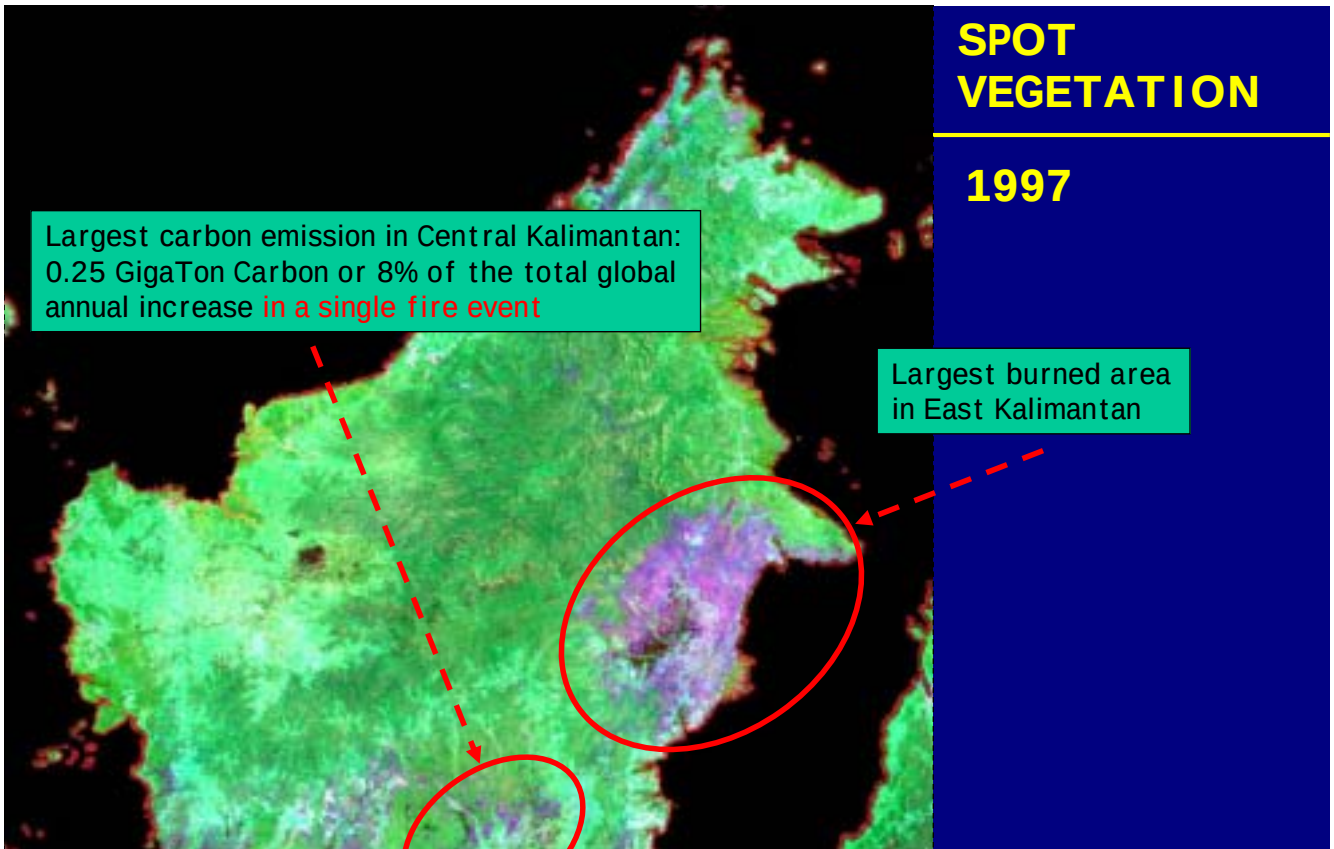
Wetlands Indonesia, K&C Initiative

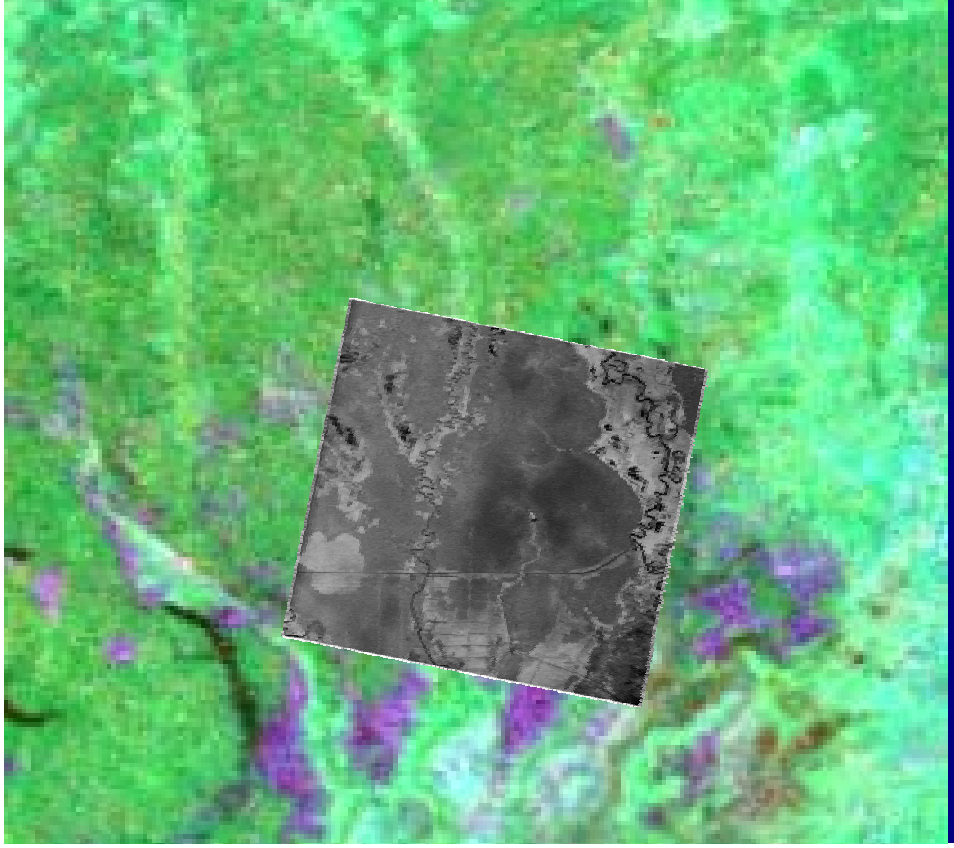
--including New Guinea, Malaysia, i.e. B3 & C1 areas--

Dirk H. Hoekman

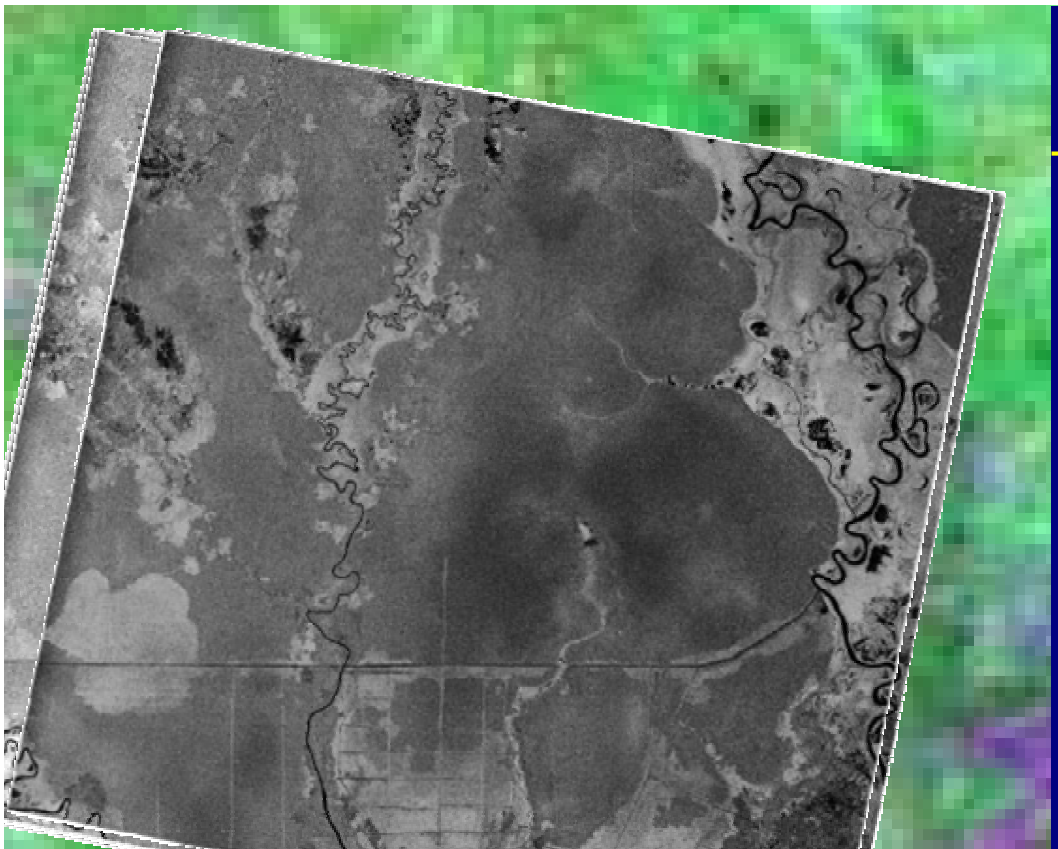
Tokyo, 20-23 May 2003

4th Science Advisory Panel Meeting



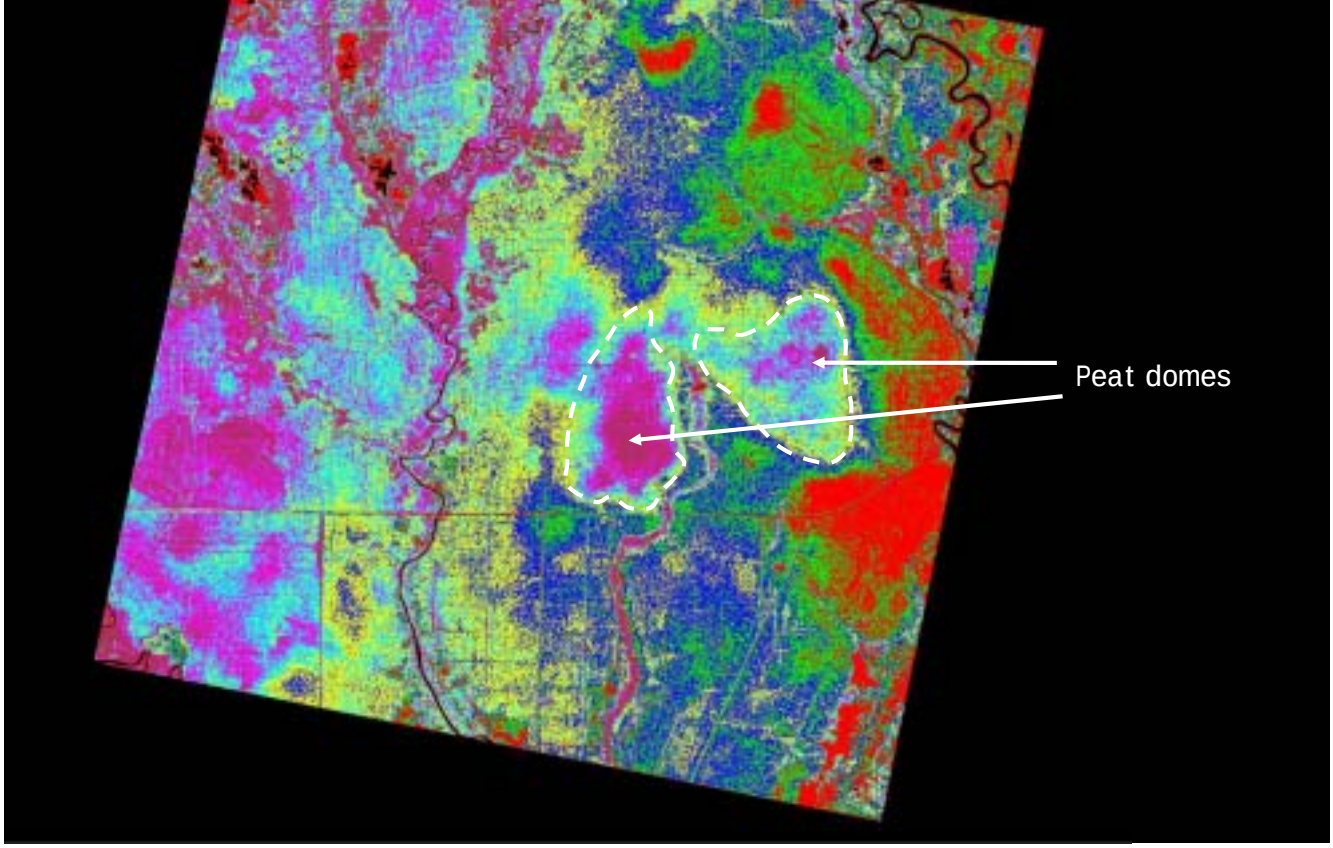


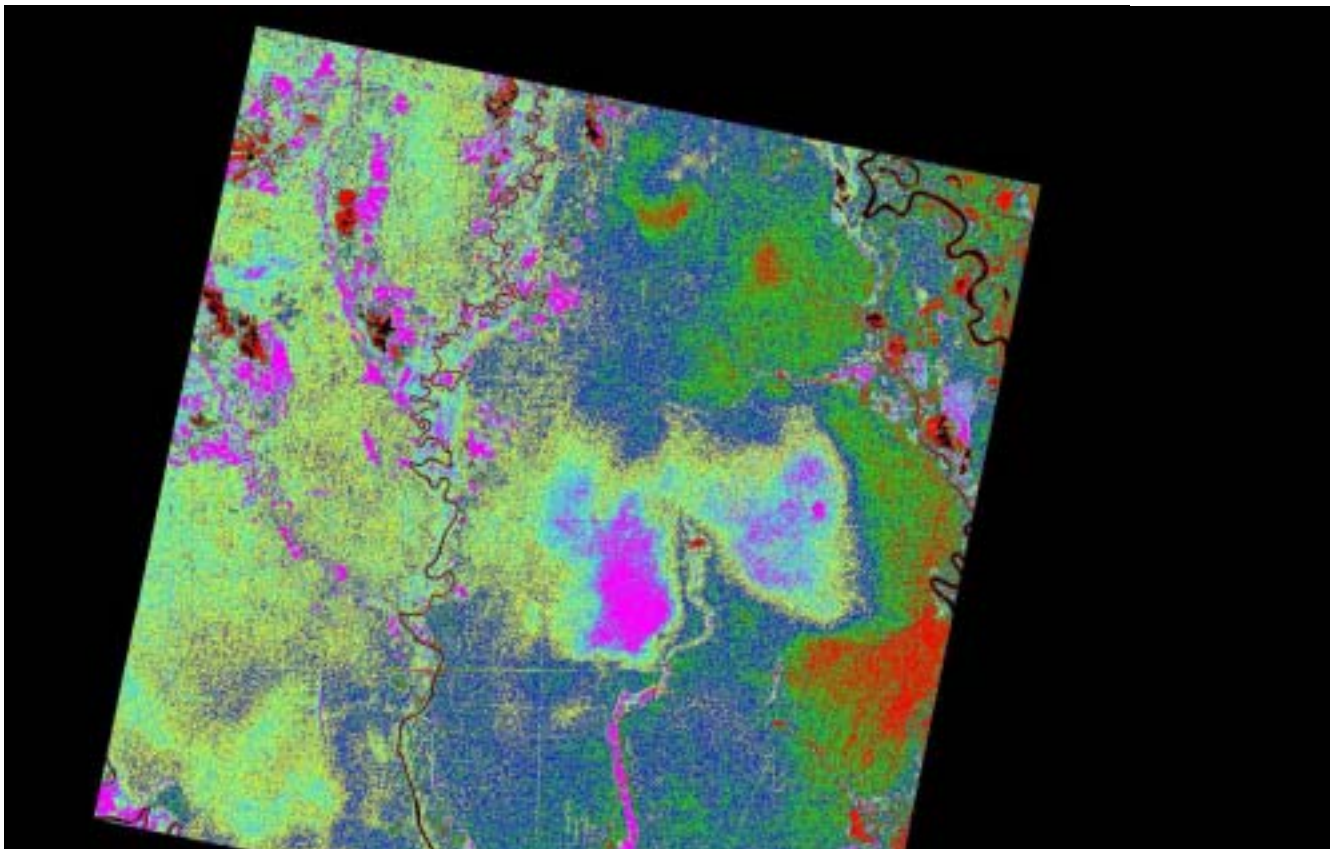
Mawas area with JERS frame

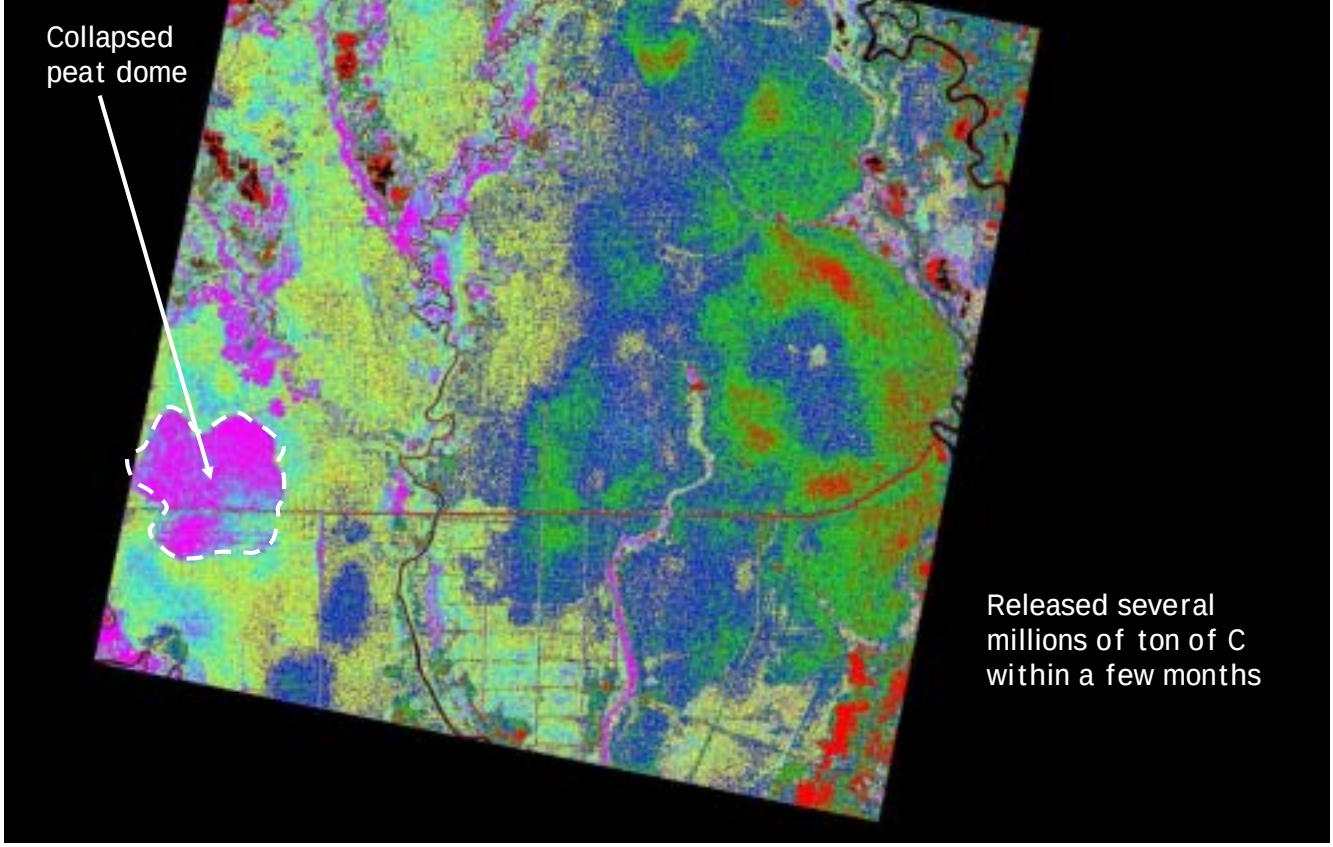


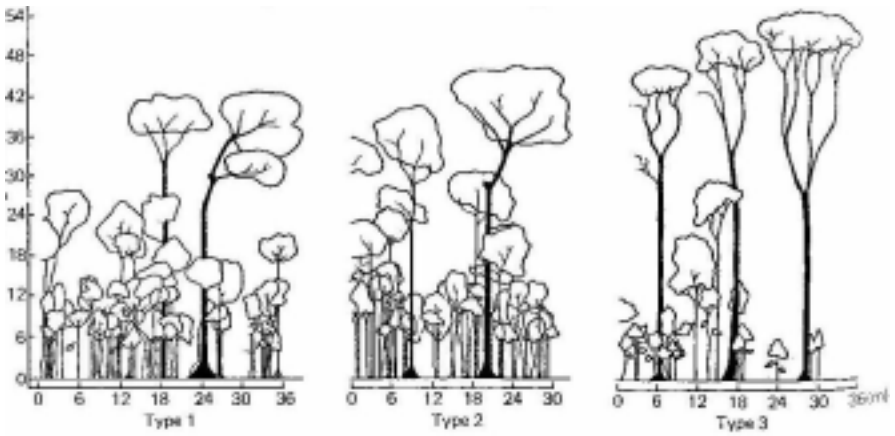
SPOT VEGETATION & JERS

1998 08 29
1998 01 21
1997 10 25
1997 09 11
1997 07 29
1997 05 02
1997 03 19
1997 02 03
1996 09 24
1995 07 12
1994 07 25

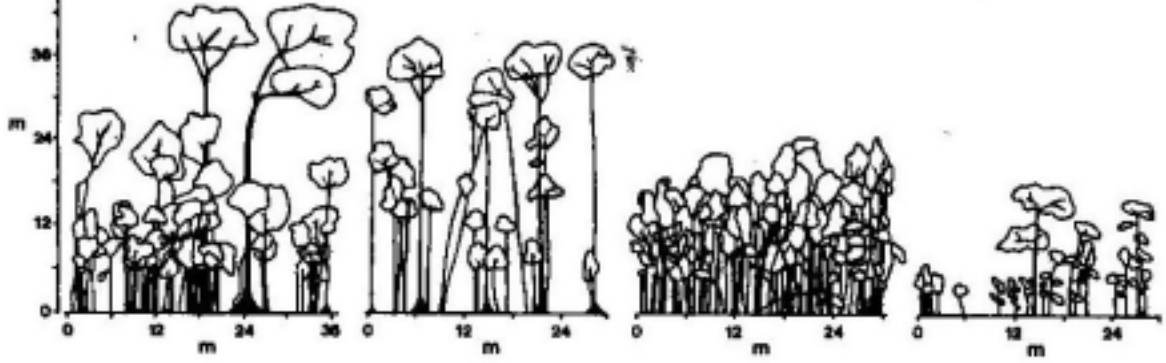

Peat domes





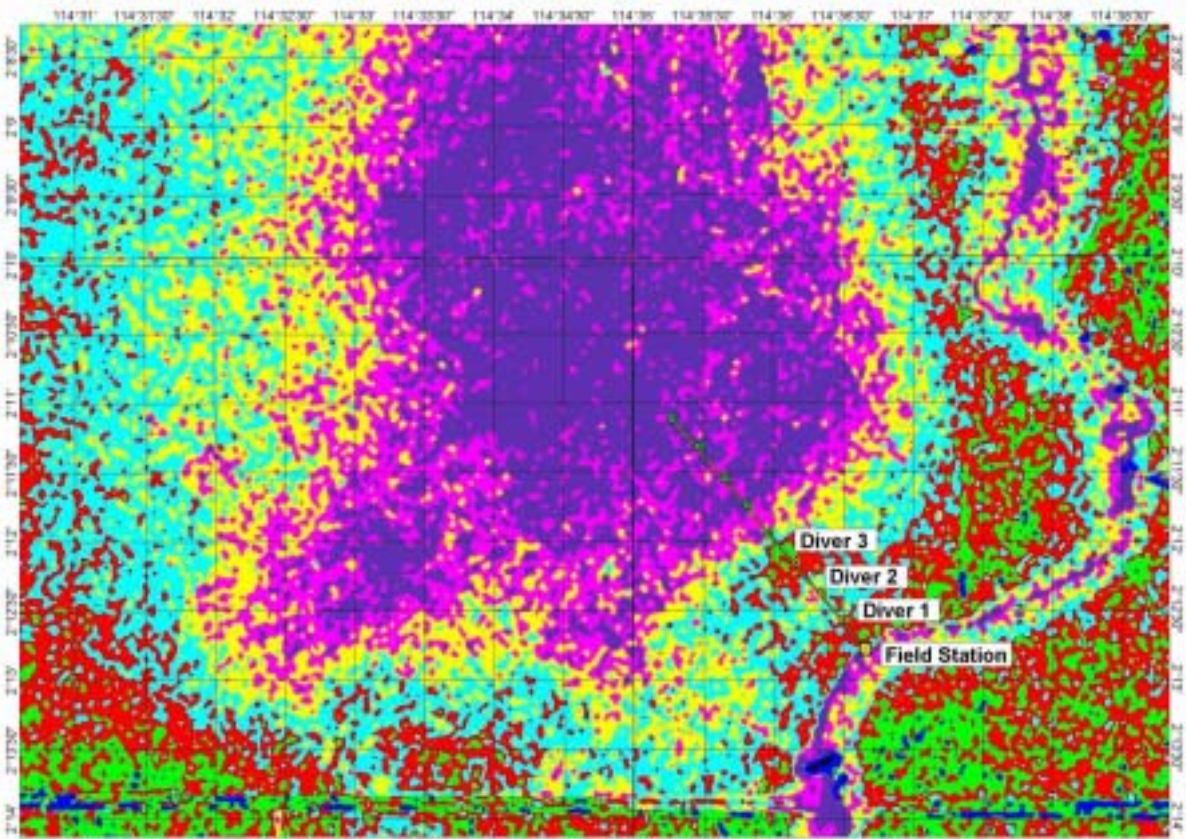


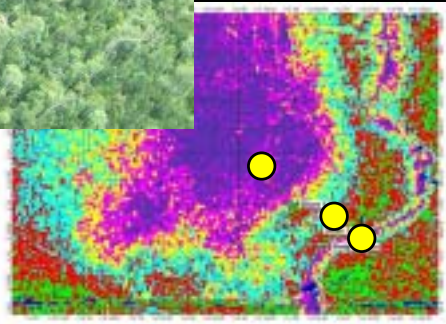
Concentric zones (in 'ombrogenous' or rain-fed areas)
'Poorer' forest types towards the centre of the 'lens'

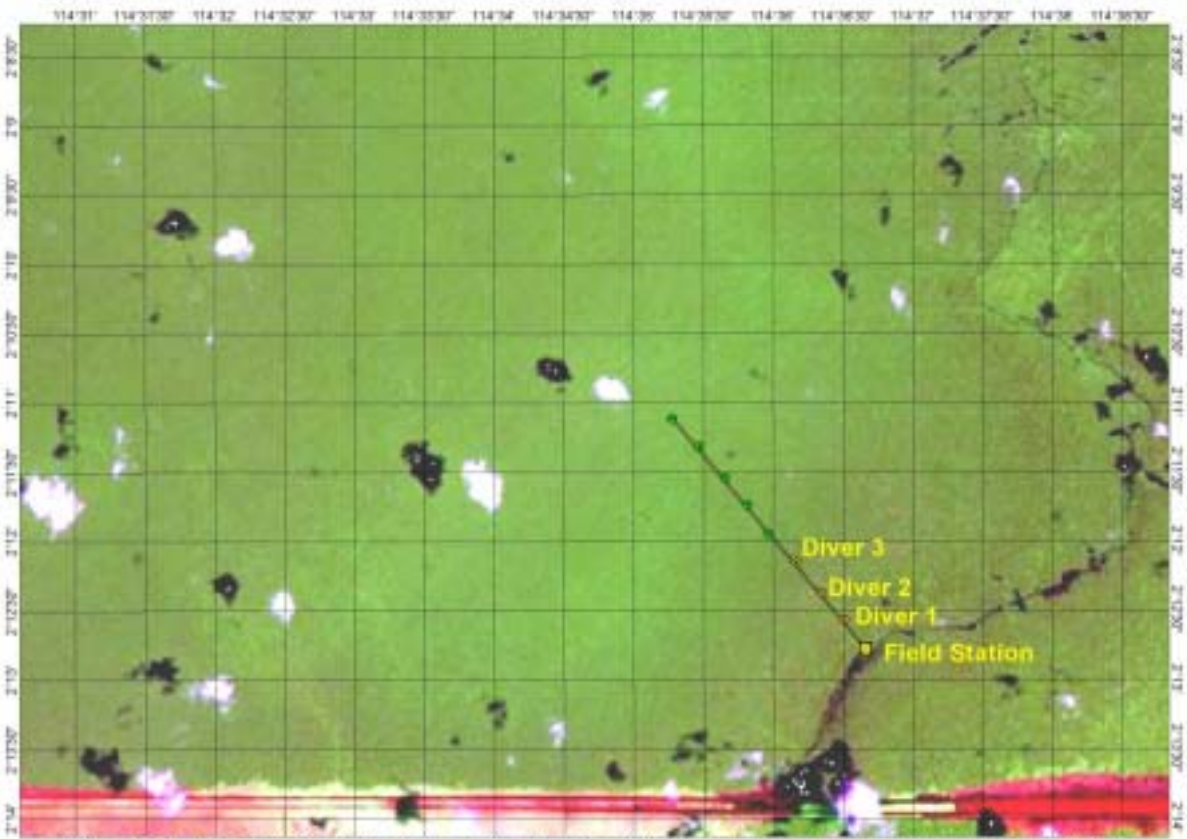


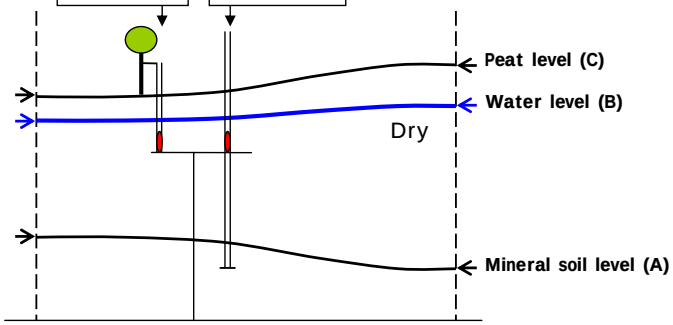
Another example of an ombrogenous area

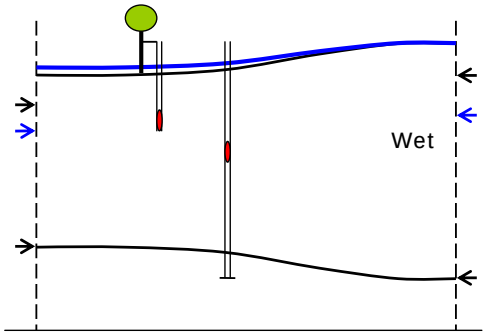
a- high canopy mixed forest
b- lower canopy forest
c- pole forest
d- padang forest

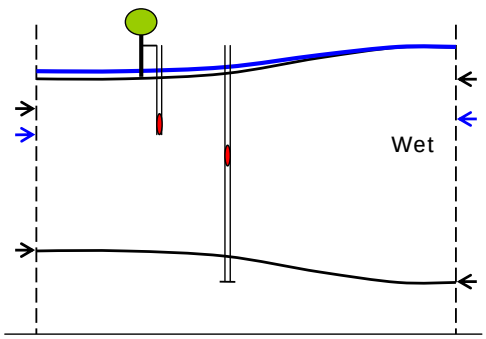




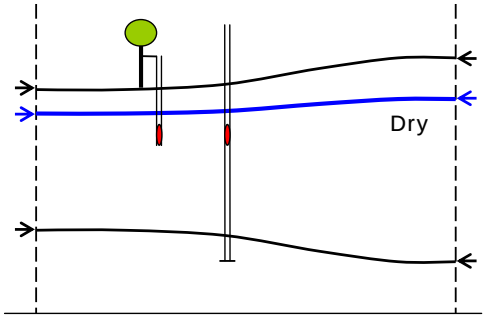

Diver 3
Diver 2
Diver 1
Field Station







•Peat dome research station
•Floating bridge 4 km length
•Ten data loggers: each 1 measurement per hour for 10 years



- Peat dome research station
- Floating bridge 4 km length
- Ten data loggers: each 1 measurement per hour for 10 years

Tropical Peat Swamp Forest Carbon Content

Peat bulk density:	0.1 g cm^{-3}
Carbon content:	57 %
→	
1 m^3 contains:	57 kg C
1 ha, 1 m deep:	570 ton C

Example Mawas Area

Peat layer 10 m deep:	5700 ton C/ha
Above ground undisturbed forest:	250 ton C/ha
Above ground logged forest:	100 ton C/ha

minimum peat depth (e.g. >0.4 m, >1 m, >2 m)

Peat layer depths over 10 m frequently occur in Indonesia, with 60 m as the 'world record' in Sebangau, Central-Kalimantan

Most of the world's tropical peat is located in Indonesia

Estimated pre-disturbance tropical peat land area

Total 50 million ha

SE Asia 33 million ha

Brunei	0.01 Million ha	} Intended Coverage
Indonesia	27 Million ha	
Malaysia	2.7 Million ha	
Papua New Guinea	2.9 Million ha	
Philippines	0.24 Million ha	?
Thailand	0.07 Million ha	

Example Indonesia: Stocks and Emissions

Stocks

Area >20 Million ha
Average peat depth >2 m
→ Carbon content >23 Giga ton (Gt)

(Note: in Mawas 0.5 Gt; global stock 63-148 Gt)

Emissions

Fires Borneo 1997: release 0.19-0.23 Gt from peat
+ 0.05 Gt from vegetation

Extrapolated to whole Indonesia 1997: 0.81-2.57 Gt
Or 13-40% of mean annual global carbon emission from fossil fuels

Contributed greatly to the largest annual increase since records started in 1957

Fires frequently occur and intensify

Contribute to inventory (global climate change science)

Contribute to environmental and biodiversity protection (operational)
(e.g. Mawas: 1 Million ton C credits / large wild orangutan population)

2. Mangroves in intended study area

Contribute to environmental and biodiversity protection

Economic relevance: Fish nursery, coastal protection, shrimp/fish ponds

3. Land cover change monitoring Indonesia (LULUCF Theme)

Provide up-to-date information continuously (likely to become part of larger framework)

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1. Peat forests in intended study area

Objectives;
•Map / characterize flooding dynamics;
•Biophysical characterization; Improve existing maps from 1-2 to ±7 vegetation types;
•Peat depth mapping?

Approach;
•8 SCANSAR (100 m) observations first year to map flooding dynamics and peat dome (concentric) zones
•Calibration/reference using field research station at Mawas;
•Fieldwork at selected sites; Peat sampling with drills; Trike overflights with digital video system
•Monitoring in each subsequent year of lifetime in dual pol (HH/HV, 20 m) for land cover change
•Orthorectification using SRTM data? (These are flat areas)

Objectives;
•Map / characterize tidal dynamics;
•Biophysical characterization; Improve/update existing maps;
•Note: Indonesia has some unique mangrove ecosystems

Approach;
•8 SCANSAR (100 m) observations first year and tidal data to map tidal dynamics
•Fieldwork at selected sites; Trike overflights with digital video system
•Monitoring in each subsequent year of lifetime in dual pol (HH/HV, 20 m) for land cover change
•Orthorectification using SRTM data? (These are flat areas)

•Ombrogenous 'peat swamp' (only rain fed);
•Topogenous 'fresh water swamp' (seasonal inundation by river);
•Mangrove (tidal influence, salt and brackish zones);
•River floodplains;
These form very large complexes in coastal regions up to 200 km land inwards, notably in Borneo, Sumatra and New Guinea

Note 1: In Central Kalimantan tidal influence is up to 200 km land inwards, far into the peat swamp areas;
Note 2: When these swamps disappear, because of deforestation and peat fires, the coast line will move 200 km land inwards !

It is intended to map and monitor the swamps and mangrove wetlands by PALSAR and GLI together as parts of a larger complex

Terrain hard to access (2 km /day);

Objectives;

•Provide up-to-date information continuously to support environmental protection, including law enforcement, fast information for governments and donor organizations, carbon offset and biodiversity crediting, etc

Approach;

→ LULUCF theme presentation tomorrow

Funding / support

Confirmed:

BOSF: Remote sensing and GIS processing centre in Balikpapan (my part-time home base!);
+ Field station(s) in Mawas, Trikes, Field staff (botanists, land surveyers, etc), other logistic support (also for guest researchers; You are welcome!)

Wageningen University, dept. Environmental Sciences: Expertise in Hydrology, Soil Physics, Watershed management, hosts Wetlands International, etc (my other part-time home base);

Ministry of Forestry: MoU with BOSF; NFI data;

T.b.d.:

Int'l donor organizations in Jakarta: Develop joint funding scheme this year?

NASA: All necessary SRTM data?

K&C Initiative: Mosaicking support?; Orthorectification support?