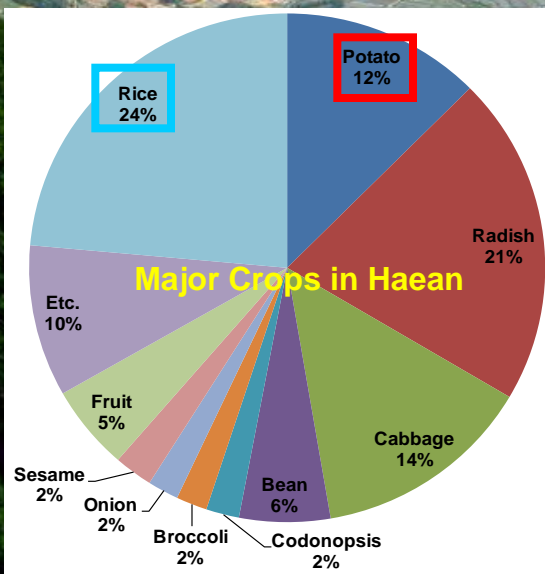
measurement

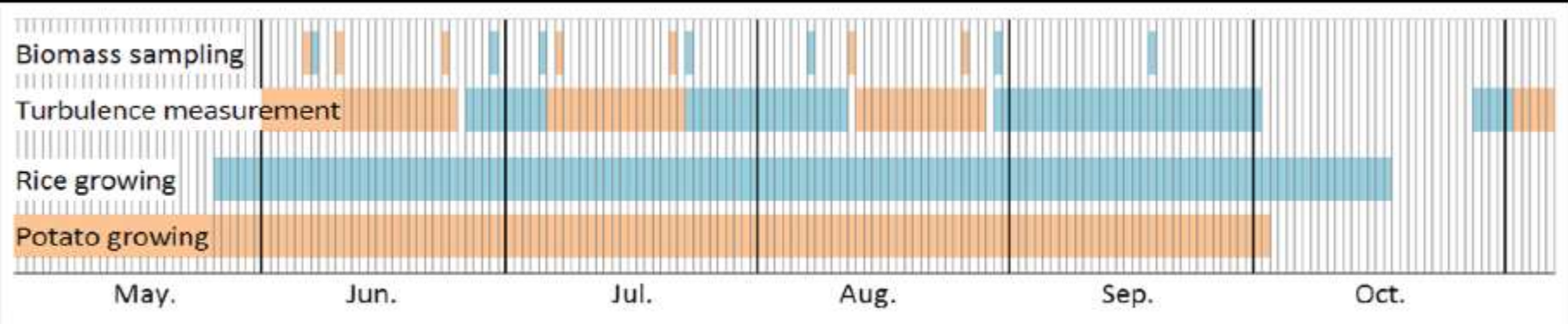
central data

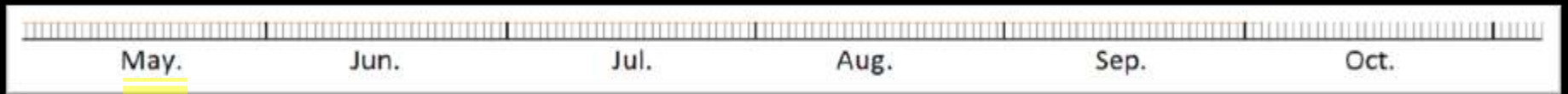
output

supporting
data

Site Selection

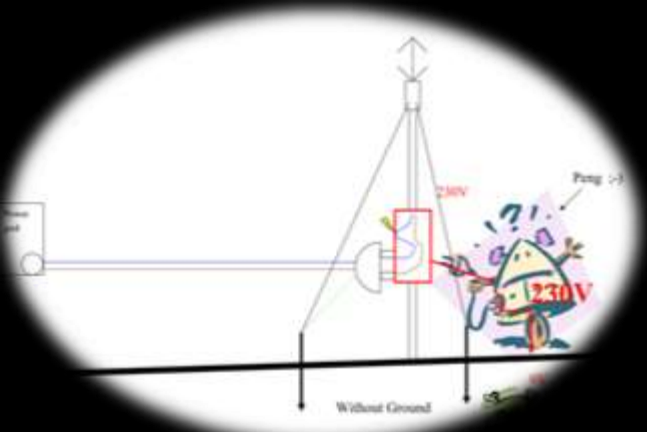




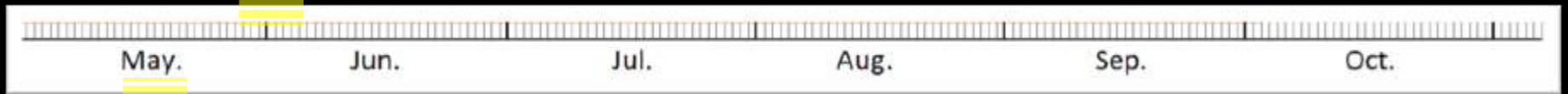


- Site selection
- Negotiation with farmers



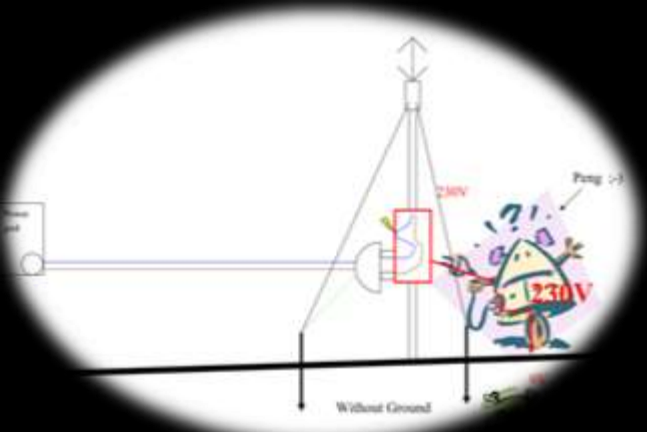


• cable connection



- Site selection
- Negotiation with farmers





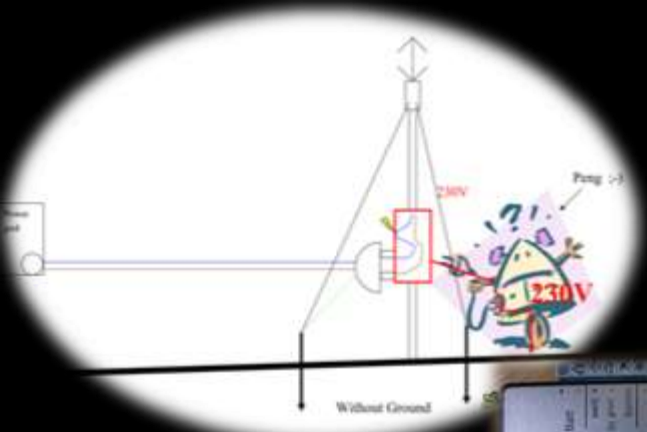
• cable connection



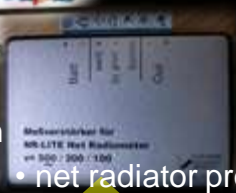
• Site selection
• Negotiation with farmers

• cable protection





• cable connection



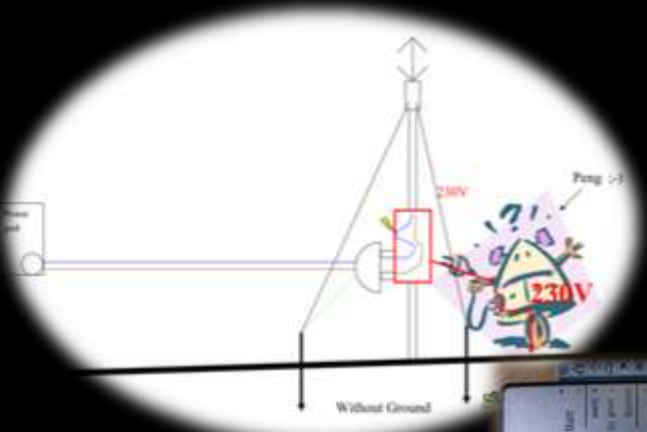
• net radiator problem
• TK2 problem



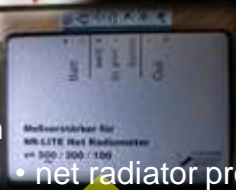
• Site selection
• Negotiation with farmers

• cable protection

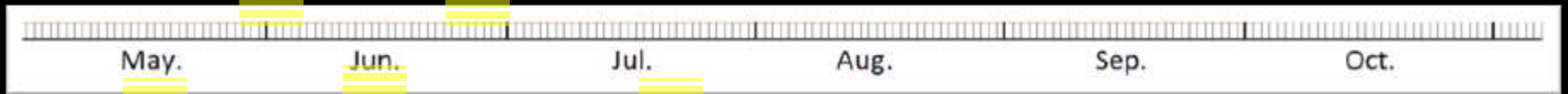




• cable connection



• net radiator problem
• TK2 problem

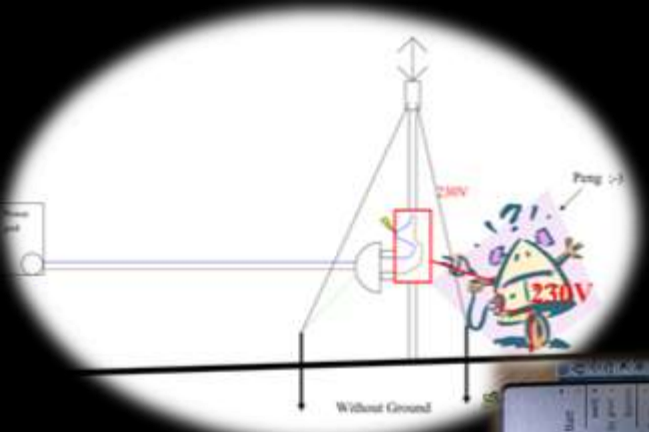


• Site selection
• Negotiation with farmers

• cable protection

• life problem





• cable connection

• net radiator problem
• TK2 problem

• Tension on the Korean peninsula



• Site selection
• Negotiation with farmers

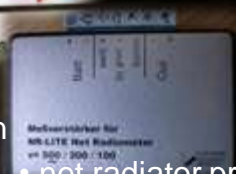
• cable protection

• life problem



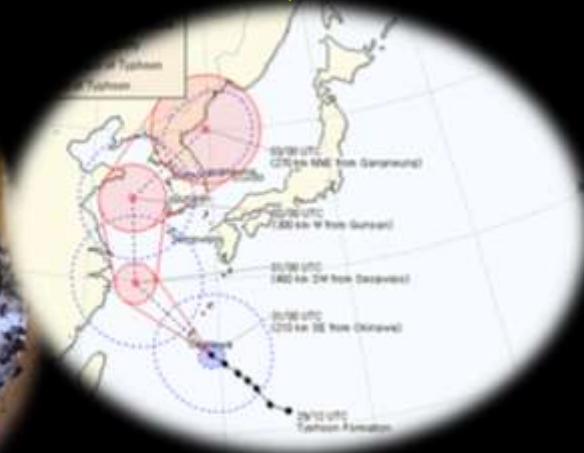


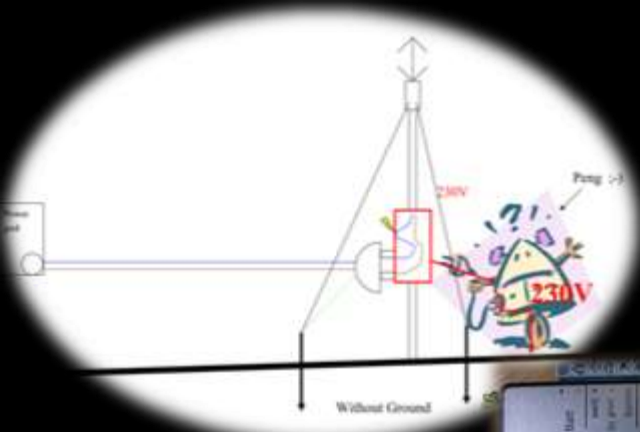
- Tension on the Korean peninsula



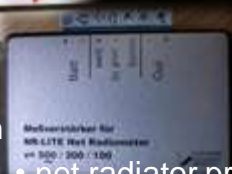
Oct.

- typhoon





• cable connection



• net radiator problem
• TK2 problem



• Tension on the Korean peninsula



• traffic accident



• Site selection
• Negotiation with farmers

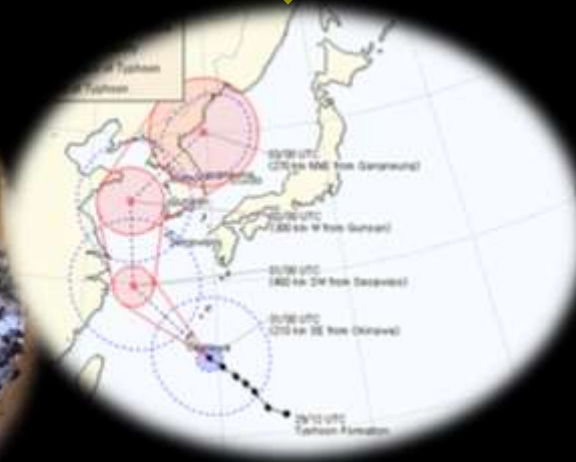
• cable protection



• life problem

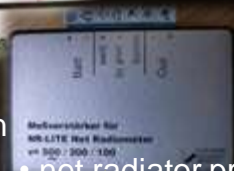


• typhoon





- traffic accident



Oct.

- working alone

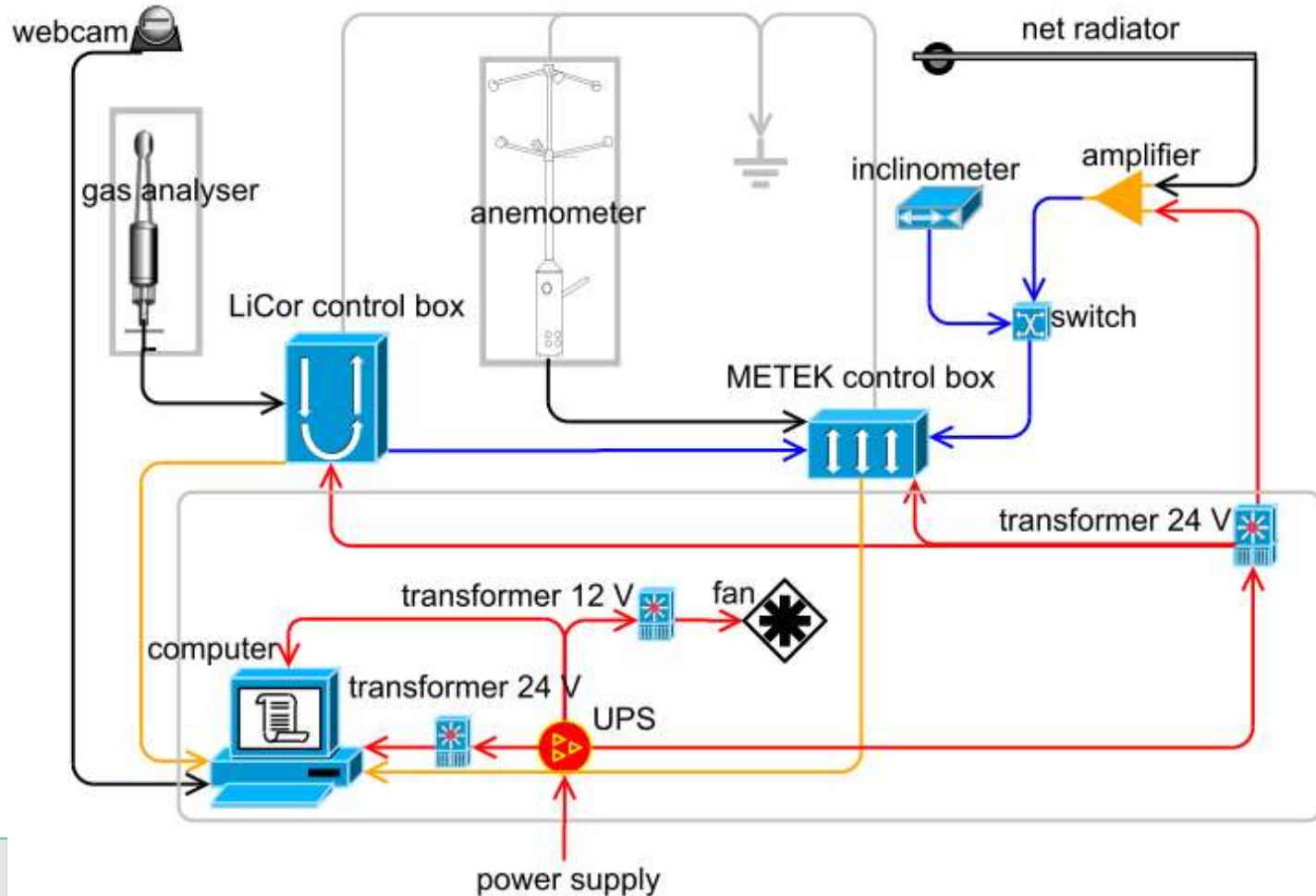


Kommt Zeit, kommt Rat.

车到山前必有路。

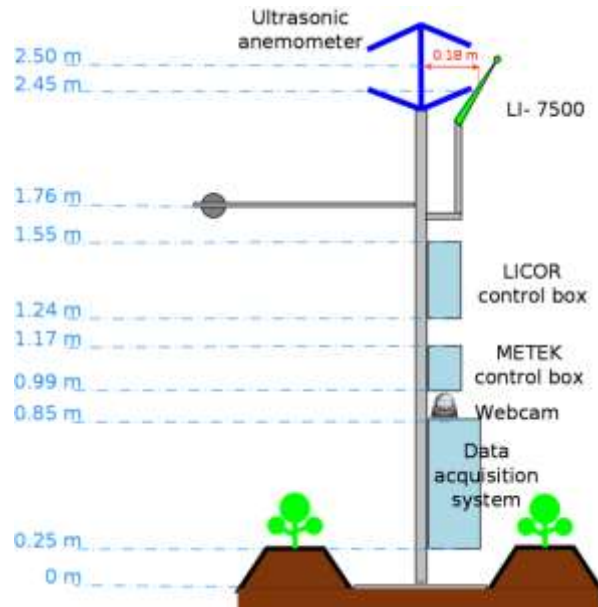
We'll cross that bridge when we come to it.

Device connections

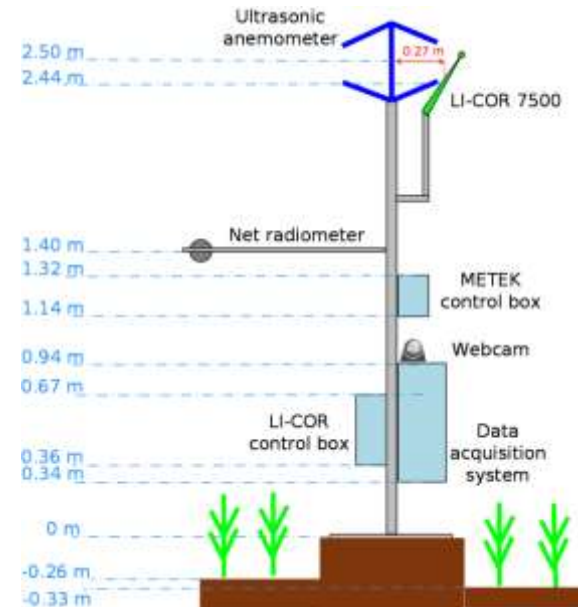


Device installation

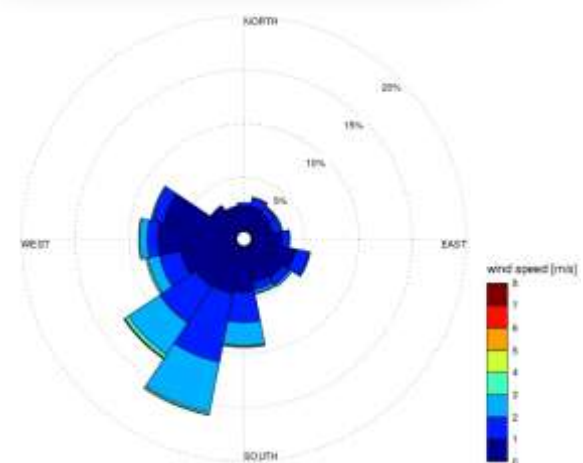
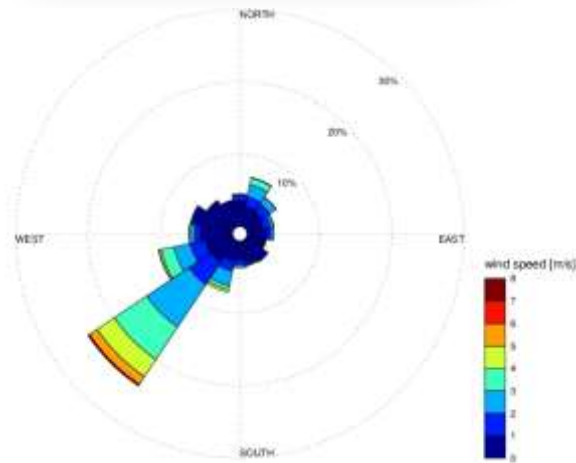
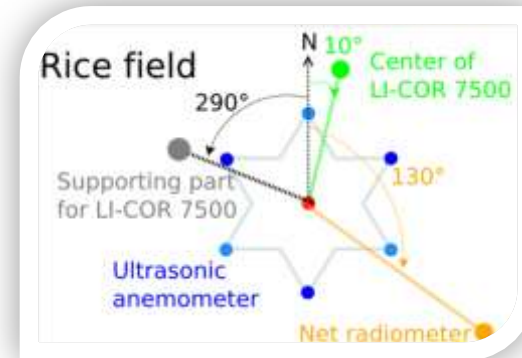
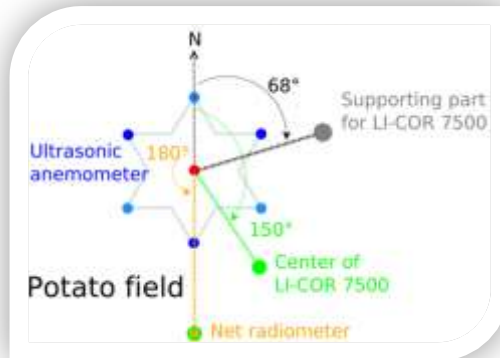
Potato field



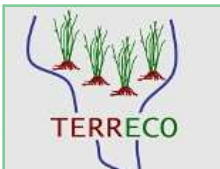
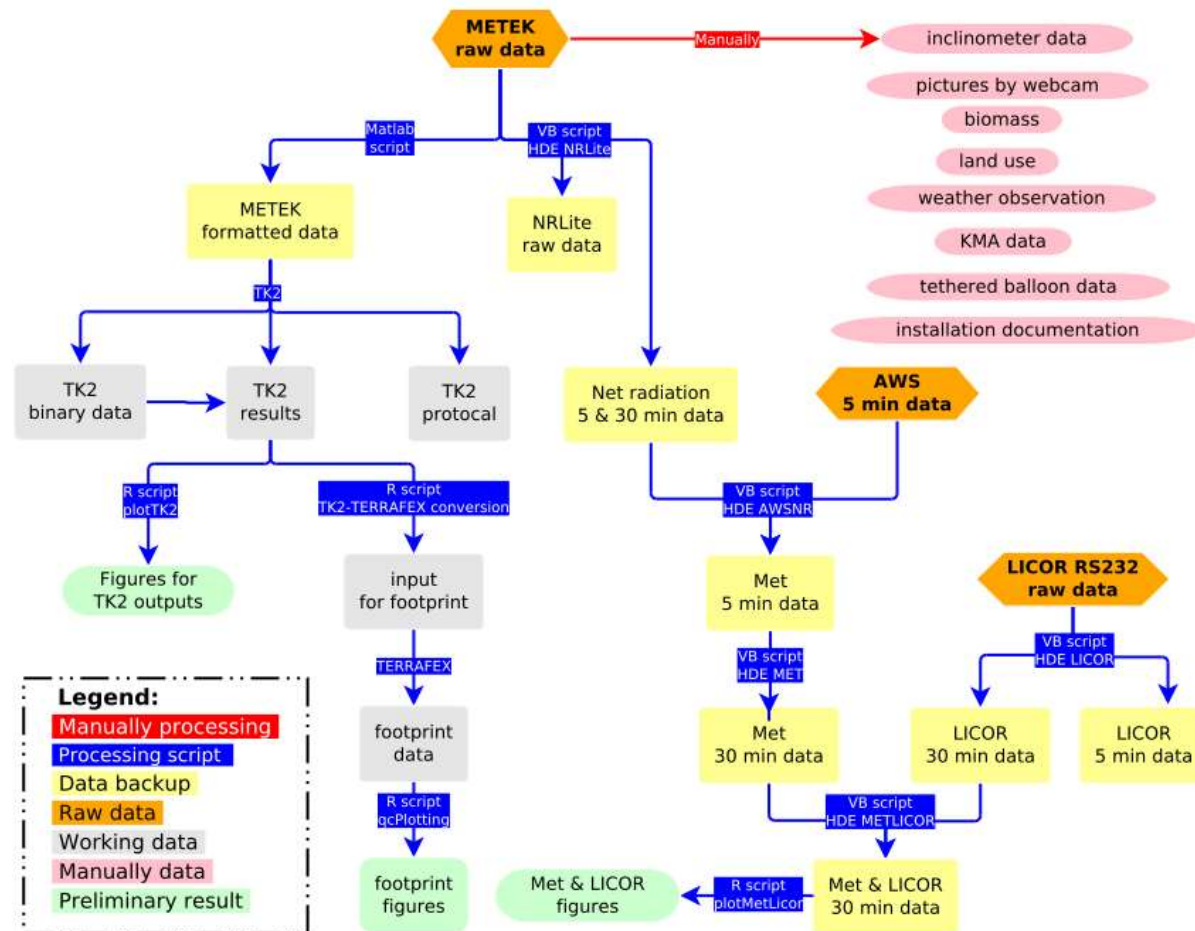
Rice field



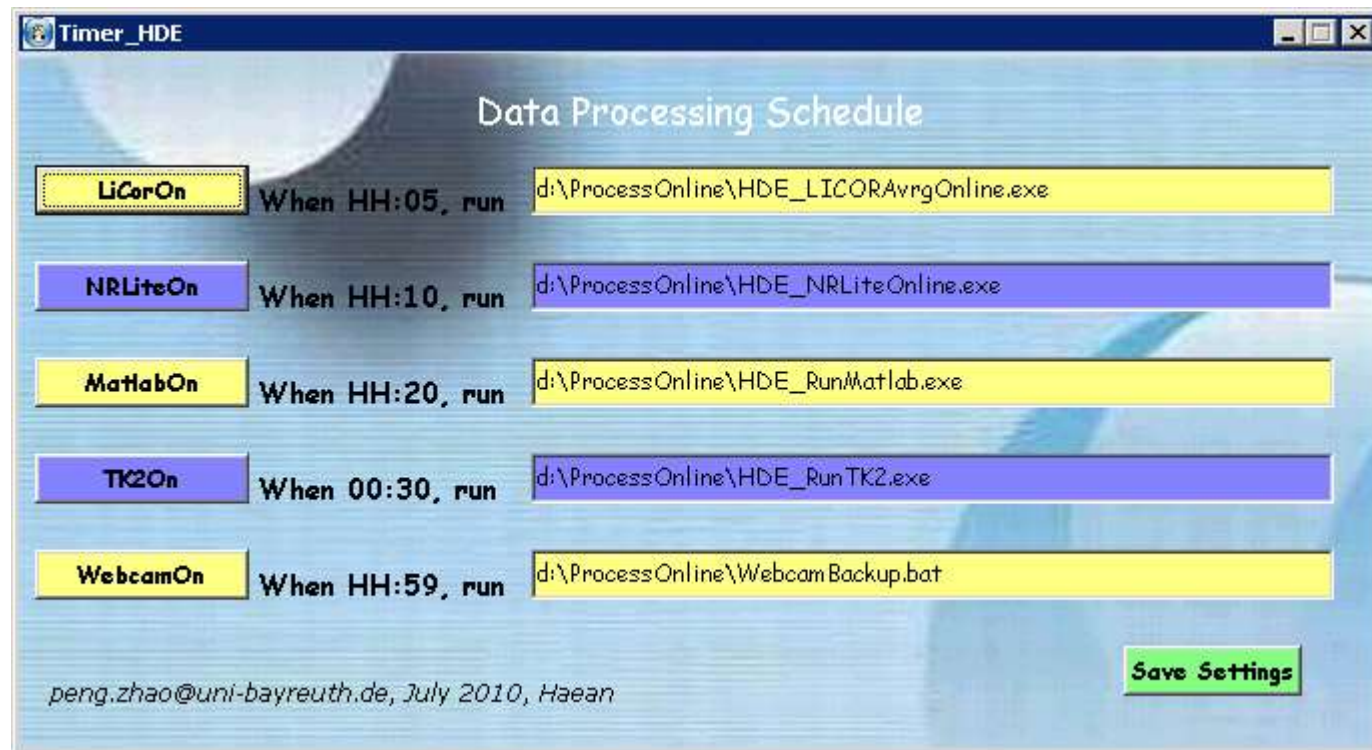
Device installation

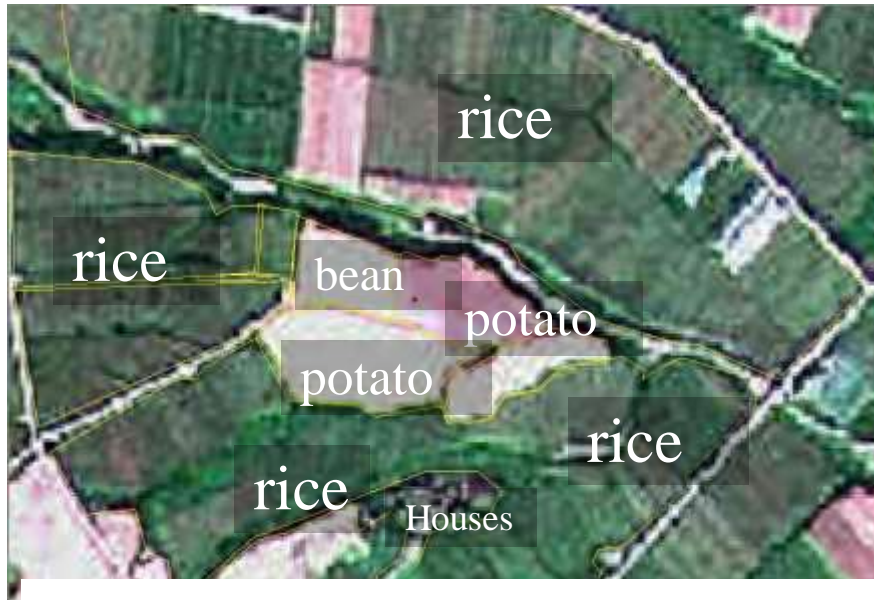


Data flow

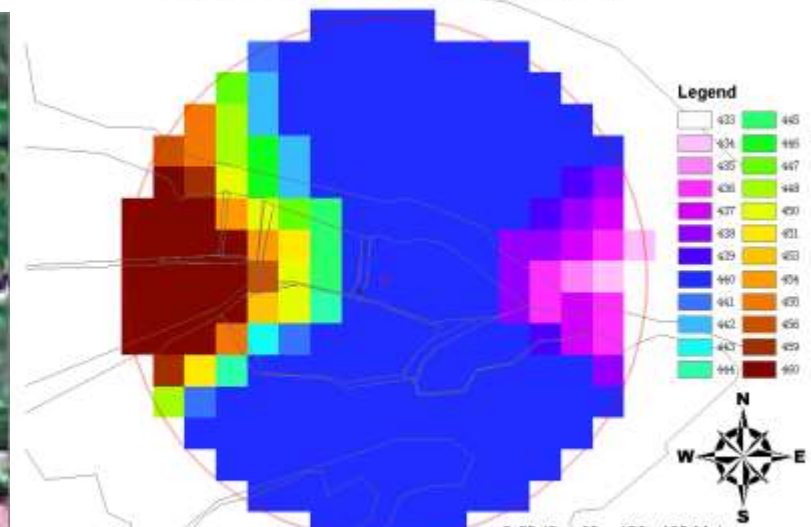


Data online processing

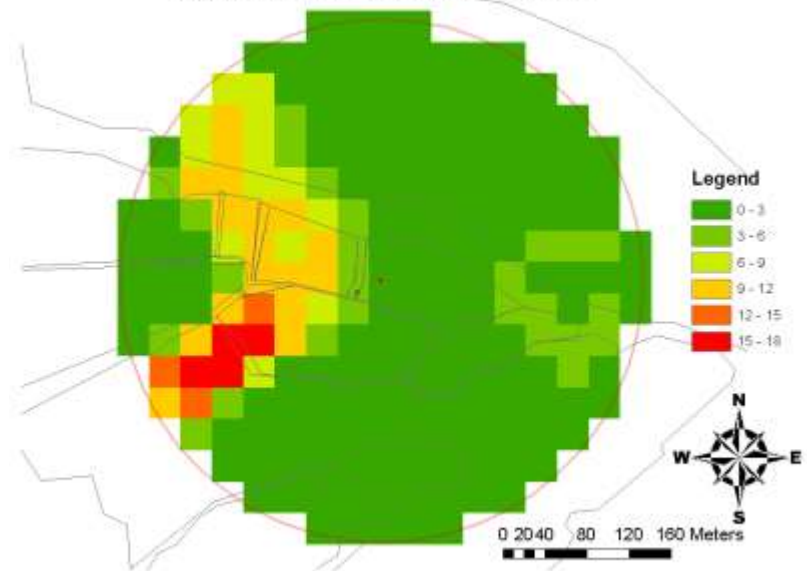




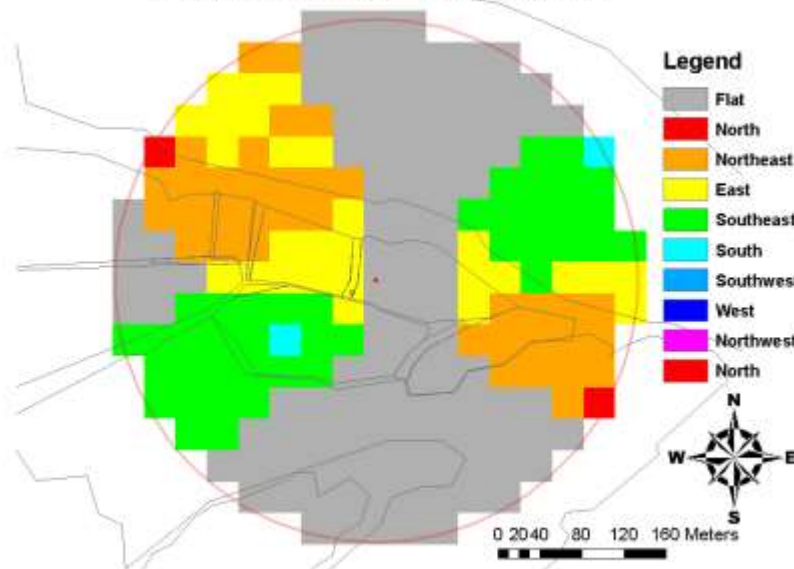
Altitude Potato Field, Haean, Korea

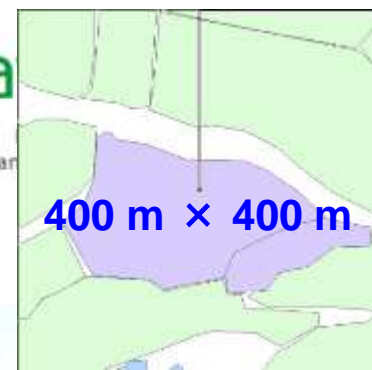


Slope Potato Field, Haean, Korea

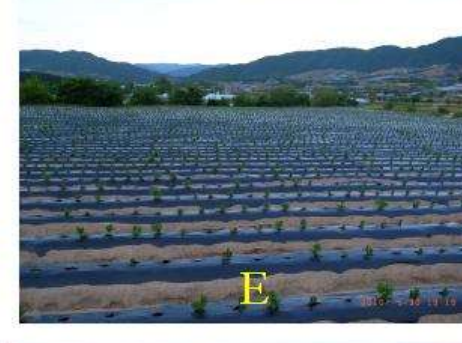
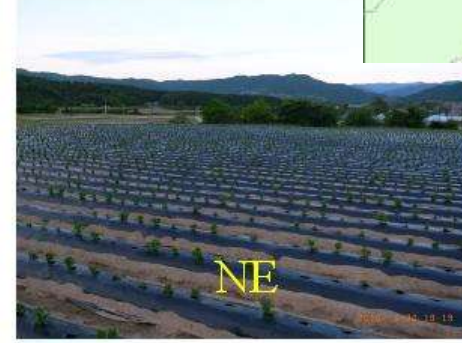


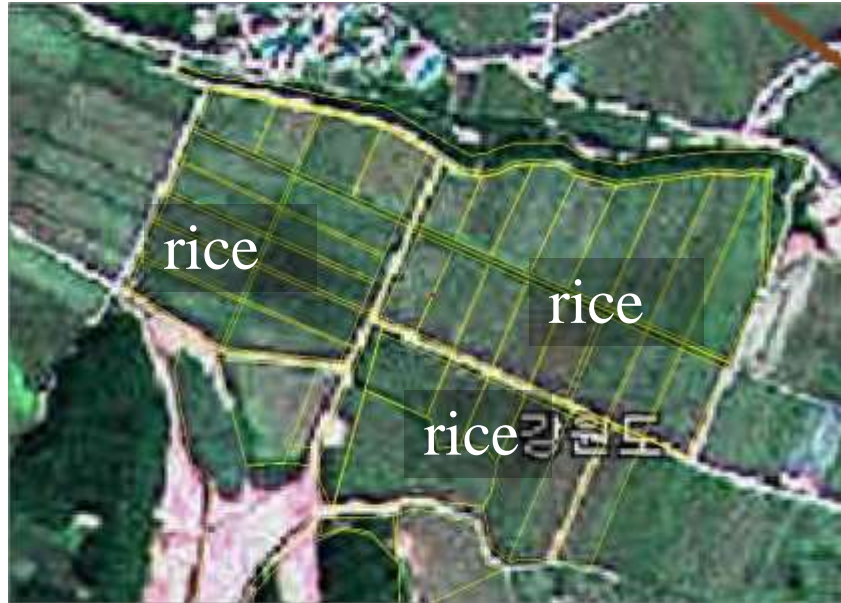
Aspect Potato Field, Haean, Korea



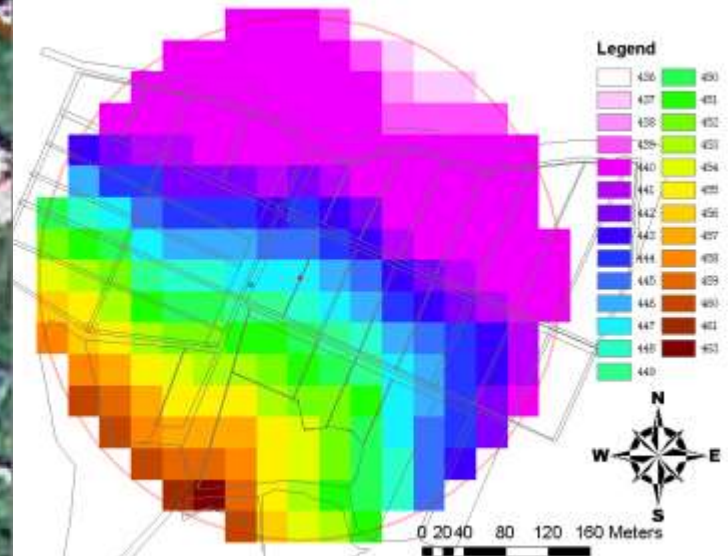


Potato field

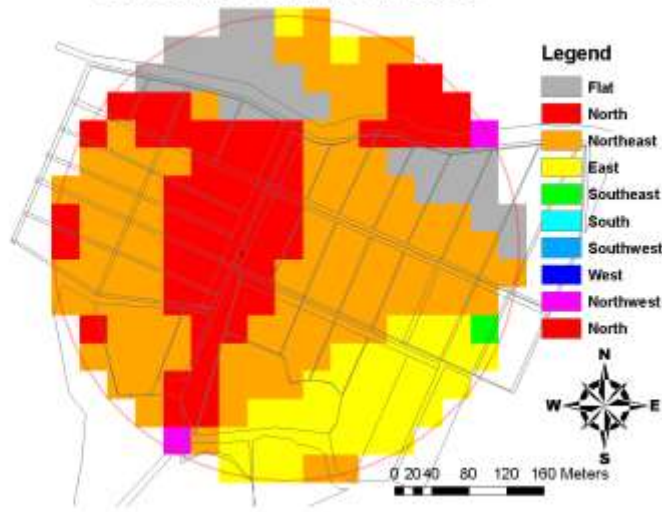


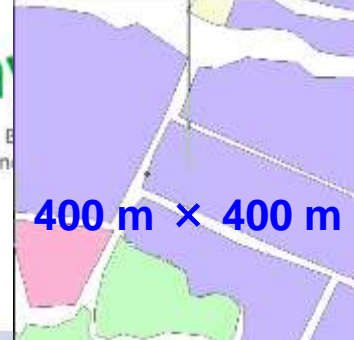


Altitude Rice Field, Hae-an, Korea



Aspect Rice Field, Hae-an, Korea





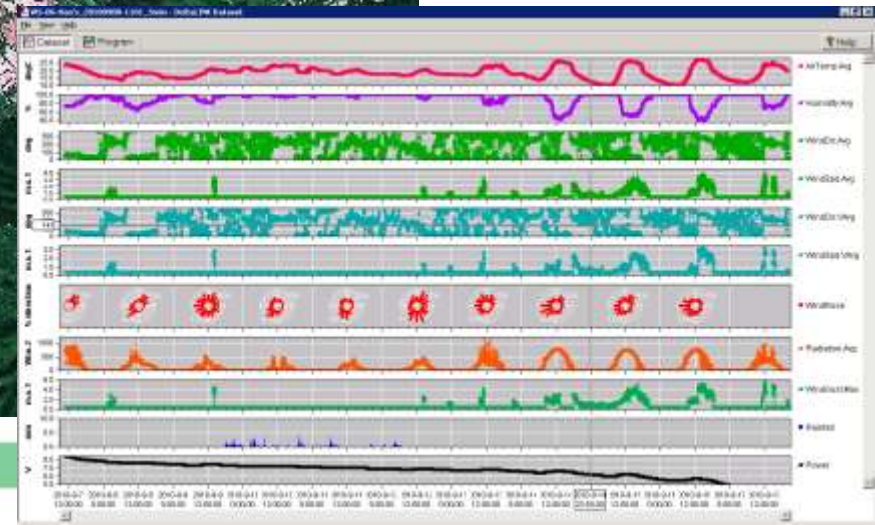
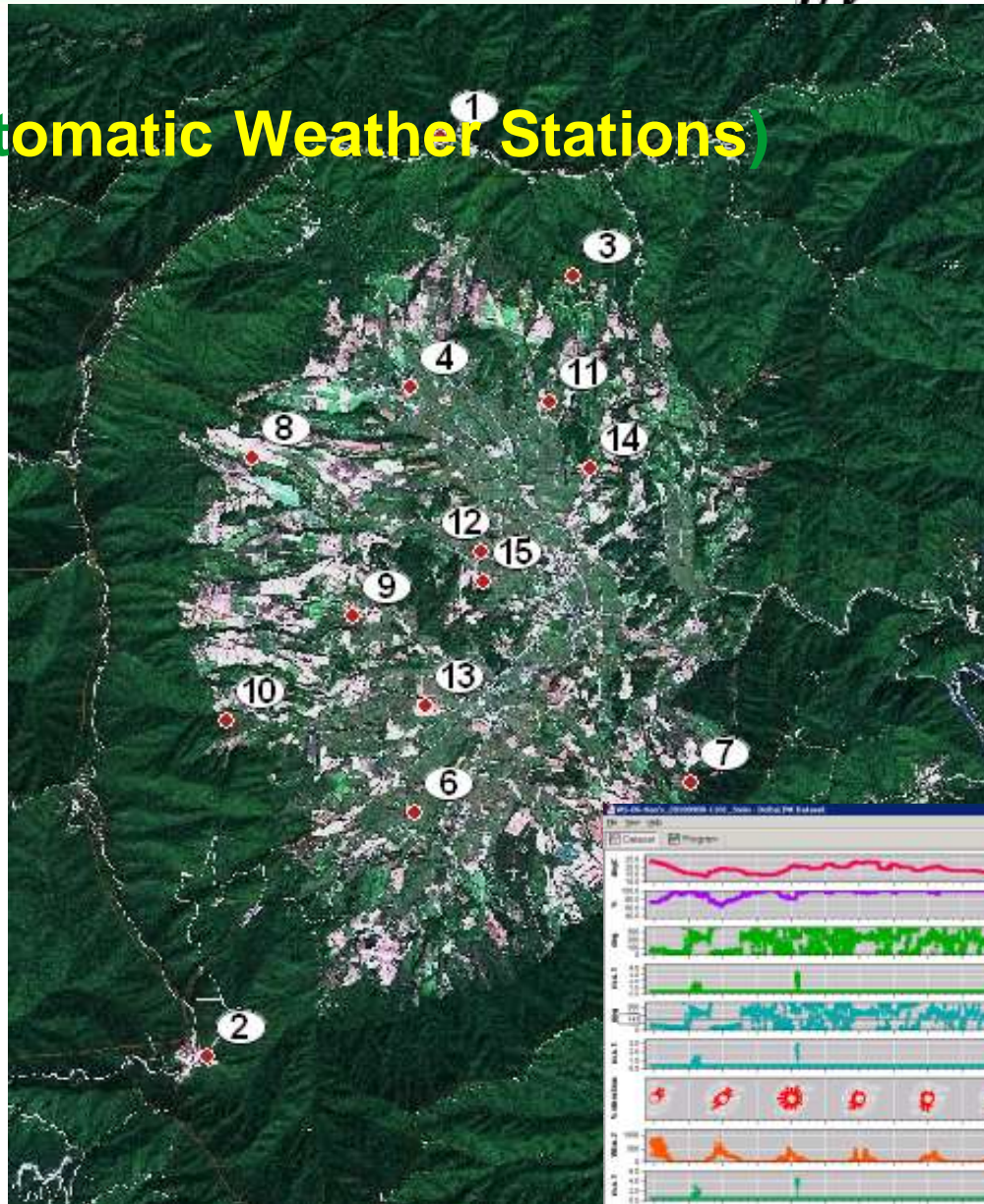
Rice field



Biomass sampling



AWS (Automatic Weather Stations)



AWS: check

Location	MM-DD	Clock
01-Observatory	11-05	0:00
02-Military_Temple	10-29	0:04
03-Sap1site	11-01	0:13
04-TERRECOHouse	10-30	0:06
06-Han's	11-03	0:00
07-Ok's_Field	11-03	0:01
08-Glass_area	11-03	0:00
09-Fruit_area	11-03	0:00
10-Western_Forest	11-03	0:01
11-Kang's_Rice	10-30	-0:02
12-Eddy_Rice	11-02	0:00
13-Eddy_Potato	11-06	0:00
14-Exper_Field	10-30	-0:03
15-Mid_Forest	11-04	0:00

clock

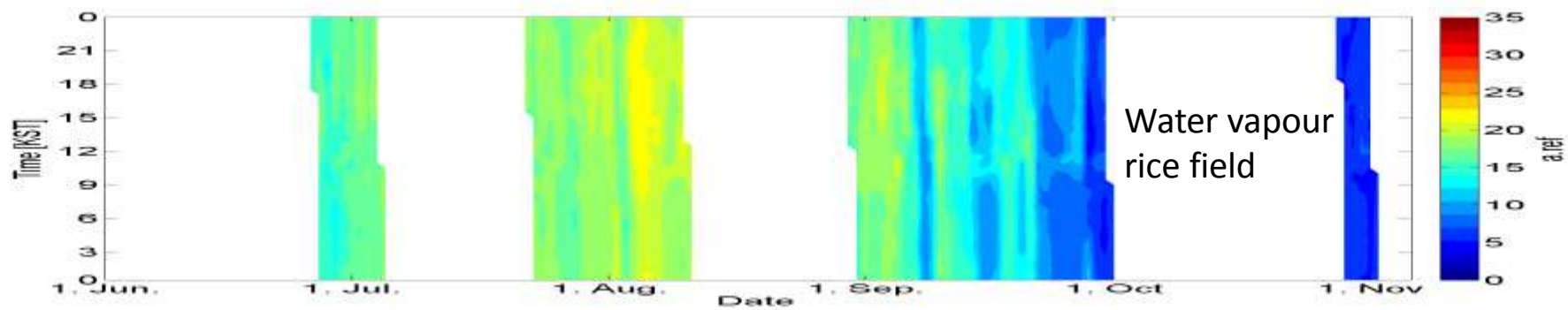
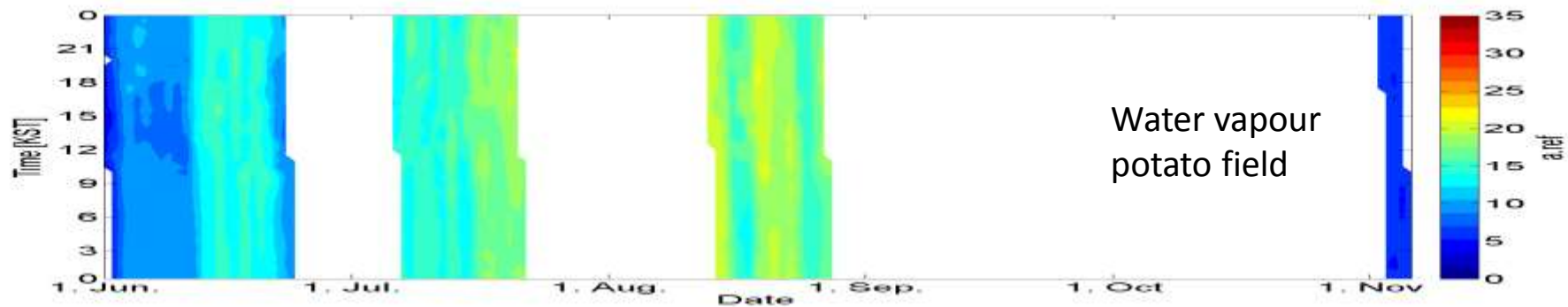
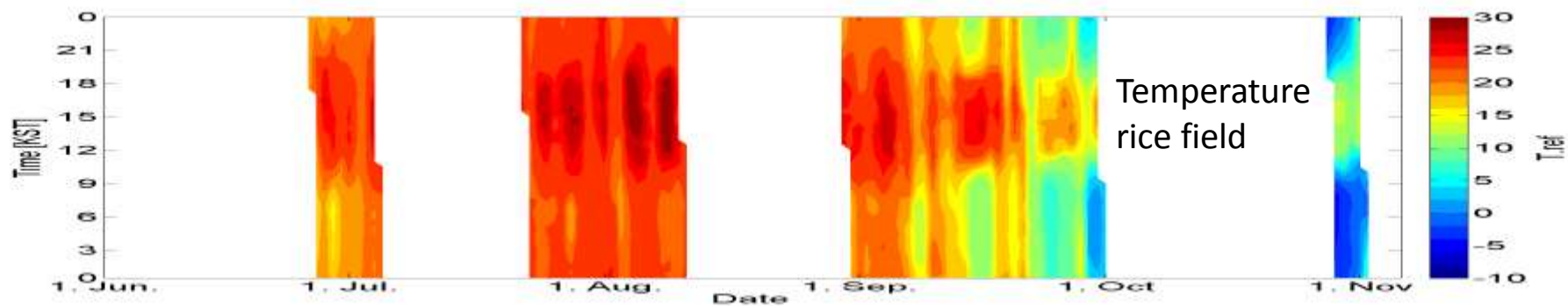
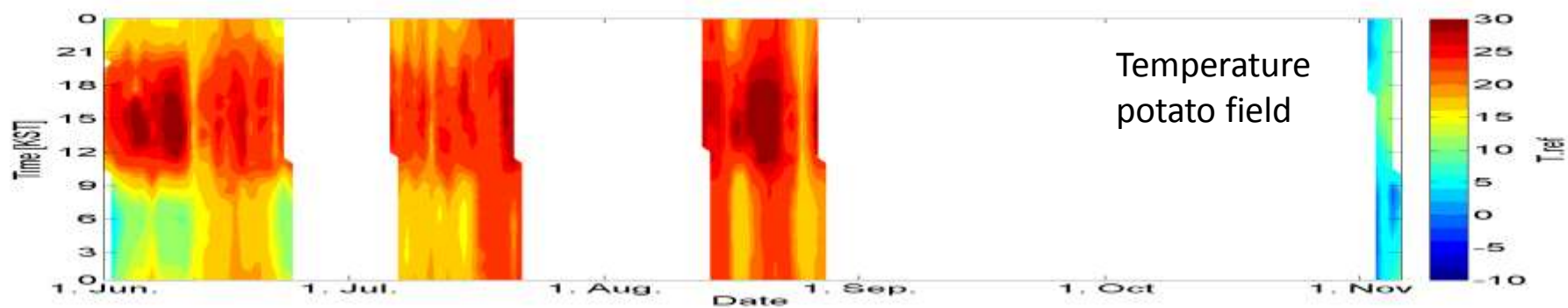
Location	MM-DD	Orie.
01-Observatory	11-05	70
02-Military_Temple	10-29	8
03-Sap1site	11-01	2
04-TERRECOHouse	10-30	12
06-Han's	11-03	24
07-Ok's_Field	11-03	34
08-Glass_area	11-03	66
09-Fruit_area	11-03	4
10-Western_Forest	11-03	34
11-Kang's_Rice	10-30	20
12-Eddy_Rice	11-02	8
13-Eddy_Potato	11-06	32
14-Exper_Field	10-30	26
15-Mid_Forest	11-04	0

orientation



sth. else







Weather Chart-Images

KMA BUSINESS

- > Satellite Images
- > Radar Images
- > Lightning Images
- > Weather Chart

Satellite Images

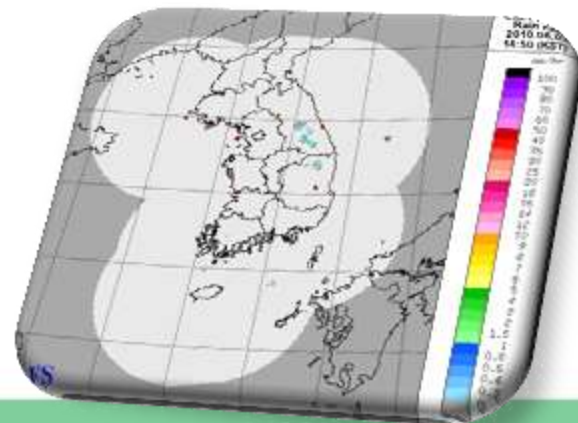
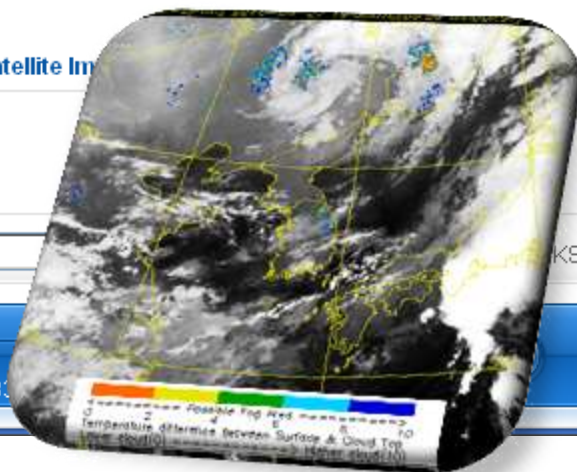
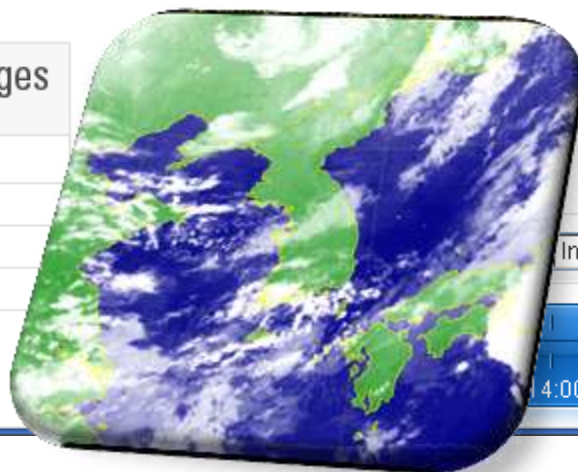
PRINT

Infrared

KST

GO

4:00 14:30



Quality check

steady state test (flag)	2 related integral turbulence characteristic tests [flag of the worse-rated test (exception: if H_{Ts} is $< 10 \text{ W m}^{-2}$ than itc_{Ts} must be ignored)]	Final flag
1	1 – 2	1
2	1 – 2	2
1 – 2	3 – 4	3
3 – 4	1 – 2	4
1 – 4	3 – 5	5
5	1 – 5	6
6	1 – 6	7
1 – 6	6	7
1 – 6	7	8
7 – 8	1 – 7	8
1 – 8	8	8
9	1 – 9	9
1 – 9	9	9

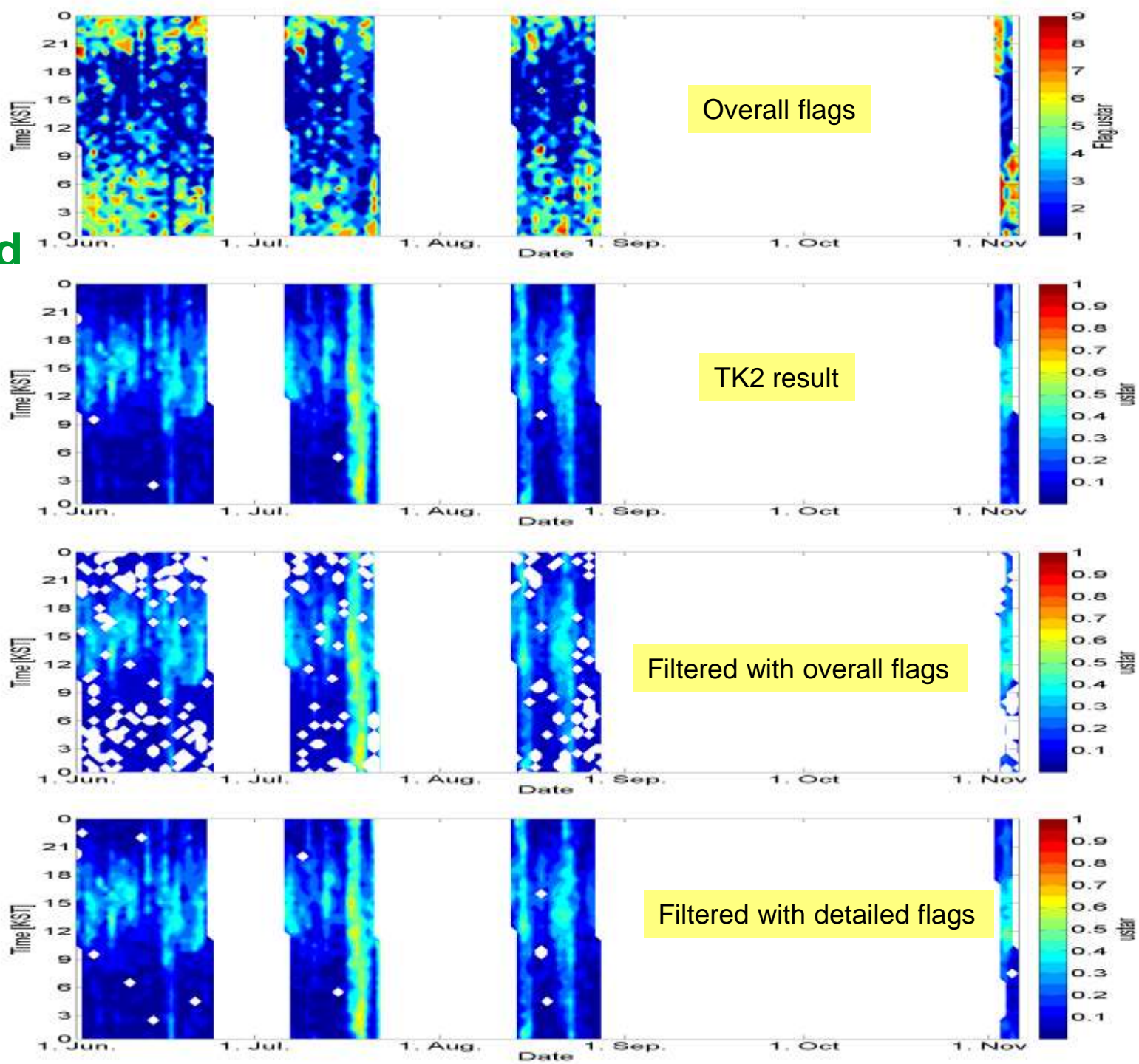
Overall rating system after Foken et al. (2004)

Test parameter	Steady state test	ITC σ_u / u_* test	ITC σ_w / u_* test	ITC σ_{Ts} / Ts_* test	ITC σ_a / a_* test	ITC σ_{CO_2} / CO_{2*} test
<u>ustar</u>	$\overline{u'w'}, \overline{v'w'}$	x	x			
H_{Ts}	$\overline{H_{Ts}}$					
<u>LvE</u>	$\overline{w'\alpha'}$		x		x	
$\overline{w'CO_2}$	$\overline{w'CO_2}$		x			x

Detailed flags from the TK2-QA_QC-File

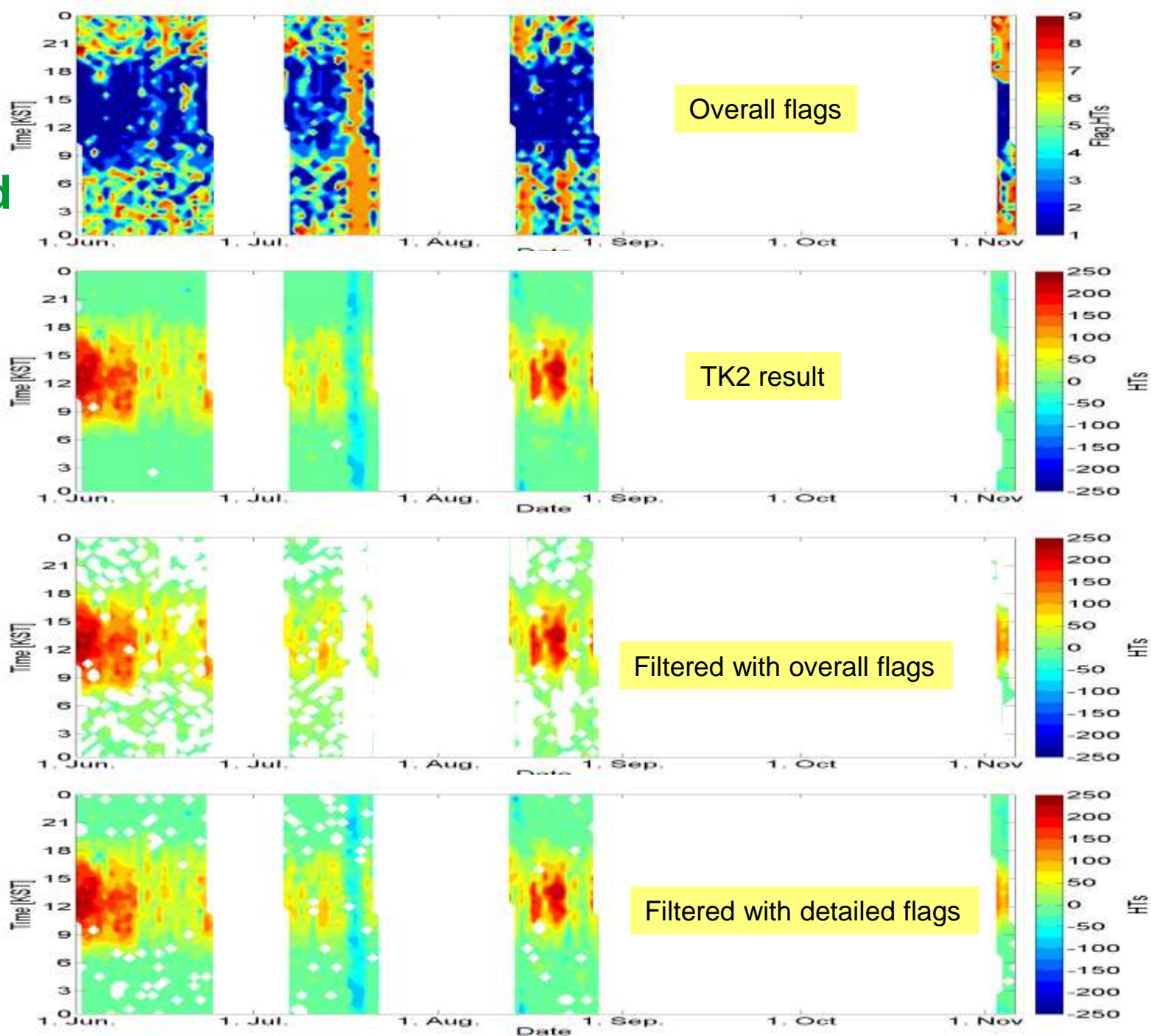


Potato field u*

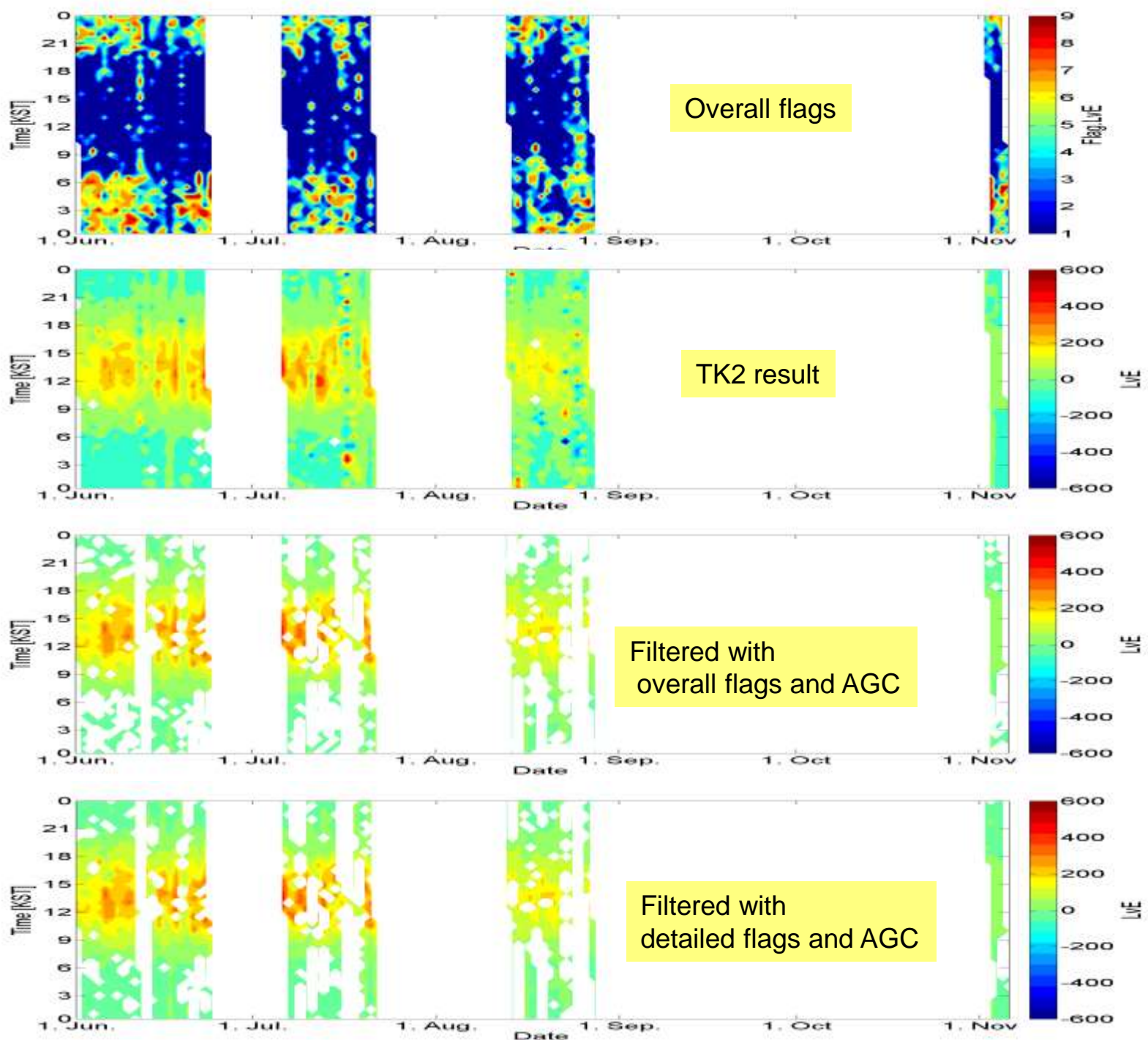


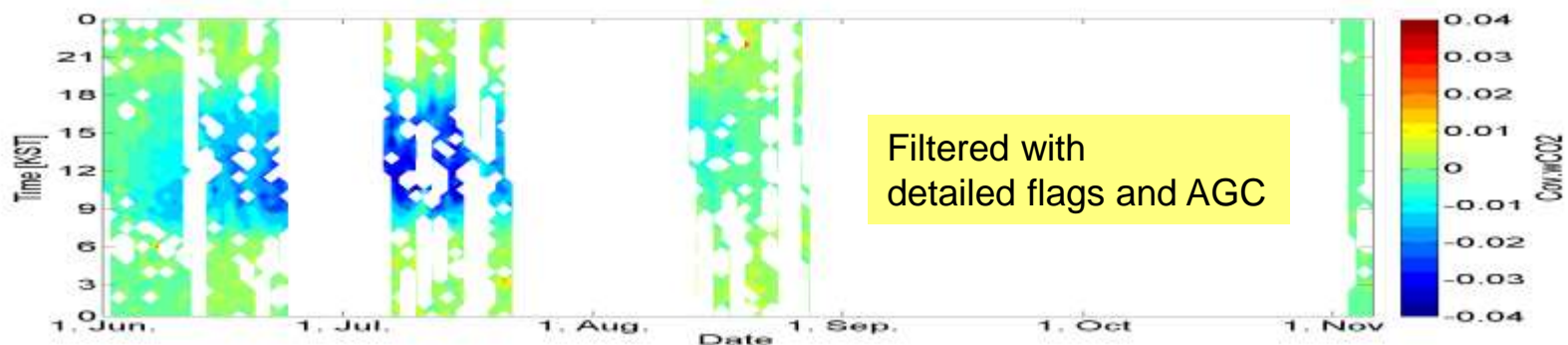
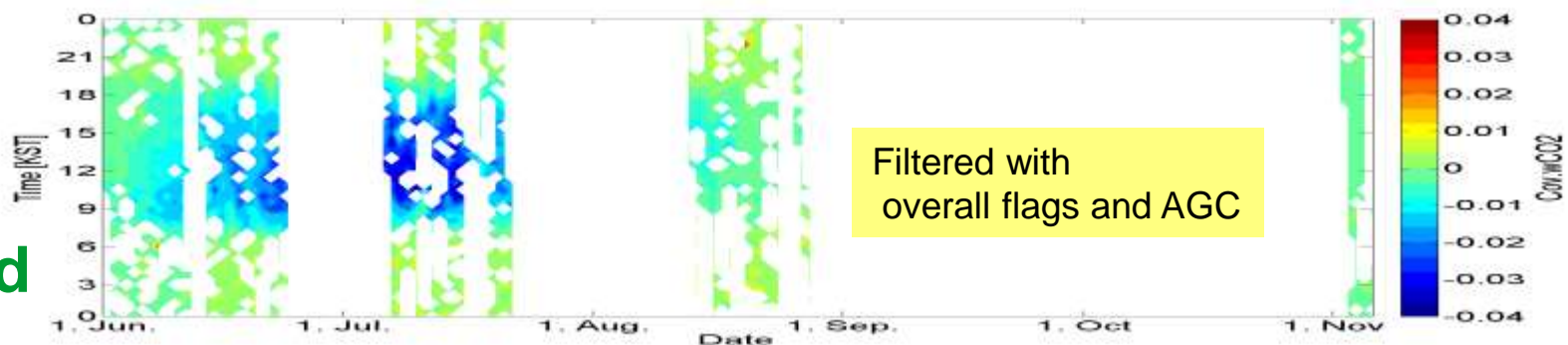
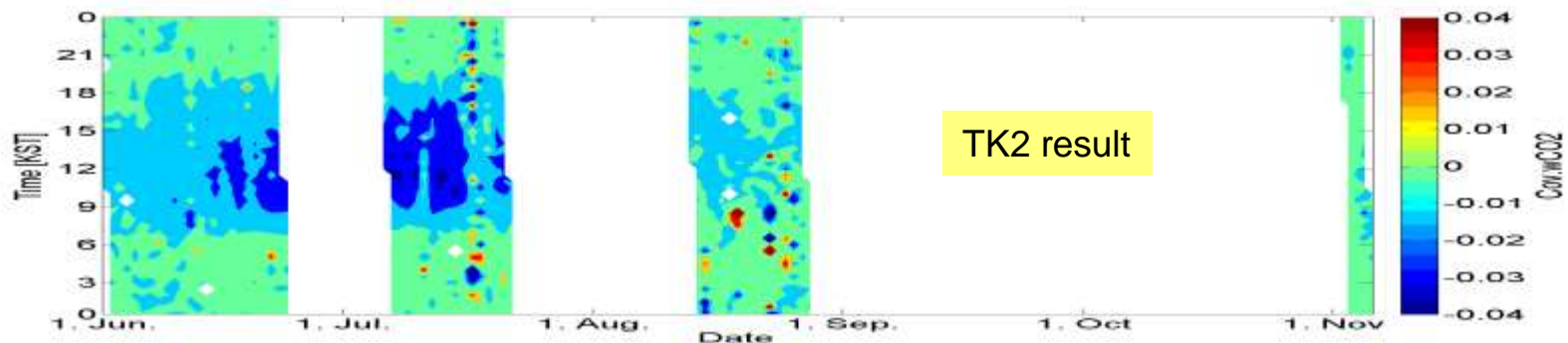
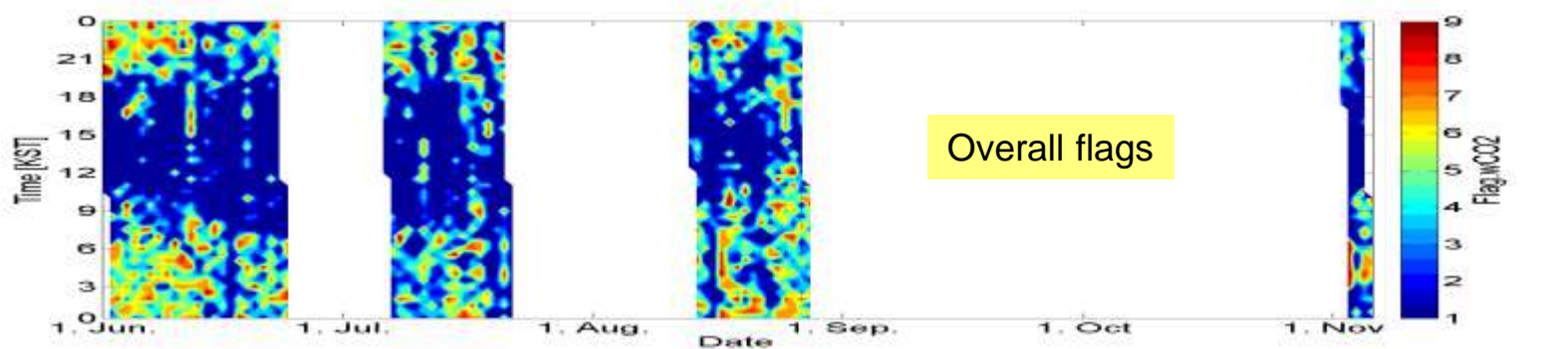
Potato field

Sensible
Heat flux

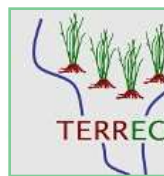


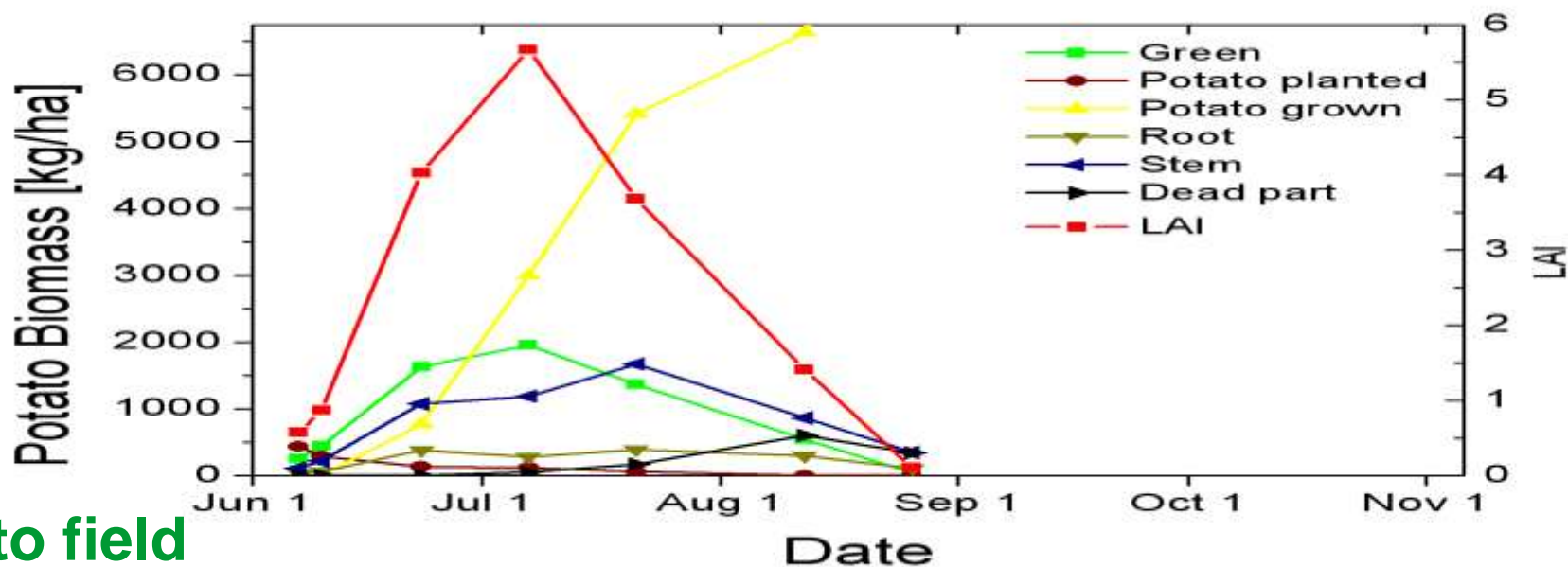
Potato latent heat flux



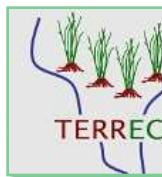
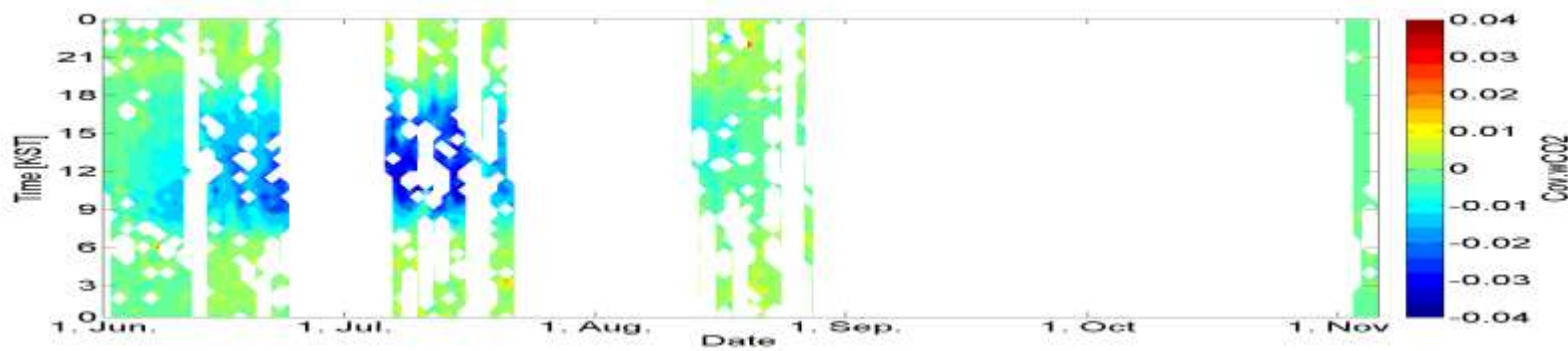


Potato field
CO₂

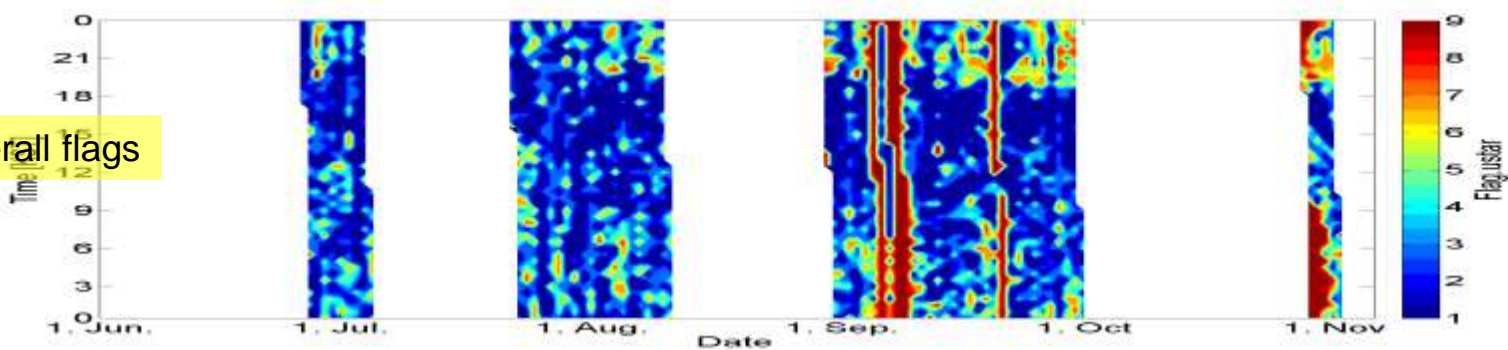




Potato field
CO₂



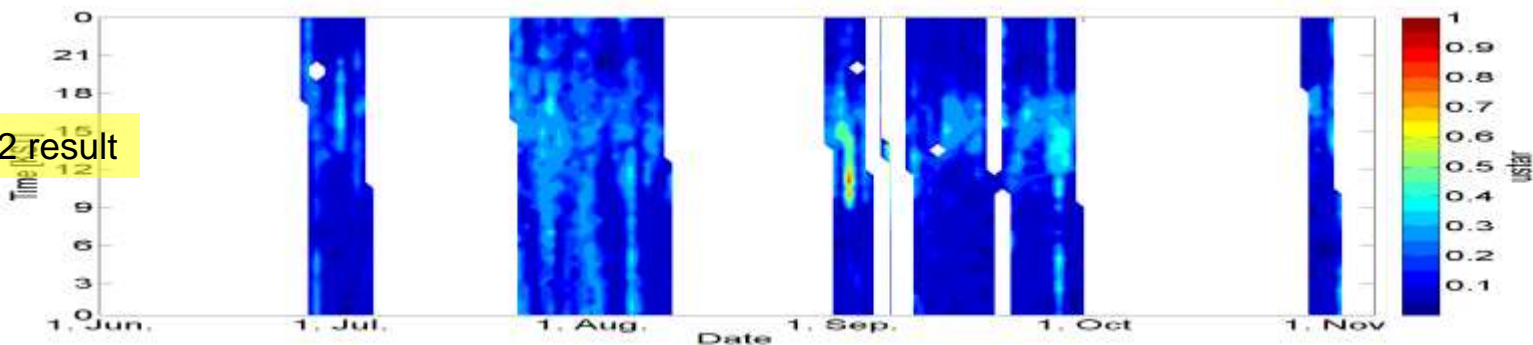
Overall flags



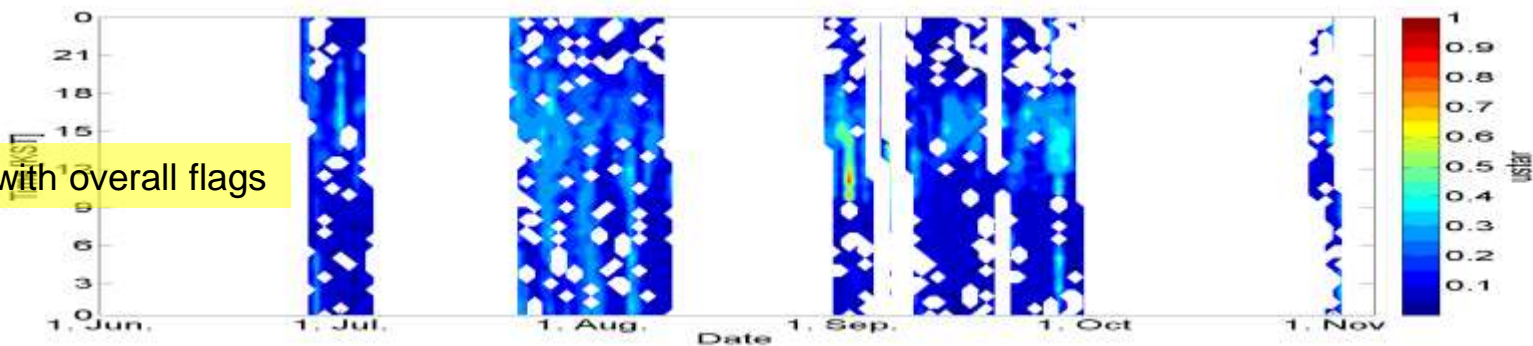
Rice field

u^*

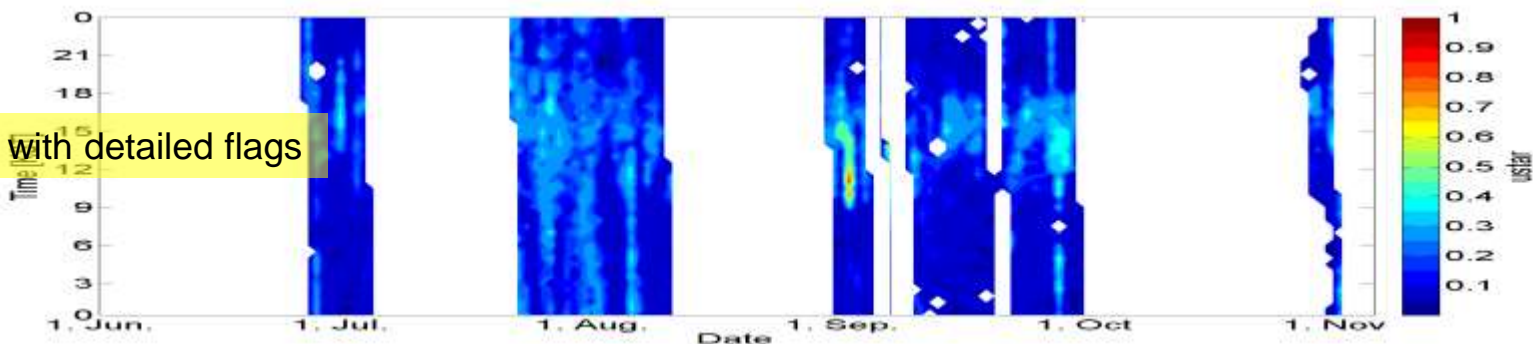
TK2 result



Filtered with overall flags



Filtered with detailed flags



Overall flags

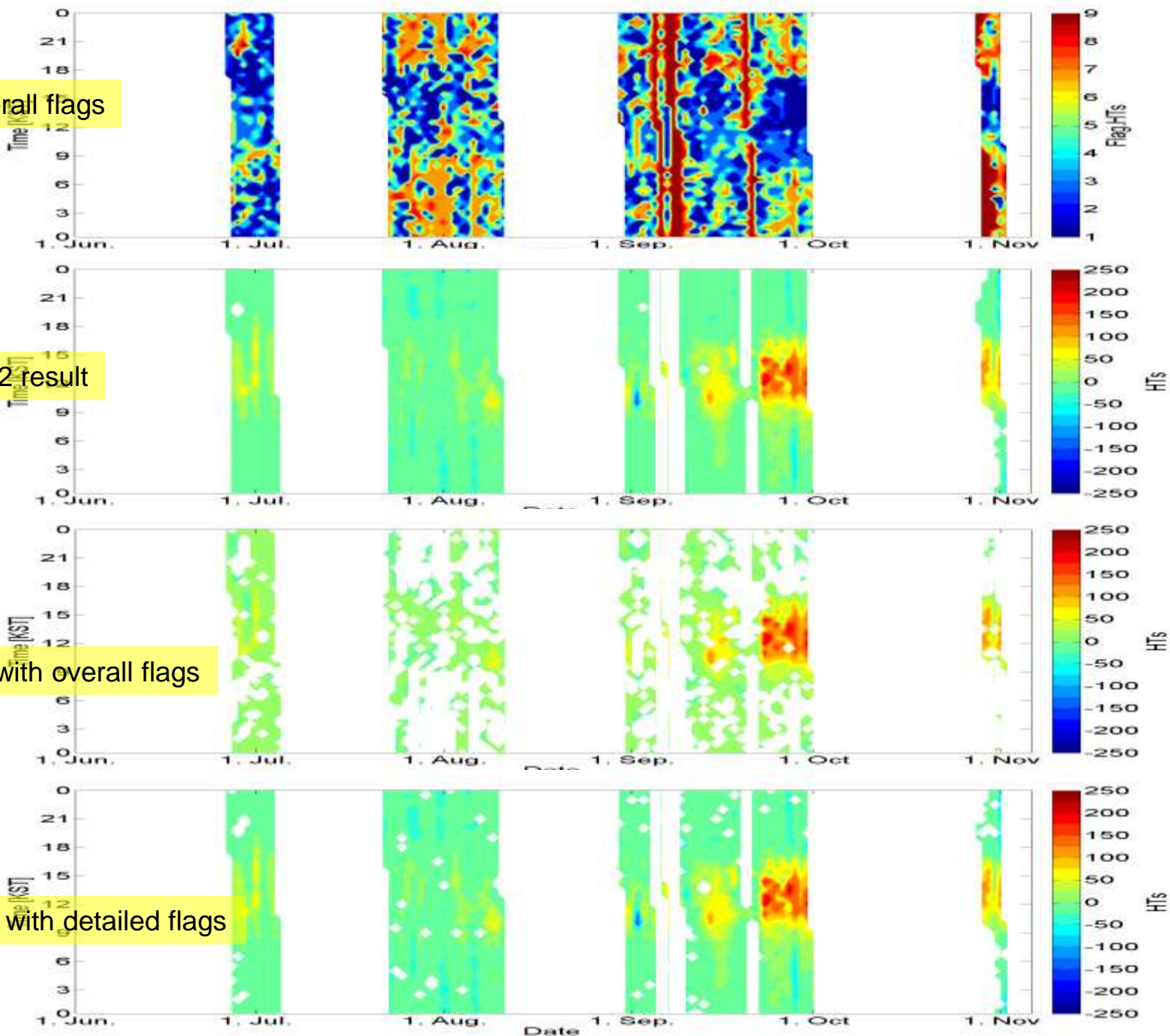
Rice field

Sensible
heat
flux

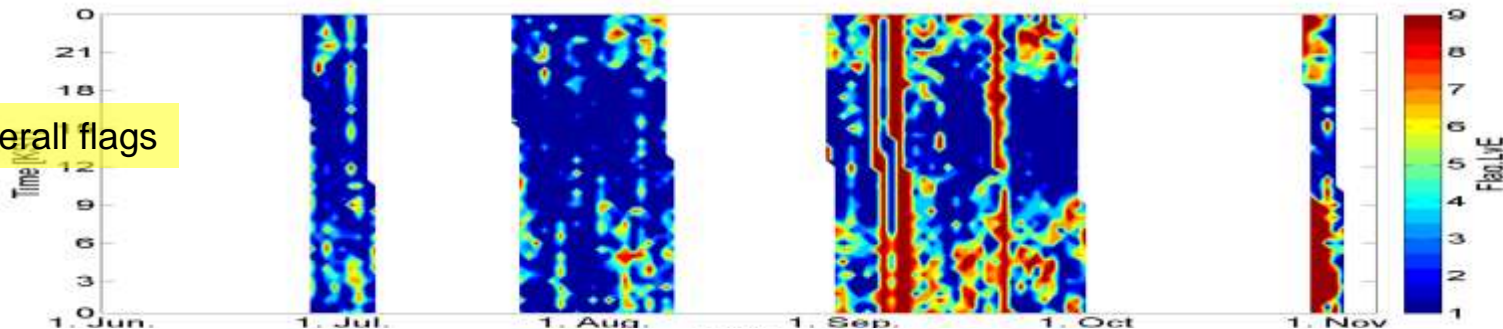
TK2 result

Filtered with overall flags

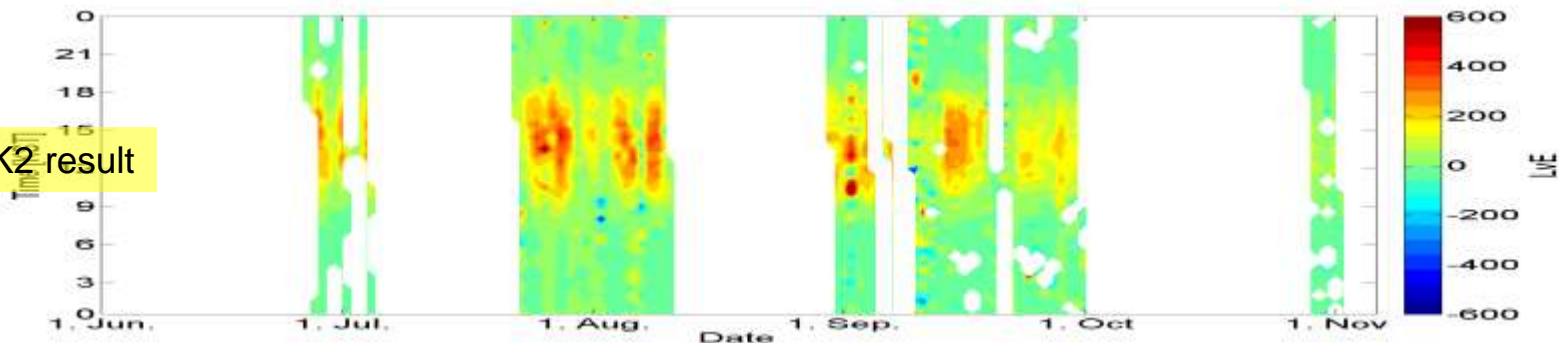
Filtered with detailed flags



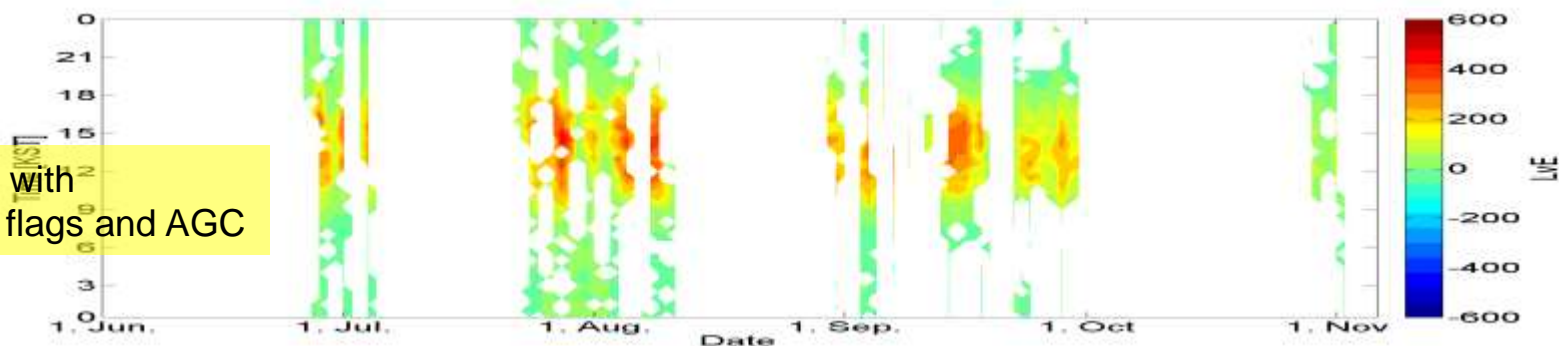
Overall flags



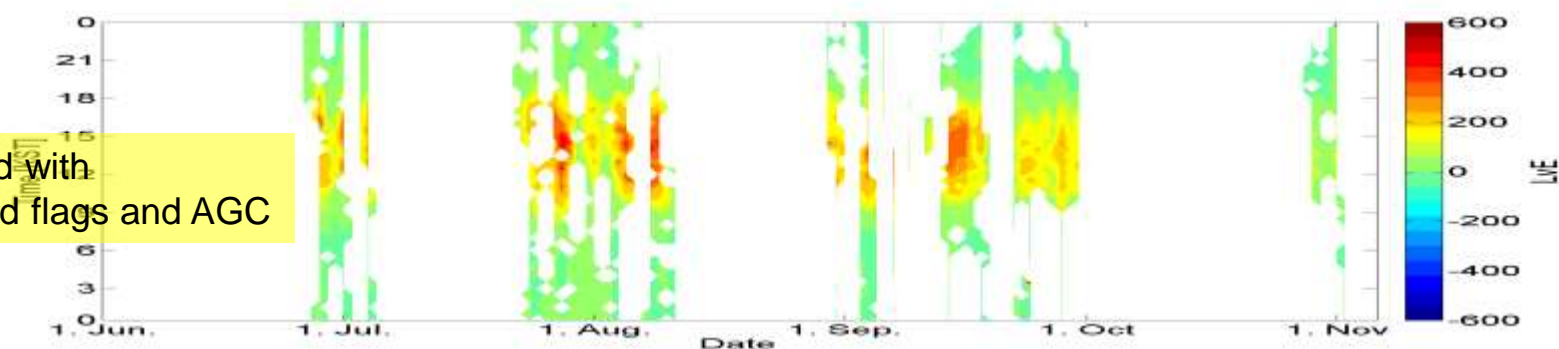
TK2 result



Filtered with overall flags and AGC

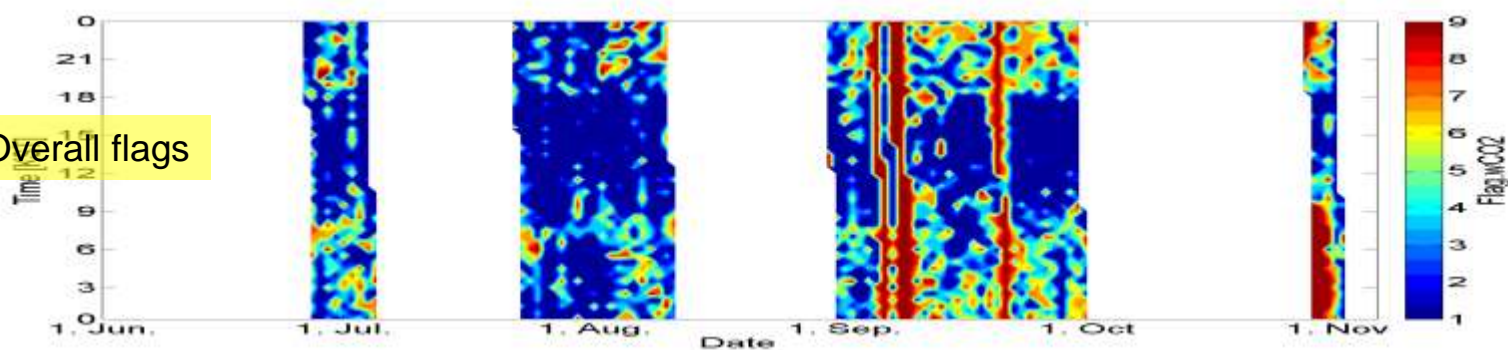


Filtered with detailed flags and AGC

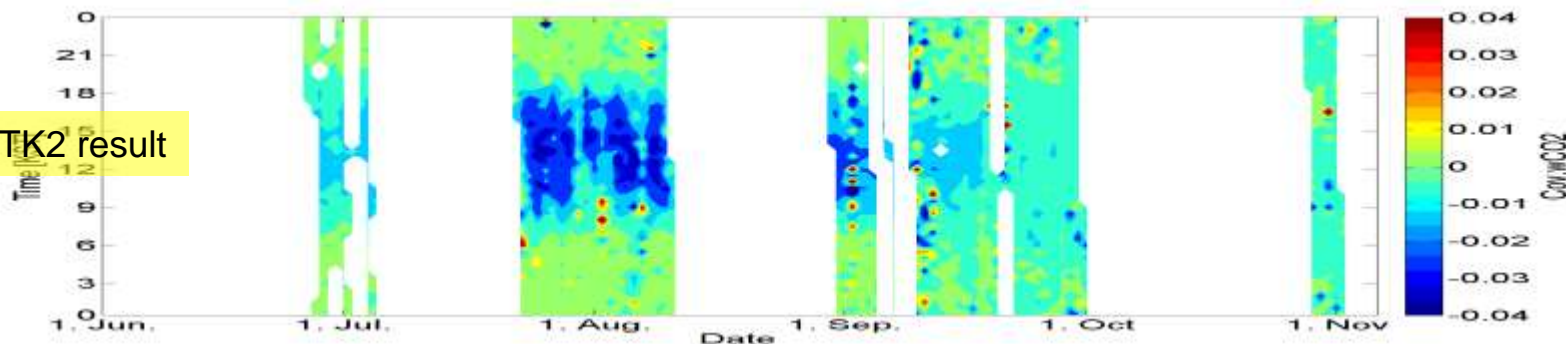




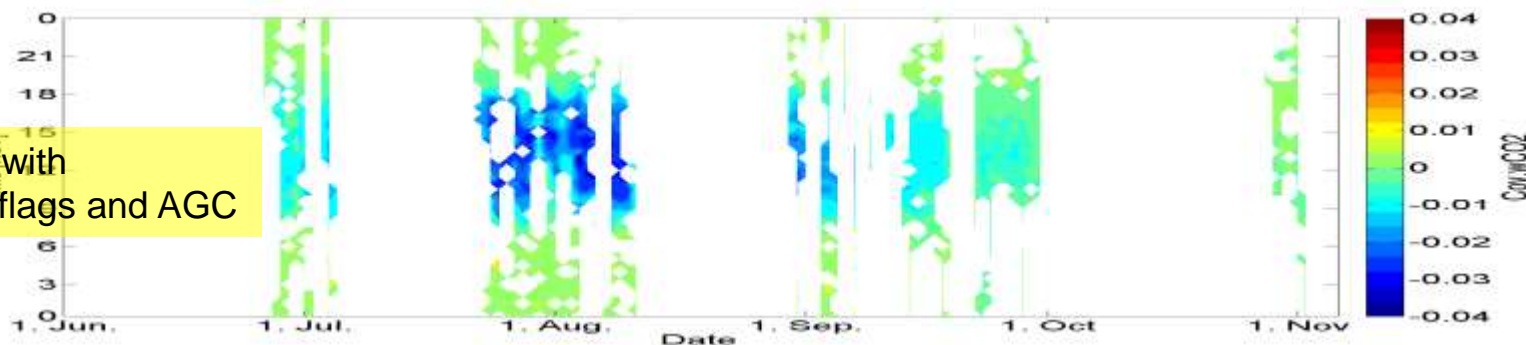
Overall flags



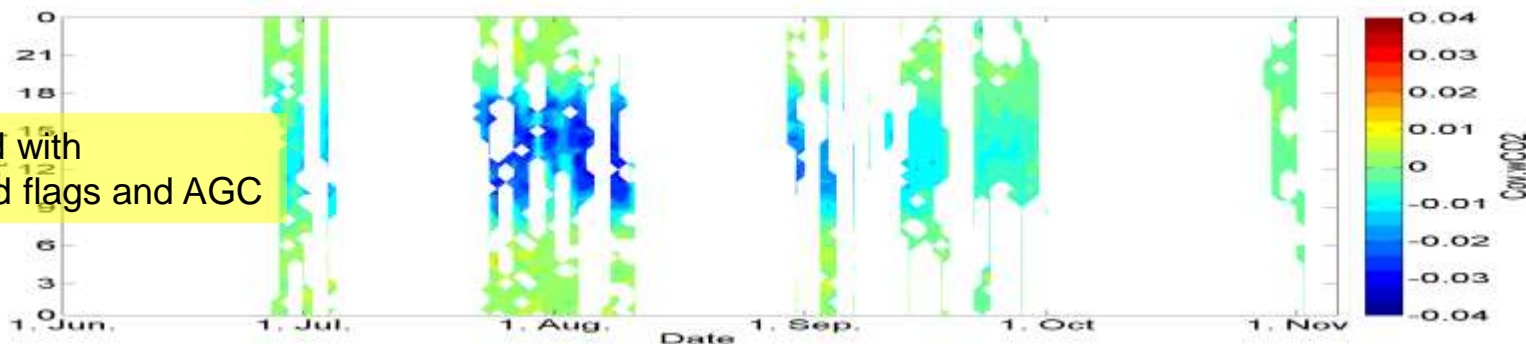
TK2 result



Filtered with
overall flags and AGC

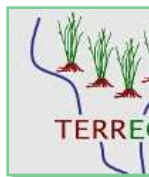


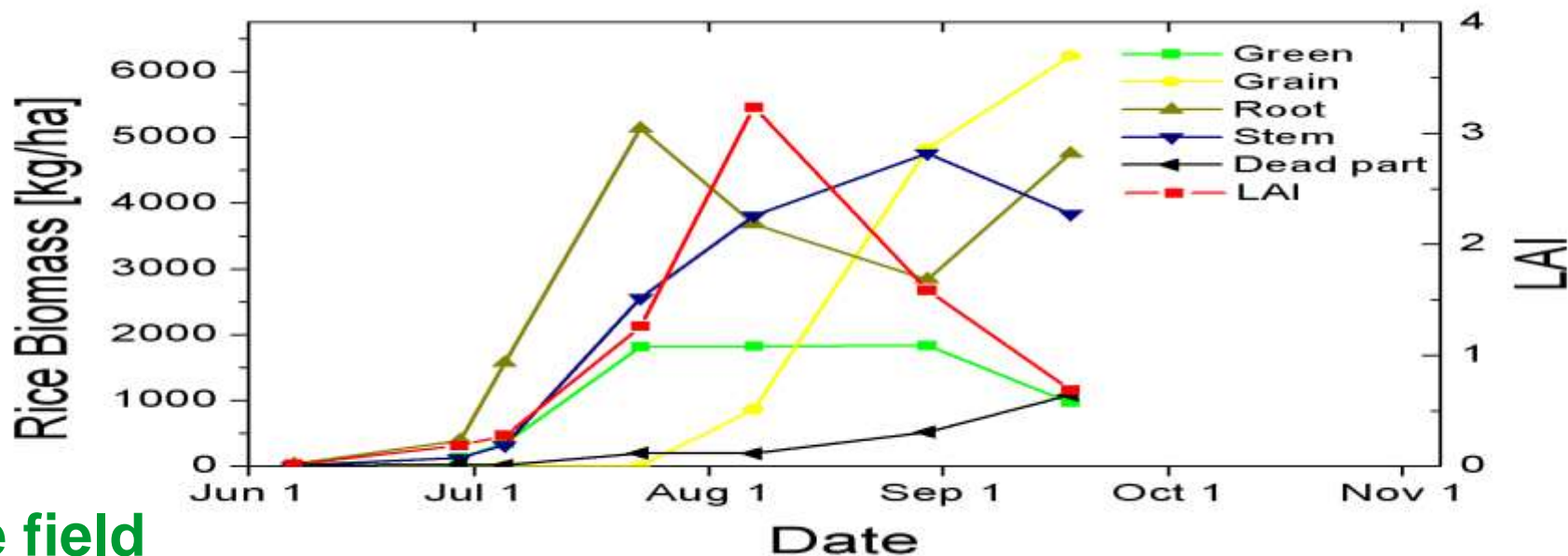
Filtered with
detailed flags and AGC



Rice field

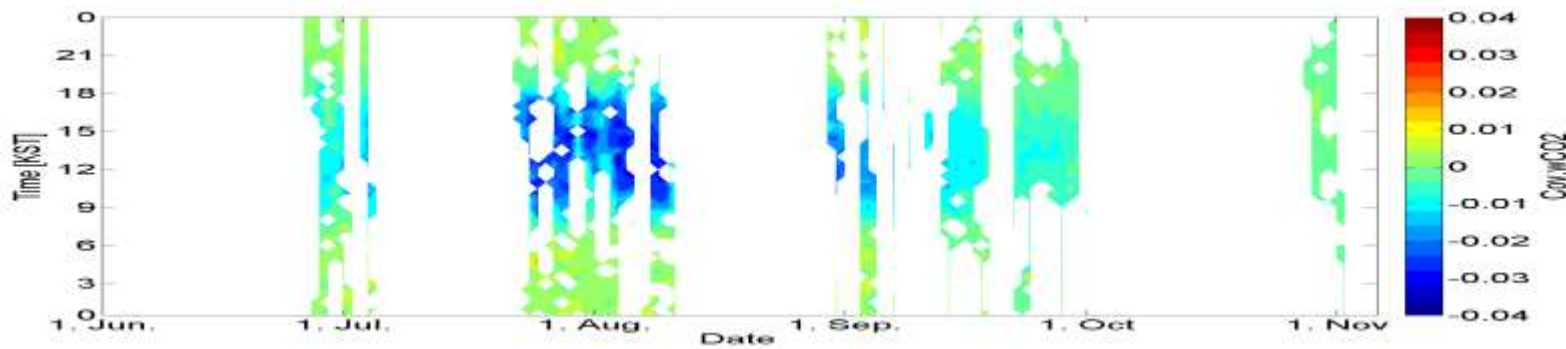
CO₂ flux



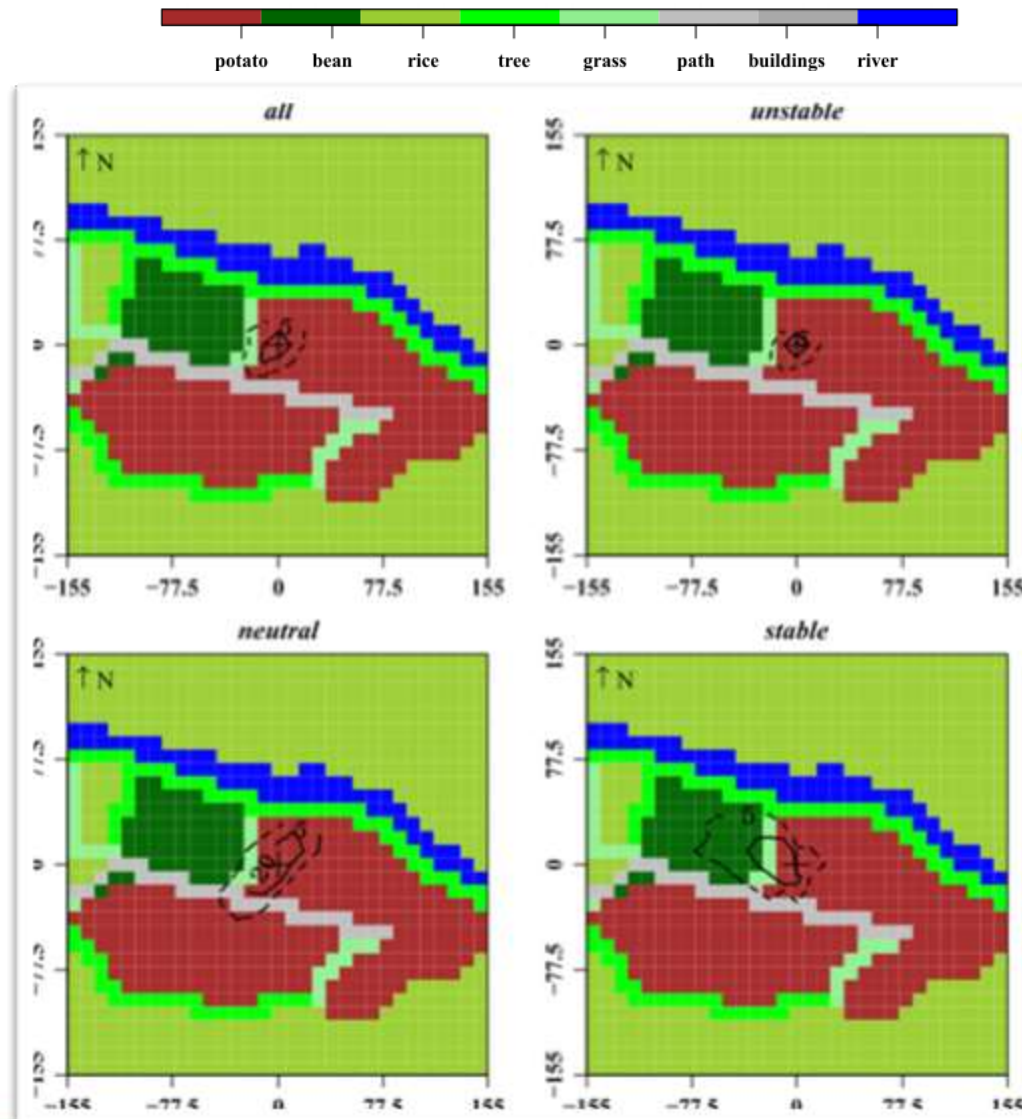


Rice field

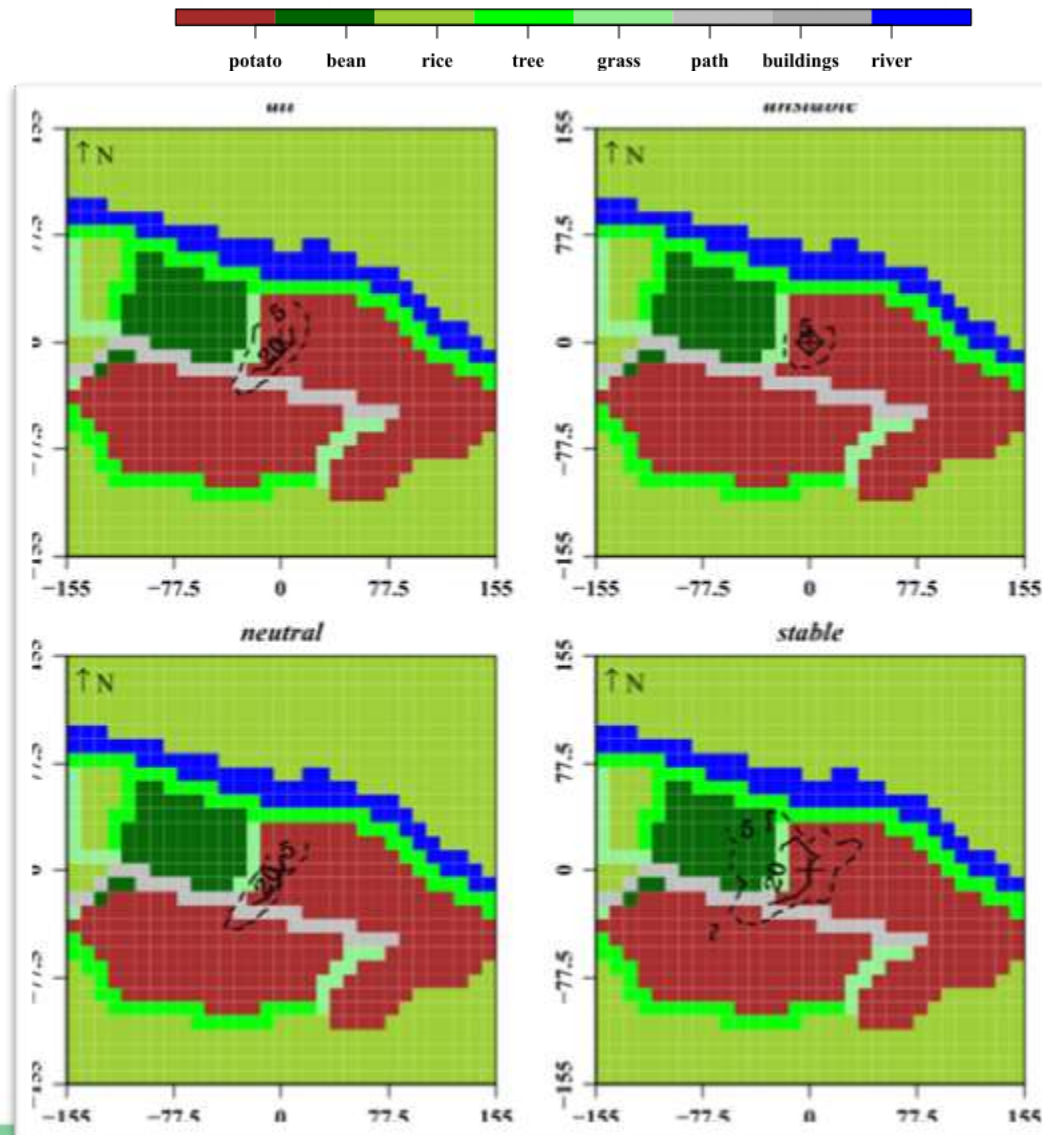
CO₂ flux



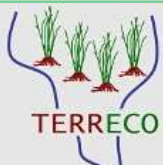
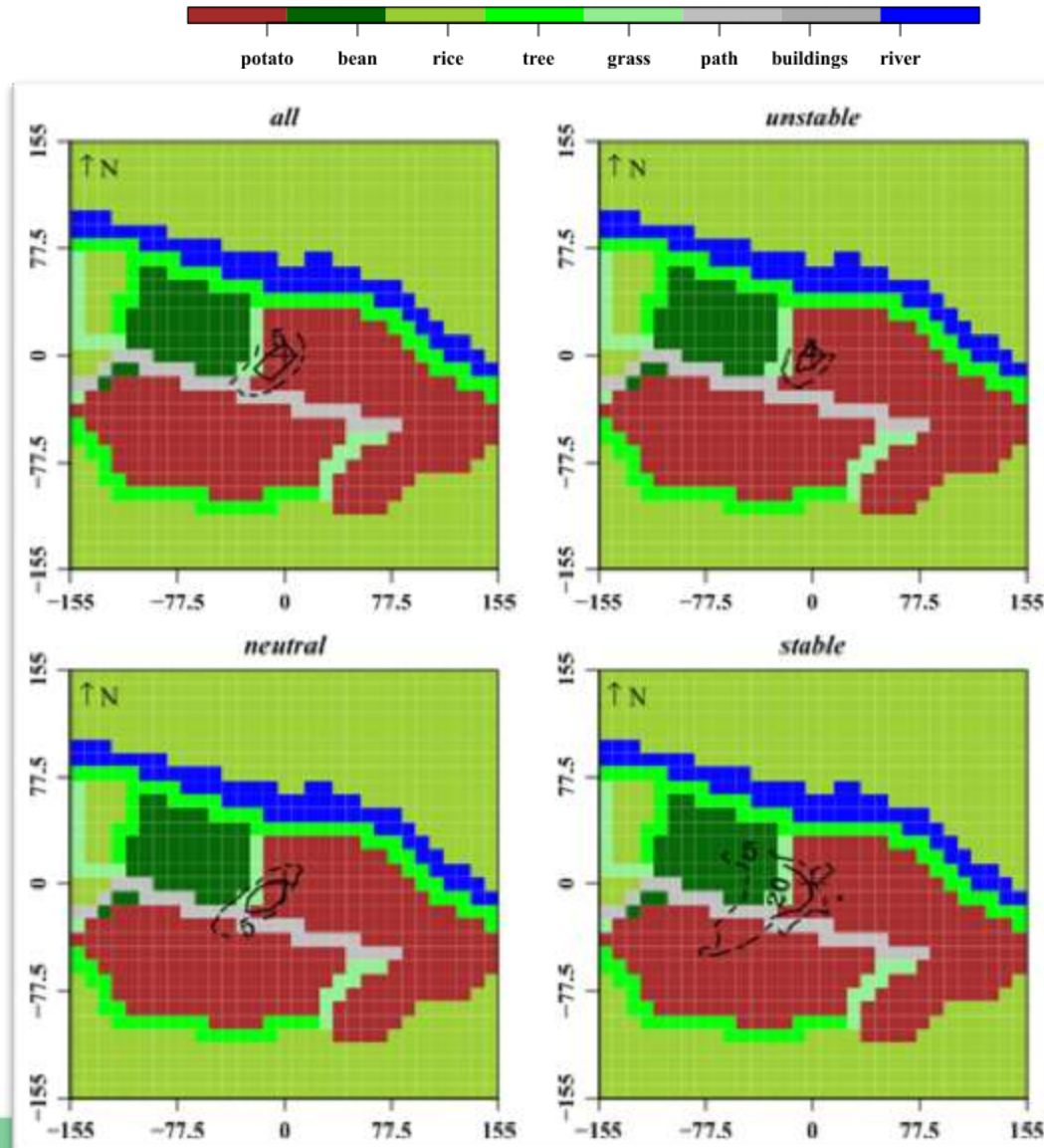
Footprint at potato field 2010-6-1 ~ 6-24



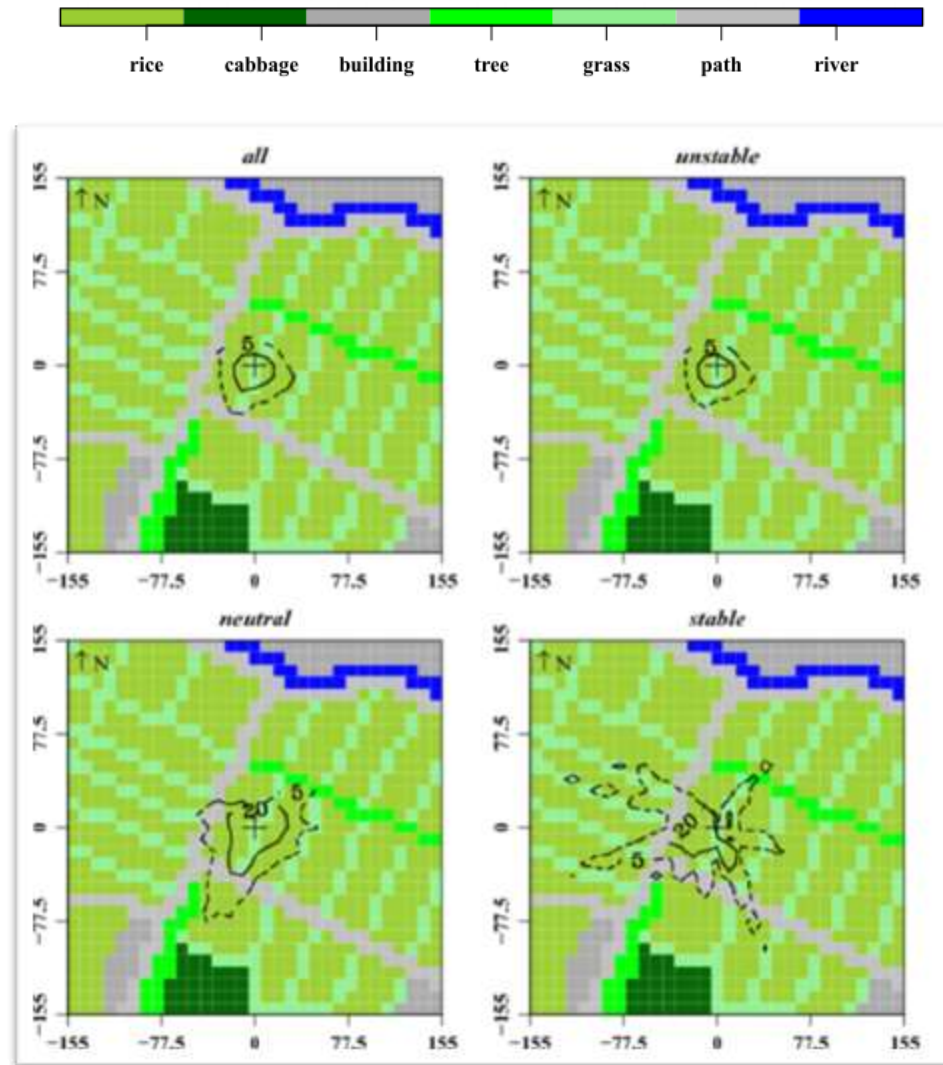
Footprint at potato field 2010-7-6 ~ 7-22



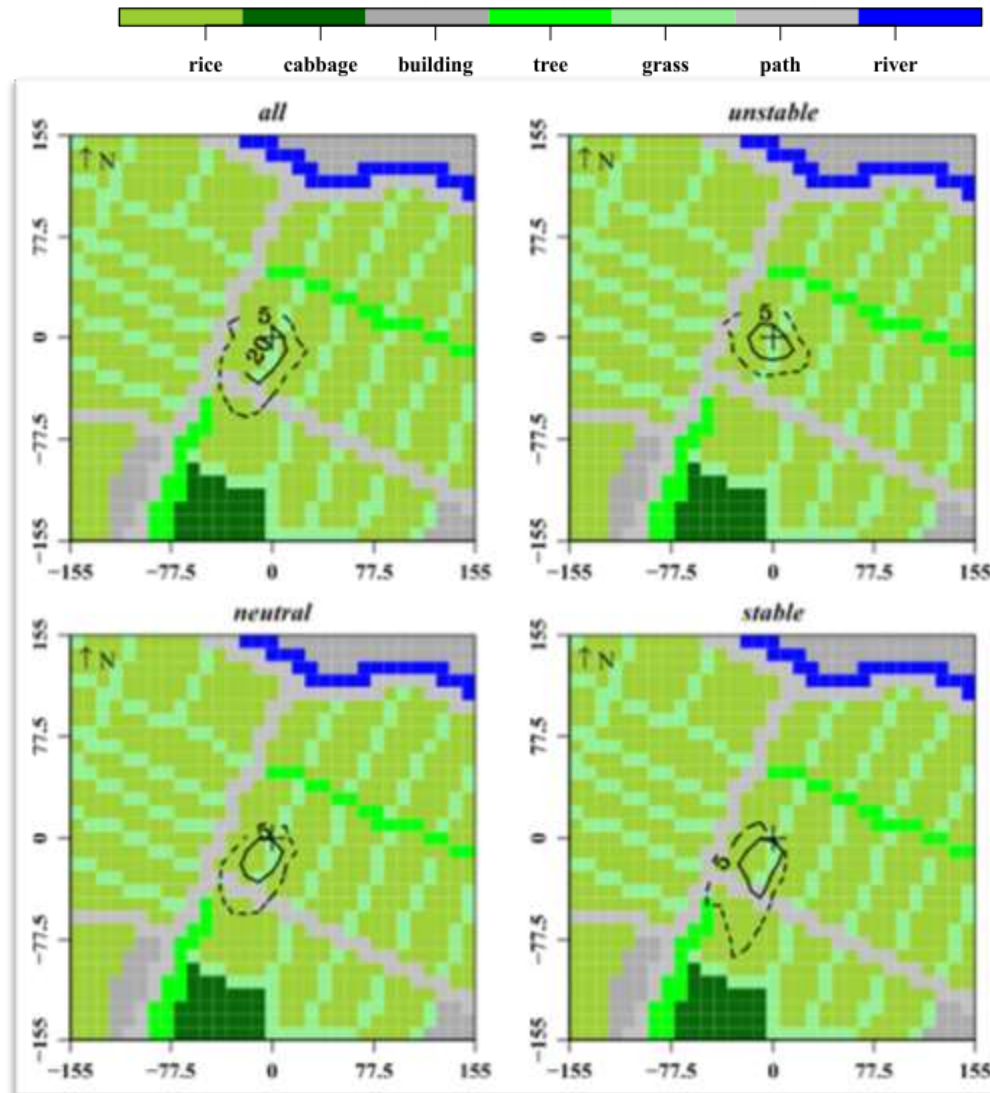
Footprint at potato field 2010-8-13 ~ 8-28



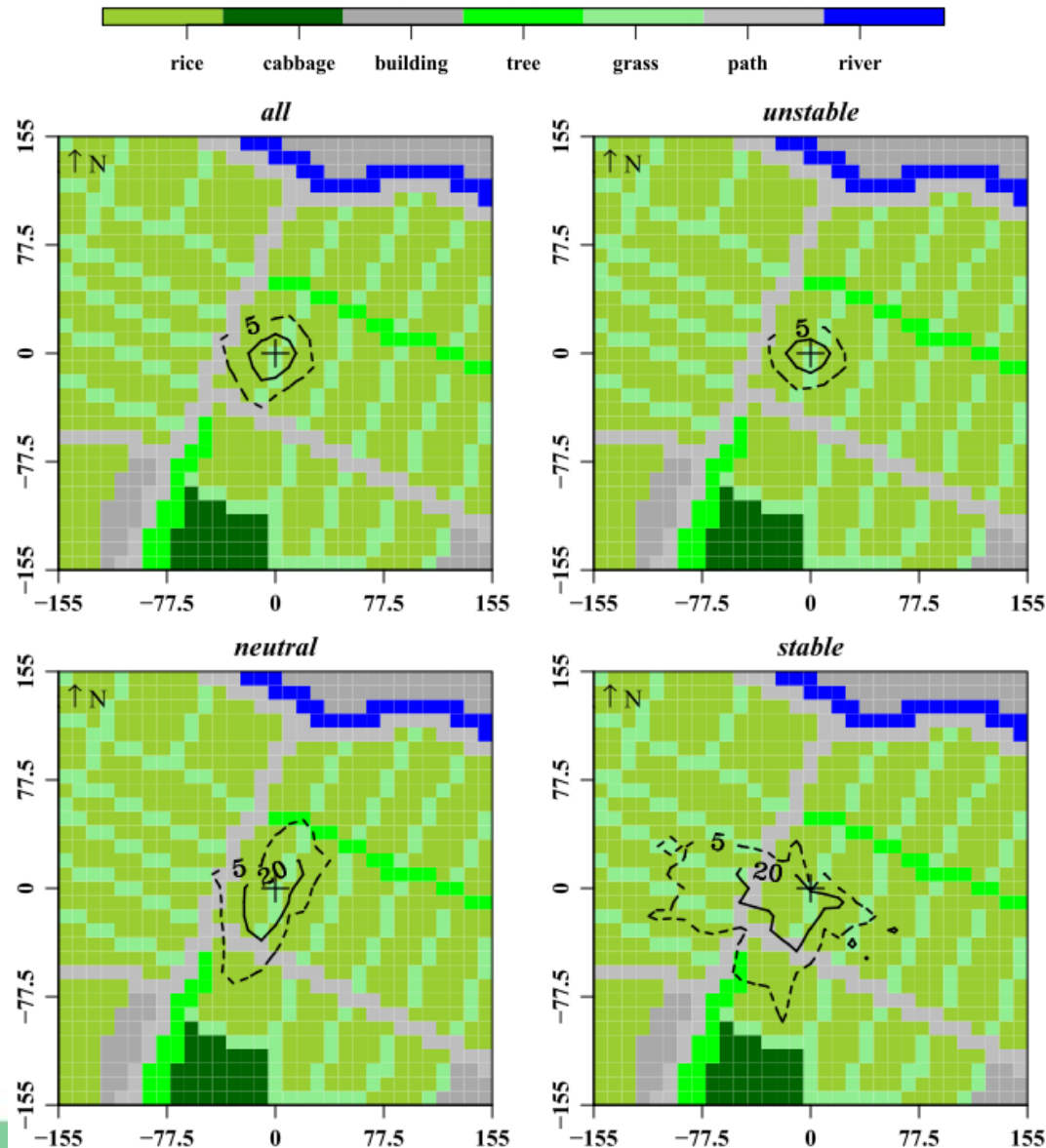
Footprint at potato field 2010-6-26 ~ 7-5



Footprint at potato field 2010-7-22 ~ 8-11



Footprint at potato field 2010-8-30~10-10



Team work



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Documentation



UNIVERSITY OF BAYREUTH

Department of Micrometeorology

Complex TERRain and ECOlogical Heterogeneity (TERRECO)

**WP 1-02: Spatial assessment of atmosphere-
ecosystem exchanges via micrometeorological
measurements, footprint modelling and mesoscale
simulations**

**Documentation of the Observation Period
May 12th to Nov. 8th, 2010, Haean, South Korea**

DRAFT

**Peng Zhao
Johannes Lüers
Johannes Olesch
John Tenhunen
Thomas Foken**

Arbeitsergebnisse
Nr. **
Bayreuth, December, 2010

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Thank you for your attention.

감사합니다.

Vielen Dank für Ihre Aufmerksamkeit.

谢谢。

