# Evaluation of Fire Detection using MODIS Imagery

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# Topics

- Background / Overview
  - Observation area
  - Location of Fire
  - Objects of this work
- Dataset
  - Hotspots
  - Satellite Imagery
  - Ground Observation
- Analysis
  - Fire detection
  - Comparison of …
    - MODIS imagery pixels
    - Ground observation
- Summary

# Location of observation area

Location: 113.2E – 115.0E, 3.5S – 2.0S

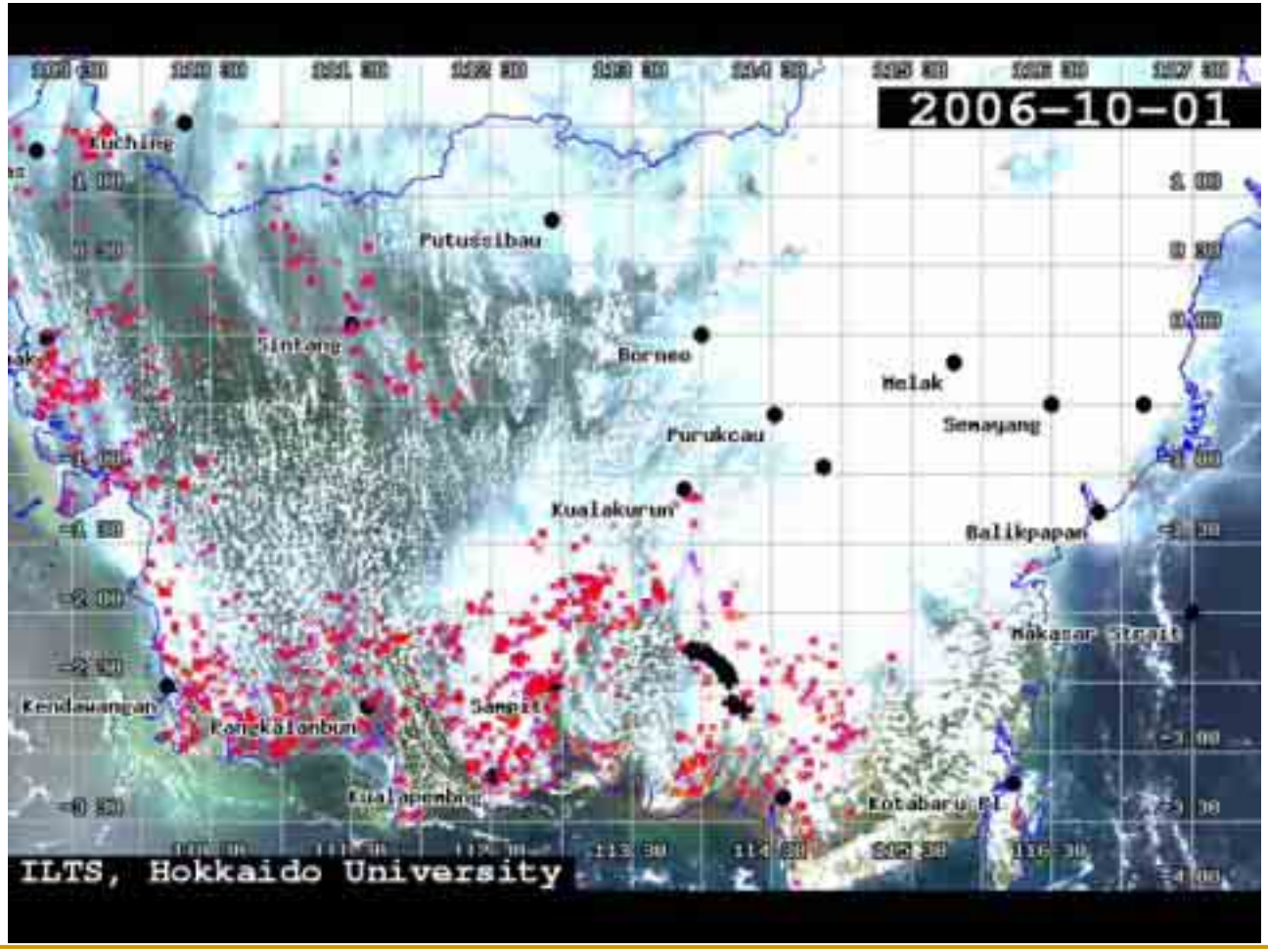
Keyword: Peat land, Mega rice project and Fire to open firm land.


- X Hotspot detected by CRISP
- X Hotspot detected by LAPAN
- X Hotspot detected by AIT
- + Ground Obs. by Univ. Palangka Raya

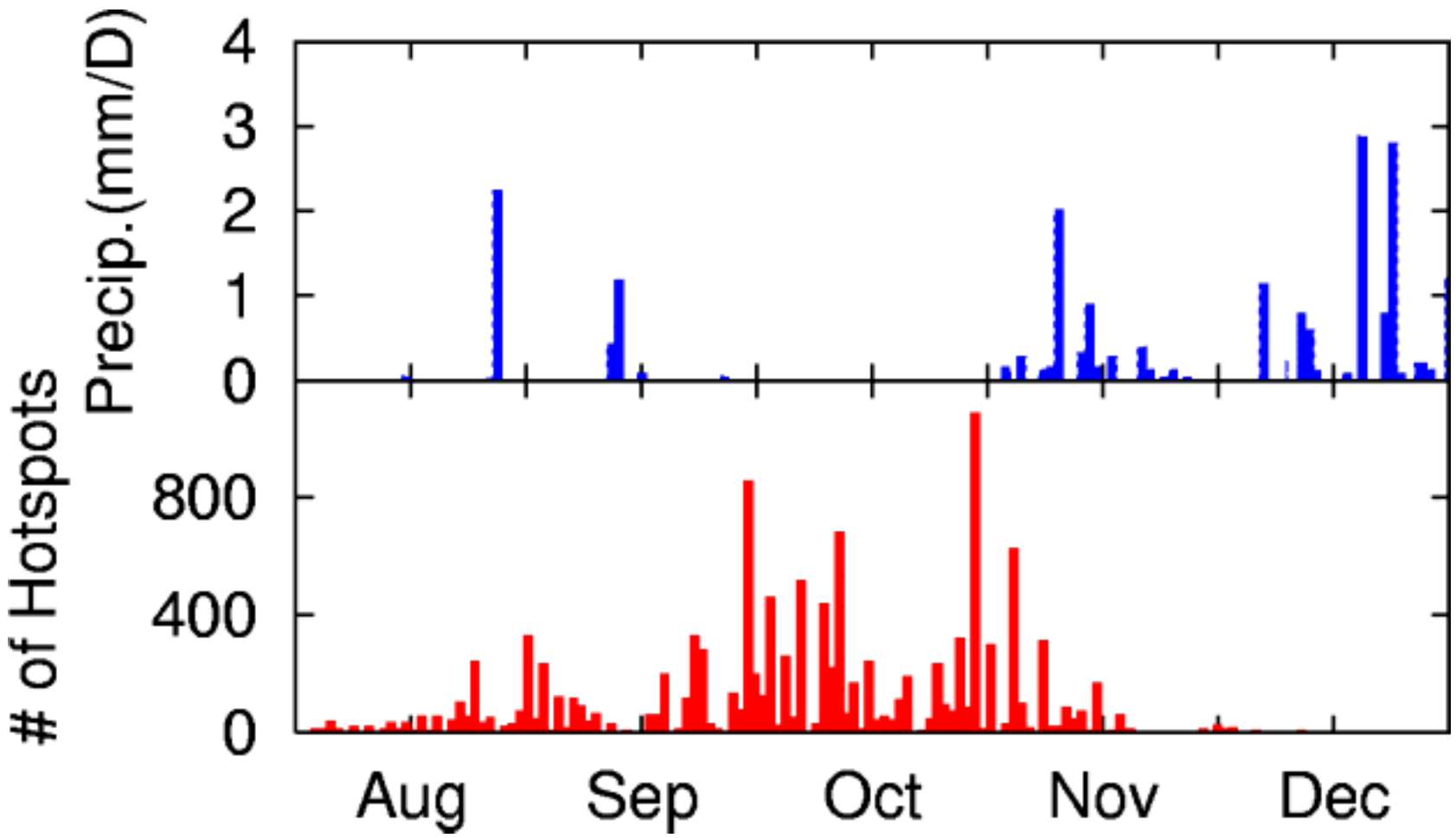

7 Oct 2006 Hotsp

Grass Fire on 8 Oct.

# Hotspot plot in October 2006



# Hotspots and Climate Condition



# ALOS AVNIR2 Imagery and Hotspot by MODIS on 6 Oct

# Objectives

- Validation of fire detection algorithm
  - Comparison of hotspots between stations
    - Effect of Different in process of satellite imagery
  - Comparison of hotspots with ground observations
    - Burning area vs. Brightness Temperature
  - Research will continue to…
    - Burning area vs. Brightness Temperature anomaly
    - Less commission error and less omission error

# Collected Datasets

| | |
|---|---|
| Hotspots | 1 Oct – 31Oct. |
| MODIS L1B Imagery | 1 Oct – 31Oct. |
| Ground Observation data | 1, 5, 8, 15, 20, 25 Oct. |

# Received Hotspots

| Institute | Total num. of imagery | Imagery incl. Hotspots | Number of hotspots |
|---|---|---|---|
| AIT | 172 | 46 | 3356 |
| CRISP | 221 | 46 | 3403 |

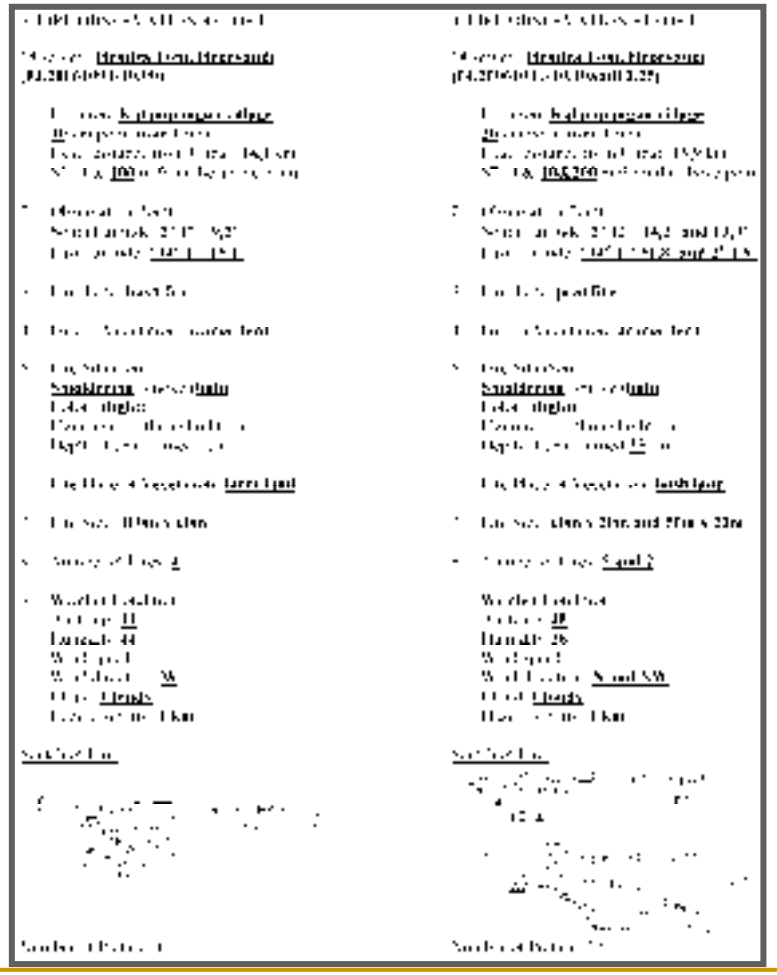
Comparison of hotspots between stations:

→According to plots of hotspots,
most of hot spots are at almost same location.

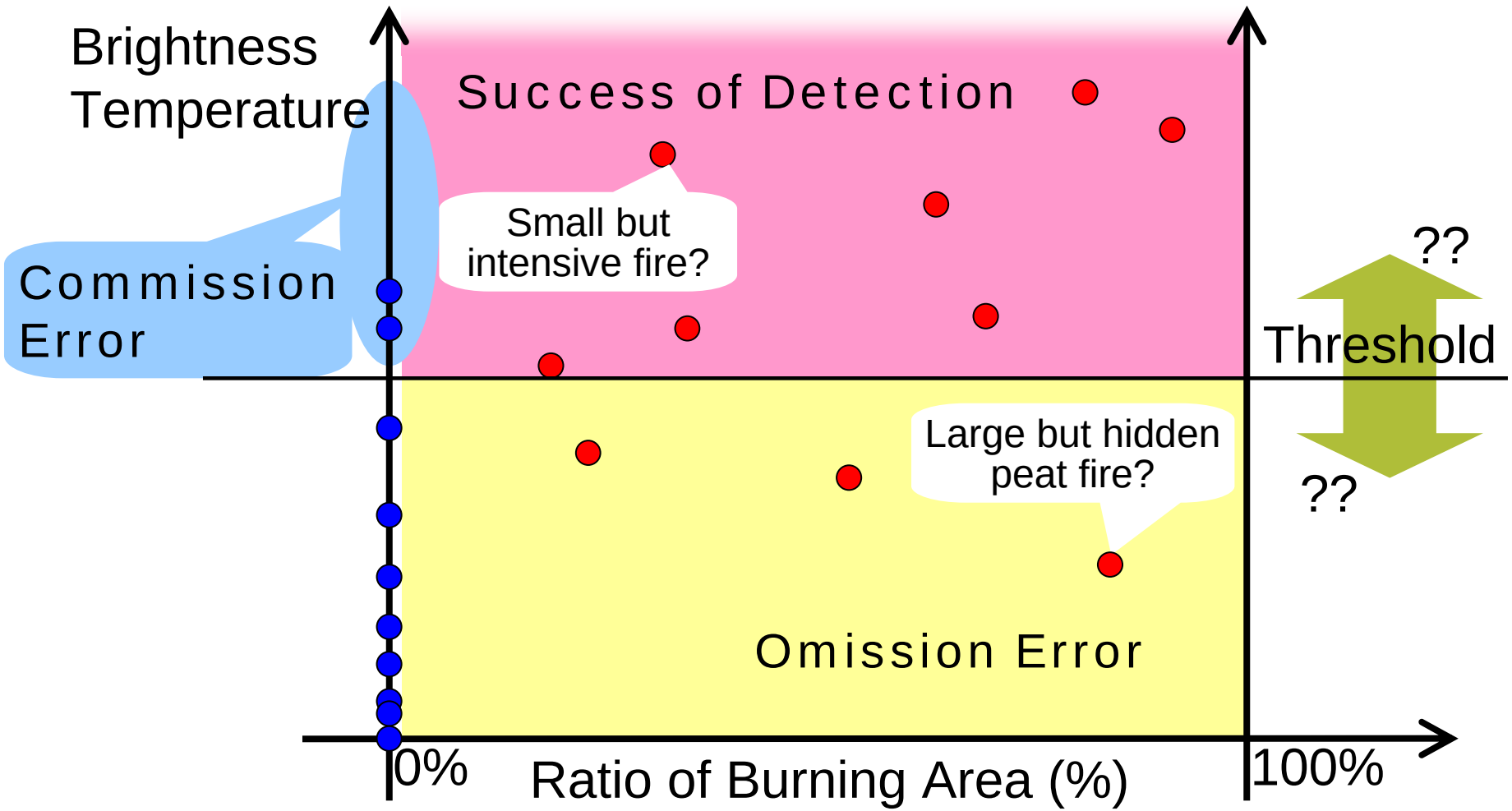
→MOD14 datasets are almost compatible among stations.

# Ground observation data

- Ground observation
  - Observations in Oct 2006
    - 6 times (1,5,8,15,20,25)
    - Latitude, Longitude
    - Fire shape information
    - Fire type (peat, forest…)
    - Climate conditions

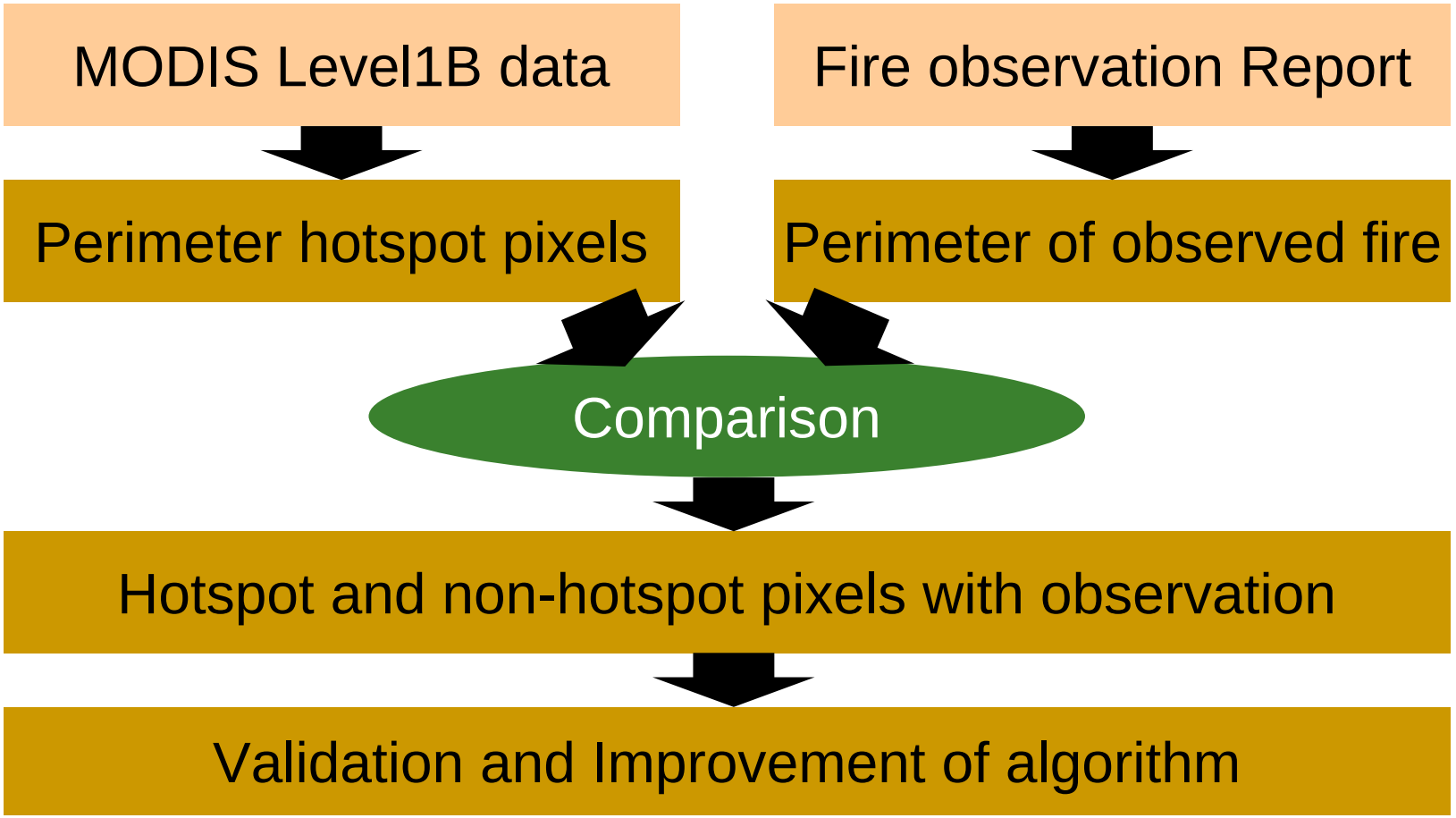


# Fire detection and errors




Relationship:
Burning Area ←→ Brightness Temperature

# Process of validation of fire detection algorithm



# Production of fire perimeter

3. FIRE OBSERVATION REPORT

Observer : Hendra Toni, Hepryandi (03.2006101-10.00)

1. Location: Kalampangan village
   10 km point from Unpar
   Exact distance from Unpar: 14.1 km
   SE of & 100 m from the above point
2. Observation Point:
   South Latitude: 2° 17'' 9.2'
   East Latitude: 114° 1'' 15.1'
3. Fire Type: bush fire
4. Fuel or Vegetation: acacia, fern
5. Fire Situation:
   Smoldering, smoke (light)
   Color : (light)
   Flaming ( - ), flame hight - m
   Depth of peat burned - cm
6. Fire Place of Vegetation: farm land
7. Fire Size: 100m x 60m
8. Number of
9. Weather C
   Air temp
   Humidity
   Wind spee
   Wind direc
   Cloud Cle
   Haze visibi

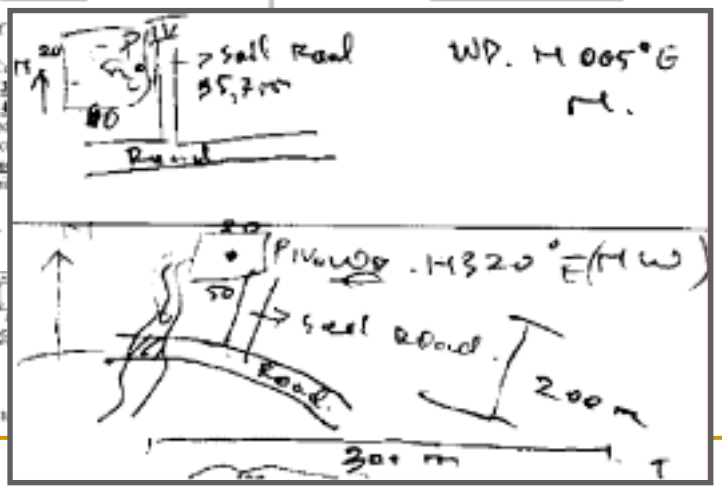
Sketch of Fire:

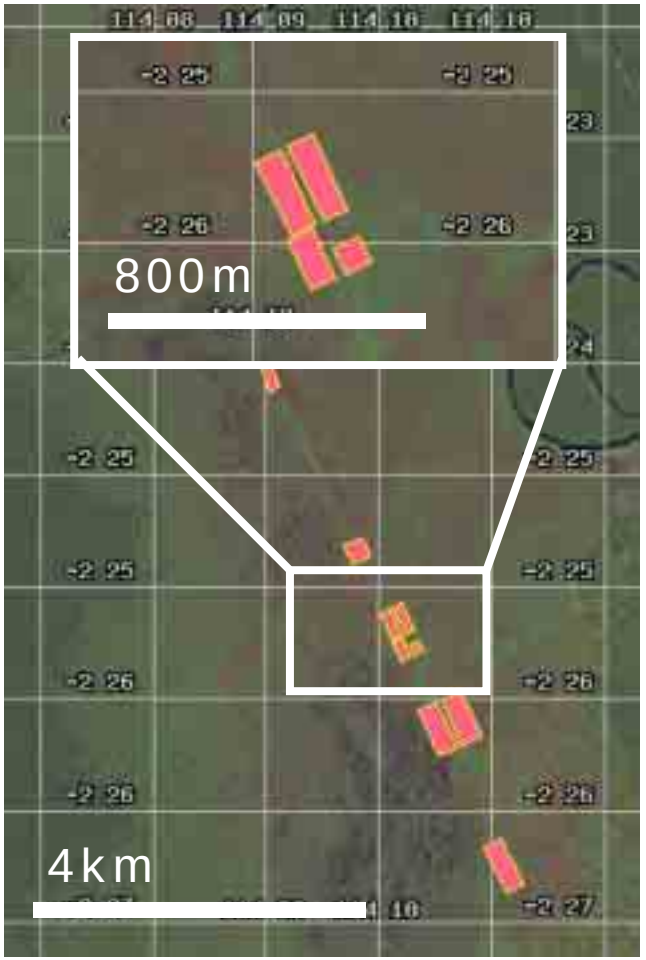
Number of Pic

4. FIRE OBSERVATION REPORT

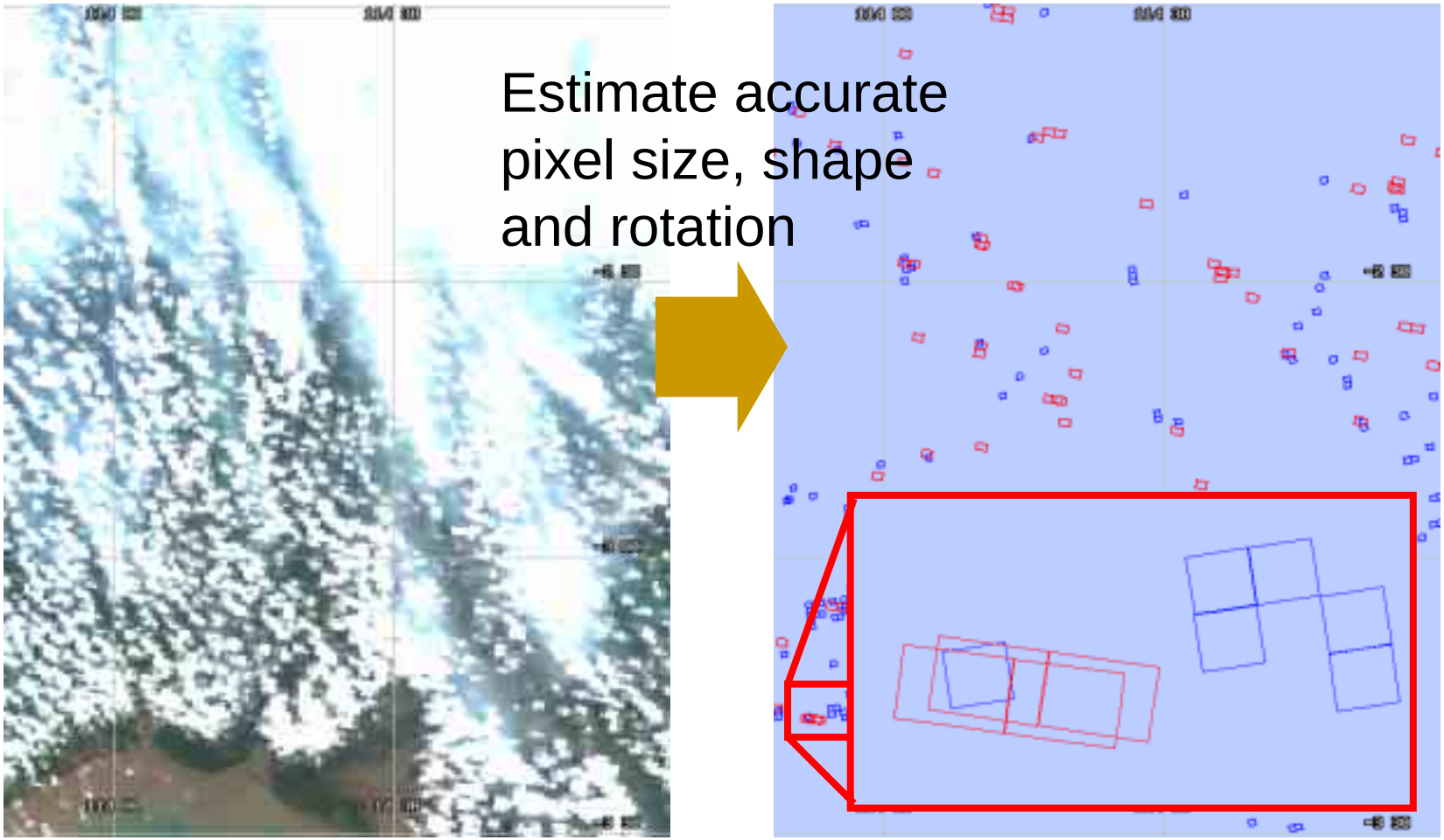
Observer : Hendra Toni, Hepryandi (04.2006101-10.10and10.25)

1. Location: Kalampangan village
   10 km point from Unpar
   Exact distance from Unpar: 15.9 km
   SE of & 10&200 m from the above point
2. Observation Point:
   South Latitude: 2° 12'' 14.3' and 13.9'
   East Latitude: 114° 1'' 51.8' and 2'' 1.9'
3. Fire Type: peat fire
4. Fuel or Vegetation: acacia, fern
5. Fire Situation:
   Smoldering, smoke (light)
   Color : (light)
   Flaming ( - ), flame hight - m
   Depth of peat burned 35 cm
6. Fire Place of Vegetation: bush land
7. Fire Size: 60m x 20m and 50m x 20m

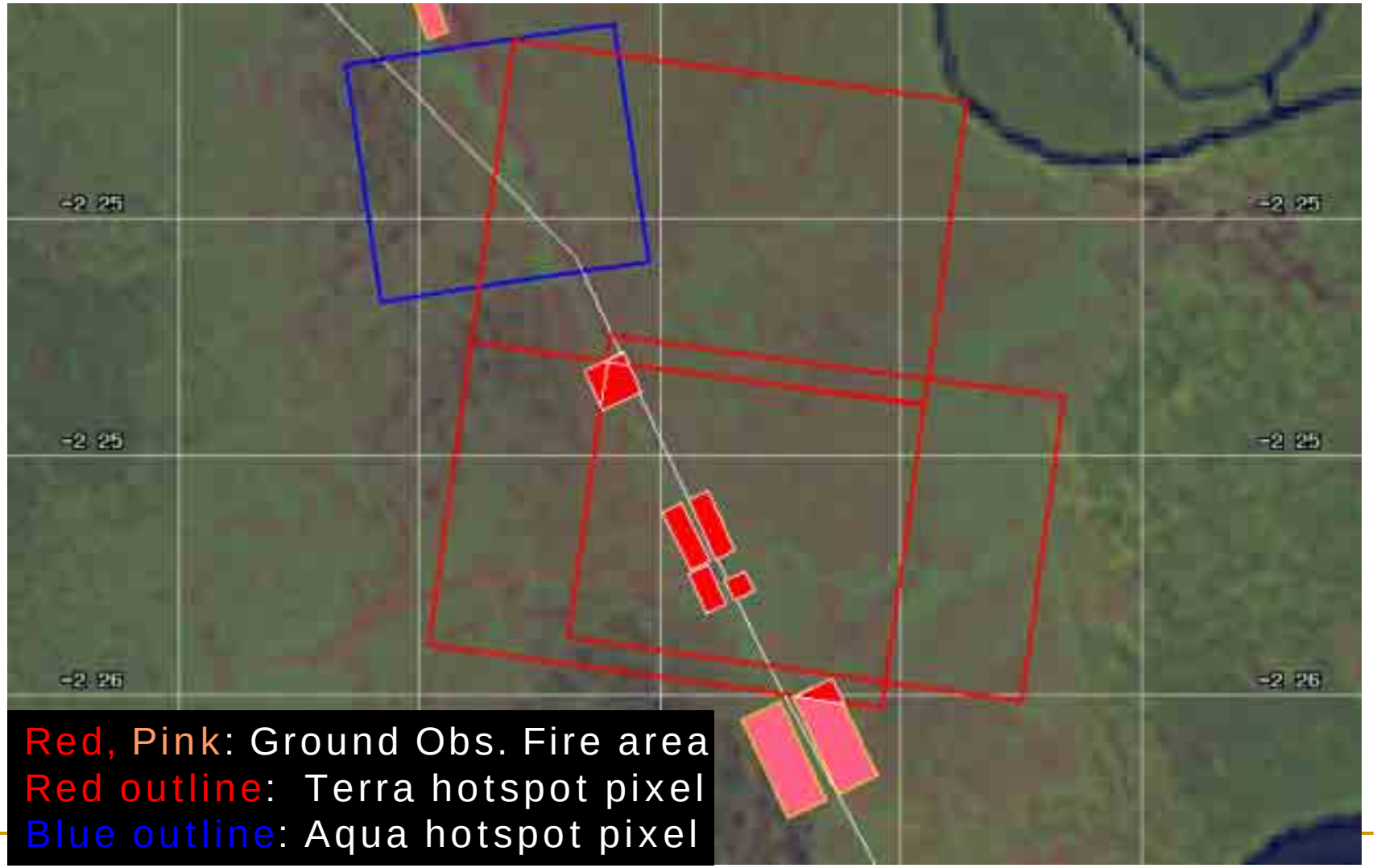


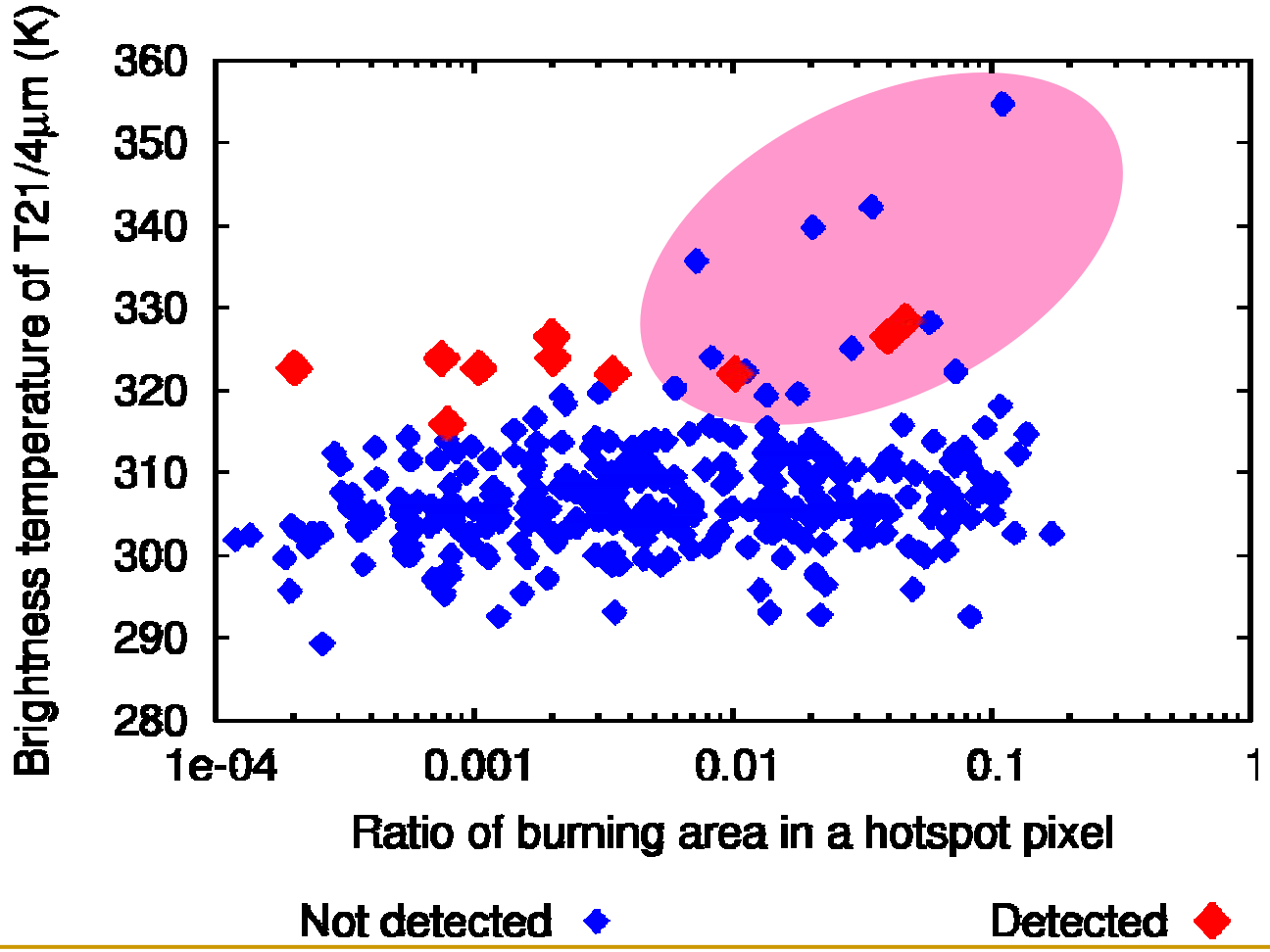
# Production of hotspot perimeter



# Example of perimeters



# T21 (4μm/500K) and burning area



# Summary

- Prototype of Validation
  - Pixel shape & Fire perimeter was estimated
  - Burning area and brightness temp was compared
- Current Limitation
  - Fire type is not considered yet.
  - Limited number of comparison.
- Continue to…
  - Comparison with AVNIR2
  - Modified threshold / new algorithm

    → Less Omission / Commission Error

# Acknowledgement


- Thank you for cooperation.
  - Hotspot information was received from;
    - ACRES (Alphabetical order)
    - AIT
    - CRISP
    - LAPAN
  - Financial / organization support was made by
    - JAXA