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South Dakota State University



Different peat depth and Ground water level influence to the potential Greenhouse gass emission release during peat fires

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•Pratama Aviation (ER-MHV)•
-3°1'39", 104°40'58"
04/08/2017 15:32:57



EY-222 BPBD PLM MI8 QUALITA
-3°9'42", 104°28'23", 151,1m
19/09/2017 10:45:30 AM



EY-225 Mi8 BNPB
1°6'44", 102°54'33", 131°
15/10/2016 14:39:40



EY-222 BPBD PLM MI8 QUALITA
-3°7'24", 104°31'22", 342,0m
12/09/2017 3:15:30 PM



EY-222 BPBD PLM MI-8 QUALITA
-3°9'9", 104°43'7", 122,4m
21/07/2017 4:58:44 PM



BNPB Bolkow PK-EAJ
-3°8'10", 104°30'7", 148,7m
18/09/2017 11:15:55



-3°7'37.08"S 104°39'0.165"E
Indralaya Utara
PRATAMA BELL 407 GX PK-JPB / BNPB
20 Oct 2018 8:48:25 a.m.



14 Sep 2018 10.21.22 AM
-3°21'21,069"S 105°23'16,538"E
Tulung Selapan
MIE RA 22700 - BNPB SUMSEL 2018



-3°10'49,37"S 104°34'6,593"E
Indralaya Utara
ATS Bolkow PK-EAA / BNPB
10-Okt-2018 13:42



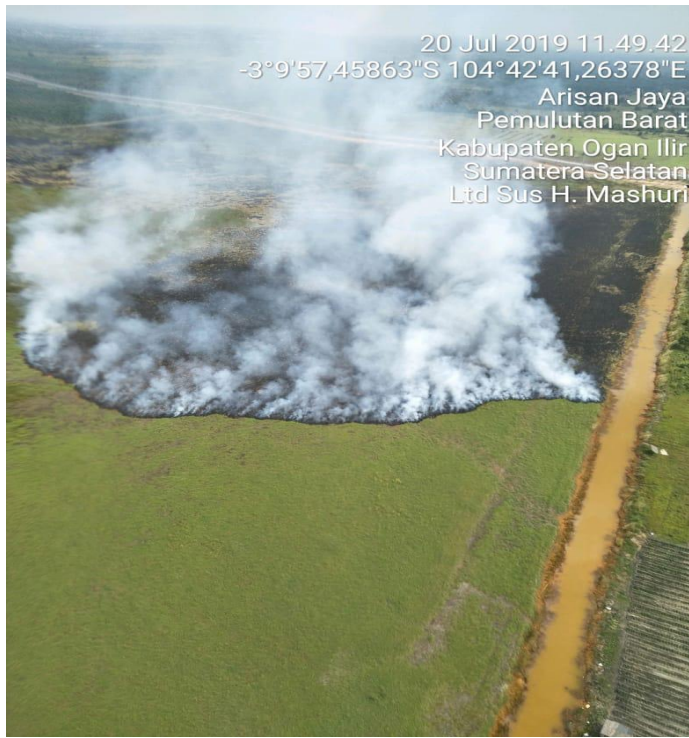
Jul 31, 2018 14:13:38
-3°5'50.507"S 104°55'39.371"E
BNPB-BMS-SUMSEL-PK RTM



Monday, September 3, 2018 16:34:48
-2°54'54.618"S 103°40'11.352"E
PRATAMA RDPL-34230 - BNPB



4 Okt 2018 10:35:35
-3°7'8,60736"S 104°44'5,19324"E
Jalan Sriwijaya Raya
Indralaya Utara, Kabupaten Ogan Ilir 30862
Indonesia
Riyo seba BPBD sumsel



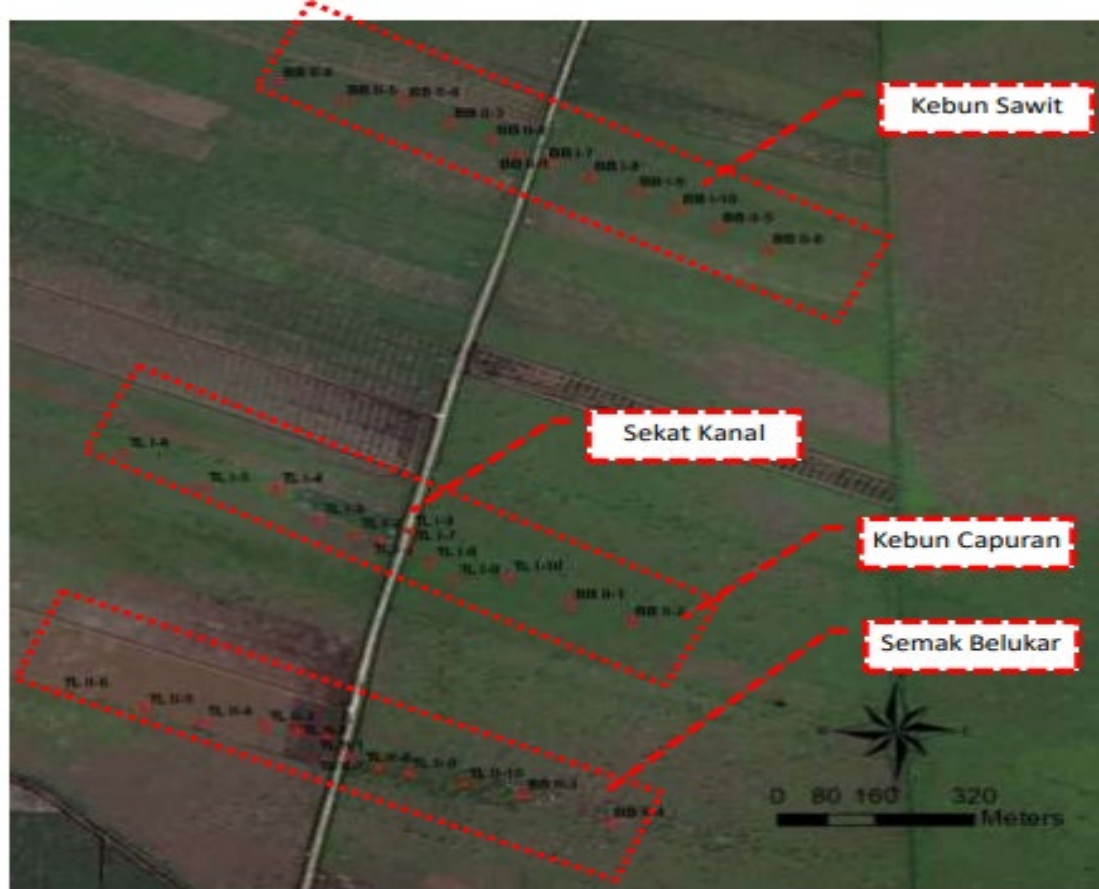


Depth to the water table is a prime determinant of the peat that can burn



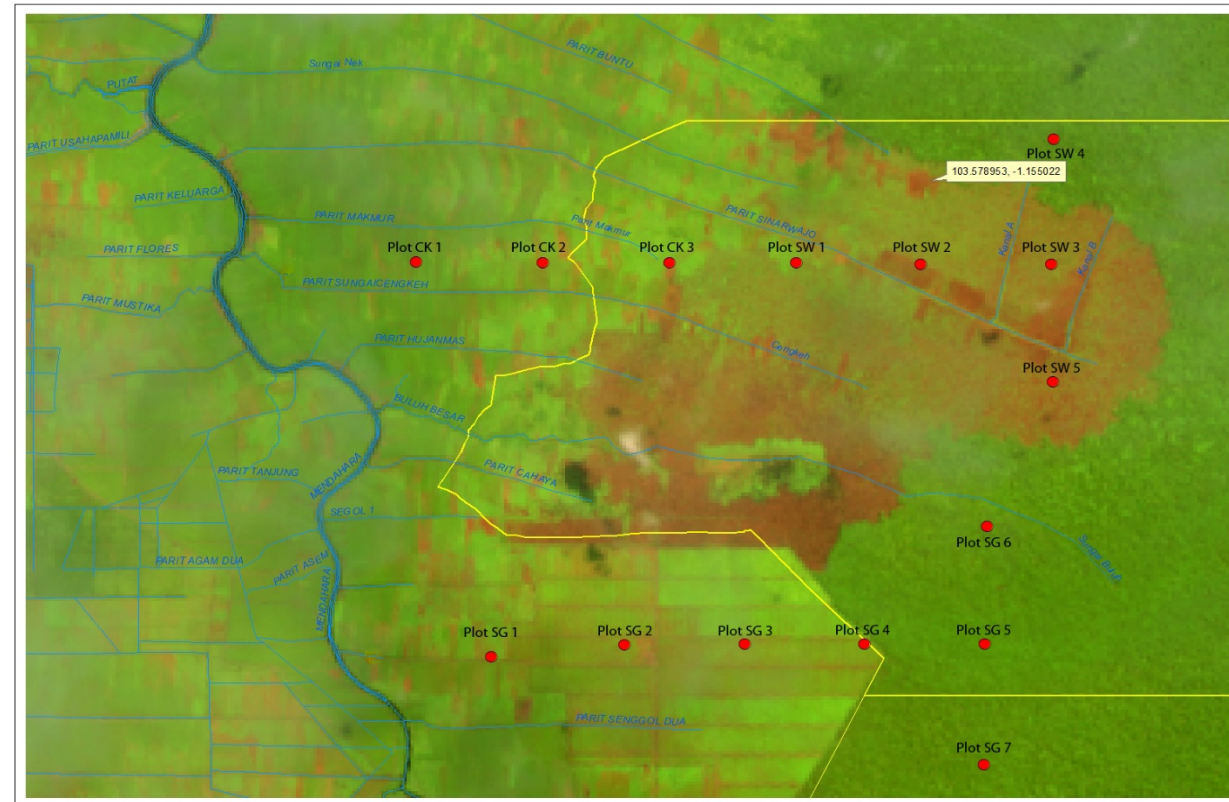
(COCHRANE, 2014)





Gambar 3.6 Konfigurasi hasil pemasangan dipwell di Desa Tanjung Leban

Dipwell in Tanjung Leban, RIAU



Dipwell in JAMBI



Kanal di desa Tanjung Leban



Sekat Kanal di desa Tanjung Leban



Foto 2.

Pengukuran titik sumur pantau

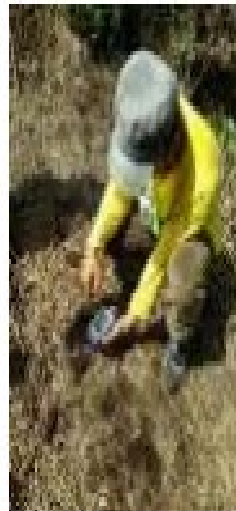


Foto 3.

Pengukuran GPS



Foto 4.

Peralatan pengukuran titik sumur pantau

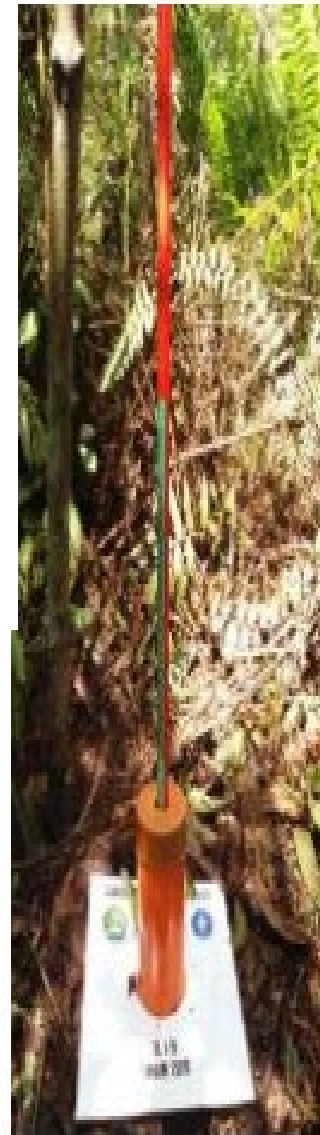


Foto 10.

Pemantauan MAT

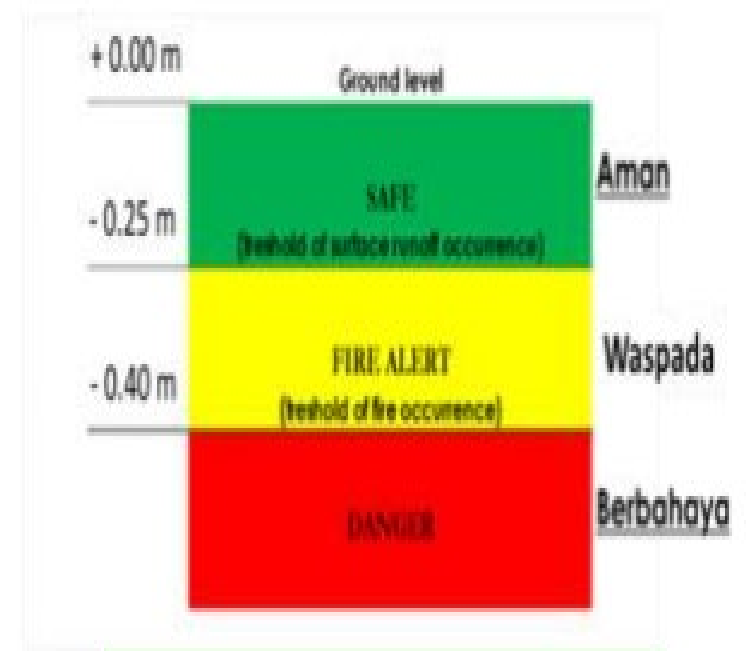


Foto 11.

Peringatan dini kebakaran gambut

GWL in One site in RIAU PLOT IN THE YEAR 2019

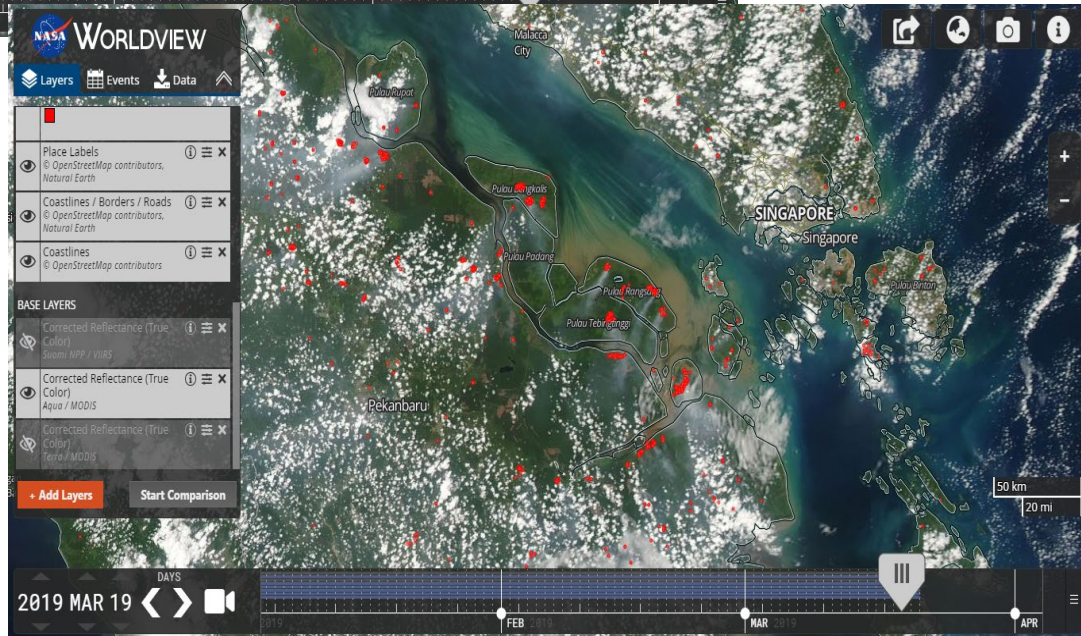
		BB II-1	BB II-2
1	10/01/2019	-64	-114
2	15/01/2019	-50	-69,8
3	22/01/2019	-46,2	-70
4	05/02/2019	-43	-62,2
5	12/02/2019	-54,8	-67,2
6	19/02/2019	-70,5	-82,4
7	26/02/2019	-102,1	-91,7
8	05/03/2019	-16,5	-31,5
9	19/03/2019	-35,2	-51,6
10	31/03/2019	41	55
11	09/04/2019	28	41,8

GWL in the site in RIAU PLOT IN THE YEAR 2019

NO	KODE TITIK						TANGGAL	KODE TITIK					
	BB II-10	BB II-9	BB I-10	BB I-9	BB I-8	BB I-7		BB I-1	BB I-2	BB I-3	BB I-4	BB I-5	BB I-6
1	-117	-86	-96	-94	-97	-114	10/01/2019	-95	-108	-96	-108	-121	-118
2	-113	-83	-91,8	-83	-93	-105,8	15/01/2019	-91	-106	-95	-107	-113	-115
3	-115,8	-85,8	-96,5	-92,3	-97,3	-109	22/01/2019	-95	-110,8	-100	-113	-116,8	-120
4	-112	-86,2	-90	-88,6	-93	-97,5	05/02/2019	-93	-108,8	-97	-110	-111	-113,3
5	-116,4	-84,5	-95	-90,1	-97,8	-109,5	12/02/2019	-106,5	-117,5	-105,1	-117,4	-121	-122,9
6	-126,8	-93,4	-104,3	-102,8	-110,3	-126,8	19/02/2019	-118,5	-127,4	-114,3	-125	-127,2	-130,5
7	-136,4	-101,3	-112,4	-109,8	-117,8	-135,3	26/02/2019	-124,4	-136,4	-123,2	-133,2	-134,7	-135,9
8	-89	-78	-88,4	-74,5	-70	-69	05/03/2019	-106,6	-121,4	-110,5	-123,8	-125,5	-127,5
9	-96	-68,6	-79,4	-76,5	-85,8	-105,5	19/03/2019	-123,6	-135,5	-122,6	-133,7	-134,9	-137,2
10	94,3	73,5	87,2	86,6	94,1	105,9	31/03/2019	119,6	140,8	130,8	143,1	143,8	145,3
11	83,9	59,8	69,3	63,8	68,3	80,4	09/04/2019	111,2	124	113	127	129,6	131,2



2019 MAR 18



2019 MAR 19



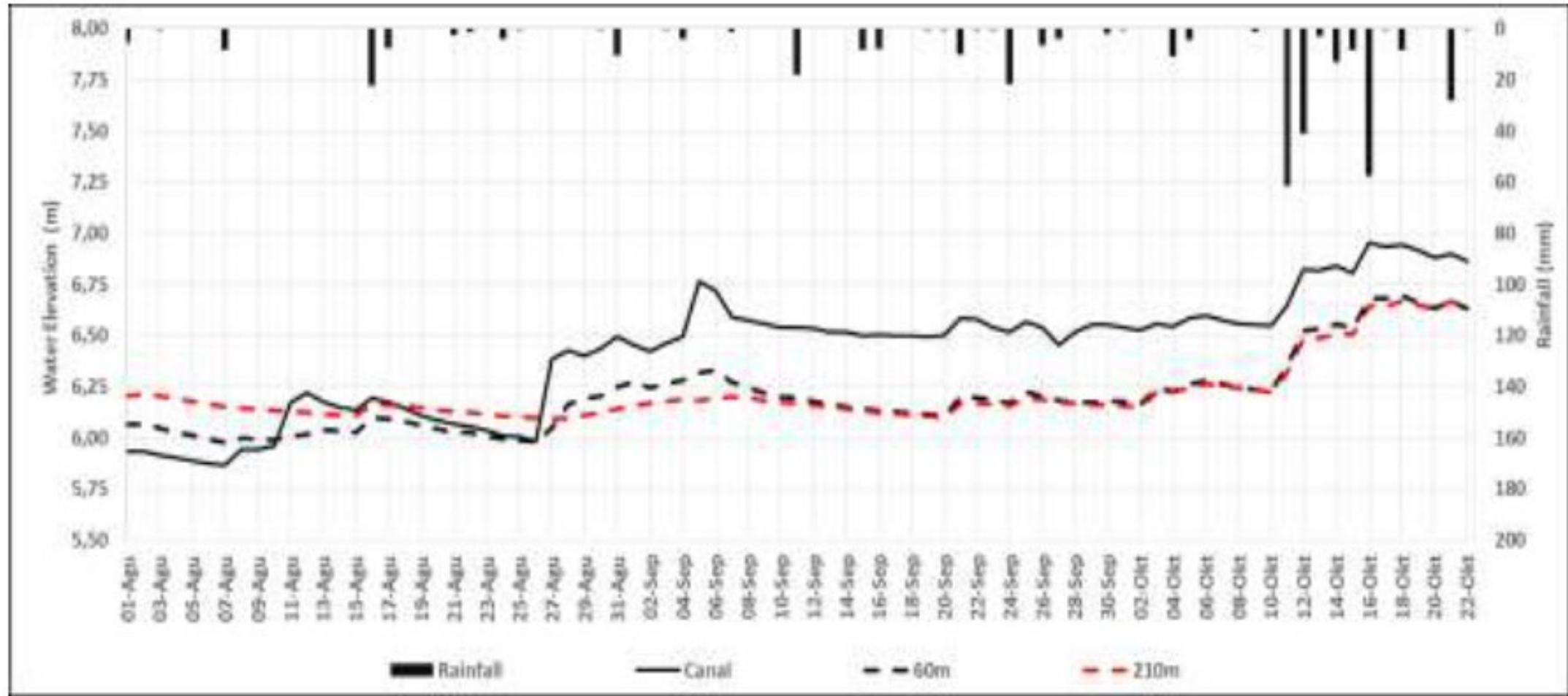
Rupat



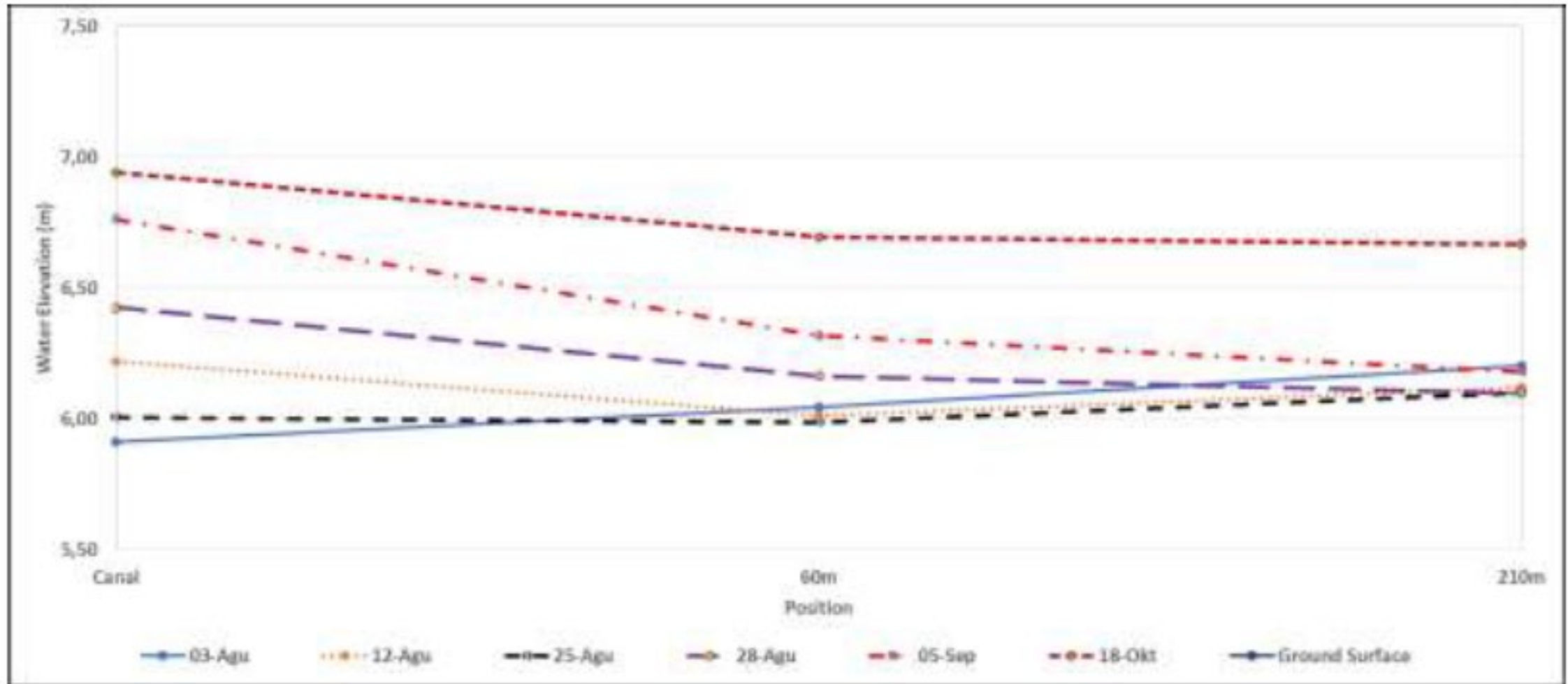
Teluk Lecah, Rupal



One day different of GWL and CWL at 60 m and 210 m distance from Canal in Riau plots



Cross section from field monitoring of GWL and CWL in dipwell at 60 m and 240 m from canal in Riau plots



GWL at different peat depth in the community land, in Jambi

Keterangan	Kedalaman Gambut (cm)	Des-17	Jan-18	Feb-18	Mar-18	Apr-18	Mei-18
Kebun Masyarakat	70	-41	-51,3	-48	-42		-47,5
Kebun Masyarakat	110	-38	-28,5	-30	-29,2		-31,5
Kebun Masyarakat	130	-36	-43,8	-39,3	-38		-54
Kebun Masyarakat	326	-25,2	-32,3	-28,5	-27		
Kebun Masyarakat	380	-10	-9,3	-9,7	-9,6		-8,7

Collecting Smokes in the dry-wet season peatland fires

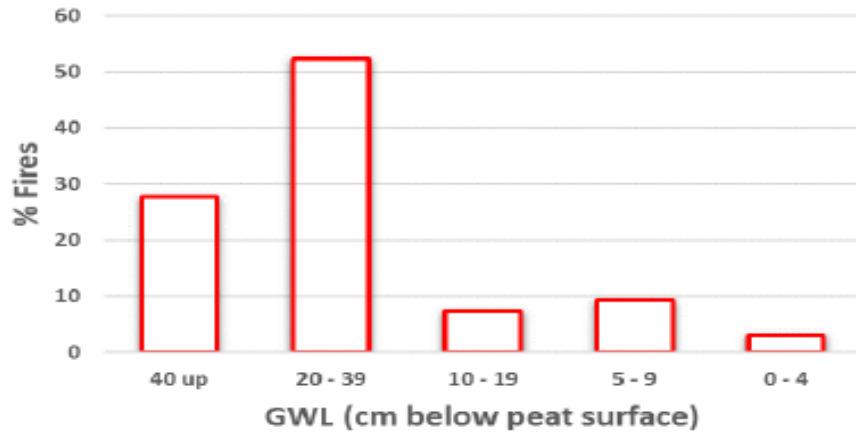


Next challenge: **Smokes** in the dry seasons



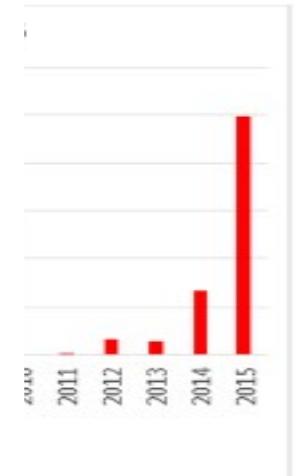
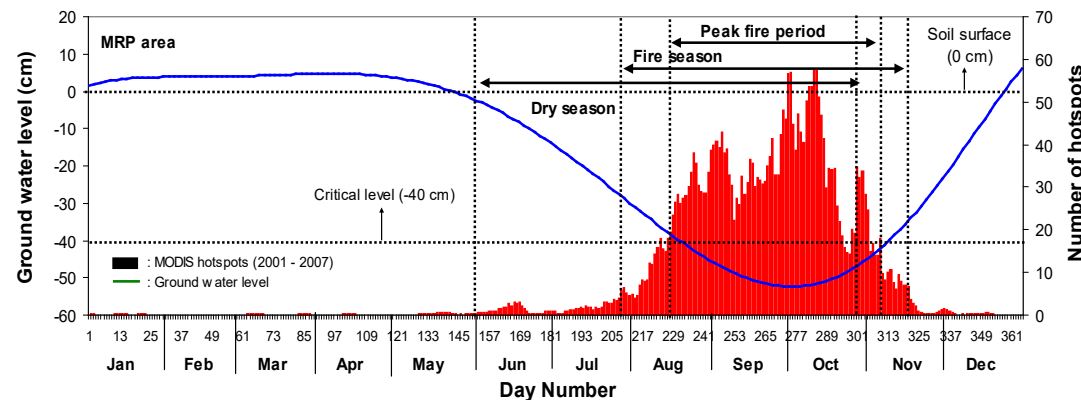
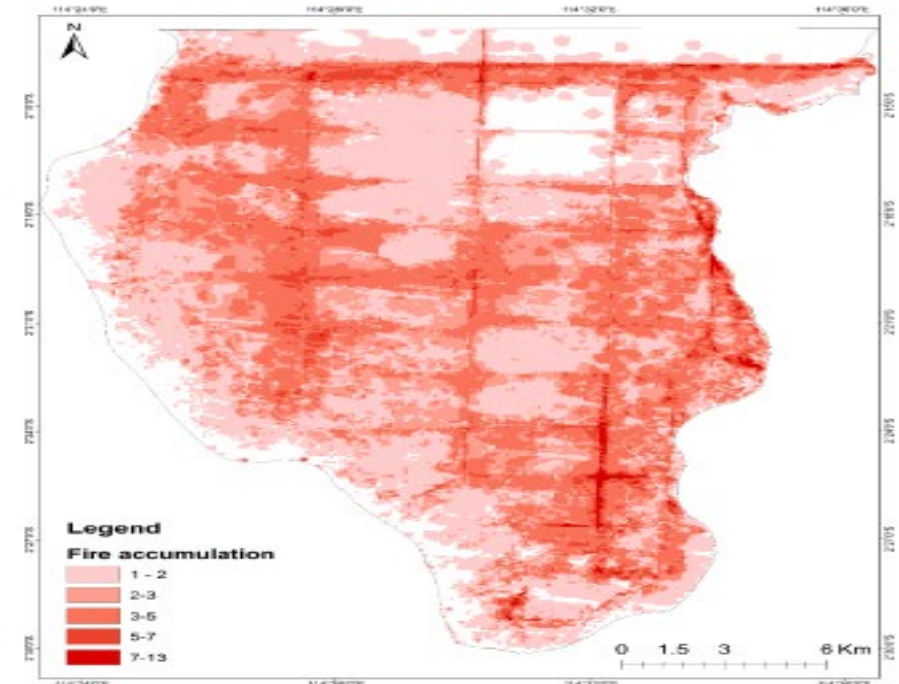
Critical GWL Central Kalimantan

- ✓ Most of fires occur in areas with GWL 20 cm below the peat surface, but fire occurrences with GWL of less than 5 cm below peat surface may strongly suggests that degraded peatlands are very vulnerable to fires even under relatively moist condition
- ✓ This indicating that fire is coincident with lower GWL, strongly illustrates the importance of maintaining high GWL, of more than 5 cm, to reduce fire risk and prevent degraded peatlands from experiencing surface peat fires and further devastating deep peat fires.



Fire occurrences under certain GWL condition

FIRE ACCUMULATION 1997-2015





Some of 90 gases detected during peat fires in Central Kalimantan (Stockwell et al, 2016)

Compound (formula)	Study avg (stdev) (g/kg)
Carbon Dioxide (CO ₂)	1564(77)
Carbon Monoxide (CO)	291(49)
Methane (CH ₄)	9.51(4.74)
Dihydrogen (H ₂)	1.22(1.01)
Acetylene (C ₂ H ₂)	0.121(0.066)
Ethylene (C ₂ H ₄)	0.961(0.528)
Propylene (C ₃ H ₆)	1.07(0.53)
Formaldehyde (HCHO)	0.867(0.479)
Methanol (CH ₃ OH)	2.14(1.22)
Formic Acid (HCOOH)	0.180(0.085)
Acetic Acid (CH ₃ COOH)	3.89(1.65)
Glycolaldehyde (C ₂ H ₄ O ₂)	0.108(0.089)
Furan (C₄H₄O)	0.736(0.392)
Hydroxyacetone (C ₃ H ₆ O ₂)	0.860(0.433)
Phenol (C ₆ H ₅ OH)	0.419(0.226)
1,3-Butadiene (C ₄ H ₆)	0.189(0.157)
Isoprene (C ₅ H ₈)	5.28E-2(4.33E-2)
Ammonia (NH ₃)	2.86(1.00)
Hydrogen Cyanide (HCN)	5.75(1.60)

Conclusion

- The existency of canals and peat deapt give significant impacts to the drying process in the peat surface to the fire occurs. It is believed to give significant impacts to the emission released during burning.