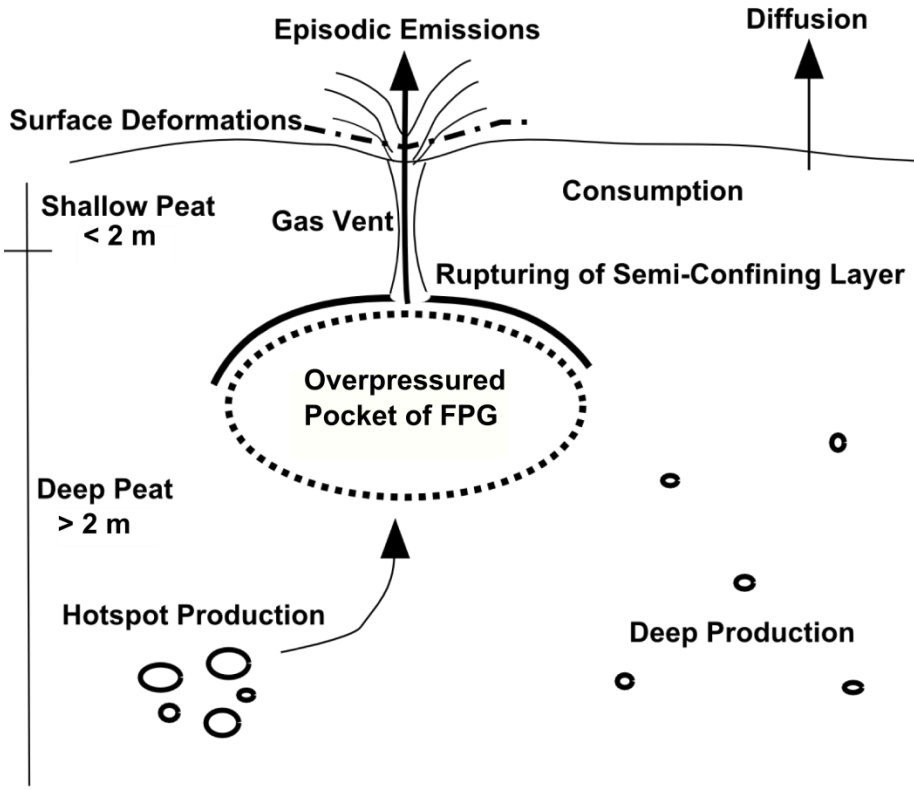
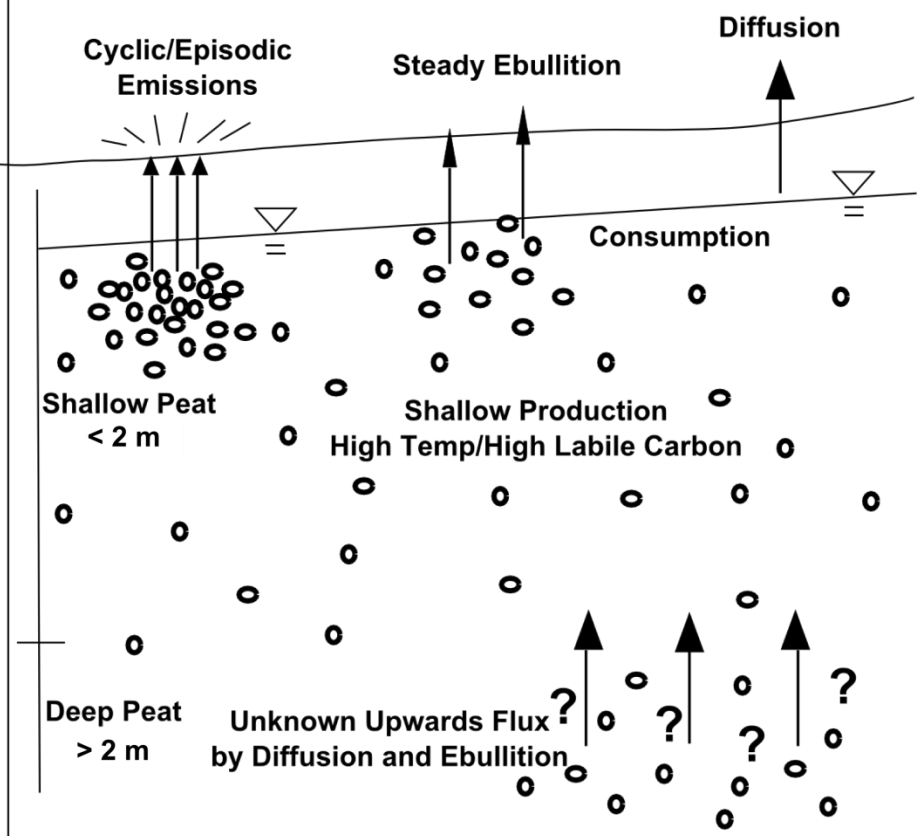
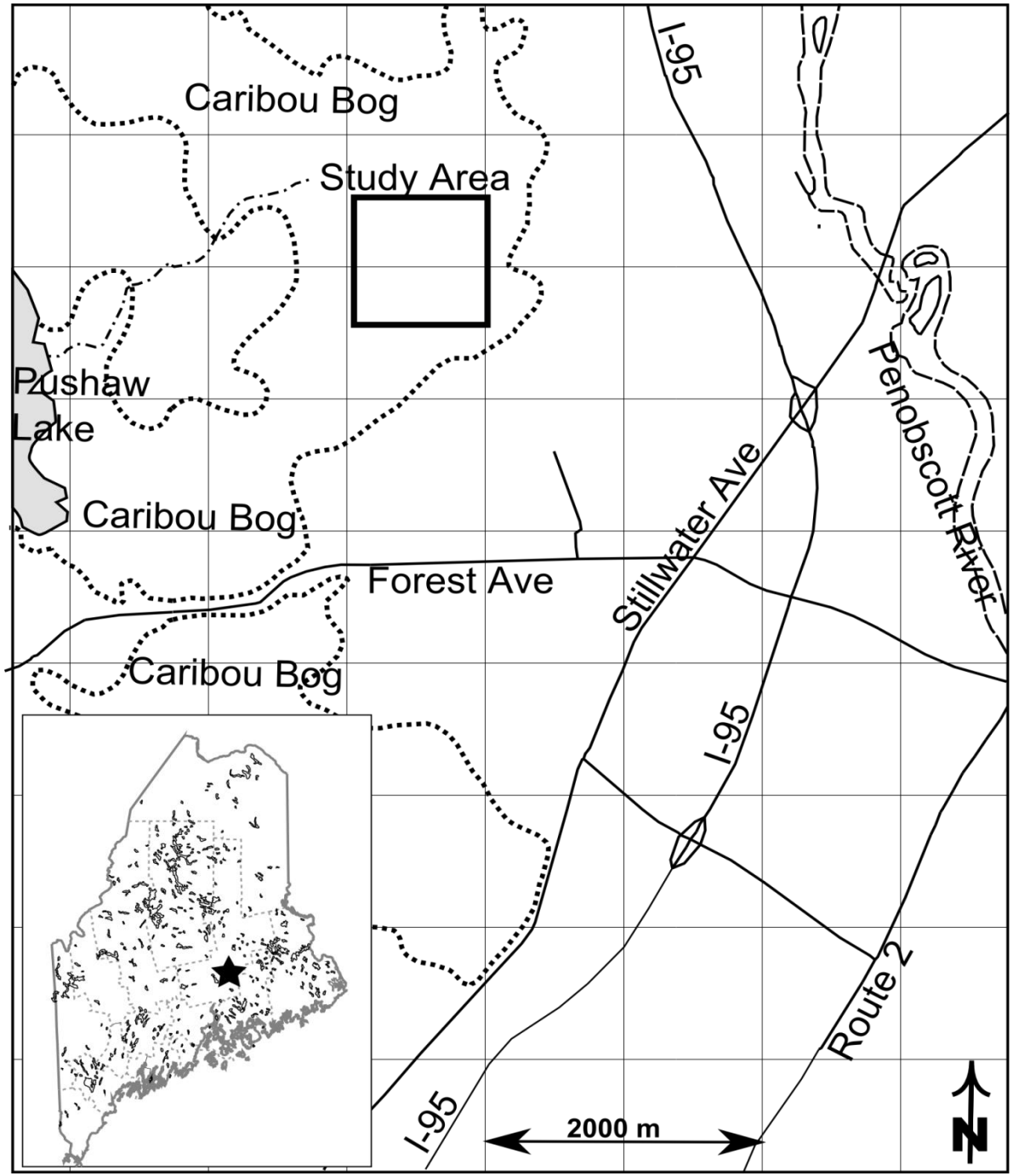
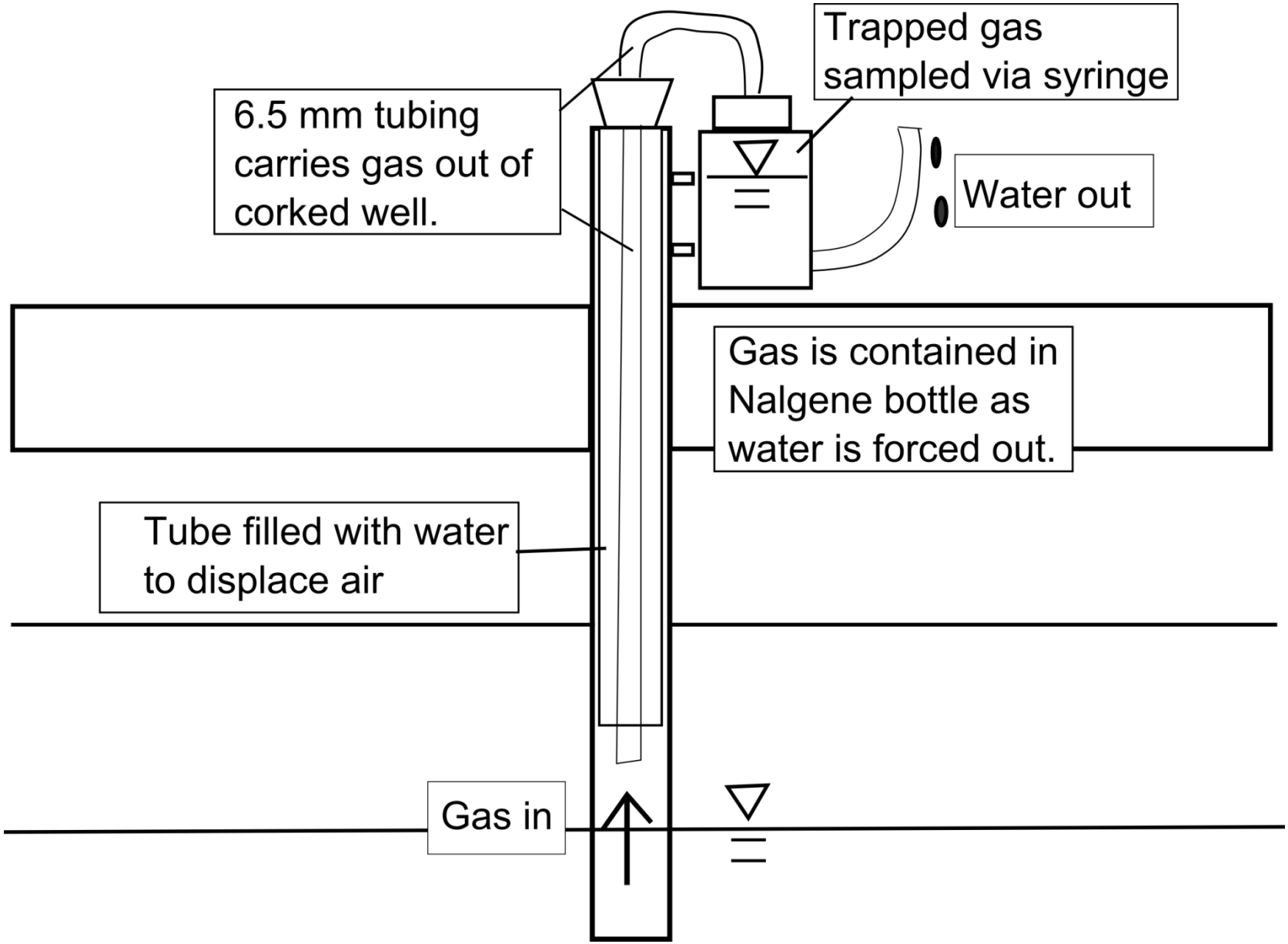
"Deep Peat" Model

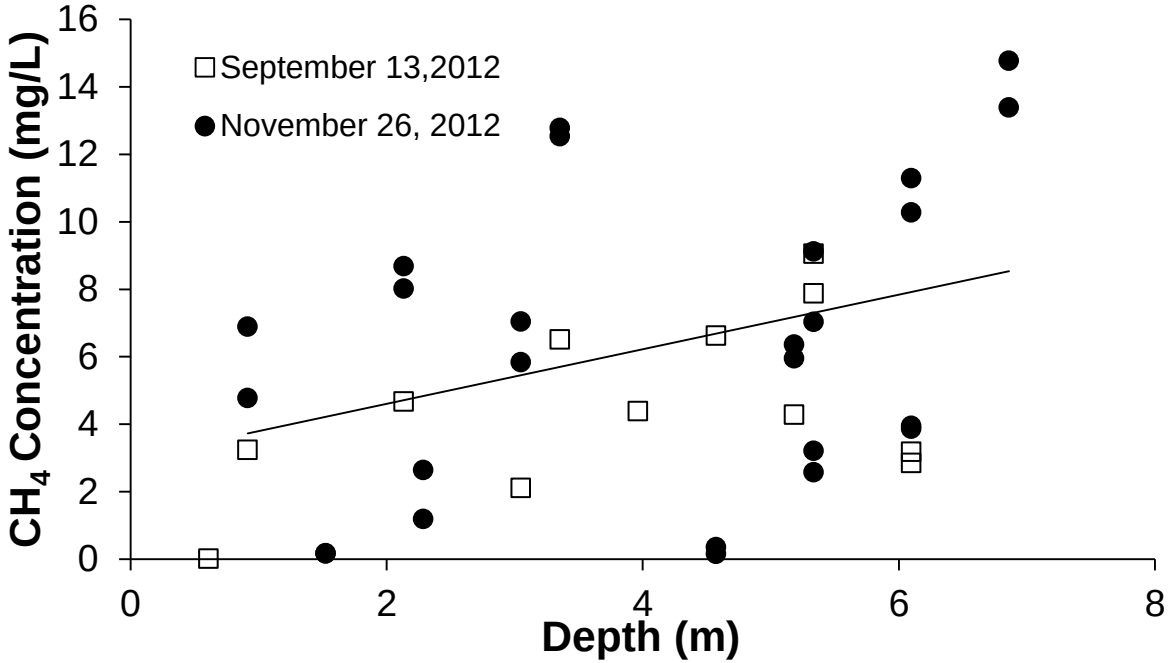


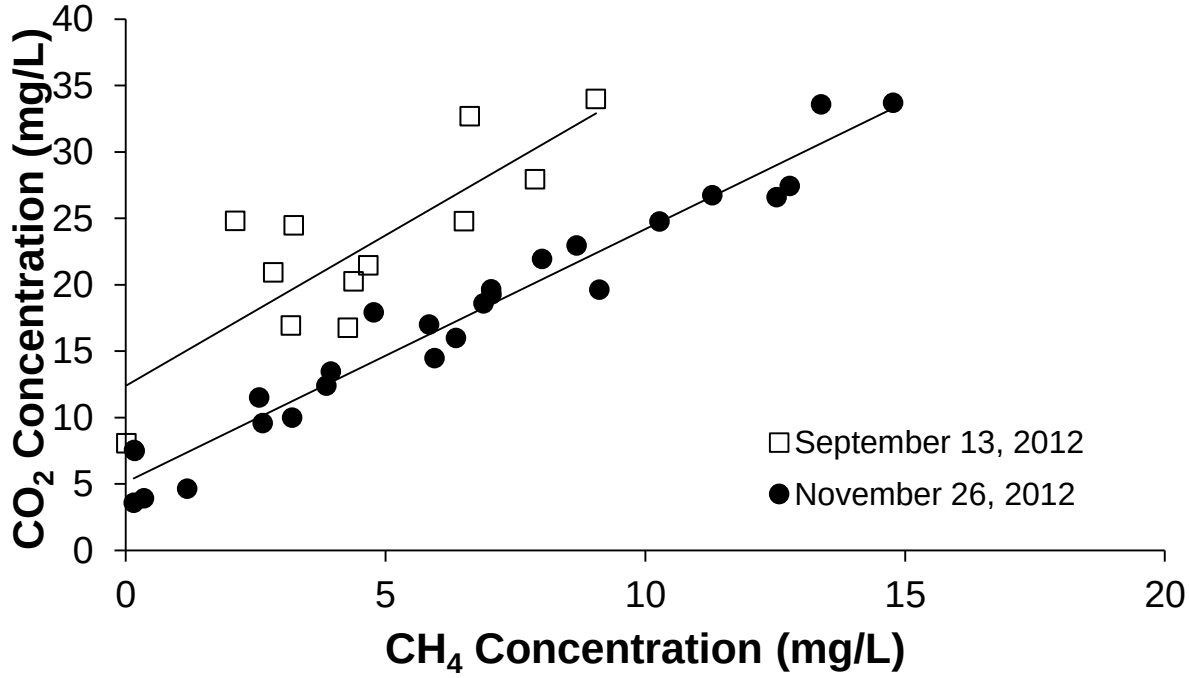
"Shallow Peat" Model

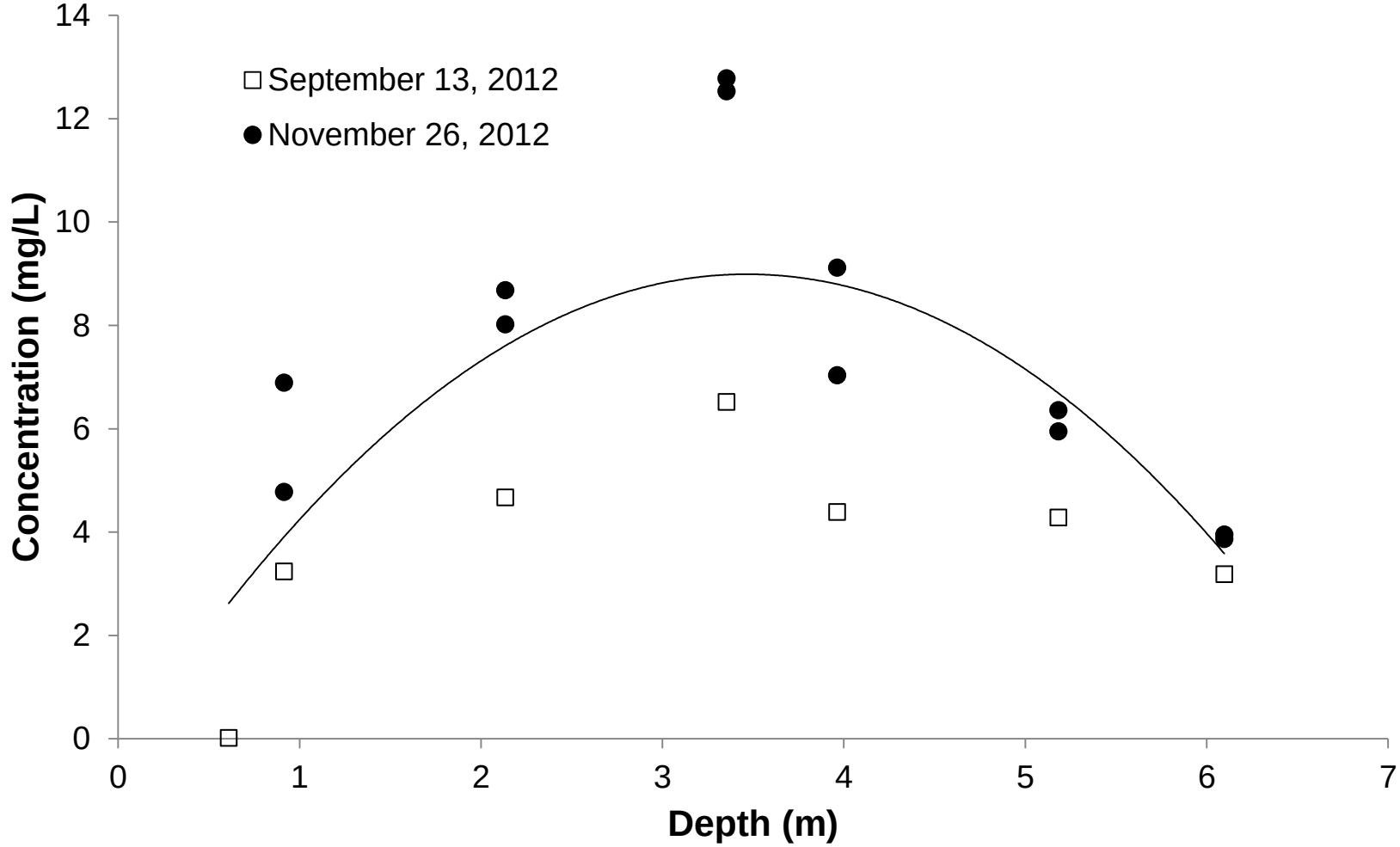


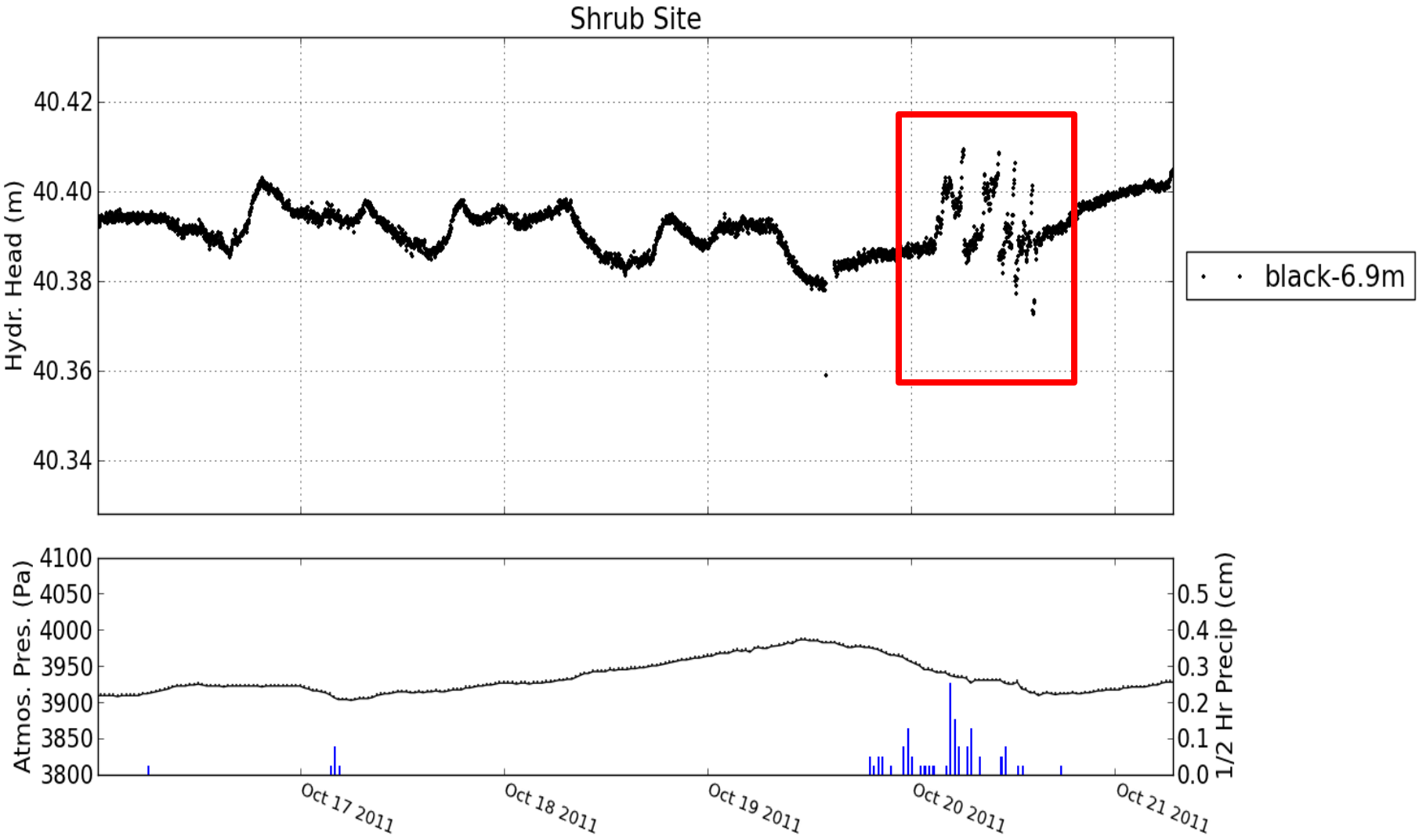

Caribou Bog
Study Area
Pushaw Lake
Caribou Bog
Forest Ave
Caribou Bog
I-95
Stillwater Ave
Penobscott River
I-95
Route 2
I-95
2000 m
N

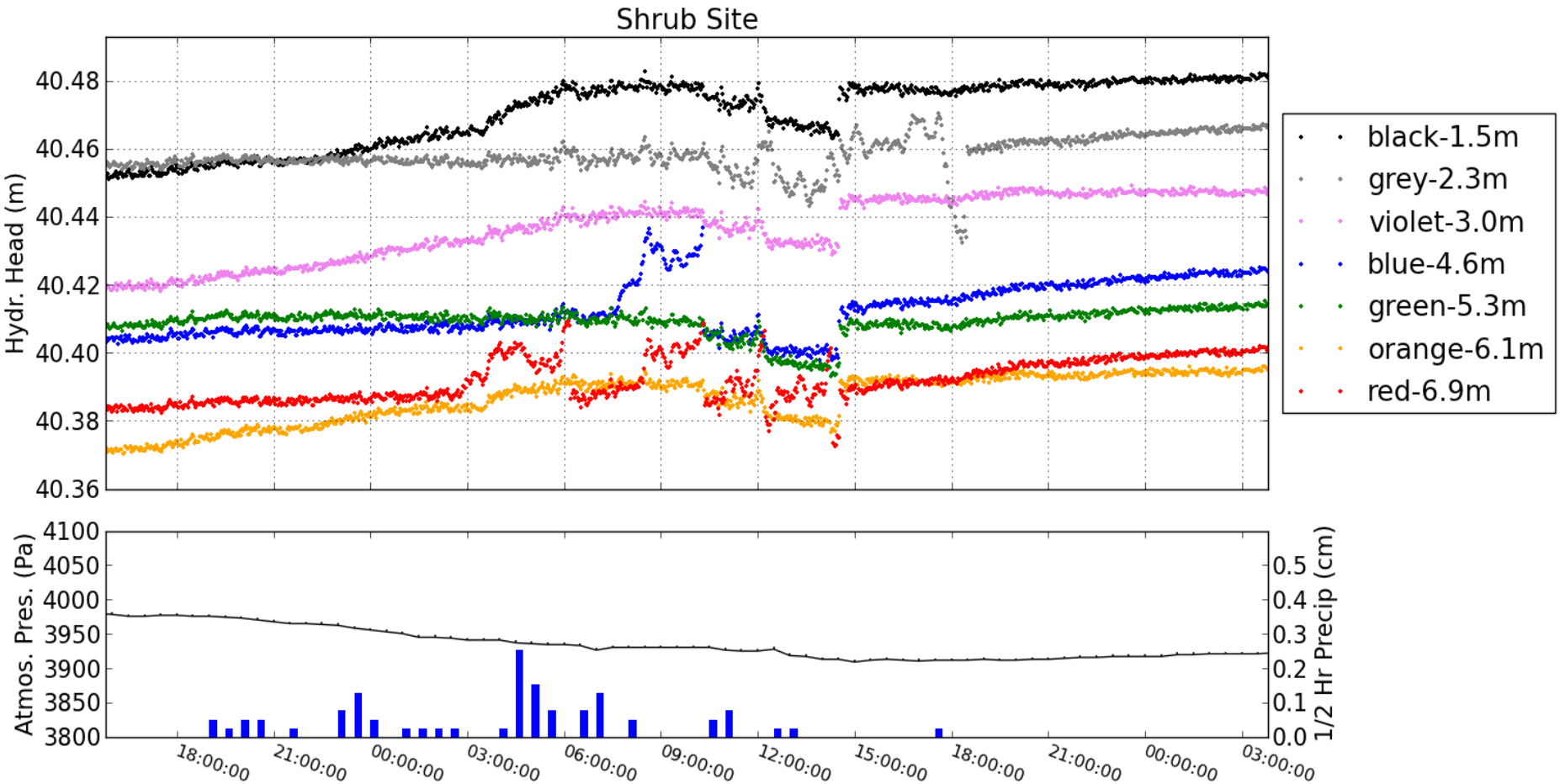

Trapped gas sampled via syringe
6.5 mm tubing carries gas out of corked well.
Water out
Gas is contained in Nalgene bottle as water is forced out.
Tube filled with water to displace air
Gas in

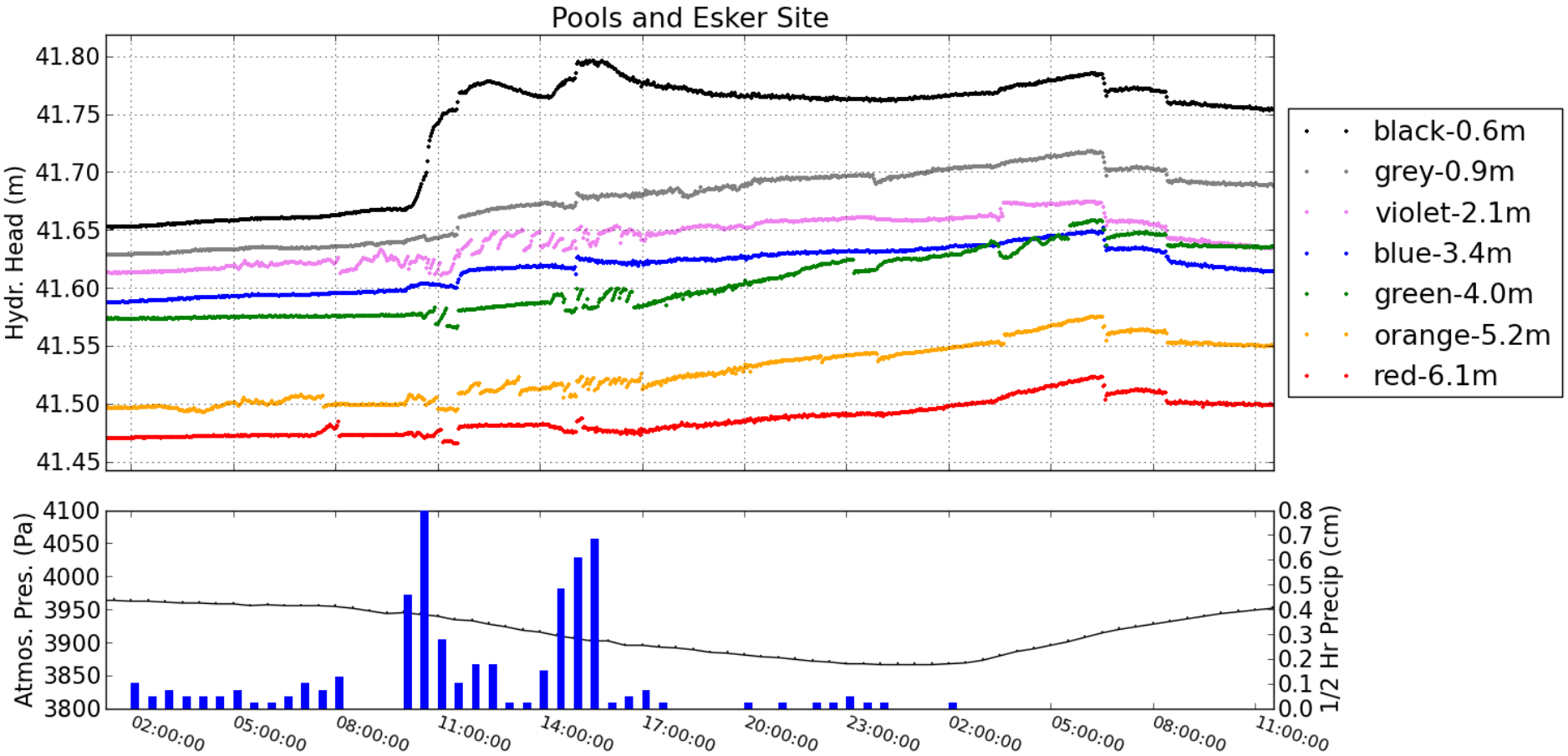

September 13,2012
November 26, 2012
CH4 Concentration (mg/L)
Depth (m)
0
2
4
6
8
10
12
14
16
0
2
4
6
8

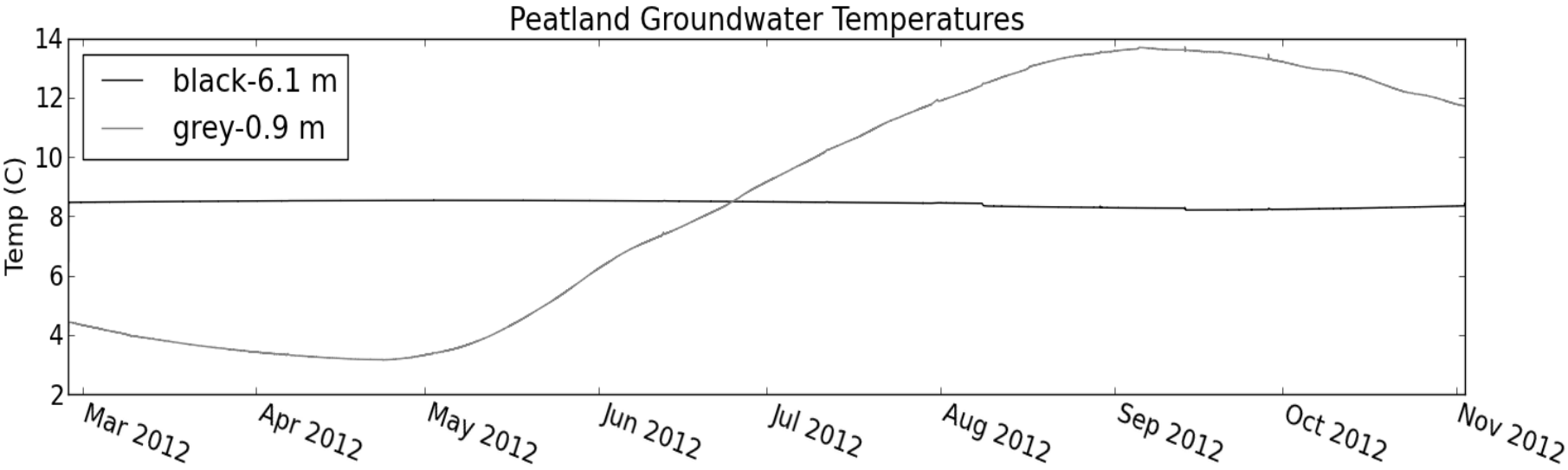

September 13, 2012
November 26, 2012
CO2 Concentration (mg/L)
CH4 Concentration (mg/L)
0
5
10
15
20
25
30
35
40
0
5
10
15
20

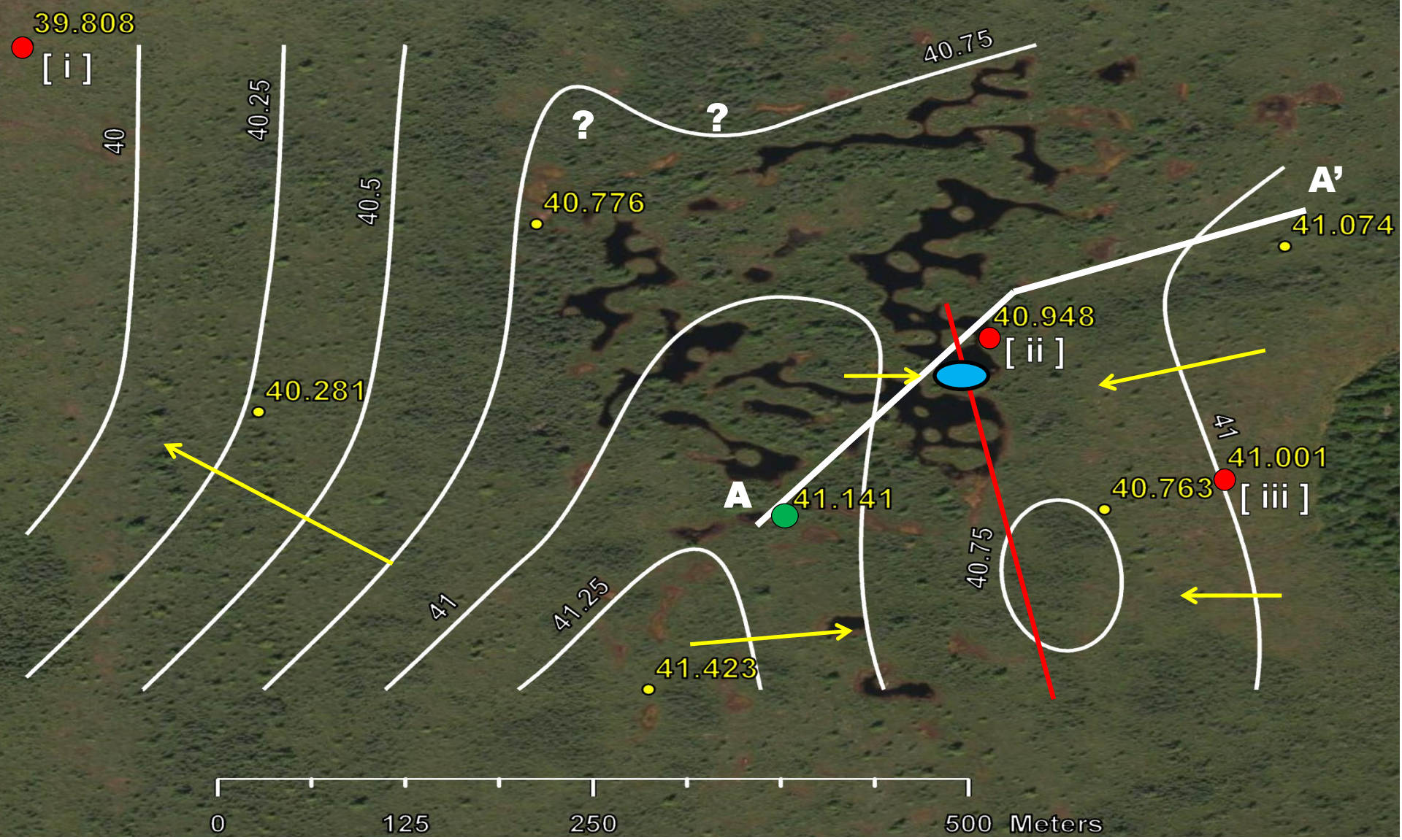

September 13, 2012
November 26, 2012
Concentration (mg/L)
Depth (m)
0
2
4
6
8
10
12
14
0
1
2
3
4
5
6
7


Shrub Site
Hydr. Head (m)
40.42
40.40
40.38
40.36
40.34
black-6.9m
Atmos. Pres. (Pa)
4100
4050
4000
3950
3900
3850
3800
1/2 Hr Precip (cm)
0.5
0.4
0.3
0.2
0.1
0.0
Oct 17 2011
Oct 18 2011
Oct 19 2011
Oct 20 2011
Oct 21 2011


Shrub Site
Hydr. Head (m)
40.48
40.46
40.44
40.42
40.40
40.38
40.36
black-1.5m
grey-2.3m
violet-3.0m
blue-4.6m
green-5.3m
orange-6.1m
red-6.9m
Atmos. Pres. (Pa)
4100
4050
4000
3950
3900
3850
3800
1/2 Hr Precip (cm)
0.5
0.4
0.3
0.2
0.1
0.0
18:00:00
21:00:00
00:00:00
03:00:00
06:00:00
09:00:00
12:00:00
15:00:00
18:00:00
21:00:00
00:00:00
03:00:00


Pools and Esker Site
Hydr. Head (m)
41.80
41.75
41.70
41.65
41.60
41.55
41.50
41.45
black-0.6m
grey-0.9m
violet-2.1m
blue-3.4m
green-4.0m
orange-5.2m
red-6.1m
Atmos. Pres. (Pa)
4100
4050
4000
3950
3900
3850
3800
1/2 Hr Precip (cm)
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
02:00:00
05:00:00
08:00:00
11:00:00
14:00:00
17:00:00
20:00:00
23:00:00
02:00:00
05:00:00
08:00:00
11:00:00


Peatland Groundwater Temperatures
black-6.1 m
grey-0.9 m
Temp (C)
14
12
10
8
6
4
2
Mar 2012
Apr 2012
May 2012
Jun 2012
Jul 2012
Aug 2012
Sep 2012
Oct 2012
Nov 2012



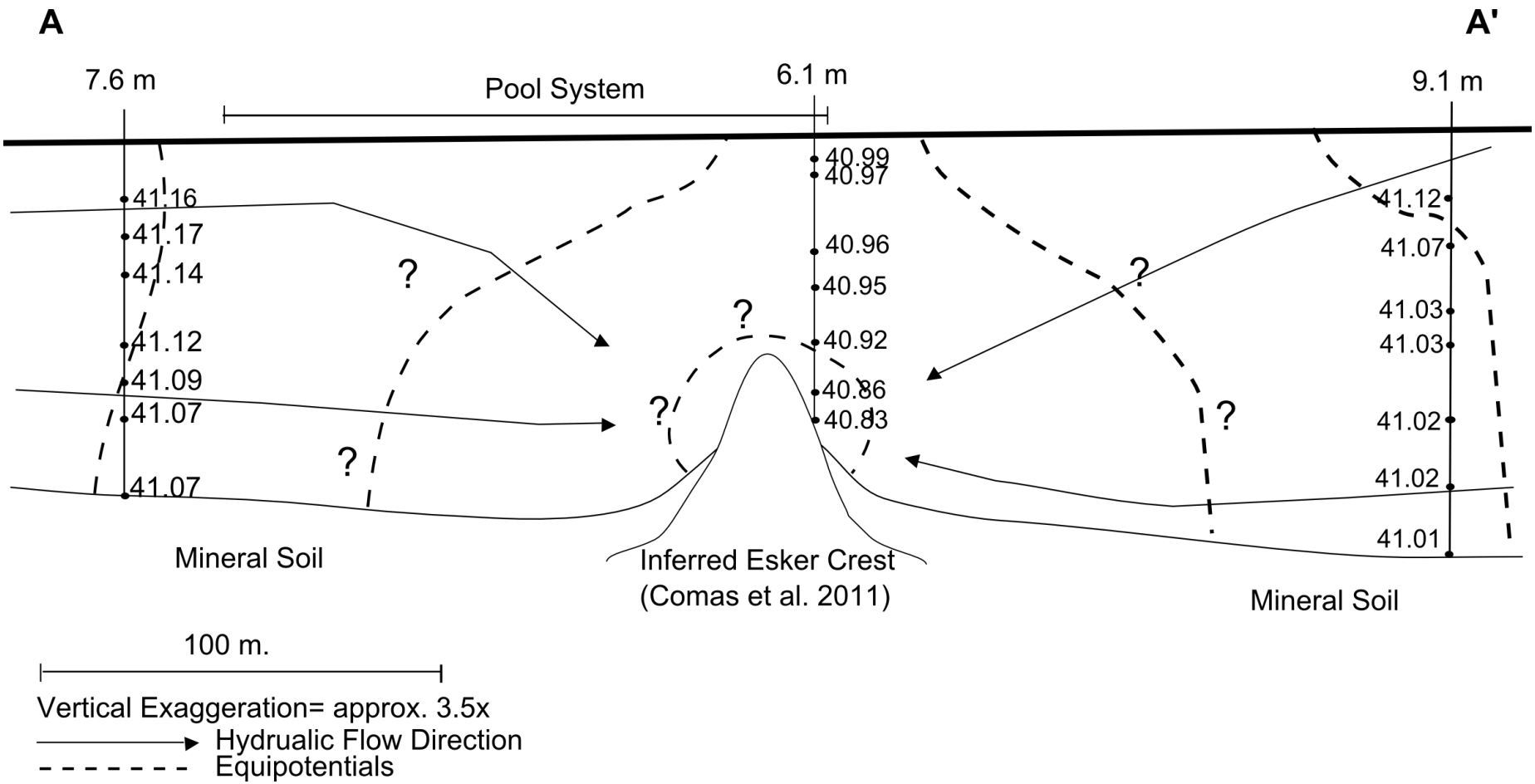
Approx. position of esker

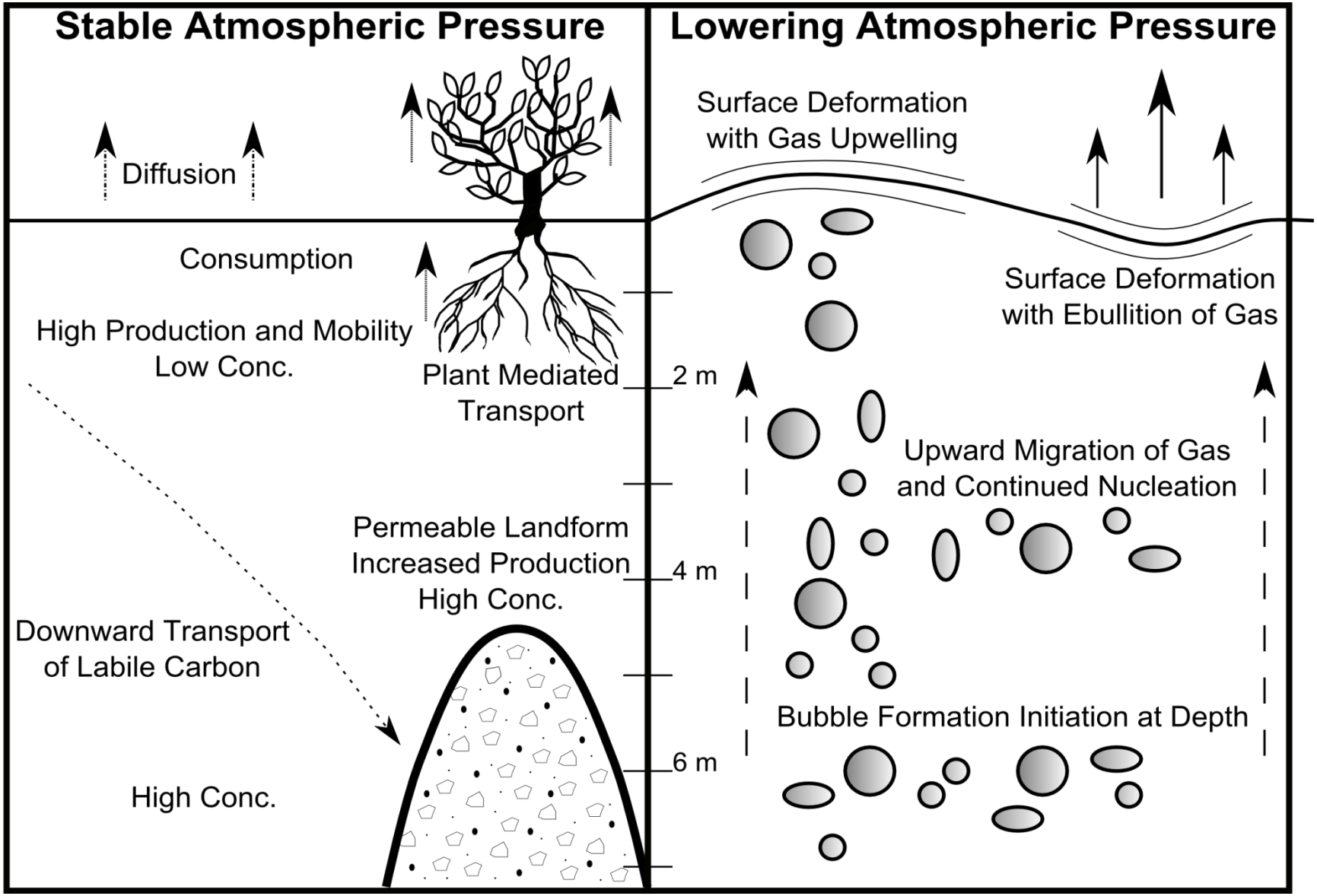
Esker crest

Well cluster

Well cluster with gas trap

Well cluster with pressure transducer


A
A'
7.6 m
Pool System
6.1 m
9.1 m
41.16
41.17
41.14
41.12
41.09
41.07
41.07
40.99
40.97
40.96
40.95
40.92
40.86
40.83
41.12
41.07
41.03
41.03
41.02
41.02
41.01
?
Mineral Soil
Inferred Esker Crest
(Comas et al. 2011)
Mineral Soil
100 m.
Vertical Exaggeration= approx. 3.5x
Hydrualic Flow Direction
Equipotentials


Stable Atmospheric Pressure
Lowering Atmospheric Pressure
Diffusion
Consumption
High Production and Mobility
Low Conc.
Plant Mediated
Transport
Permeable Landform
Increased Production
High Conc.
Downward Transport
of Labile Carbon
High Conc.
2 m
4 m
6 m
Surface Deformation
with Gas Upwelling
Surface Deformation
with Ebullition of Gas
Upward Migration of Gas
and Continued Nucleation
Bubble Formation Initiation at Depth