SATELLITE BASED EARLY WARNING SYSTEM TO DETECT PEATLAND FIRE IN CENTRAL KALIMANTAN

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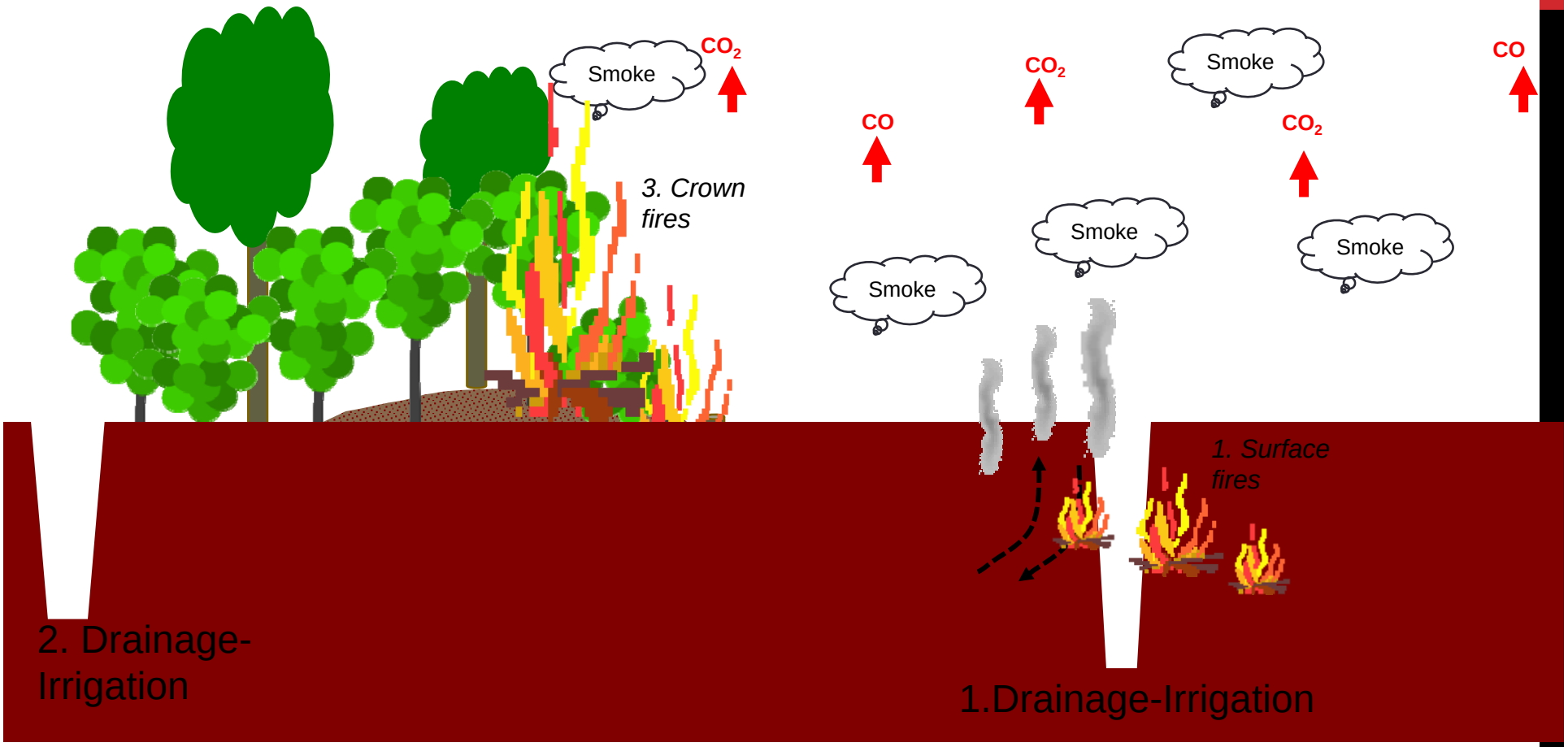
OUTLINE

1. TYPICAL PEATLAND FIRES
2. RECENT OPEN SOURCE OF FIRE MONITORING
3. THE OBJECTIVES OF STUDY
4. FIRES TREND IN KALIMANTAN
5. HOW 2014-2015 PEATLAND FIRES IN C. KALIMANTAN ?
6. HOTSPOT CHECK
7. FIRE EDUCATION CAMPAIGN

1.TYPICAL PEATLAND FIRE

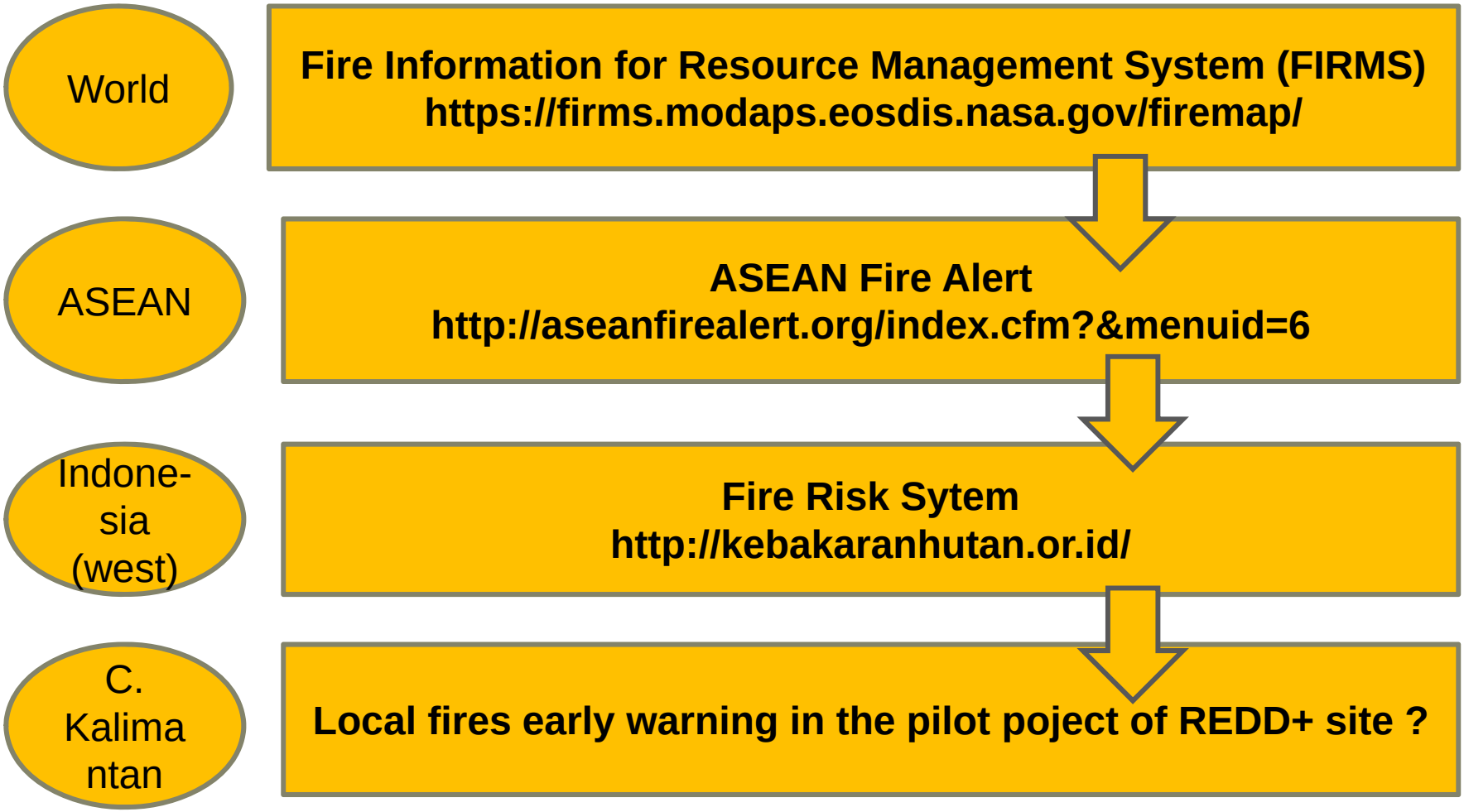


- ✓ The natural condition is very humid and water-logged (swamp).
- ✓ The decreasing of ground water level by the canals of Mega Rice Project in C. Kal

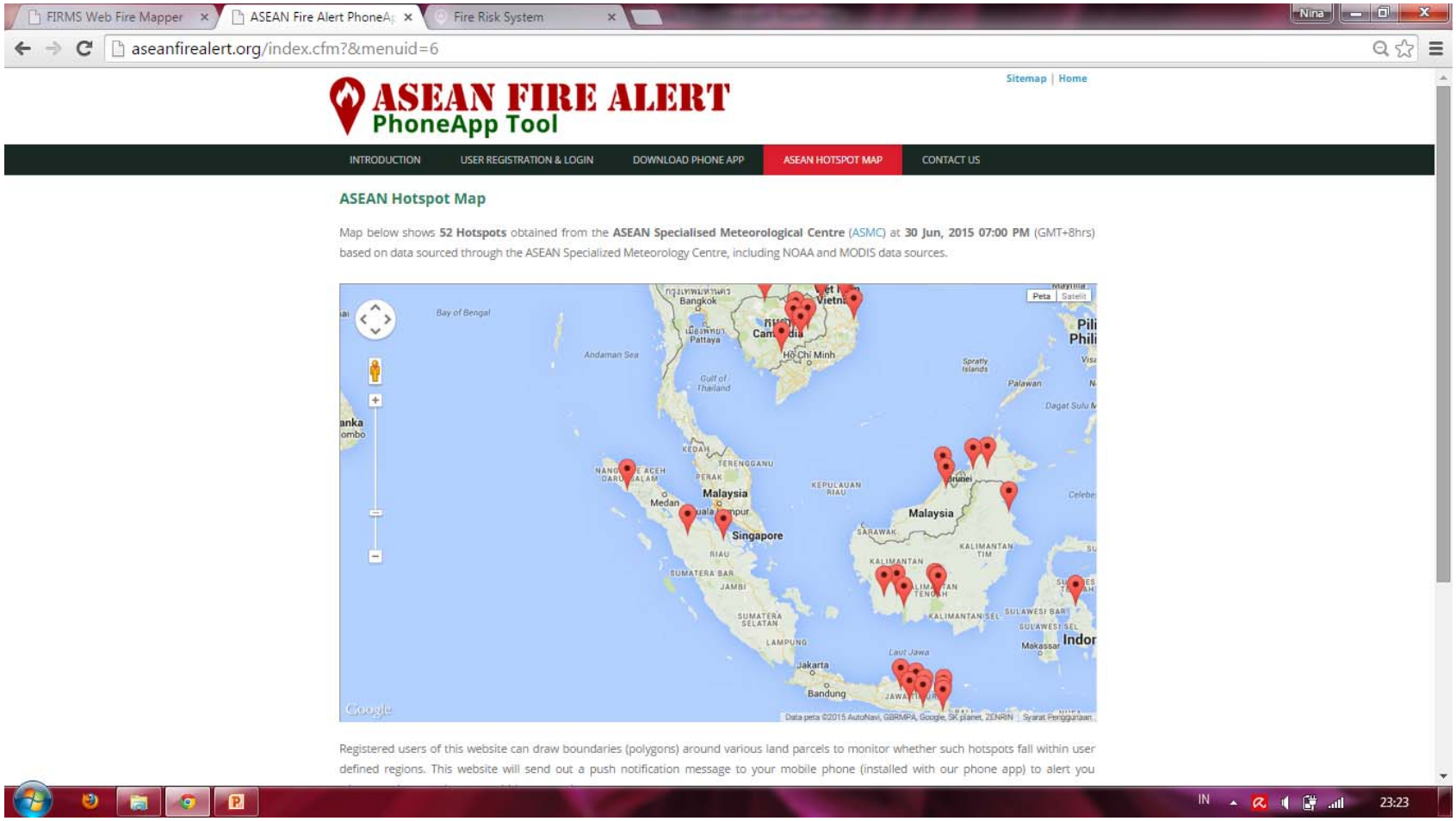
PEAT FIRES (SMOLDERING)

Peat fire :
Ground fire burn peat layer, roots, dry leaves and other organic matter. This type is smoldering fire (incomplete fire), which can be active for days with flameless and low spreading rates. The depth of smoldering is about tens centimeters underground.

2. RECENT OPEN SOURCE OF FIRE MONITORING USING MODIS DATA IN INDONESIA

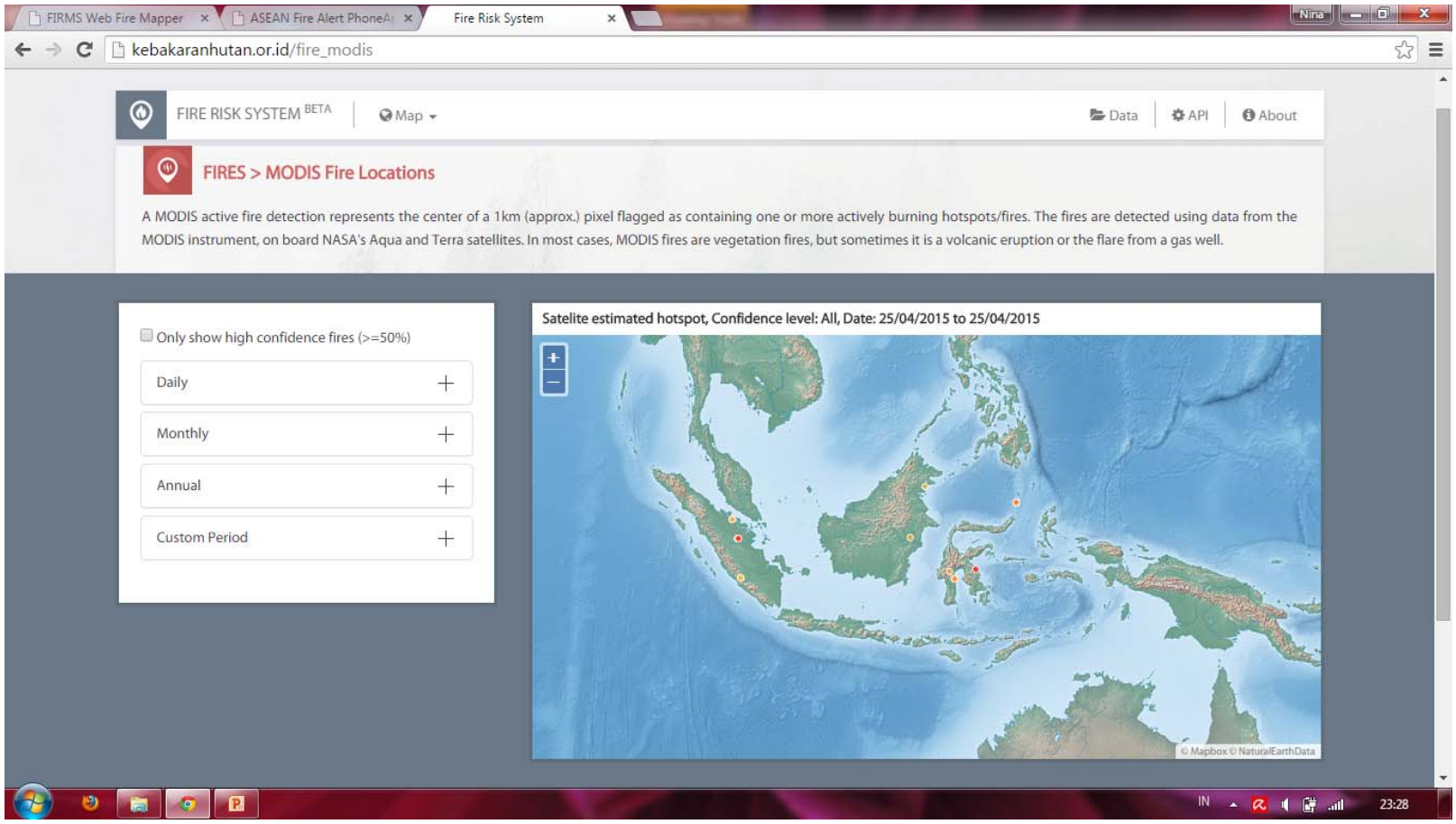


ASEAN FIRE ALERT
BY GLOBAL ENVIRONMENTAL CENTER-USAID LEAF



Provide data in PhoneApp

FIRE RISK SYSTEM BETA
BY CENTER FOR CLIMATE RISK AND OPPORTUNITY MANAGEMENT IN SOUTHEAST ASIA AND PACIFIC (CCROM)-UNORCID



Provide fire prediction and weather datar (Canadian Fire Index)

ALL OF RECENT FIRE EARLY WARNING WEB ARE COMPLETELY PERFECT FOR SCIENTIST OR EXPERT BUT THEY ARE VERY COMPLEX FOR THE ORDINARY USER OR VILLAGER

HOW TO REDUCE ANNUAL FIRE IN PEATLAND OF CENTRAL KALIMANTAN ?

Nearly 70% of population have low education and low internet access.....

3. THE OBJECTIVES OF THIS PROJECT ?

- **To investigate peatland fire and the causes factor in Central Kalimantan**
- **To deliver the hotspot (fire) information to the local stakeholder (government, plantation owner, firefighter, villager)**
- **To improve the awaraness of the local community**

4. FIRE TREND IN KALIMANTAN

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Scientific Research

Recent Active Fires under El Niño Conditions in Kalimantan, Indonesia

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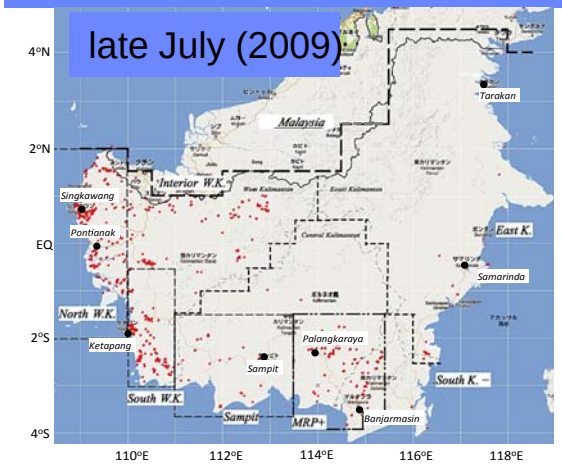
ABSTRACT

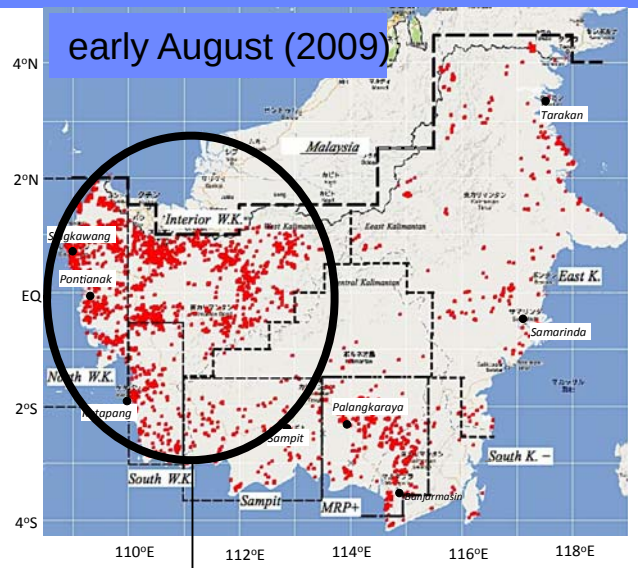
Analysis of the most recent 10-year periods (2002 to 2011) of MODIS hotspots data (fires) and precipitation in Palangkaraya and Pontianak was carried out to identify seasonal and spatial fire occurrence in Kalimantan under El Niño conditions, and to asses future forest condition in Kalimantan. Most data was tallied every 10-day to analyze seasonal and spatial fire occurrence. Seasonal and spatial analysis results for severe fire years, namely 2006 and 2009, under El Niño conditions were as follows: the severest fire incidents for whole Kalimantan occurred in October in 2006 under the driest conditions in both Palangkaraya and Pontianak. The severest fires for the Mega Rice Project (MRP) area and its vicinity occurred in late September in 2009 under the driest conditions for Palangkaraya. Fire activities in the last 10-year in south Central Kalimantan were severe than other areas in Kalimantan. This may be explained by different dry conditions of peat. Namely, the peat in the southern part of Central Kalimantan could become dryer under the relatively longer dry season (about 3-month) compared with other areas (dry season in West Kalimantan is only 2/3-month). One of spatial analysis results clearly showed a so-called a fire belt shape arising from severe fires that occurred mainly on the southern coastal peatlands from West to Central Kalimantan in mid October in 2006.

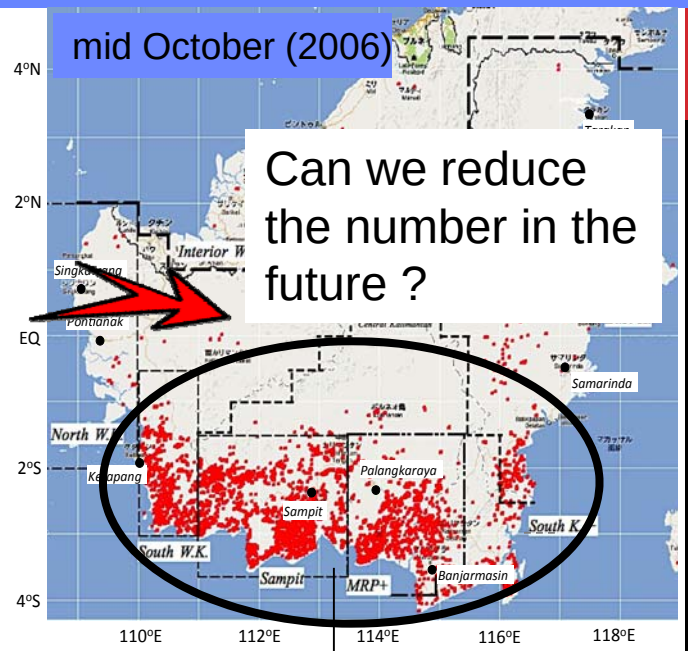
Keywords: Dry Season; El Niño; MODIS Hotspot; MRP; Peat Fire

This work was under JST-JICA Science and Technology Research Partnership for Sustainable Development (SATREPS) project on “Wild Fire and Carbon Management in Peat-Forest in Indonesia”.

Finding: Fire started in West Kalimantan and ended in Central-South Kalimantan (using MODIS hotspot data)







*Warning fire in **late July** under pre- & early dry season (less than 50 hotspots/day)*

*Severe fire season for West Kalimantan in **early August** under peak dry season for Pontianak*

*Severe fire season for southern Kalimantan in **mid October** under dry season for Palangka Raya*

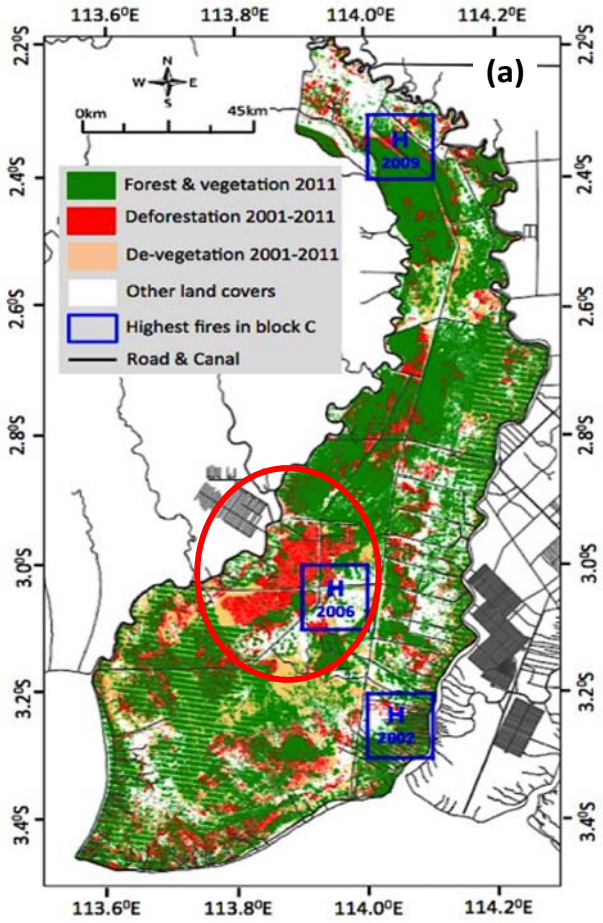
Typical fire distribution is very important for preventing and predicting fire in Kalimantan

R10

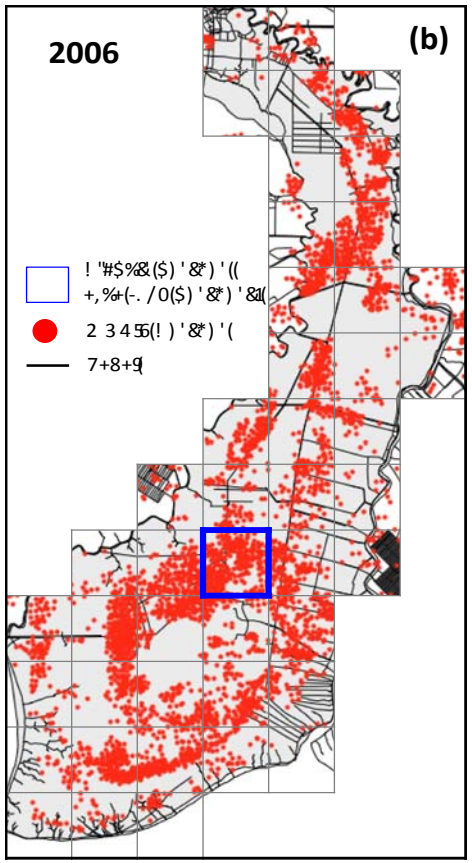
- EVIDENCE: PRIOR TO 2006, THERE WAS FOREST NEAR SEBANGAU NATIONAL PARK (RED) IN BLOCK C OF MRP BUT THE FOREST WAS DISSAPPEAR AFTER 2006.
  THEREFORE, WE ASSUMED MEGA FIRE IN 2006 IN CENTRAL KALIMANTAN CAUSED BY LAND CLEARING

Landsat image

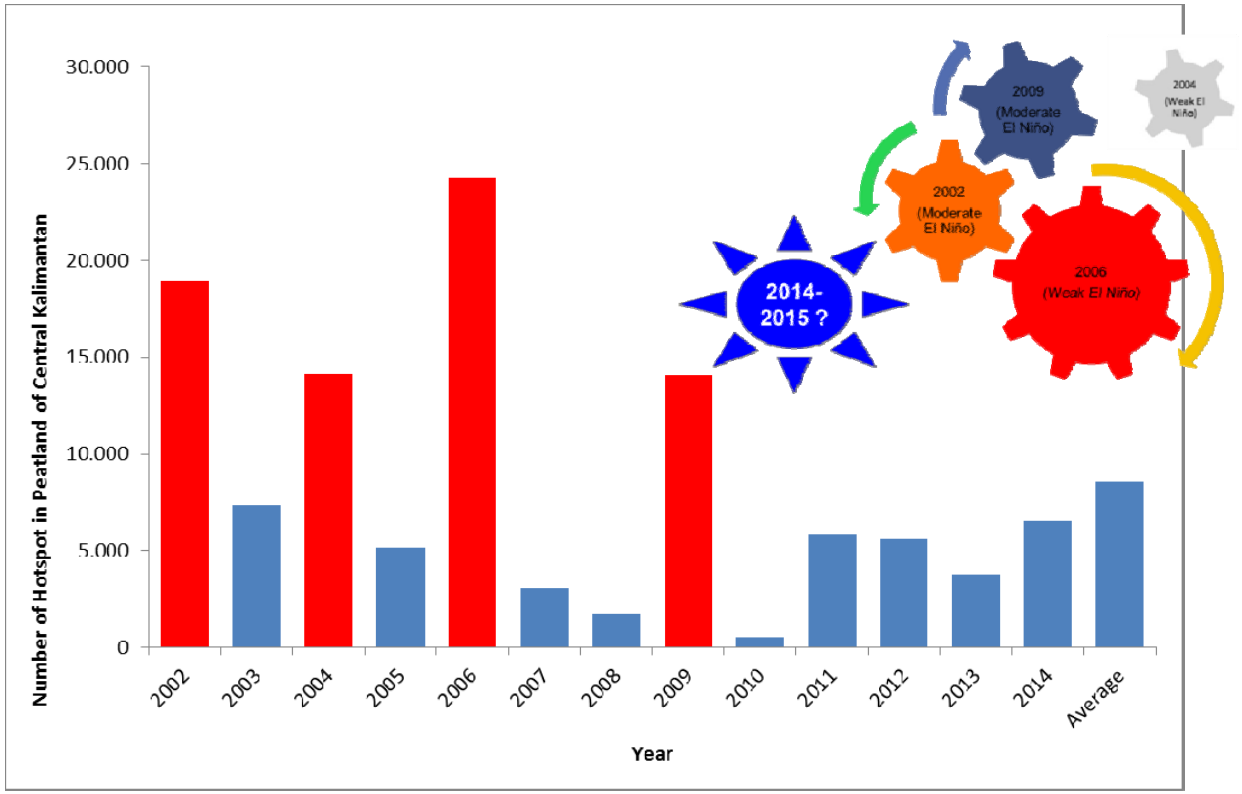
Forest condition



hotspot

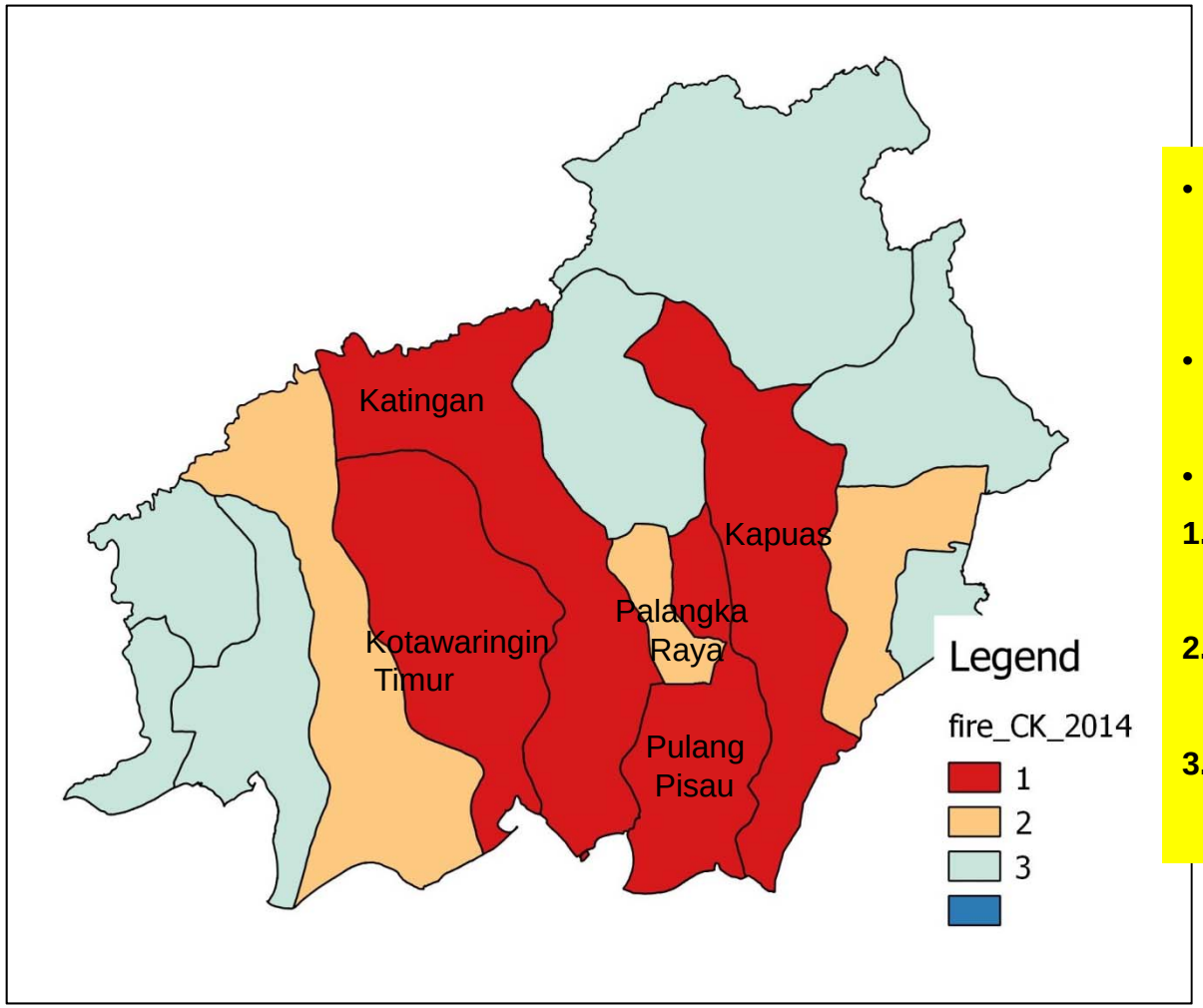


5. HOW 2014-2015 PEATLAND FIRES IN CENTRAL KALIMANTAN ?



- Severe peatland fire in Central Kalimantan occurred in 2006, 2002, 2009, 2004
- These fires were break out under weak and moderate El Nino in Indonesia
- Peatland fire occurred every year in Central Kalimantan.

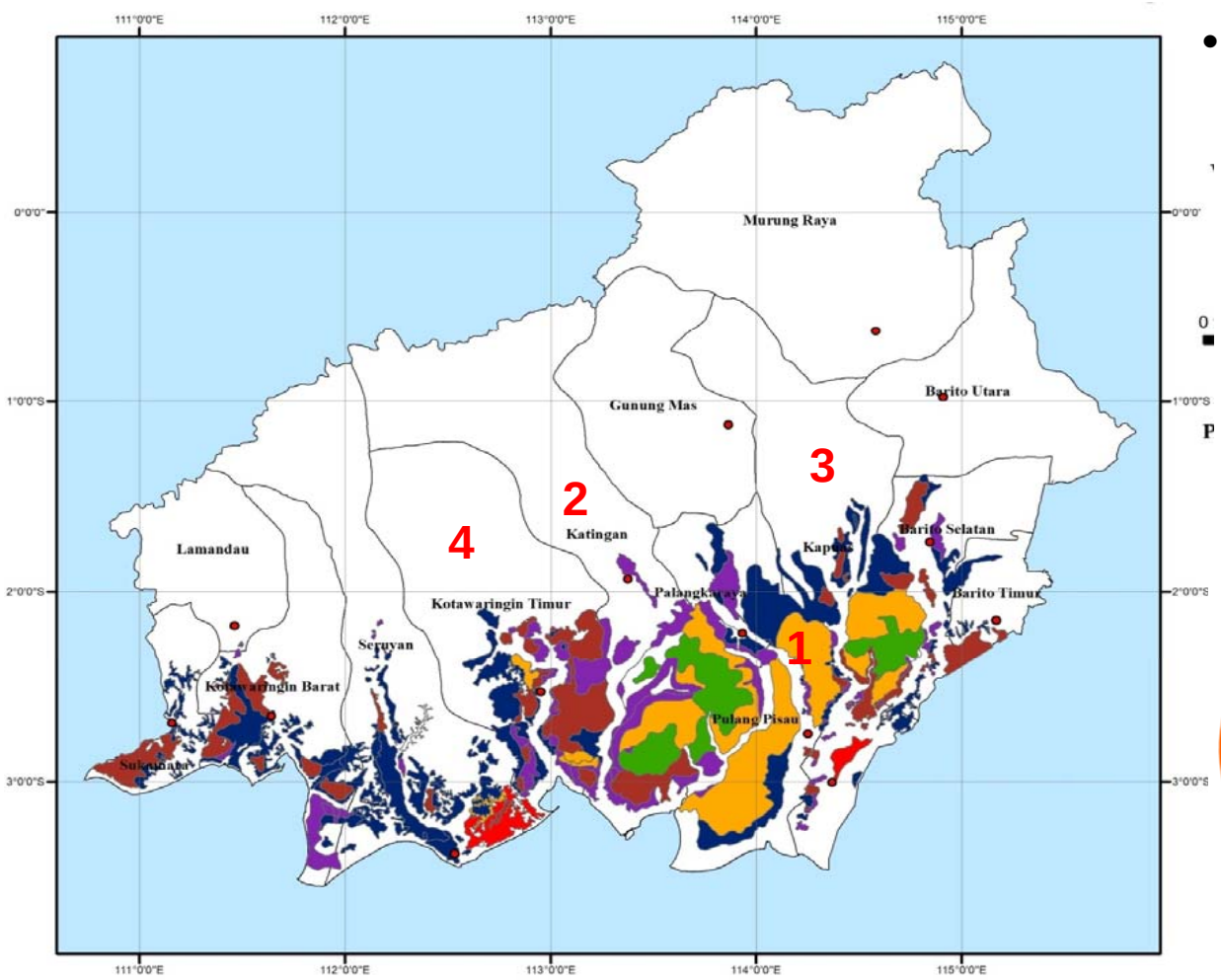
3 LEVELS OF TOTAL FIRE OCCURENCE IN REGENCIES IN 2014



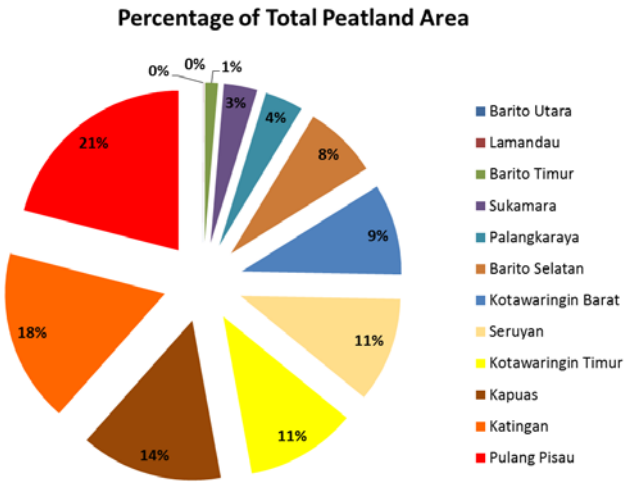
- **There were more than 8.000 hotspot in Central Kalimantan from July to Nov. 2014**
- **Fire in peatland was ~6.500 (80% of the total)**
- **Level of fire occurance as follows:**

1. **Red : hotspot >10% of the total hotspot in the province**
2. **Orange: hotspot 5-9% of the total hotspot in the province**
3. **Blue : hotspot <5% of the total hotspot in the province**

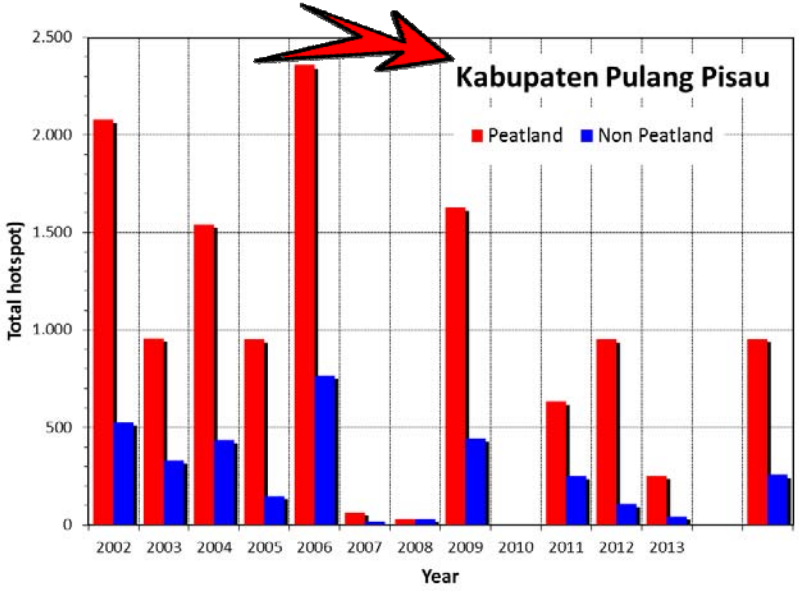
WHY ONLY THE FOUR REGENCIES HAVE HIGH NUMBER OF HOTSPOT (> 40% OF THE TOTAL) ?

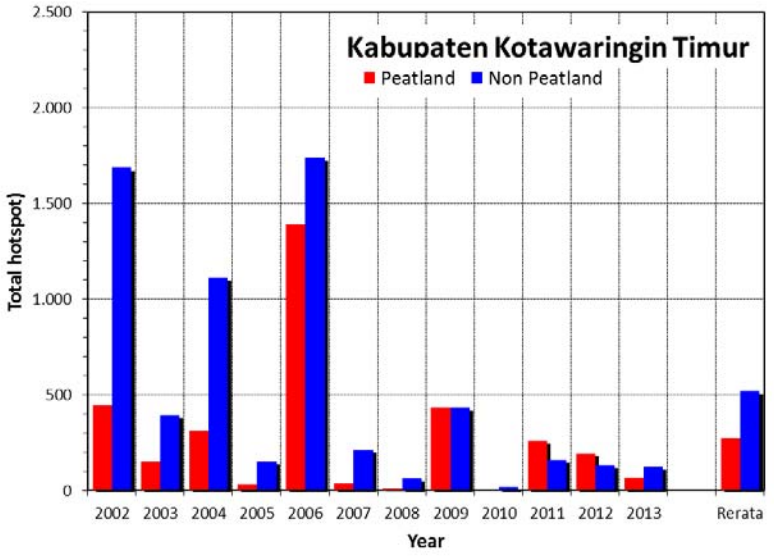


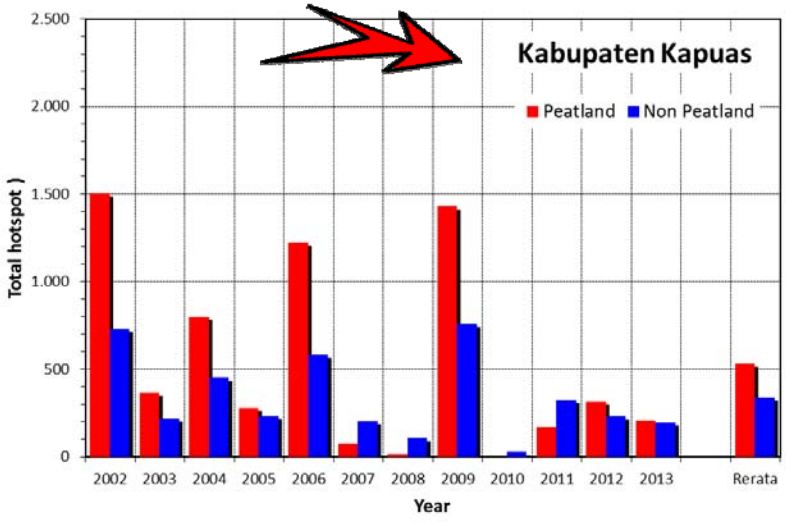
- Total peatland area in Central Kalimantan is nearly 3 million hectares, which is about 60% located in these 4 regencies

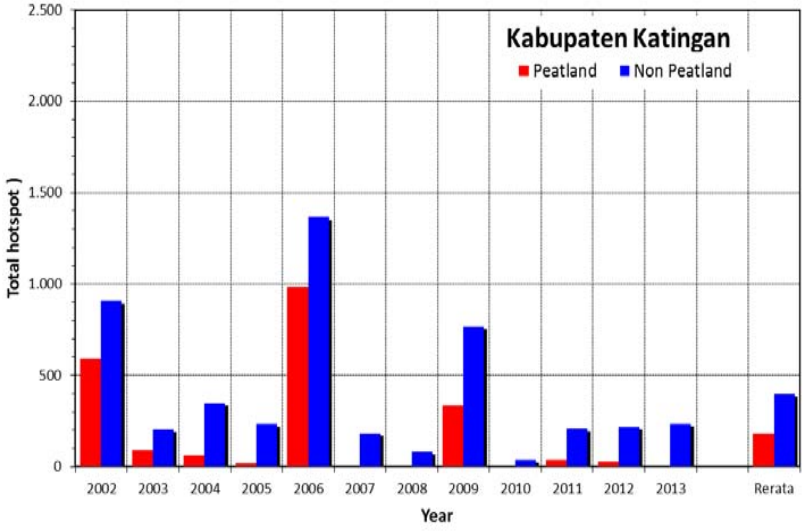


ANNUAL PEATLAND VS. NON PEATLAND FIRE

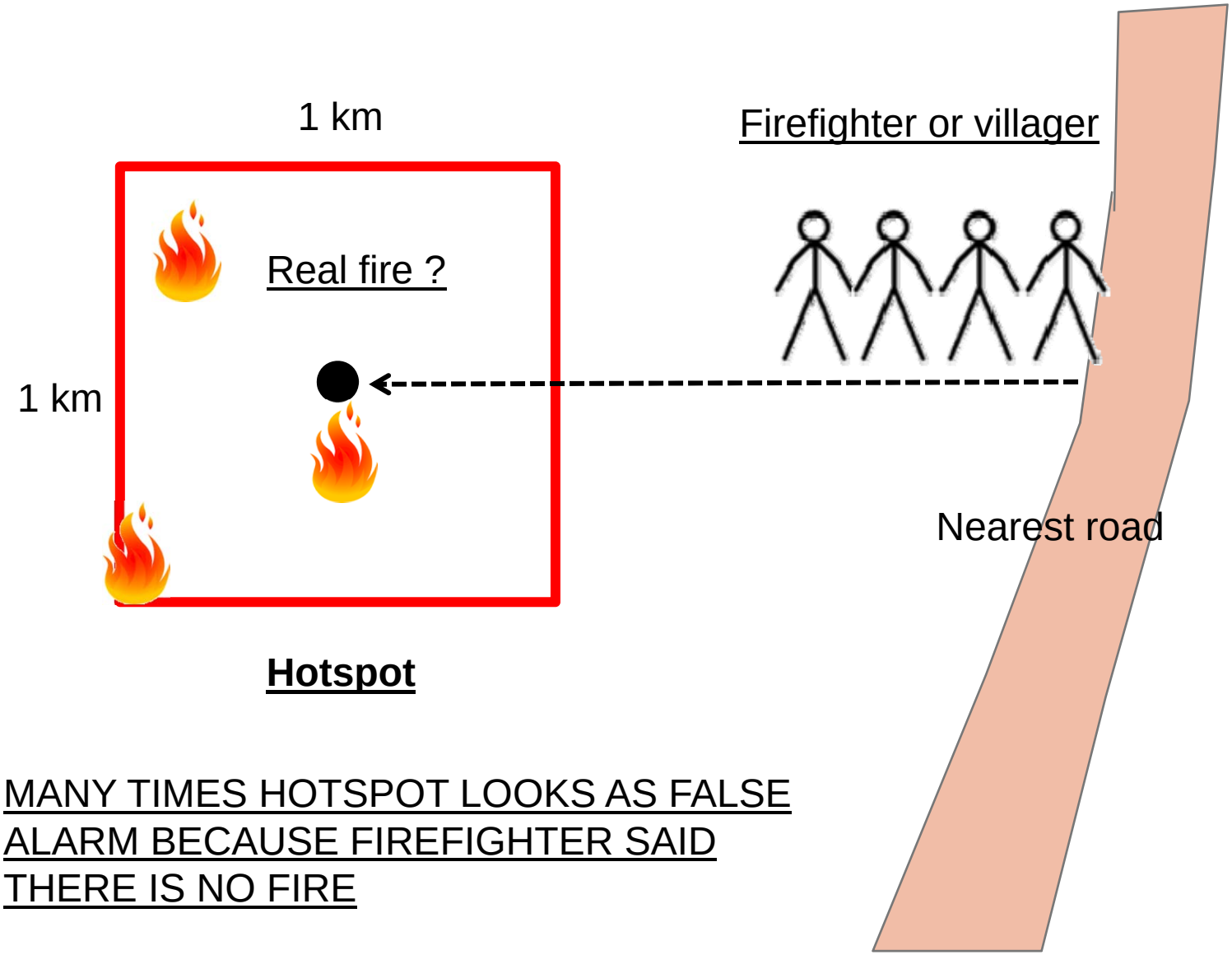






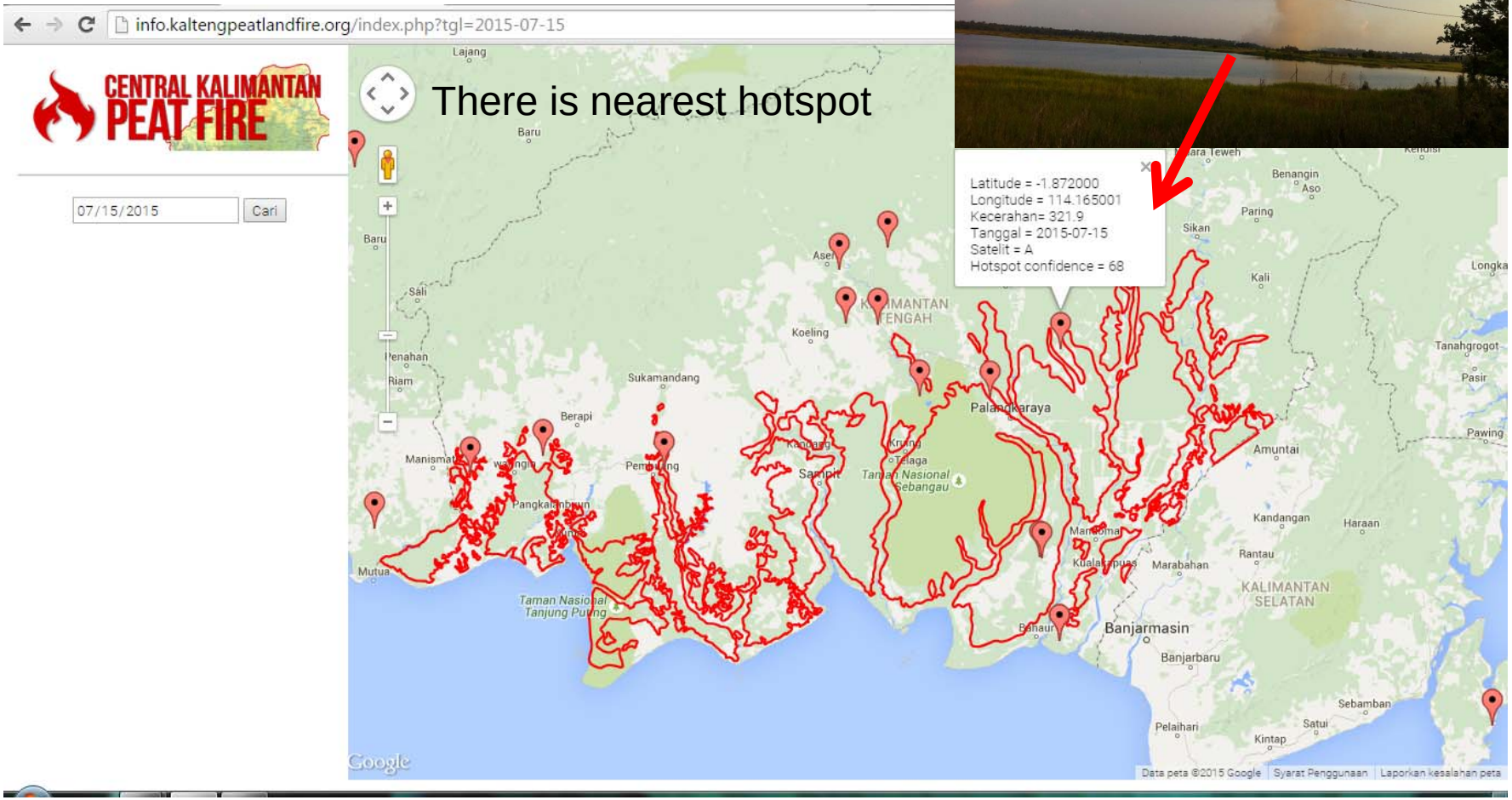


6. HOTSPOT CHECK



MANY TIMES HOTSPOT LOOKS AS FALSE ALARM BECAUSE FIREFIGHTER SAID THERE IS NO FIRE

FIRE PATROLI BY GPS (LOCATION)



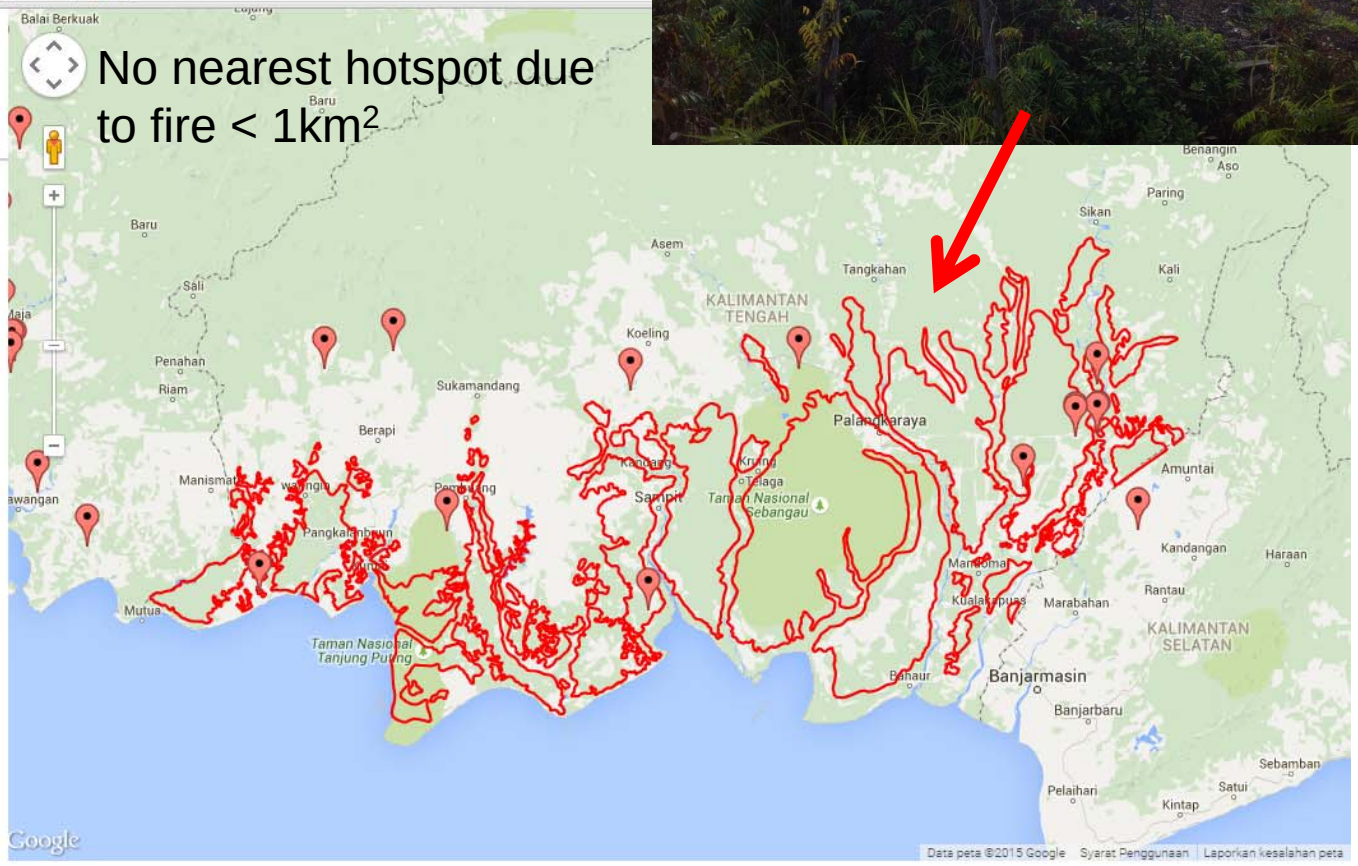
20 July 2015

info.kaltengpeatlandfire.org/index.php?tgl=2015-07-20

CENTRAL KALIMANTAN PEAT FIRE

07/20/2015 Cari

No nearest hotspot due to fire < 1km^2



17 July 2015 (Palangka Raya)

HARIAN PAGI PERTAMA DAN TERBESAR DI KALIMANTAN TENGAH

KALTENG POS

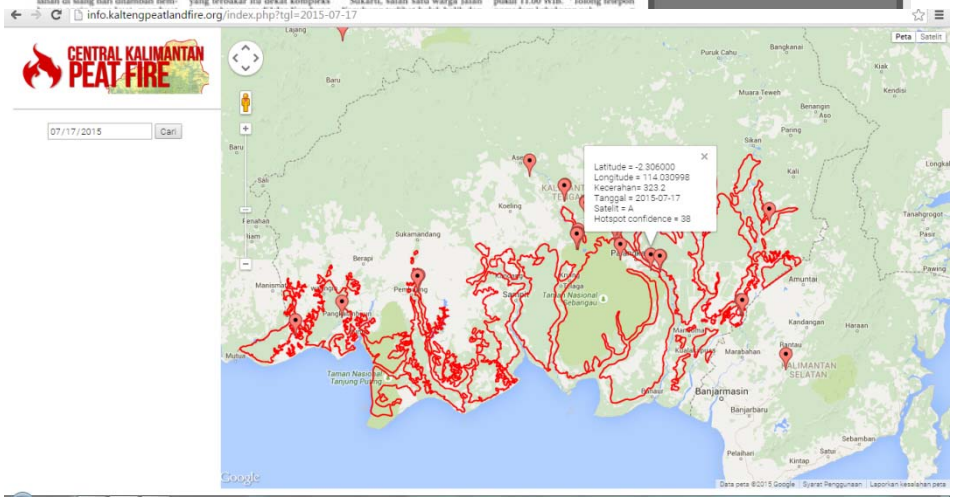
www.kaltengpos.co.id

SENIN, 20 JULI 2015 — Terdepan dan Selalu Lebih Maju — 24 HALAMAN | HARGA: RP 4.000

LAHAN TERBAKAR: Warga di Jalan Kecubung Palangka Raya berusaha memadamkan api yang menghanguskan lahan kosong di sekitarnya, Jumat (17/7) lalu.

Lahan Terbakar, Warga Padamkan Sendiri

PALANGKA RAYA - Kebakaran lahan di siang hari ditambah hem- ketakutan. Pasalnya, lokasi lahan yang terbakar itu dekat kompleks Raya, Jumat (17/7) siang. Sukarti, salah satu warga Jalan kebakaran tersebut terjadi sekitar pukul 11.00 WIB. "Tolong telepon



19 July 2015 (Barito Selatan)

KEBAKARAN LAHAN: Tim BPBD bersama Polres Barsel melakukan pemadaman kobaran api di lahan seluas lima hektare Desa Pararapak.

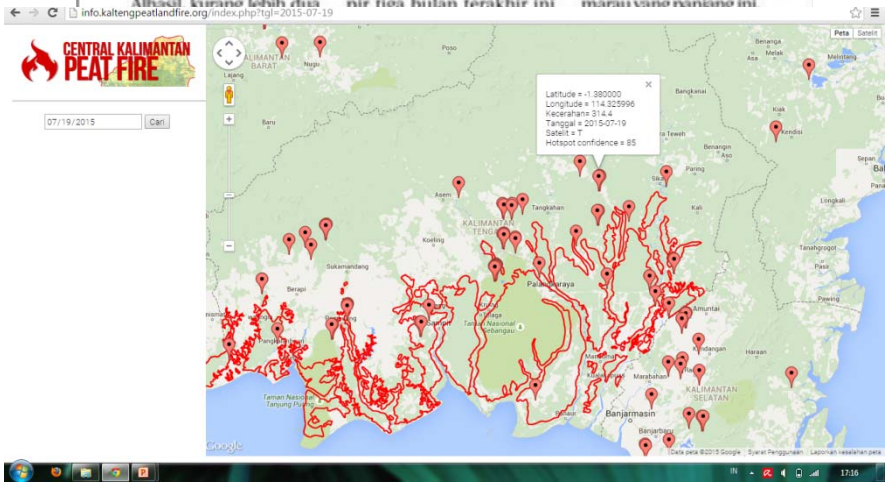
BPBD Padamkan Lahan

BUNTOK - Badan Penanggulangan Bencana Daerah (BPBD) Barsel, bertindak cepat melakukan pemadaman lahan seluas lima hektare di kawasan Desa Pararapak, Kecamatan Dusun Selatan.

pihaknya mendapatkan laporan dari Kepala Desa (Kades) Pararapak, terkait adanya lahan masyarakat yang terbakar.

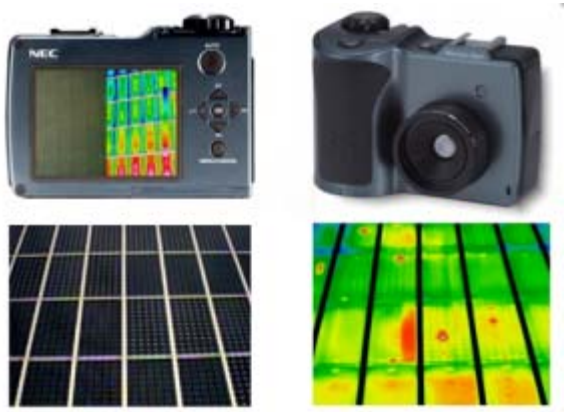
"Terbakarnya lahan seluas lima hektar itu, dikarenakan musim kemarau yang ham-

menyemprot
iram sejumlah
penyebab dari kebakaran
lahan tersebut. Mandiodi
mengimbau, terutama ke-
pada masyarakat untuk tidak
membakar lahan dengan
sembarangan di musim ke-

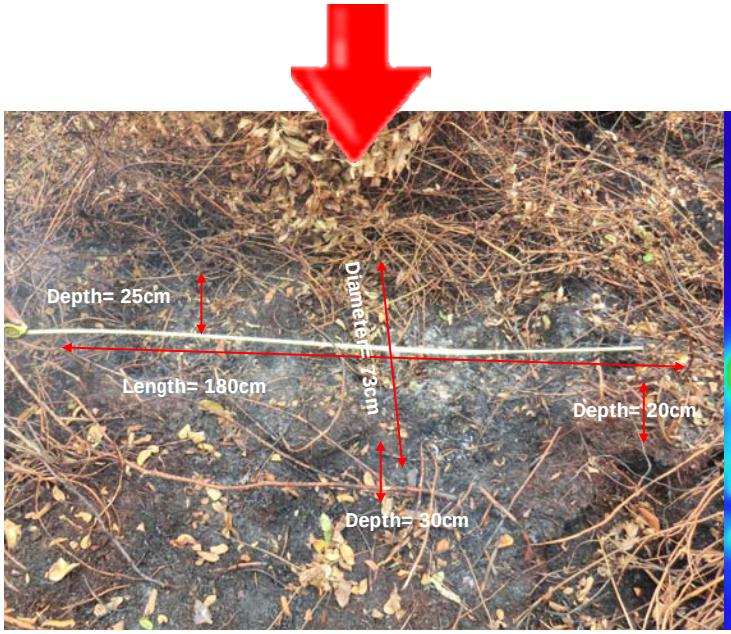


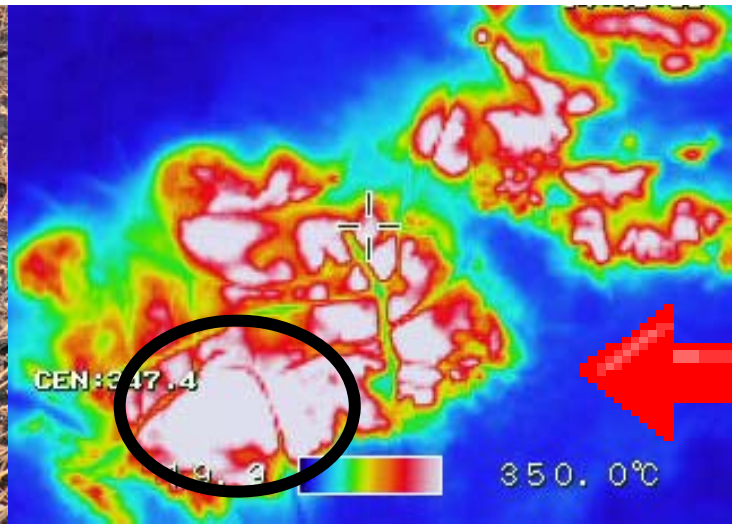
Therma shot F30, Nippon Avionic Co., Ltd., Japan

IR IMAGES (TEMPERATURE)



1. White smoke & ash (moderate peat fire)

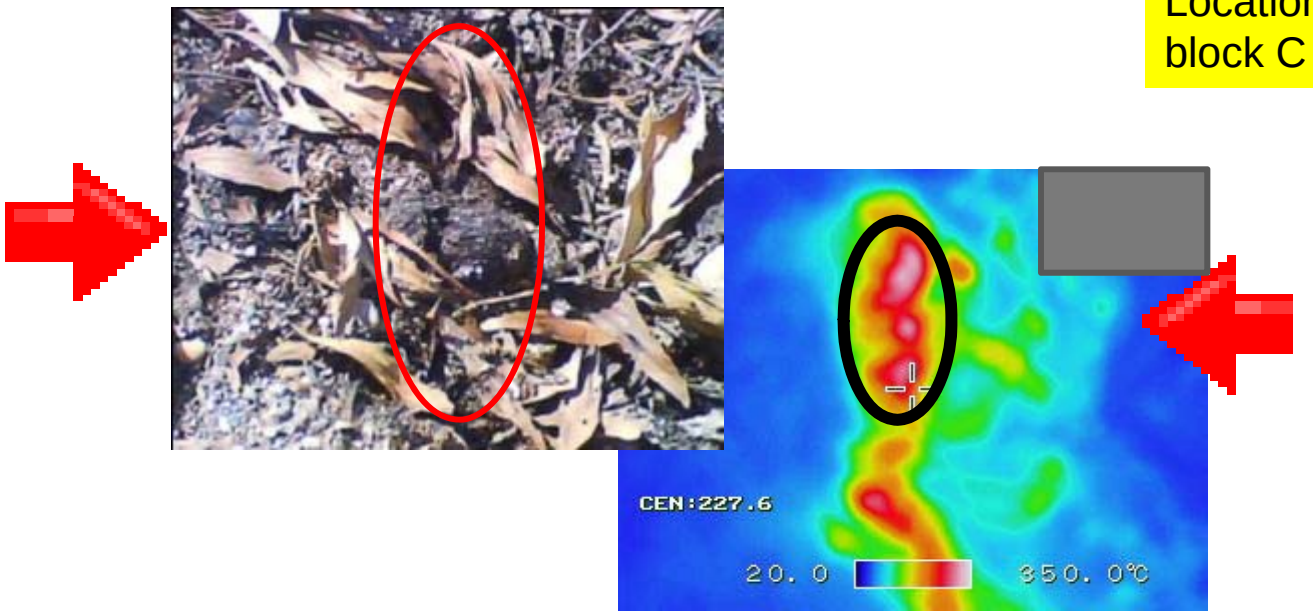




Large area (d= >25 cm) of max temperature 350^{o}C (white color)

- Surface peat fire (horizontal profile) conditions in Tumbang Nusa plot.
- Image captured by an ordinary camera (left) and Therma-shot camera (right)

Location : Maliku (South block C of MRP)

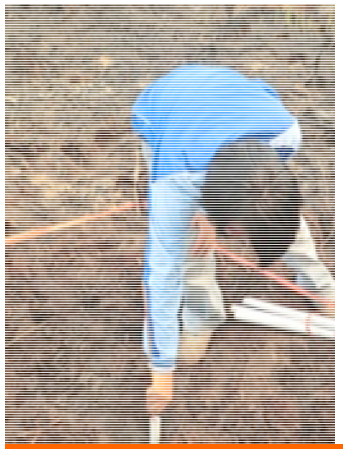


Small area (d= <10 cm) of max temperature 350ºC

<u>2. Only heat emission and temperature drop to 30º after hours (light peat fire)</u>

Peat Sampling

1. Deep peat



2. Ground water level

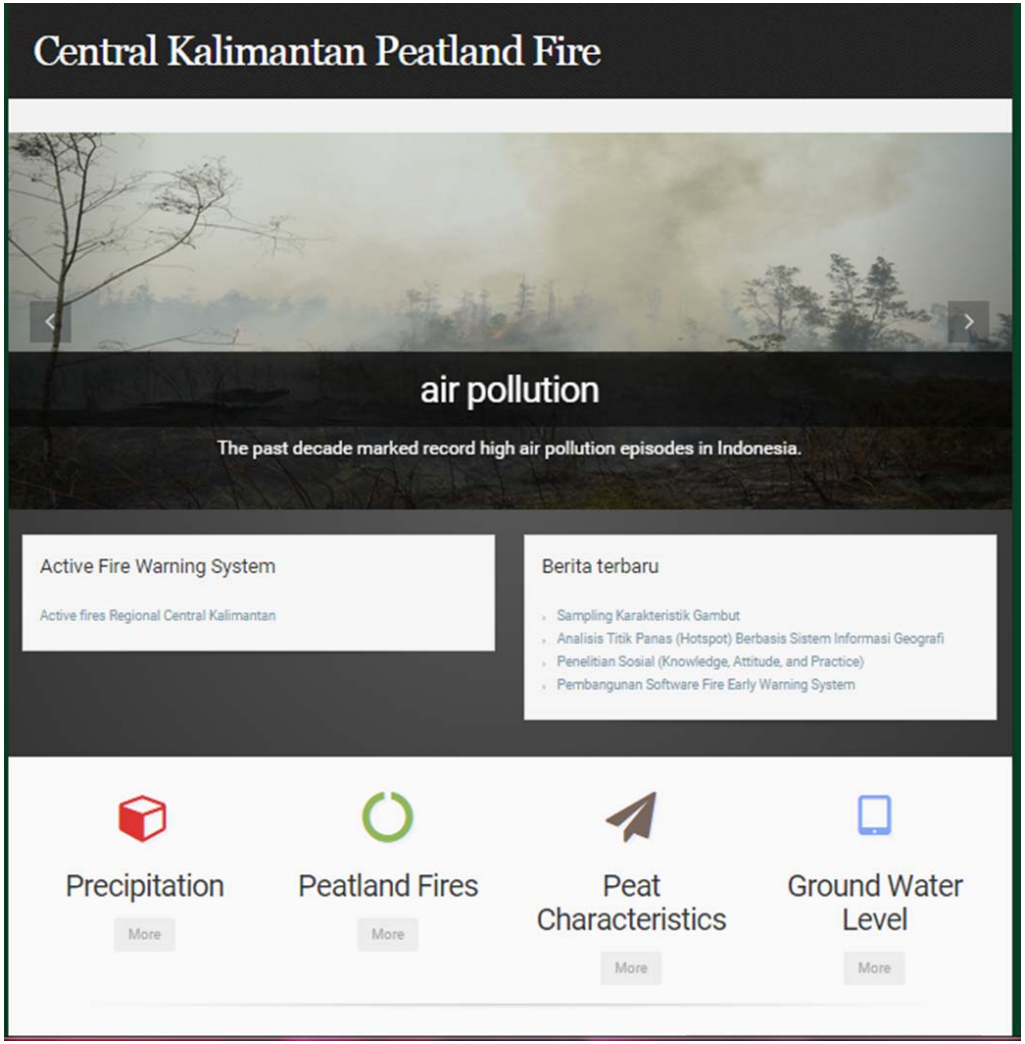
Burned oil palm

3. Temperature

4. Peat Sample

- Ground water level was mostly above > -50cm but the peat below -20cm was still wet (maybe due to capiller water).
- Peat samples experienced irreversible drying (psedousand) in the surface (0-20 cm)
- Calorific values of peat is 22-26 Kj/g is similar to the low grade coal value.

PROPOSAL:
DEVELOPMENT OF PEATLAND FIRE RISK INDEX (PFRI)



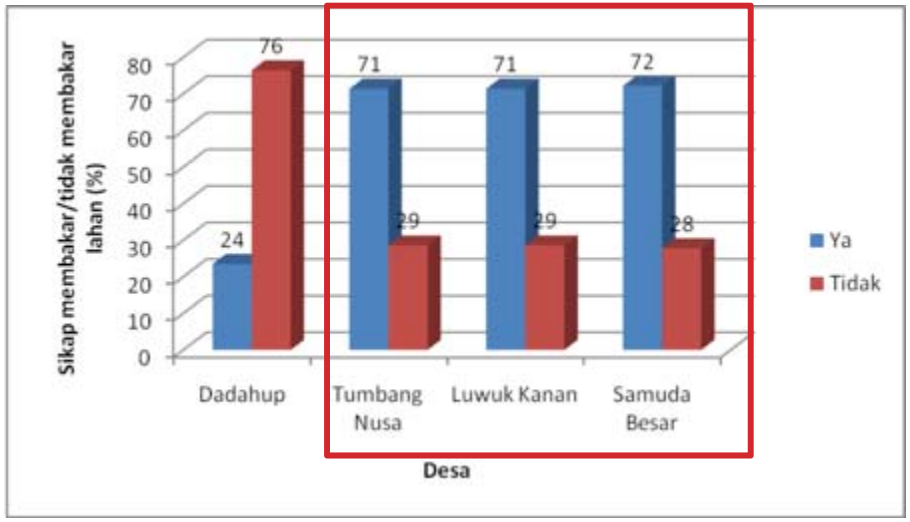
- This proposal showed in American-Indonesia Kavli Frontier of Science in June 2014

This website shows several data that will be use for the index in the future

7. FIRE EDUCATION CAMPAIGN FOR LOCAL COMMUNITY

- **Web based fire early warning by www.kaltengpeatlandfire.org (see our poster)**
- **Fire-related social economic study in Pulang Pisau Regency (the most fire prone area in Central Kalimantan)**
- **Socialization in fire prone villages around the capital province (Pulang Pisau, Kapuas & Katingan Regency)**

1.Do you burn the land during fire season ?



2.There is fire-related local policy and the warning of the effect from government ?

Desa	kebijakan pemerintah Kalimantan Tengah ttg larangan membakar lahan				Dampak			
	Ada	Tidak Ada	Tidak Tahu	Total	Ada	Tidak Ada	Tidak Tahu	Total
Dadahup	0	100	0	100	0	100	0	100
Tumbang Nusa	0	0	100	100	0	100	0	100
Luwuk Kanan	43	0	57	100	0	100	0	100
Samuda Besar	22	22	56	100	0	100	0	100

HOW THE NEGATIF IMPACT OF FIRE TO THE VILLAGER ?

- THERE IS NO DIRECT IMPACT EXCEPT SMOKE
- DURING FIRE SEASON, WE CAN CATCH MORE FISH THAN IN OTHER MONTHS
- IT IS A GOOD TIME TO CLEAN OUR ABANDONED LAND


Kapuas, September 2014

Katingan, October 2014


Pulang Pisau, August 2015


Kotawaringin Timur, October 2014

kaltengpeatlandfire.org

(web is under contruction)

Supported by:

RISTEKDIKTI

Partner:

PEMERINTAH PROVINSI KALIMANTAN TENGAH
DINAS PERKEBUNAN

BMKG

Desa Tumbang Nusa

THANK YOU FOR YOUR ATTENTION

TERIMA KASIH