
Monitoring groundwater and springs
in agricultural areas in Norway
Roger Roseth and
Jens Kværner, NIBIO
Financed by
Norwegian Environment Agency
and Norwegian Agriculture Agency

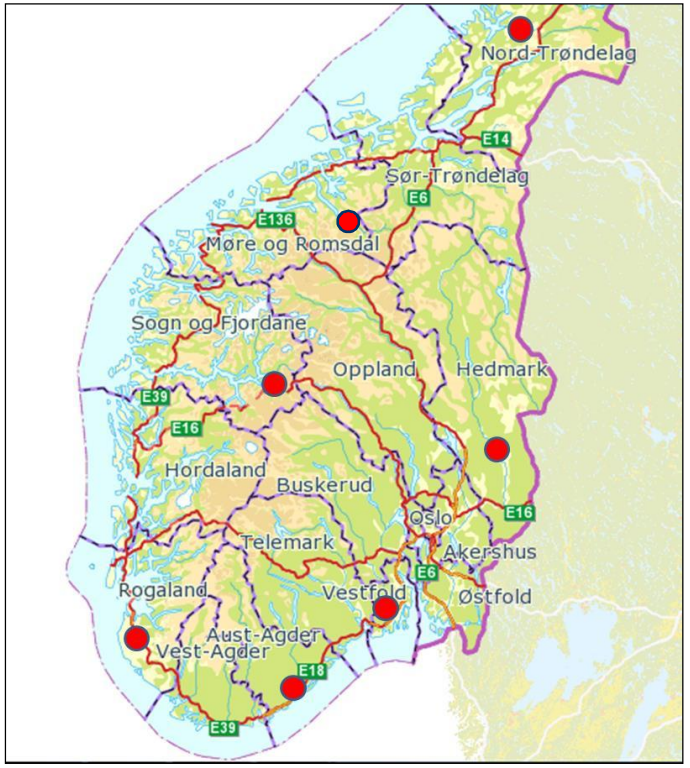
Groundwater monitoring – agricultural areas in Norway

Field sites:

- Overhalla, Trøndelag (NGU): Grain, livestock farming
- Grødal, Møre og Romsdal (NGU): Potato, grain
- Haslemoen, Hedmark (NIBIO): Potato, carrots and grain
- Rimstadmoen, Vestfold (NIBIO): Carrots, grain and potato
- Horpestad, Rogaland (NIBIO): Livestock, grass and grain
- Lærdal, Sogn og Fjordane (NIBIO): Grass, vegetables and berries

Kriteria: Important groundwater resources, national variation climate, agricultural production and geology.

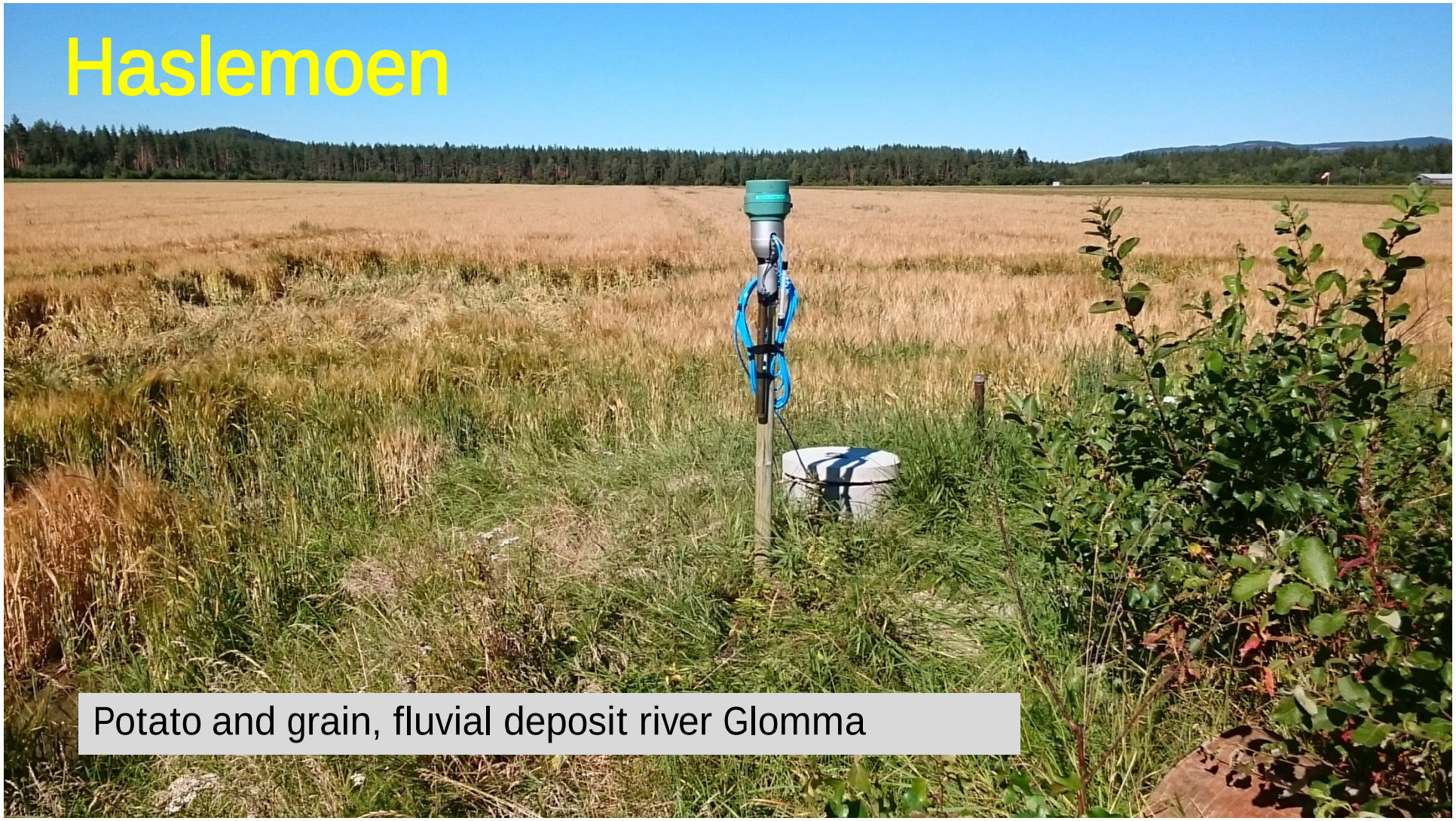
Monitoring: Nutrients, priority substances and pesticides




Horpestad
EU89, UTM-sone 33
Vis flere koordinatsystemer.
NORD 6550166.4
ØST -43435.1
Intensive livestock farming, grass production, grain and potato, glacifluvial deposit


Carrots, grain, potato, fluvial deposit Numedalslågen
Rimstadmoen

Haslemoen



Potato and grain, fluvial deposit river Glomma

Lærdal

Grass produktion, vegetables and berries –fluvial deposit

Grødalen

Potato, grain and grass produktion, fluvial deposit

Fruit and berries, glacifluvial deposit

Strawberries, sweet cherries, glacifluvial deposit

Pesticides in groundwater in Norway. A screening investigation of 28 drinking water wells in agricultural areas, 2010 – 2012

Roger Roseth - NIBIO

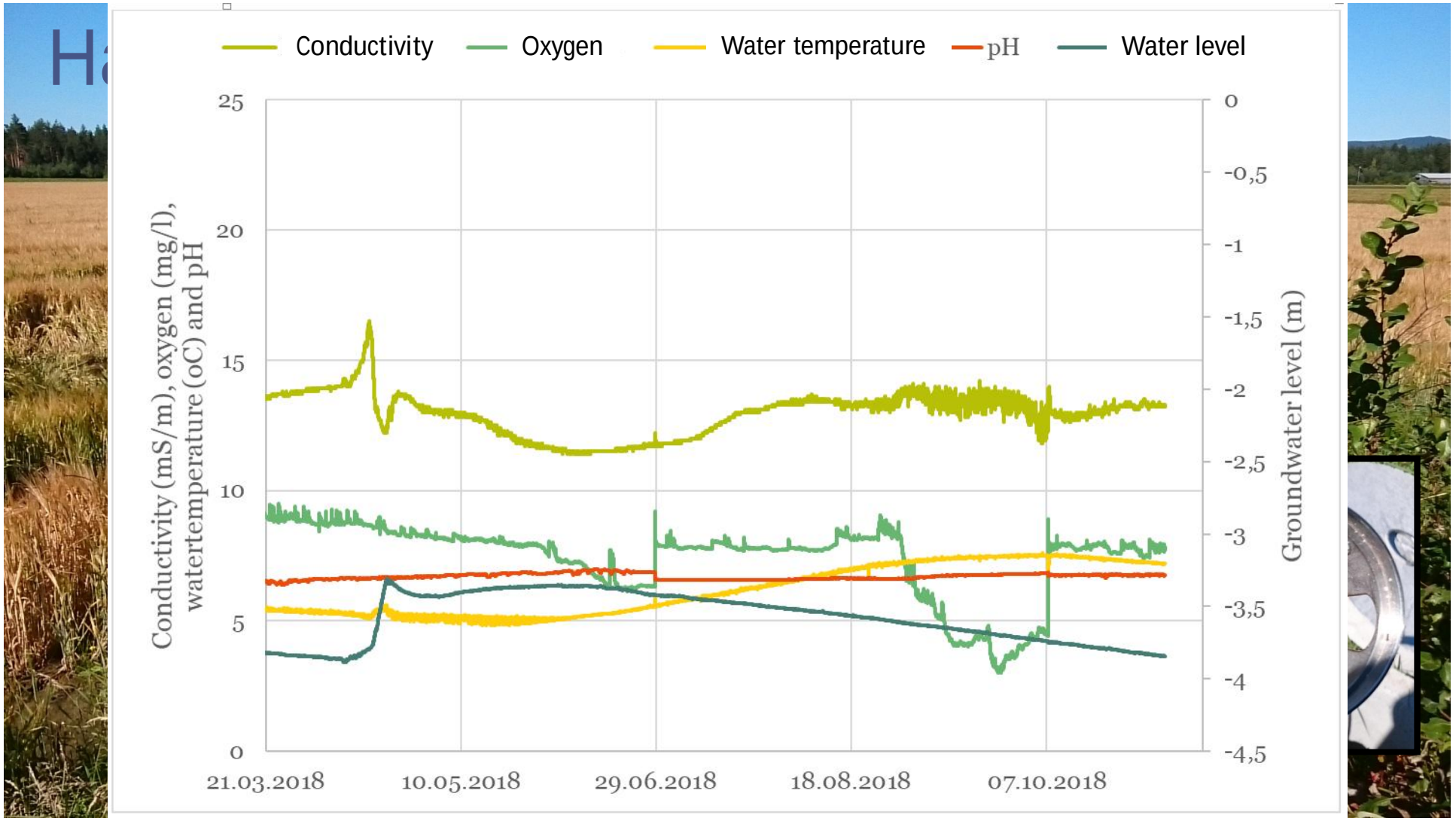
NIBIO
NORWEGIAN INSTITUTE OF BIOECONOMY RESEARCH

vann fra

Summing up – pesticides in groundwater

2010 - 2012

- Analyzed 199 samples from 28 wells. Found pesticides in 89 samples (45 %) and in 24 wells.
- Residues exceeding drinking water limit (> 0.1 µg/l) in 24 samples (12 %).
- Found 19 different pesticides and metabolites (Total 2007-12 = 31 pesticides)
- Most common residues: bentazone, atrazine, simazine, metalaxyl, MCPA and BAM
- Most common residues exceeding 0.1 µg/l: bentazone, pencycuron, dicamba and MCPA.
- Pesticides used for coating of seed potato – risk for leaching!
- Variability in occurence of pesticides in wells – sampling strategy


Conductivity
Oxygen
Water temperature
pH
Water level
Conductivity (mS/m), oxygen (mg/l), watertemperature (oC) and pH
Groundwater level (m)
25
20
15
10
5
0
0
-0,5
-1
-1,5
-2
-2,5
-3
-3,5
-4
-4,5
21.03.2018
10.05.2018
29.06.2018
18.08.2018
07.10.2018

SEBA Internetmodul

Ikke sikker | bioweb08.bioforsk.no/seba/projects/index.php?include=7

NIBIO NORWEGIAN INSTITUTE OF BIOECONOMY RESEARCH | SEBA HYDROCENTER

Logout (rimstad) | View | Evaluation | Settings | Export | Language | Help

Haslemoen

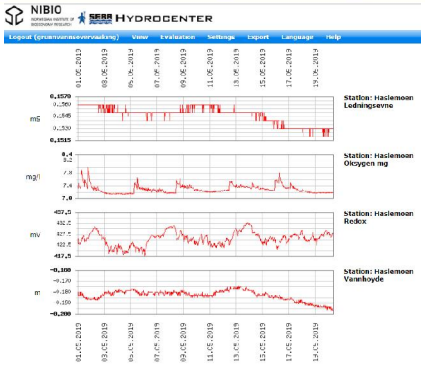
back to top

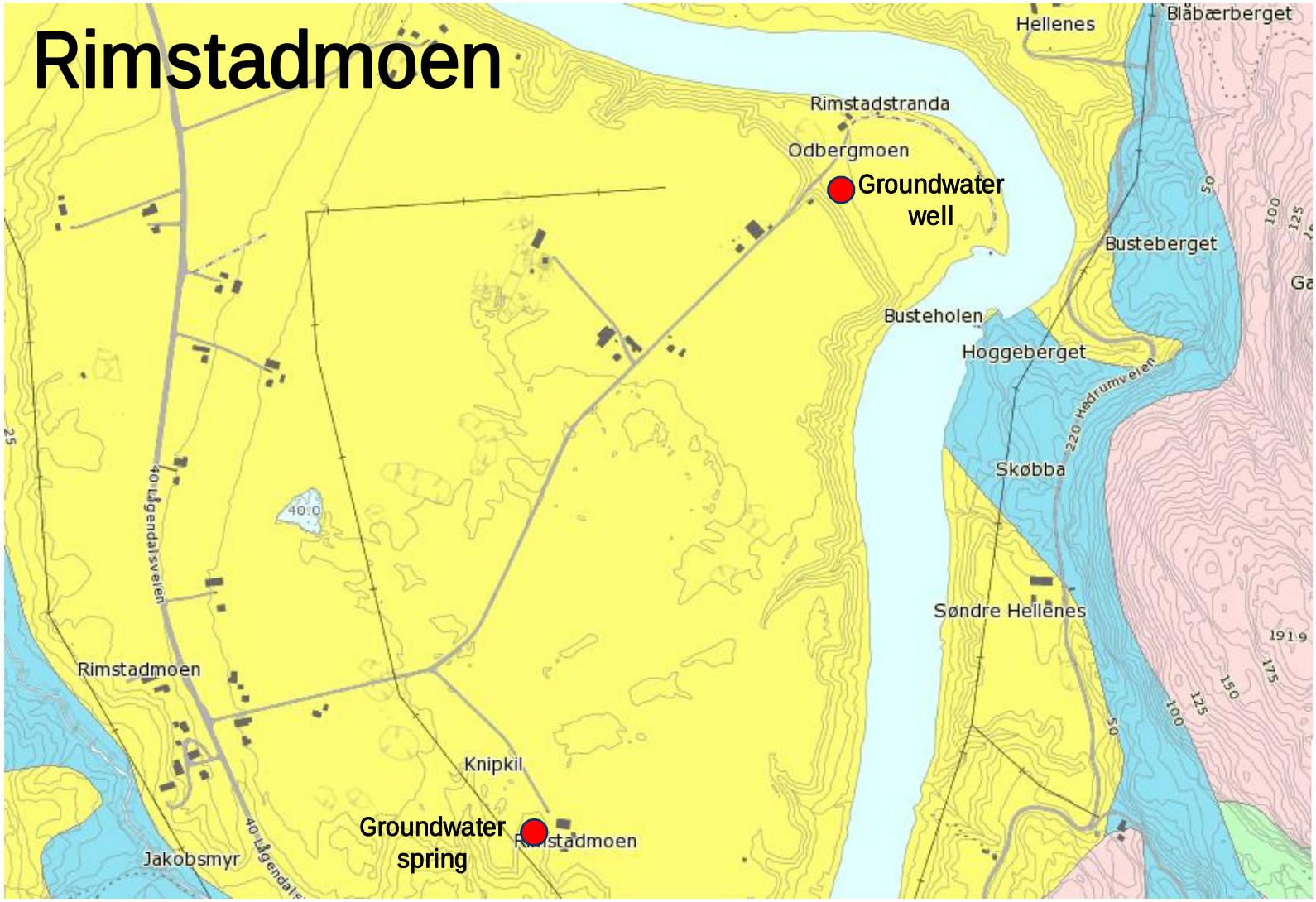
Haslemoen

Haslemoen grunnvann

Last data available:

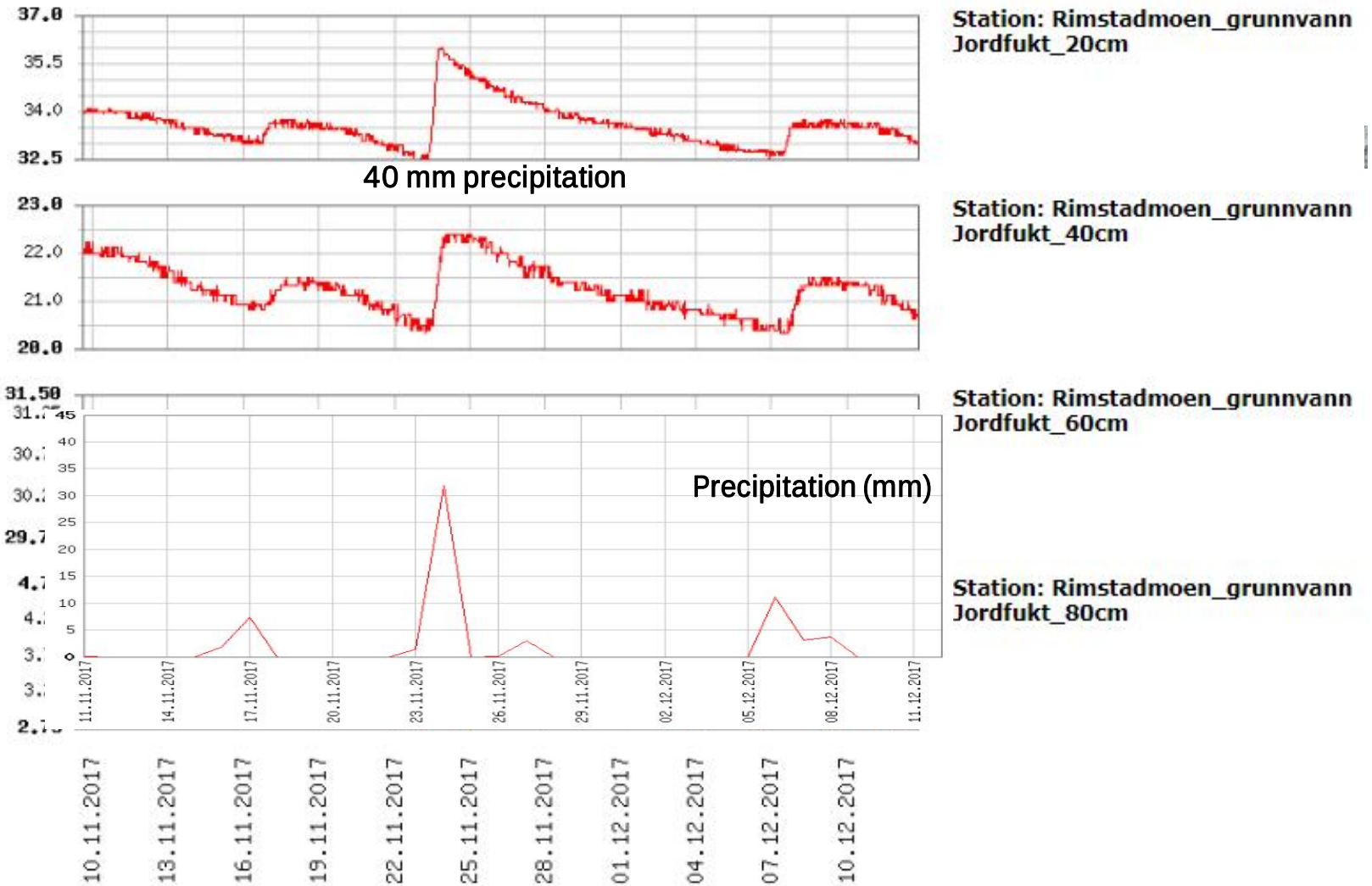
Batterispenning:	8.141 V (08:39:02 20.05.2019)
Ledningsevne:	0.153 mS (08:39:02 20.05.2019)
Oksygen mg:	7.172 mg/l (08:39:02 20.05.2019)
Oksygen prosent metning:	61.980 % (08:39:02 20.05.2019)
pH:	6.738 pH (08:39:02 20.05.2019)
Redox:	428.300 mV (08:39:02 20.05.2019)
Salinitet:	0.072 SAL (08:39:02 20.05.2019)
Vannhoyde:	-0.196 m (08:39:02 20.05.2019)
Vanntemperatur:	5.340 °C (08:39:02 20.05.2019)




Rimstadmoen
Hellenes
Blåbærberget
Rimstadstranda
Odbergmoen
Groundwater well
Busteberget
Busteholen
Hoggeberget
Hedrumvelen
Skøbba
Søndre Hellenes
Rimstadmoen
Knipkil
Groundwater spring
Jakobsmyr
40 Lågendalsveien
40:0
191.9

Action p

Project: Mc

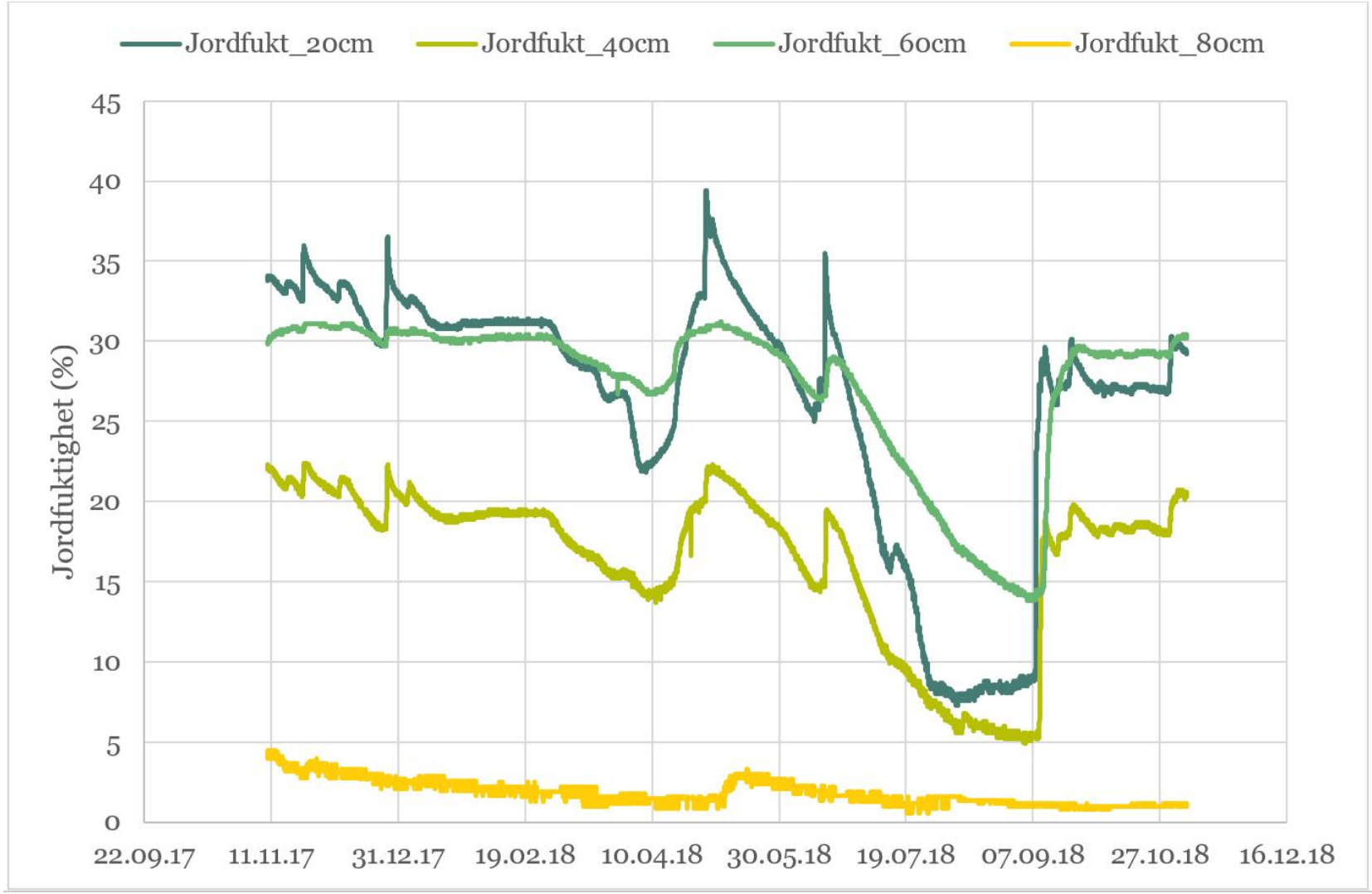


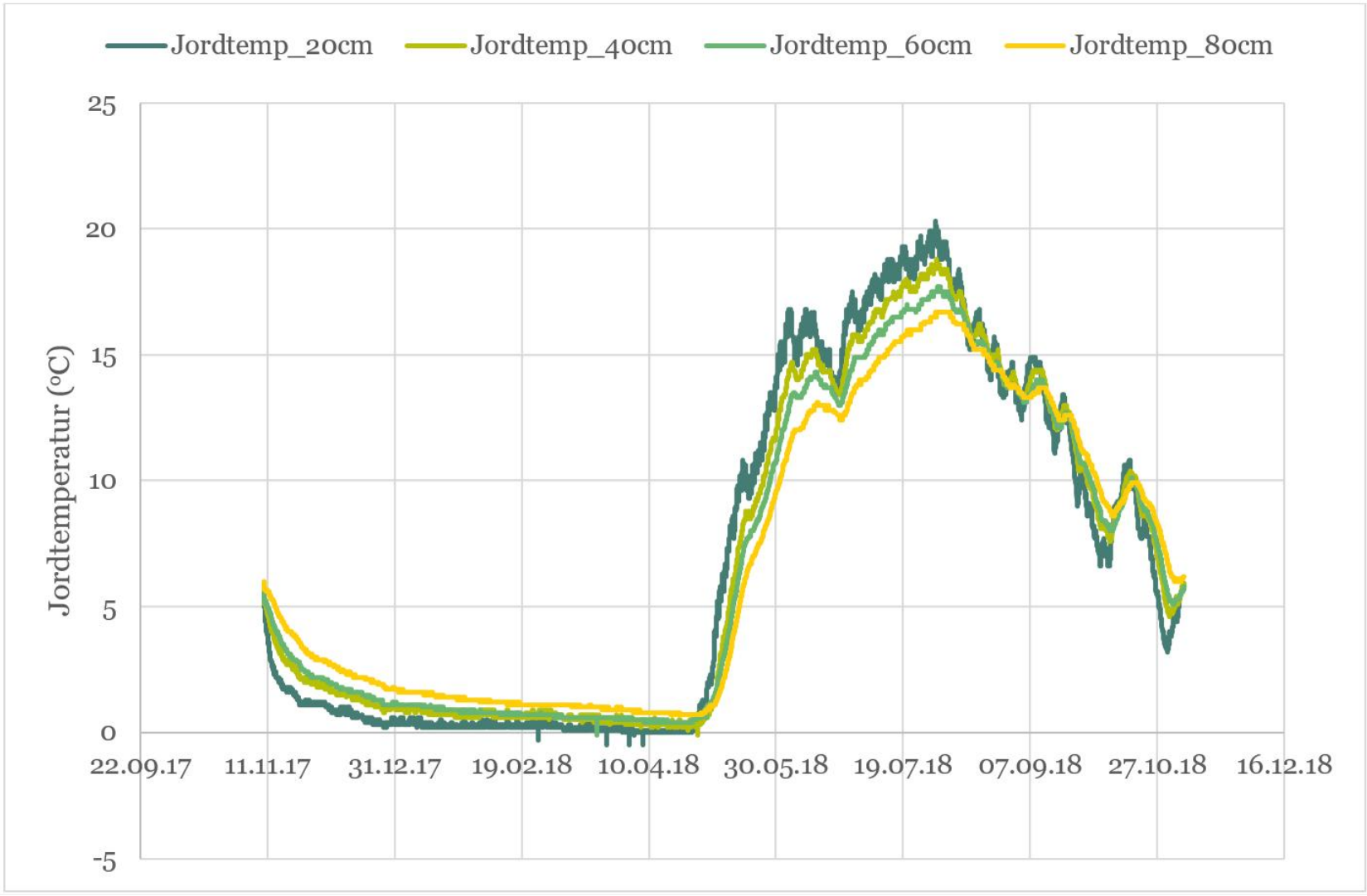
Station: Rimstadmoen_grunnvann Jordfukt_20cm

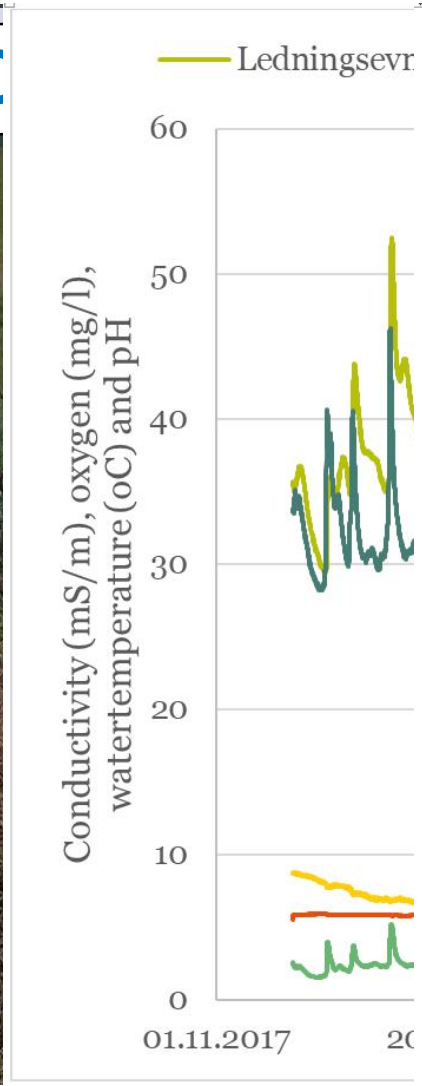
Station: Rimstadmoen_grunnvann Jordfukt_40cm

Station: Rimstadmoen_grunnvann Jordfukt_60cm

Station: Rimstadmoen_grunnvann Jordfukt_80cm

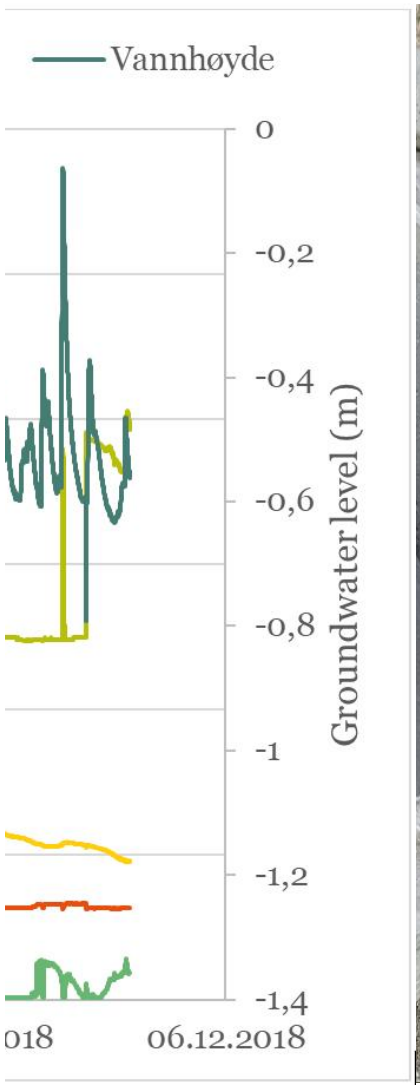

Jordfukt_20cm
Jordfukt_40cm
Jordfukt_60cm
Jordfukt_80cm
Jordfuktighet (%)
45
40
35
30
25
20
15
10
5
0
22.09.17
11.11.17
31.12.17
19.02.18
10.04.18
30.05.18
19.07.18
07.09.18
27.10.18
16.12.18

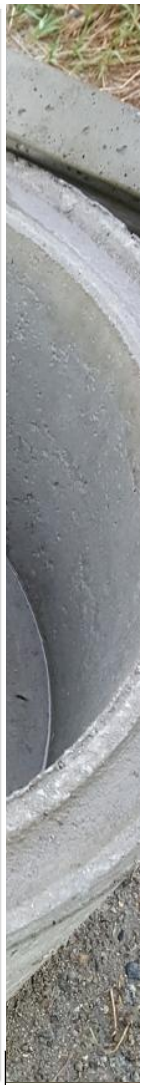

Jordtemp_20cm
Jordtemp_40cm
Jordtemp_60cm
Jordtemp_80cm
Jordtemperatur (°C)
25
20
15
10
5
0
-5
22.09.17
11.11.17
31.12.17
19.02.18
10.04.18
30.05.18
19.07.18
07.09.18
27.10.18
16.12.18



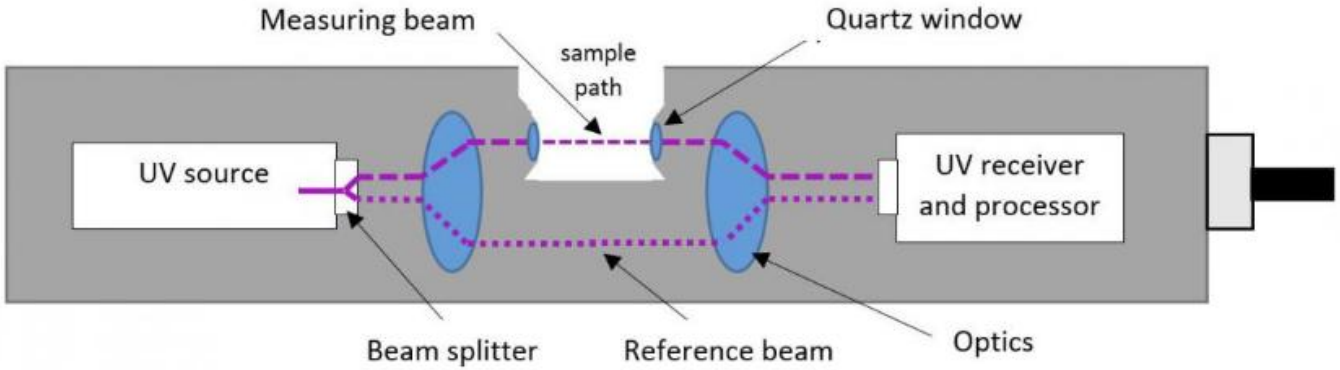
Stoffer/Parameter	Terskel verdi	Vende punkt	Klepp 10.10.17	Klepp 14.11.17	Klepp 25.06.18	Klepp 22.10.18
Nitrate (mg/l)	50	37,5	13,7	19,5	5,3	8,4
Chloride (mg/l)	200	150	25	35	72	27
Sulphate(mg/l)	100	75	8,6	18,5	30,1	22,5
Ammonia (µg N/l)	500	400	110	17	38	14
As (µg/l)	10	7,5	1,8	2,3	0,76	0,47
Cd (µg/l)	5	3,75	0,07	0,16	0,03	0,03
Pb (µg/l)	10	7,5	2,3	1,7	0,26	<0,20
Cu (µg/l)**	15,6	7,8	50	44	14	15
Zn (µg/l)**	60	11	45	13	6,9	15
Fe (µg/l)	-	-	2200	2500	2500	83
Mn (µg/l)	-	-	79	110	160	31
Triklormetan (µg/l)	2,5	1,9	0,23	*	*	*
Plantevernmidler						
Propikonazole (µg/l)	0,1	0,075	0,012	*	*	*
Fenpropimorph (µg/l)	0,1	0,075	*	*	*	*
Pyraclostrubin (µg/l)	0,1	0,075	*	*	*	*
Metalaxyl (µg/l)	0,1	0,075	*	*	*	*
Metribuzin-DK	0,1	0,075	*	*	*	*
Metribuzin-DADK	0,1	0,075	*	*	*	*
Imazalil	0,1	0,075	*	*	*	*
Glyfosat/AMPA (µg/l)	0,1	0,075	0,38	*	*	*
MCPA (µg/l)	0,1	0,075	0,091	0,016	*	*
2,4 D (µg/l)	0,1	0,075	*	*	*	*
IN70941, Lavdose (µg/l)	0,1	0,075	0,006	0,030	*	*
INA 4098, Lavdose (µg/l)	0,1	0,075	*	*	*	*
Metsulfuron-methyl, Lavdose (µg/l)	0,1	0,075	*	*	*	*
Sum plantevernmidler	0,5	0,4	0,49	0,046	0	0

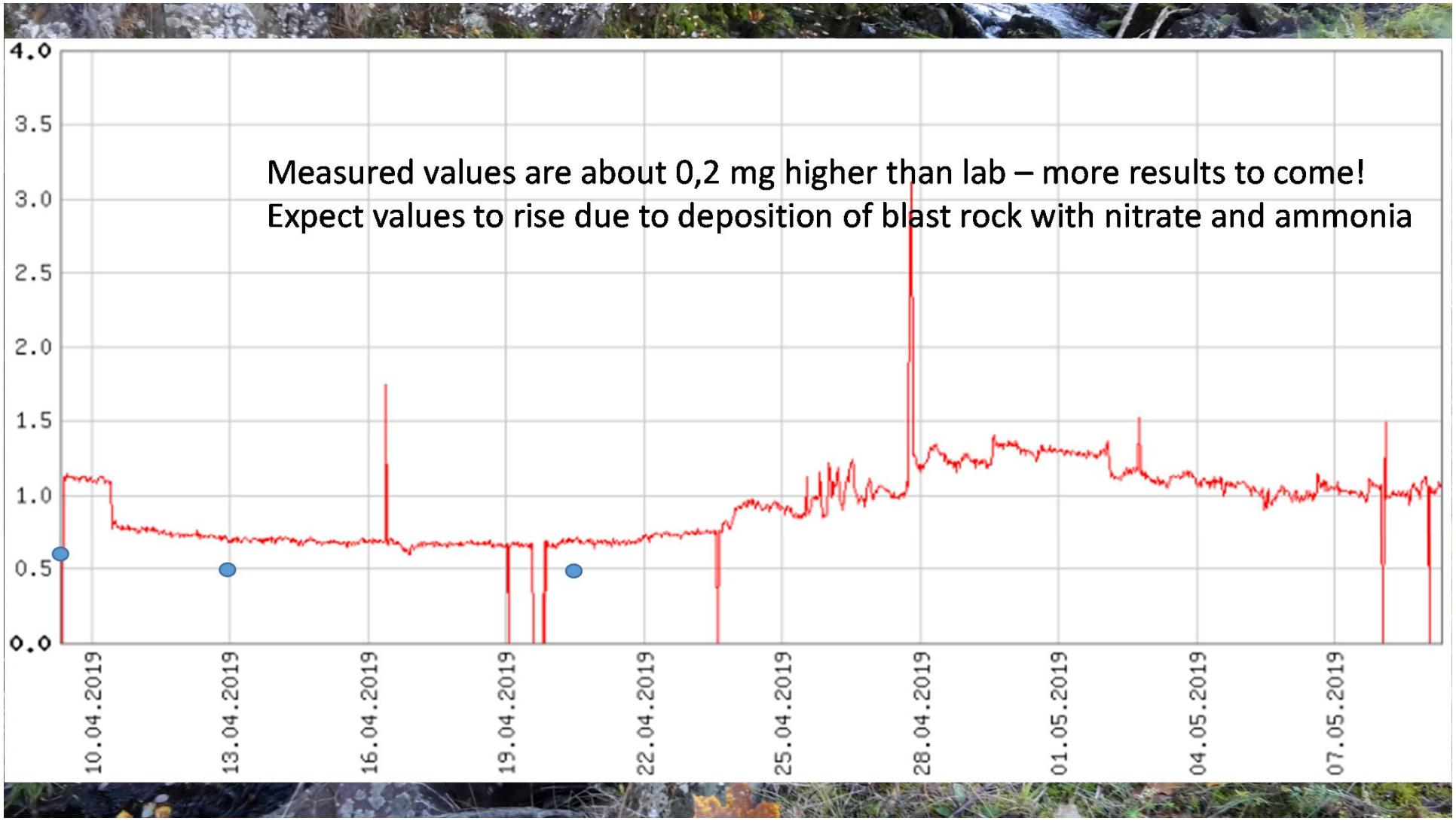
*Ikke påvist, ** Fra M608/02:2018, Terskel = Akutt (IV), Vendepunkt= Kronisk (III)





Real-time Optical NO_3 Analysis




Measured values are about 0,2 mg higher than lab – more results to come!
Expect values to rise due to deposition of blast rock with nitrate and ammonia
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
10.04.2019
13.04.2019
16.04.2019
19.04.2019
22.04.2019
25.04.2019
28.04.2019
01.05.2019
04.05.2019
07.05.2019


Pesticides in soil – increasing depth - mobility
Thats all ☺