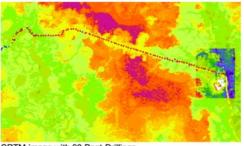
SRTM-image with 90 Peat-Drillings along Transect Tangkiling - Kasongan



SRTM-image with 90 Peat-Drillings along Transect Tangkiling - Kasongan different false-colours

METHODOLOGY

Peat Drilling and Carbon estimation

We used the normal poat driling aculpment and two Global Positioning Sensors (GPS) and a compass (Figures 1 - 4). Along the trensect Kasongan at Int79 to Tangilling at Int74.5 we compass (Figures 1 - 4). Along the trensect Kasongan at Int79 to Tangilling at Int74.5 we necessary the peat the clines. Peat samples from 0 - 20 cm depth and the mineral soil below the peat were taken for pH, C and ruthert analysis to the Analytical Laboratory at Palangka Raya University. Additionally water samples from the seven small invest crossing the Panasect were brought to the laboratory for pH analysis (Table 1). Nutrient analysis for the mineral soil was carried out on three samples near Tangilling area (Table 2) for Rungan Sari and Transmigration area km38. Table 3 contains the 91 peat drillings with peat depth, the respectation, the location and the mineral bolow the peat.

C analysis was carried out on 22 samples and bulk density analysis on 12 samples (Table 4), pH value of the mineral soil below the peat was enalysed for 12 samples (Table 5) along the transact (Hardjowigeno 1993 and Suldistyanto 2004). We estimated two peat area types in the GIS (type 1, brown, with 5 to 6 m peat depth and type. 2 yellow, with 2 5m to 4 m depth) in order to calculate the peat volume and the stored carbon between the Rivers Rungan and Kaltingan.

| | Parameter | Method |
|---|----------------------------------|-------------------------|
| П | Peat, mineral soil, and water pH | pH meter |
| 2 | C-organic | Loss on ignition |
| } | Bulk Density | Ring sample |
| Г | N total | Kejhdahl method |
| 5 | Available P | P-Bray 1 |
| ķ | K, Ca, Mg, and Na exchangeable | Ammonium Acetate pH 4.8 |
| 7 | C E C (Cation Exchange Capacity) | Ammonium Acetate pH 4.8 |
| 1 | Texture | Pipette method |

Data Processing

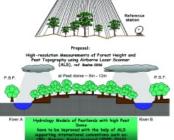
Land correct classes with peat land and PSF types:

Basic image processing was done using the Remote Sensing Software ENVI4.2. Raw image
Basic image processing was done using the Remote Sensing Software ENVI4.2. Raw image
Basic image. This hand combination proved to be the learn substituted by produce a colour RoB image. This hand combination proved to be the learn substitute to produce a colour RoB during peat difficing using the waypoint mode of the GPS. With the GPS optimis were collected during peat difficing using the waypoint mode of the GPS. With the GPS optimis were collected of the peat difficing using the support more of the GPS. With the GPS optimis were accelerated of the CANDSAT images from 1991 and 200. Segent, 200. Septem et al. 2003, 2004, Beatm 2004 and 2009). The analysis was made by visual interpretation in the images. May see more prayable or an area of 29 4 46 km between Kasongan and Tangkling using the Satellite images from 30, June 1991 and 15. Feb. 2003 (Figures 5 and 6) with classified areas of PSF types. We catchiners and Palangha Rays between inverse Kastingan and Rungan up to the border of the health forest the LANDSAT image from 1991, with the different visible colours for PSF types.

ERS and SRTM-DEM elevation data with existing regetation types:
Additionally we used multi-temporal Radar ERS data from 1996 and 1997 to compare it forest opening process of the PSF (Figure 7) with the Landsat image from 1991 (Figure 5).
To get information about the elevation along the transect we used the SRTM DEM data for Exchany 2000. Different heights of elevation lines were analysed in ArtView in combination with the peat drillings (Figure 8 and 9) and shown by different colours, Cross-sections alo the transect were prepared for the highway without PSF and to the north parallel to transact with PSF (Figure 11 and 12).







Symposium on Carbon in Peatlands, 15 – 18 April 2007 Wageningen, the Netherlands

" Carbon Storage in the Northern Sebangau Area between Tangkiling and Kasongan, Central Kalimantan and Peatland DEM-measurements with an Airborne Laser Scanner'

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 2) University of Palangka Raya, Indonesia

Keywords: Peat Land Topography, Airborne Laser Scanner (ALS), Peat Drilling, Carbon Storage, Fires, DEM

ABSTRACT

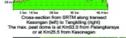
In 1997, 2002 and 2006 El Niño prolonged the dry season considerably causing strong fires, haze and smoke in Central Kalimantan. The peatland fires during the dry season have greatly increased, caused mainly by the Ex-Mega-Rice Project (MRP).

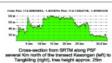
To understand better the situation of that area more than 90 peat drillings have been done in 2006 parallel to the Kalimantan highway along the transect Tangkilling and Kasongan. Results of these peat measurements showed a peat depth up to 8.10 m. The estimation of stored peat volume and carbon for the northern Sebangau Catchment and Palangka Raya between Katingan and Rungan rivers up to the border of the heath forest has a peat volume of 7.1 Gm² (res. 5.93 Gm²). The content of carbon in 1 cubic meter of peat has been measured to be 154.3kg. We found a stored carbon value of 0.92 to 1.1 Gtors for this area. The pH-values of water were very acidc and three soil samples showed a very low nutritional value. It will be necessary to rehabilitate this fragile peatland ecosystem.
With a high-resolution Airbome Laser Scanner (ALS) the topography of peatlands will be measured in Feb. 2007 by an helicopter. Also the biomass of Peat Swamp Forest

be measured in Feb. 2007 by an helicopter. Also the biomass of Peat Swamp Forest (PSF) will be analysed by this modern technology with an elevation resolution of +/-15cm. Additionally illegal channels in PSF will be monitored and the hydrology model of peatland improved.

Ref.: Page, S., Siegert, F., Rieley, J.O., Boehm, H.-D.V., Jaya, A., Limin, S. (2002) The amount of carbon released from peat and forest fires in Indonesia during 1997. In: Nature 420









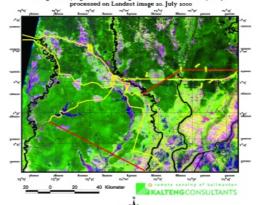






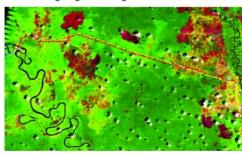


al Kalimantan Peatland Project (CKPP) Block B, Block C, Block D, Block E-Maw Topography measurements with Airborne Laser Scanner. (ALS) sign with three flight routes foreses occassed on Landsat image 20. July 2





Landsat image from 30.6.1991 with Peat-Drillings along Transect Tangkiling to Kasonagan



Landsat image from 15.2.2003 with Peat-Drillings along Transect Tangkiling to Kasonagan

RESULTS AND DISCUSSION

Table 1 shows the pH-value from the seven small black water rivers crossing the Kalimantan highway ranging from 3.41 to 4.74 with the siverage of 3.7. There is one pH-value from a small river at kin95.2 showing a pH-value higher than 4.0 with a value of 4.74. This river comes from the Tangkling hills and flows mainly over a minoral soil area. The pH-values of the other six rivers were analysed between 3.41 and 3.73. These rivers come directly from peat land area. These pH-values are higher than Sulistlyanto results. Sulistlyanto (2004) that the water running off the Sebangau area range from 3.04 to 3.18. The pH-value usually indicates where the water comes from.

Table 2 present the results of the nutrient analysis for three soil samples under very shallow past land (7cm deep / km36.5) and two samples with no peat but only quartz sand, RSf (km36) at Rungana Sari and km36 at the transmigration area. Table 2 shows that almost all miscro nutrients in that area have very low values (K, Ca, Mg and Na) with exception of P which has a low value, based on critishal from the Bogor Soil Research Institute (PPT, 1983, cited by Hardjovigeno, 1993). The macro nutrient cation exchange capacity (CEC) was very low too. Based on these results of nutrient analysis, we can conclude that the fertility condition of the soil at that area is low.

Table 3 shows the variation of peat depth and mineral soil below the peat from Kasongan to Tangkiling transect. Very shallow peat can be found from km79 to km77.5 and in several locations there is no peat at all. There is deep peat from km79 to km76.5. This resis is near to the black water river of km 76.8. Between km76 and km84, there is fluctuation in peat depth from 0 cm (no peat) to 170 on peat depth.

The dome shape is between km63.5 and km47. The thickness of peat increases gradually from km62.5 to km64 with the thickest peat depth at km63.5 with 810cm depth. At this gradually until km67.5 with only 5cm depth. From km47 to km34.5, the thickness of peat is very shallow and

several drilling holes had no peat at all, except at km40.5 and km40. On the river side the soil under the peat is sendier and under the rivers themselves are perity clay. Shallow peat with sand below can be seen in Figure 10, There is a variation on mineral soils types below the peat along the transact Kasongan to Tengkling. Note of the mineral soil below the peat was sand (quartz sand) and hardpan, only a few places had clay. Table 5 shows that there is a variation on mineral soil pH-values below the peat from 3.2 to 4.97 with the average of 4.01. According to 5.0 Research Institute (PPT, 1983 cited by Hardjowigeno, 1993) the state of mineral soil below the peat is very acid.

very acid.

The peet itself has in average a bulk density of 0.275 g/cm² (measured from 12 samples 0 - 20 cm peat depth (Tablo 4)). The average of C organic content is 56.1% (from 22 samples from 0 - 20 cm peat depth (Tablo 4)). From the data above we can calculate that the peat weight in 1 m² volume x bulk density = 1,000,000 cm x 0.275 g/cm² = 275 kg.

With the help of the SRTH-DEM information we analysed the transact cross-section (Figure 1). The peat land without trees has in average on the river side an altitude of 221 to 25 m and at the peat dome of approx. 40m. That means a soli-peat-accumulation between the shore of the rivers and the peat dome is approx. 15 fm to 18m. Since the 180s the PSF along the highway has been logged. The primary PSF in Figure 8 and 9 have a canopy top of up to 60m. That means that the sal PSF in this area is between 20m and 25m high. The average height of the trees was confirmed with 24m by ground measurements.

Solangua, Catchonett and Palangua Rayle between rivers Kalingan and Rungan up to the border of the health forest in the following calculation:

The total man area of the tree of the theory of the health forest in the following calculation:

The total man area of the rivers of the peat area and 2.5m to 3 m average x 1473x10 Micm² = 3.68 to 4.42x10 G/m medium peat area.

The sum is for the peat land 154.3 kg Carbon. So we find a stored Carbon value of 0.32 to 1.1x10 G/cms for this area. This is in line with the calculations of Page et al. 2002 for a bigger area in Kalmanian and Indonesia.

CONCLUSION

This paper provides information on peat thickness, type of mineral soil below peat including pht-values, the chemicals characteristic of quartz sand along a transect Kasongan to Tangkling. The amount of C in 1 m² peat was analysed be tel 54-3 by which is 56.1 % of the peat weight of 275kg.

Calculation was estimated on the amount of stored peat volume and carbon in the northern area of Sebangau Catchment between Kasongan and Tangkling using peet measurements and GIS technology. We found a stored carbon value of approx, 14.10 Geons in this area. Due to the mineral soil below the peat being miniting using order flexible than area. One to the mineral soil below the peat being miniting using a for low flexible, this area is of doubtful utility for agriculture or for plantations.



