# Continuous $CO_2/CH_4$ measurement at Zotino Tall Tower Observatory (ZOTTO) in Central Siberia

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# Acknowledgements


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ZOTTO consortium:

| | |
|---|---|
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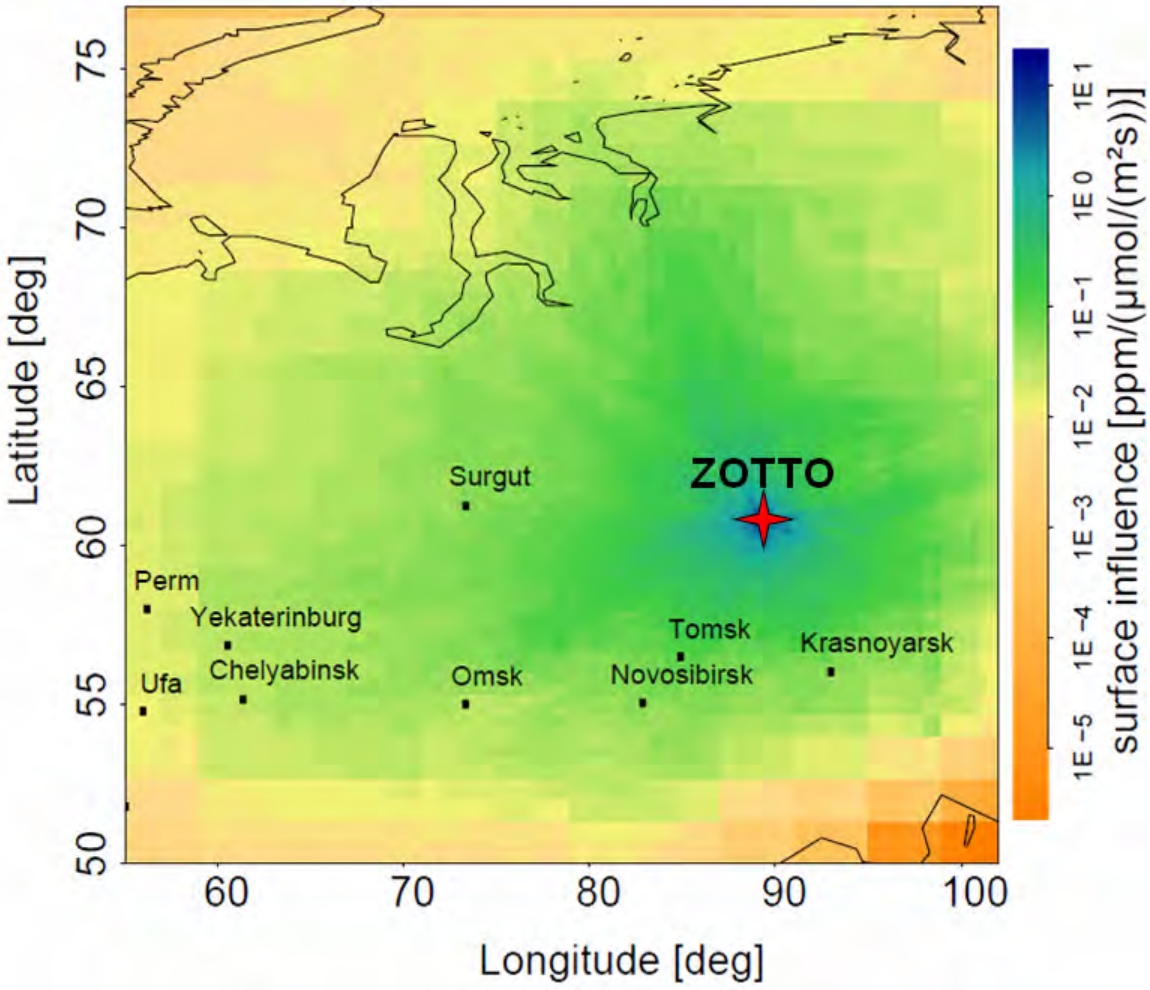
# ZOTTO site

- Siberia is important for carbon cycle:
  - ~ 10 % of global terrestrial carbon (vegetation + soils)
  - ~ 5-10 % of global terrestrial productivity
  - ~ 65 % of Siberian forests contain permafrost

**Integrated ZOTTO footprint**




*STILT transport model, 1.5.-30.11.2009, 301 m, -5 days*

# ZOTTO setup

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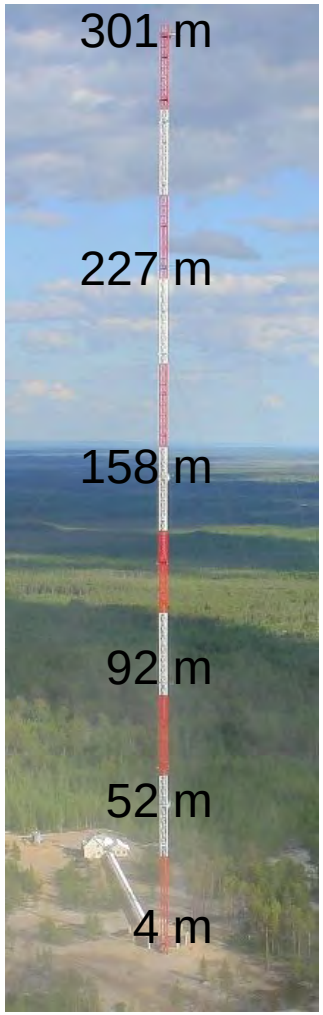
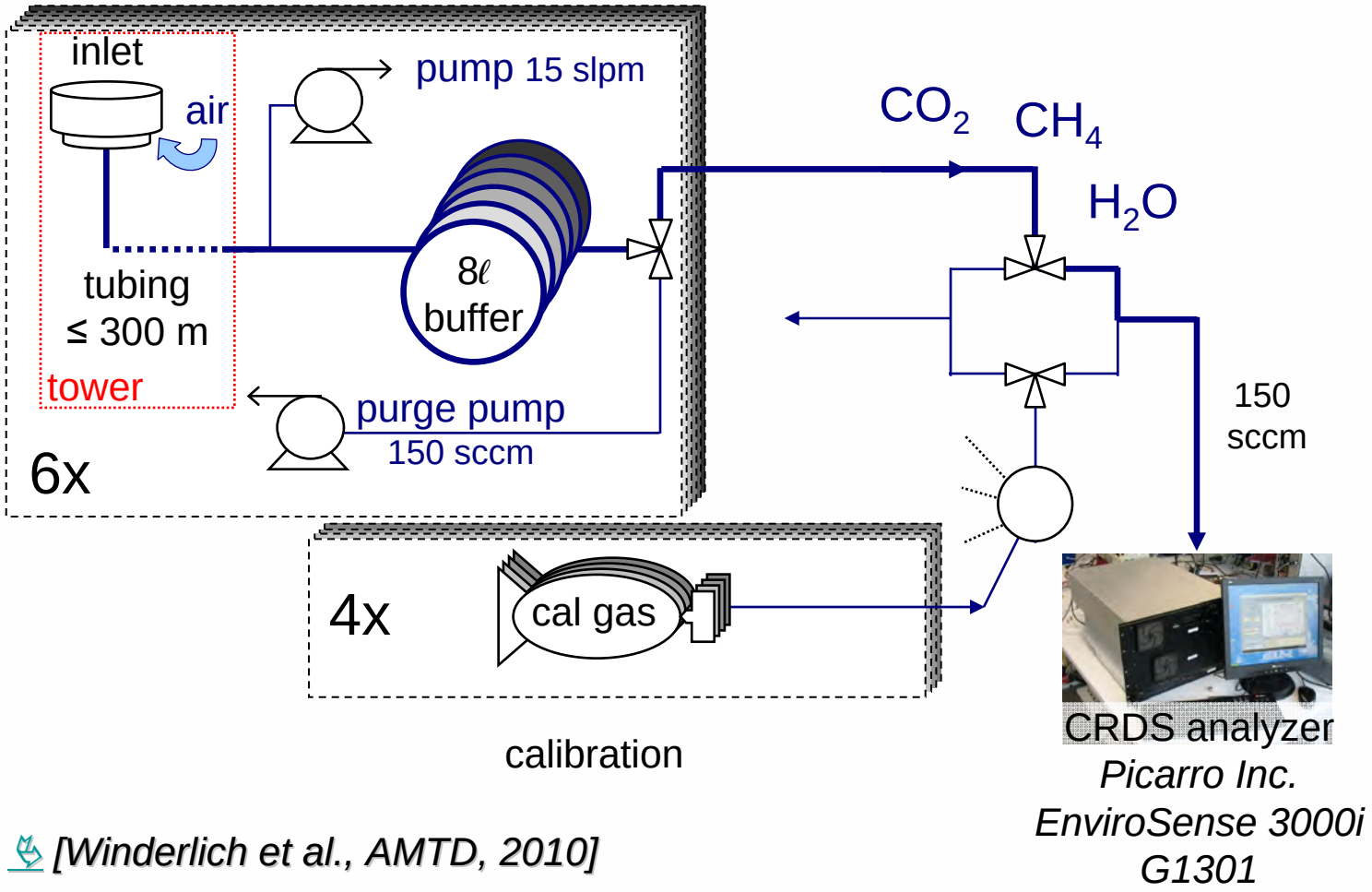



- Measure with 1 instrument the air from 6 tower levels




[Winderlich et al., AMTD, 2010]

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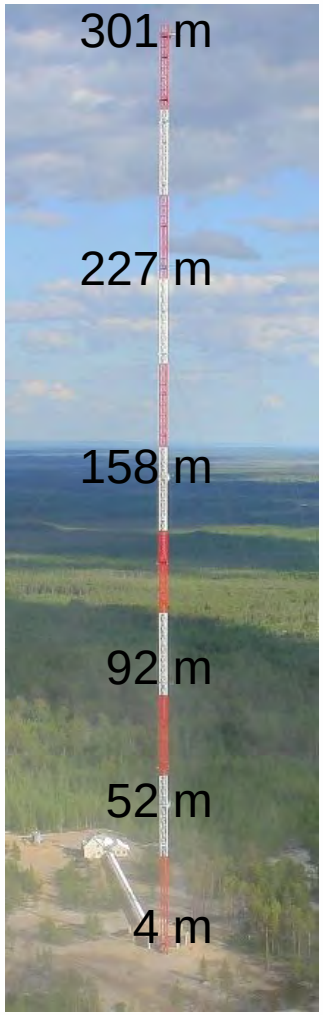


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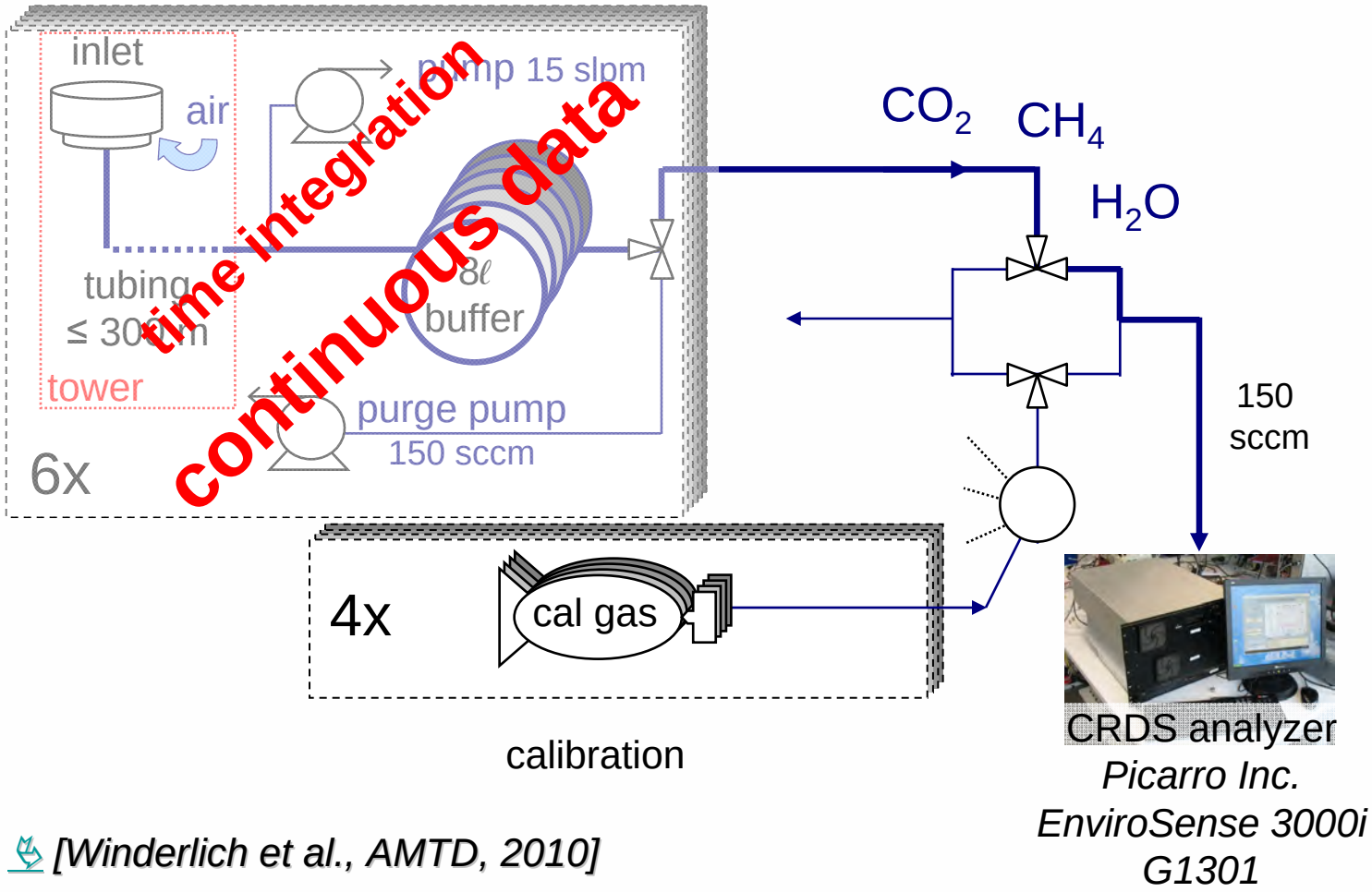


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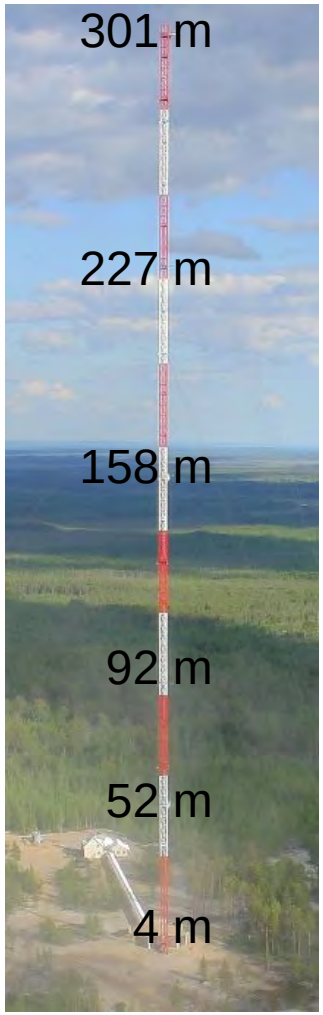


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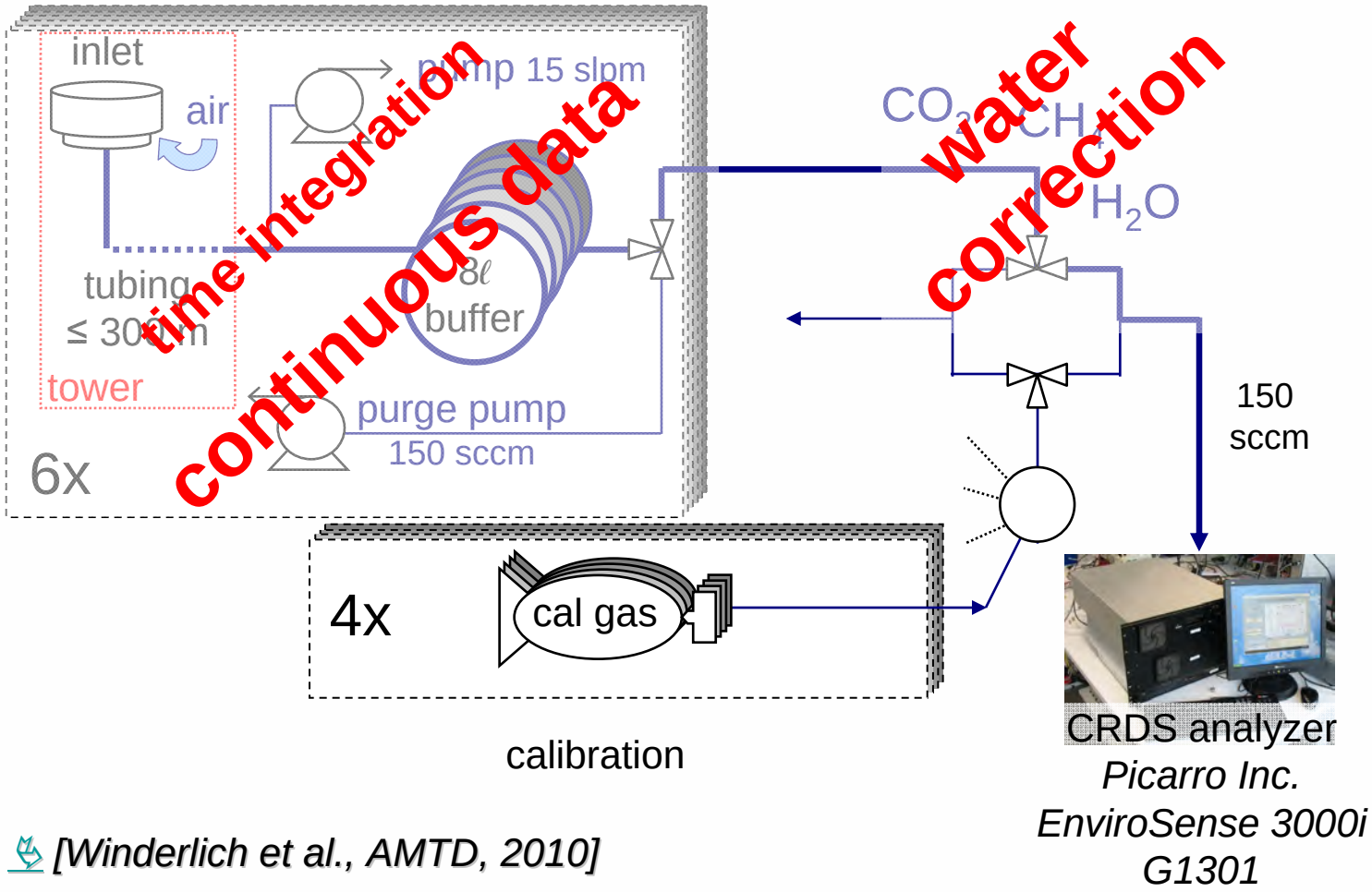


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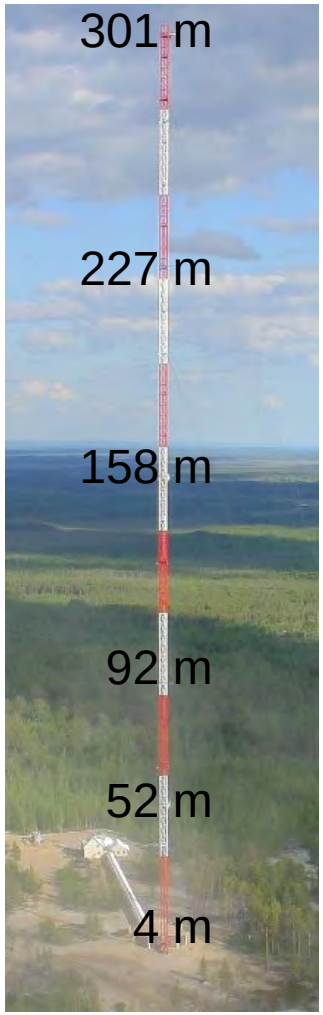


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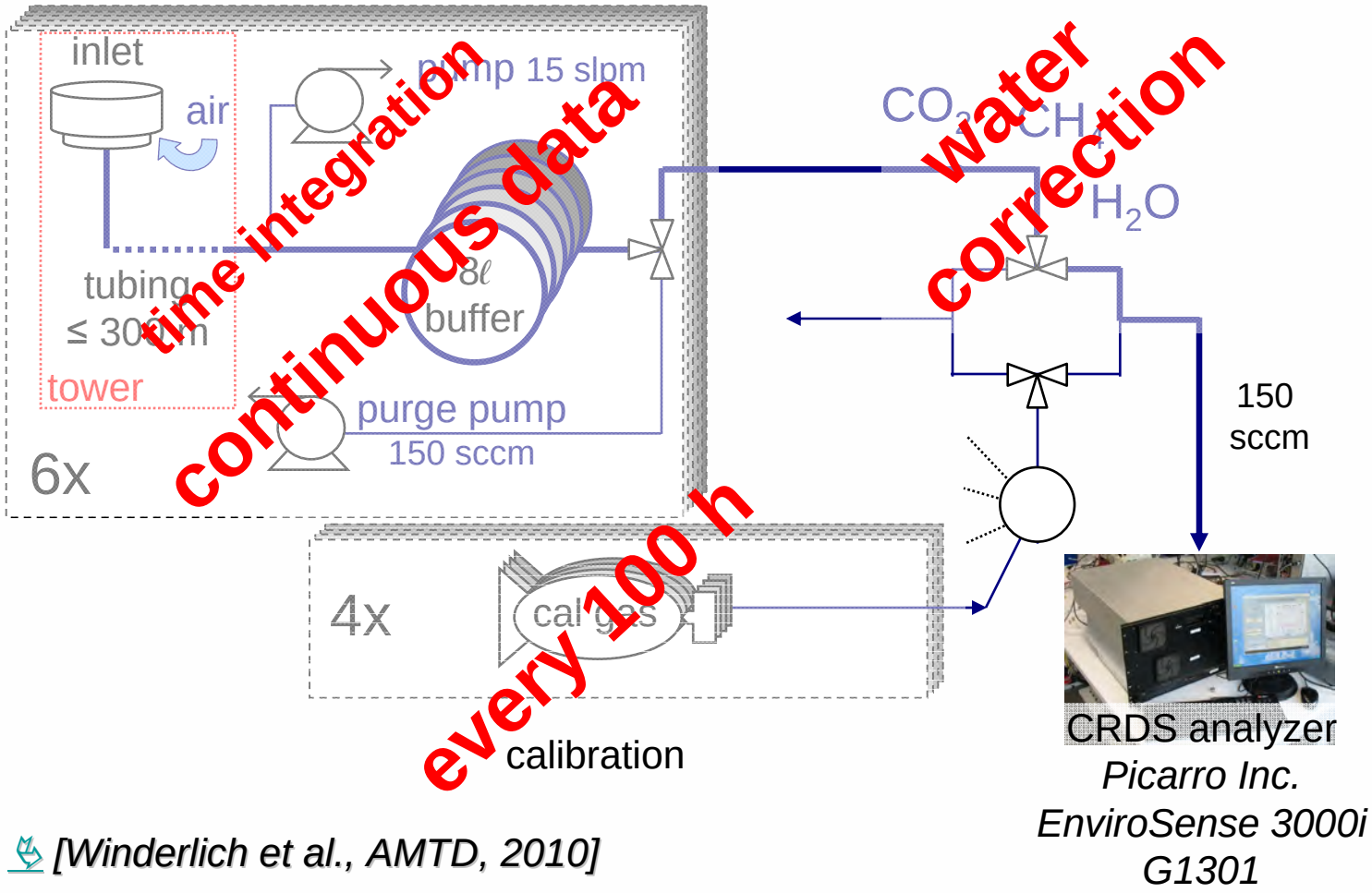


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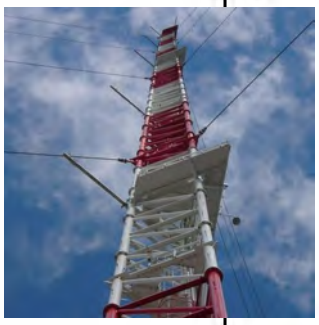
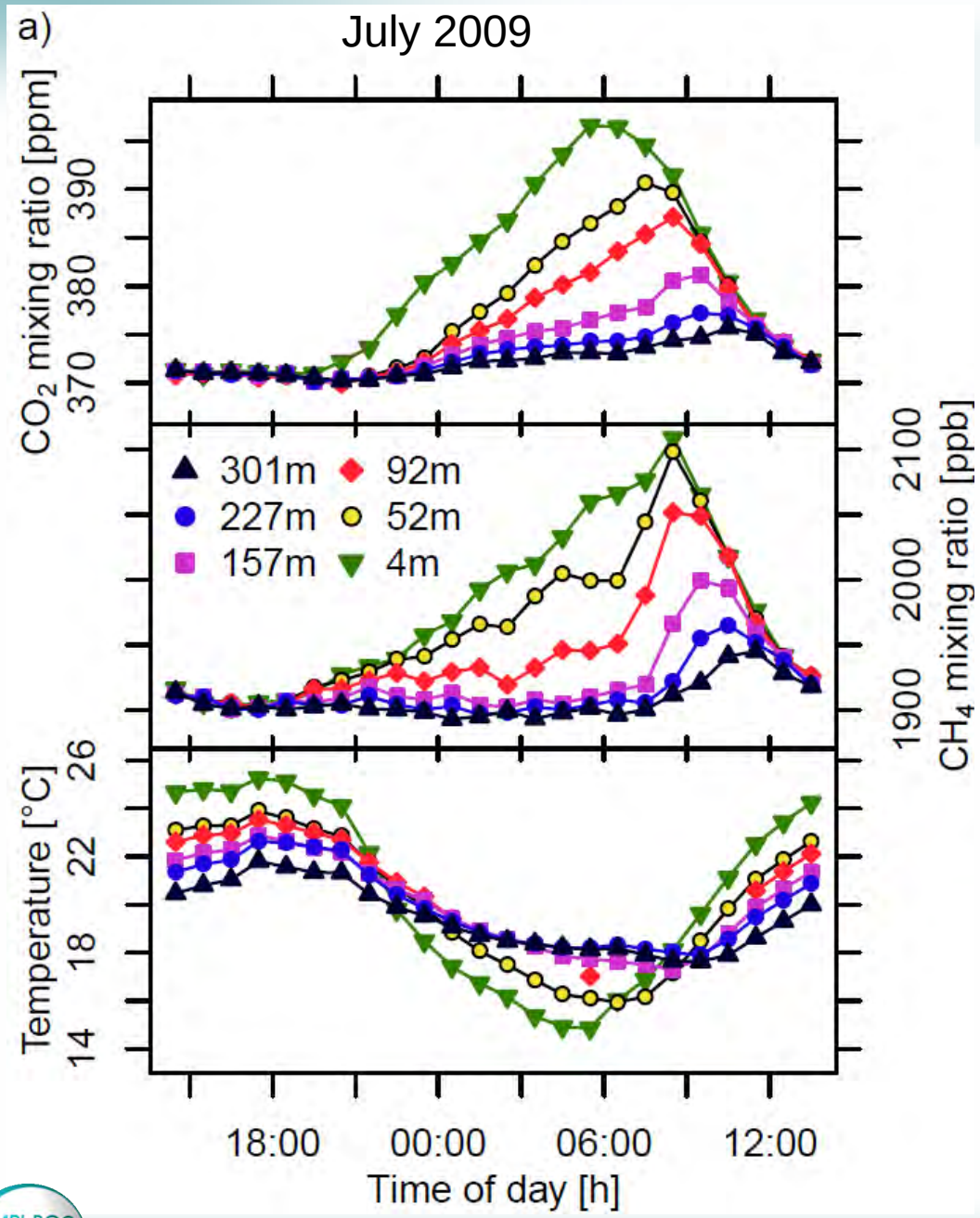
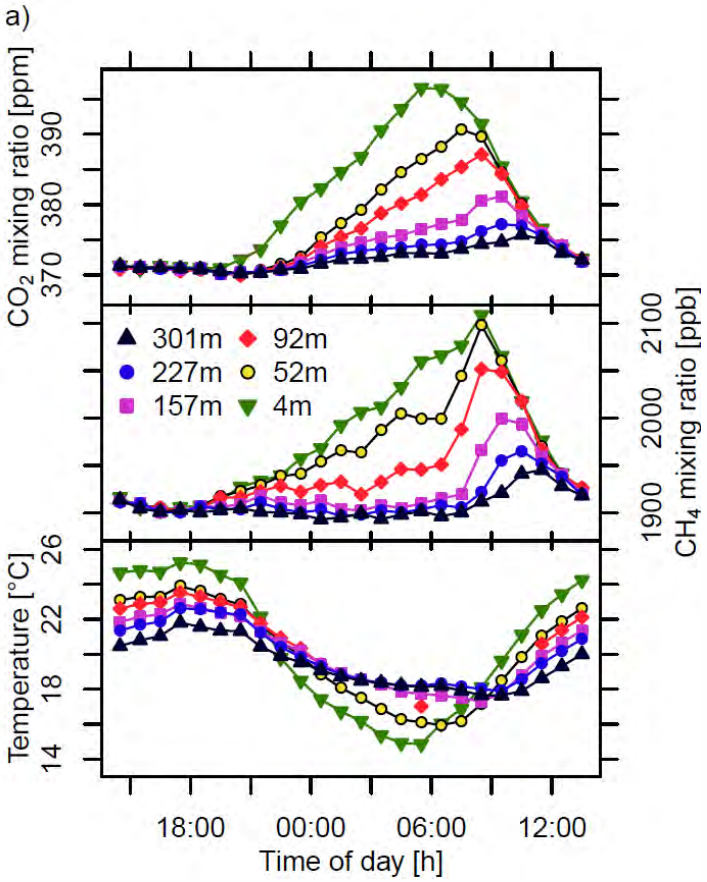
# 300 m data




a)
July 2009
$CO_2$ mixing ratio [ppm]
370
380
390
301m
92m
227m
52m
157m
4m
$CH_4$ mixing ratio [ppb]
1900
2000
2100
Temperature [°C]
14
18
22
26
18:00
00:00
06:00
12:00
Time of day [h]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14
18
22
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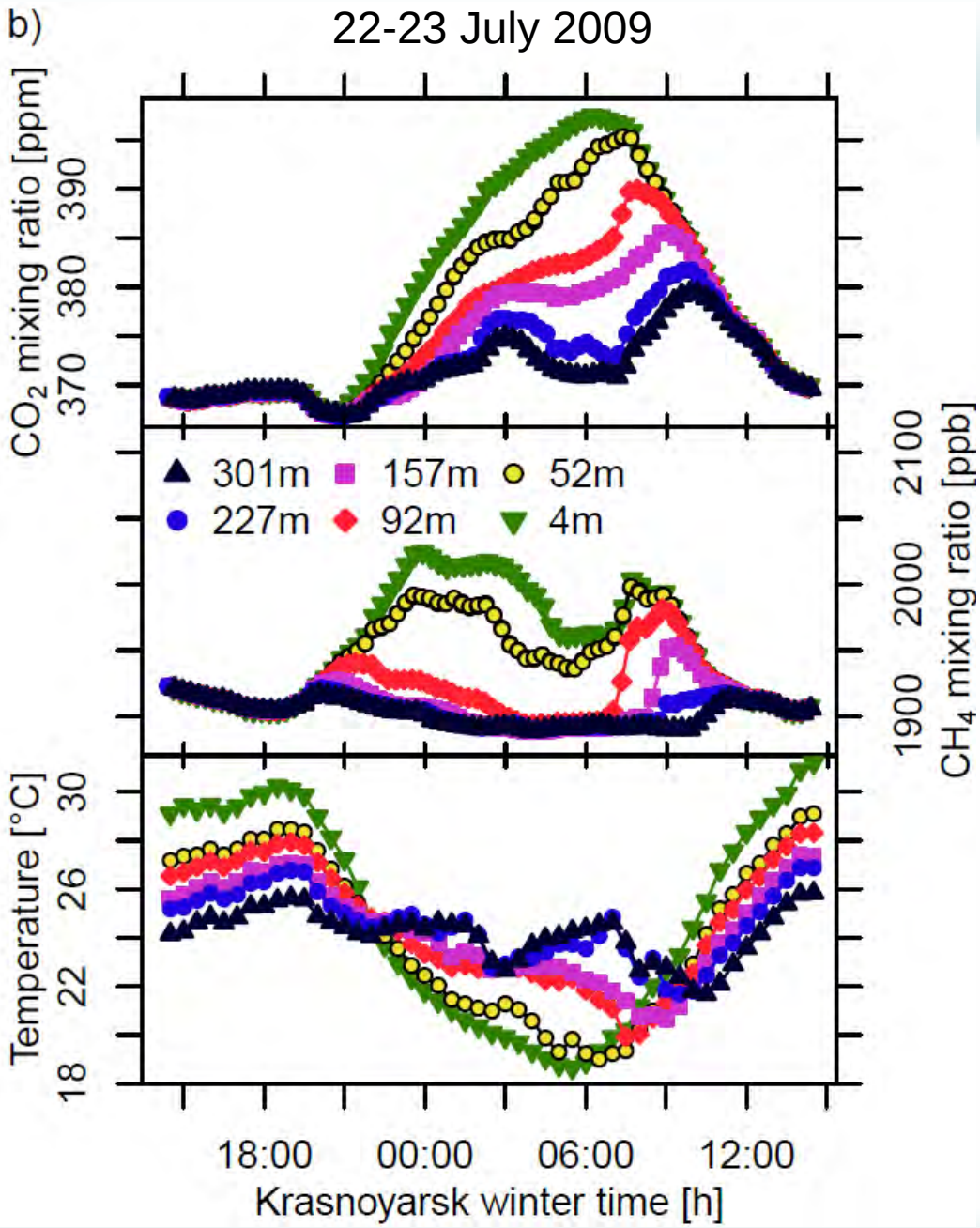
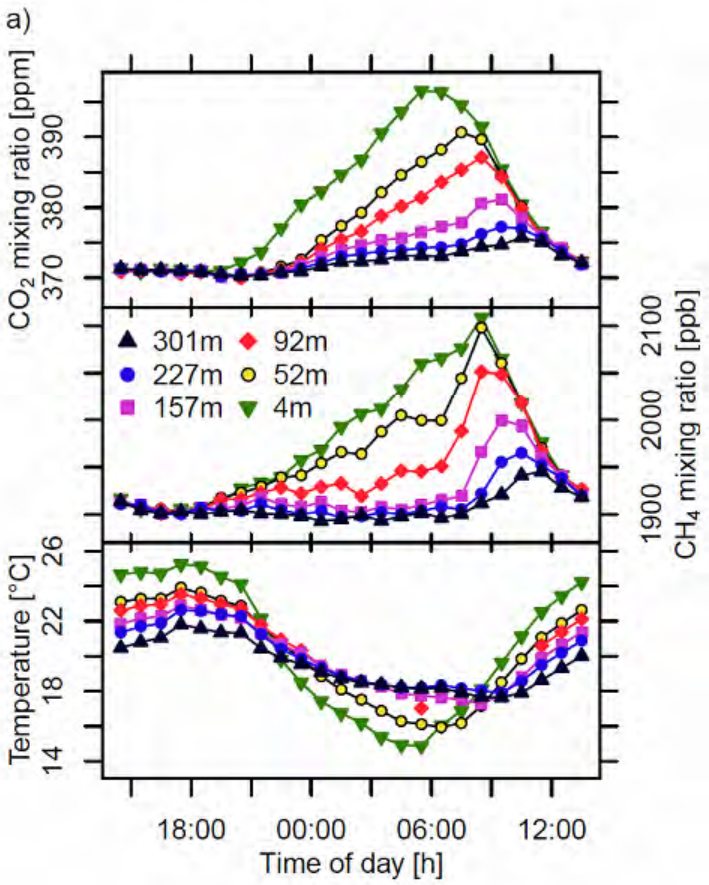
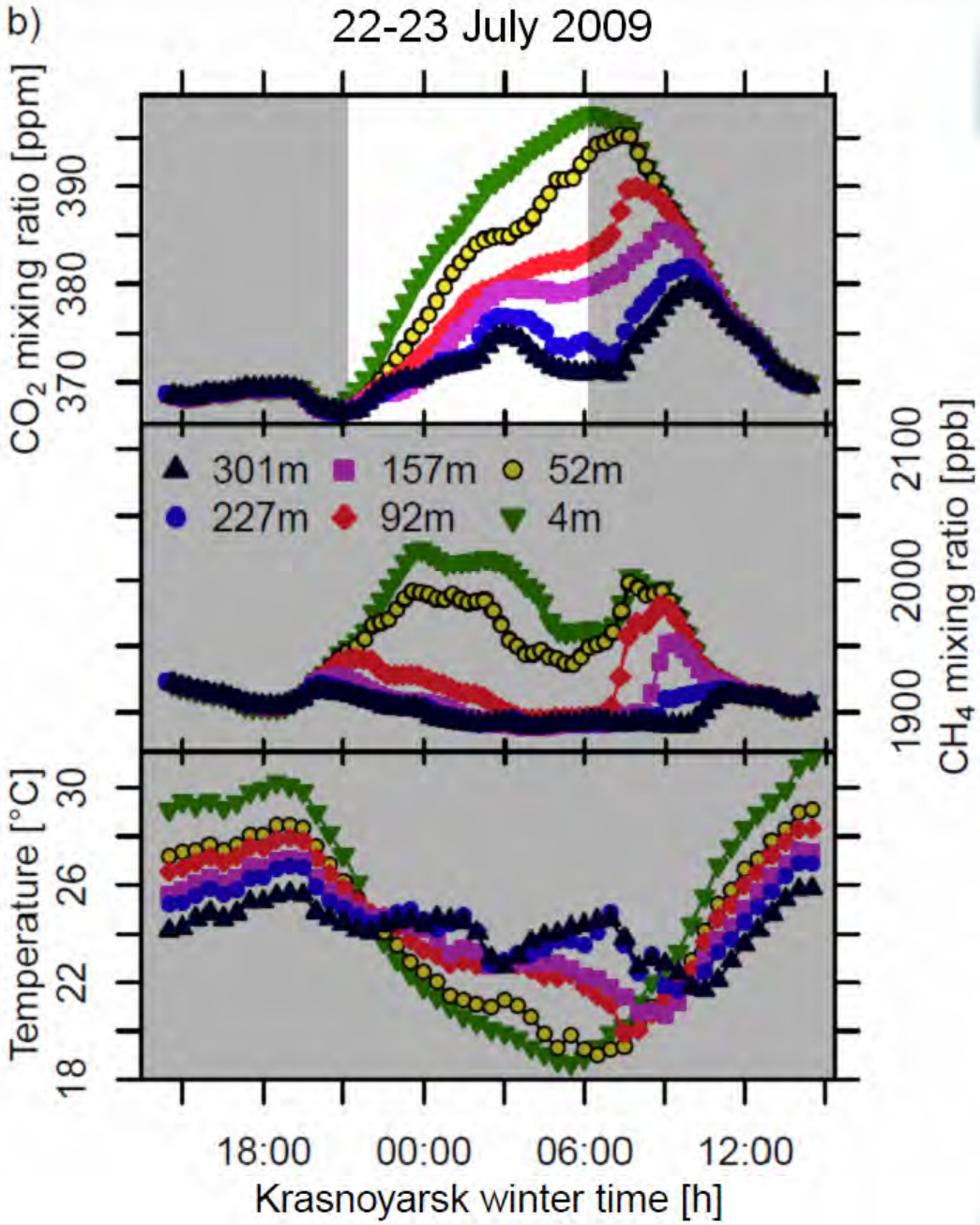
06:00
12:00
Time of day [h]


b)
22-23 July 2009
$CO_2$ mixing ratio [ppm]
370
380
390
301m
157m
52m
227m
92m
4m
1900
2000
2100
$CH_4$ mixing ratio [ppb]
Temperature [°C]
18
22
26
30
18:00
00:00
06:00
12:00
Krasnoyarsk winter time [h]


a)
$CO_2$ mixing ratio [ppm]
370 380 390
301m 92m
227m 52m
157m 4m
1900 2000 2100
$CH_4$ mixing ratio [ppb]
Temperature [°C]
14 18 22 26
18:00 00:00 06:00 12:00
Time of day [h]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$CO_2$ mixing ratio [ppm]
370 380 390
301m 157m 52m
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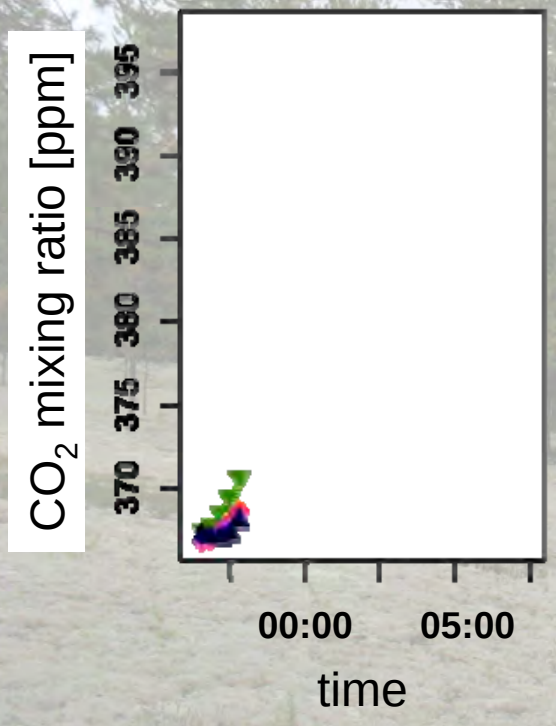
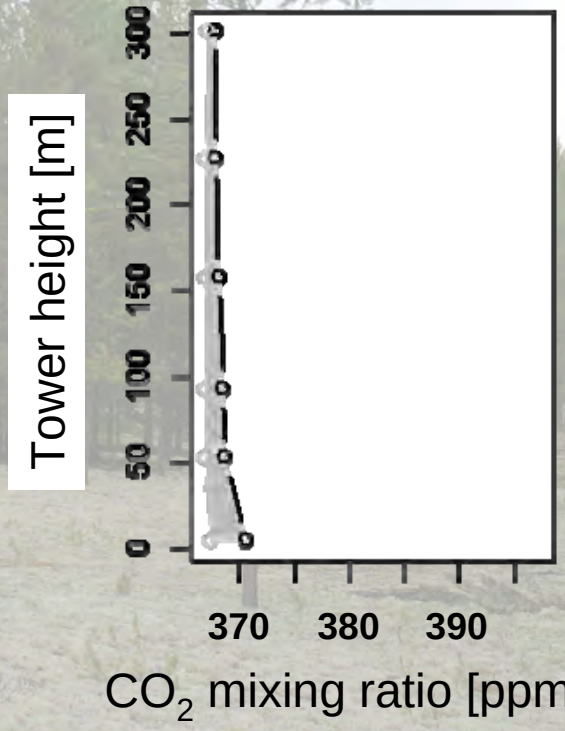
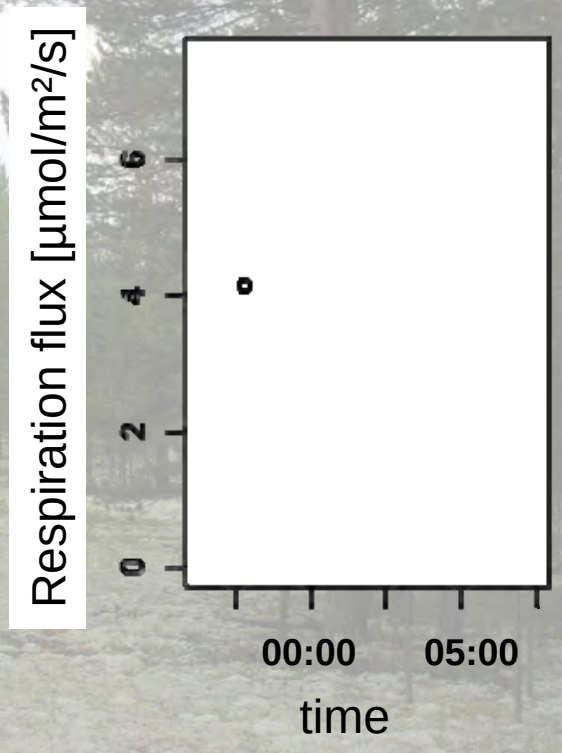
1900 2000 2100
$CH_4$ mixing ratio [ppb]
Temperature [°C]
18 22 26 30
18:00 00:00 06:00 12:00
Krasnoyarsk winter time [h]

# Flux estimates

→ Estimate regional C-release in PBL



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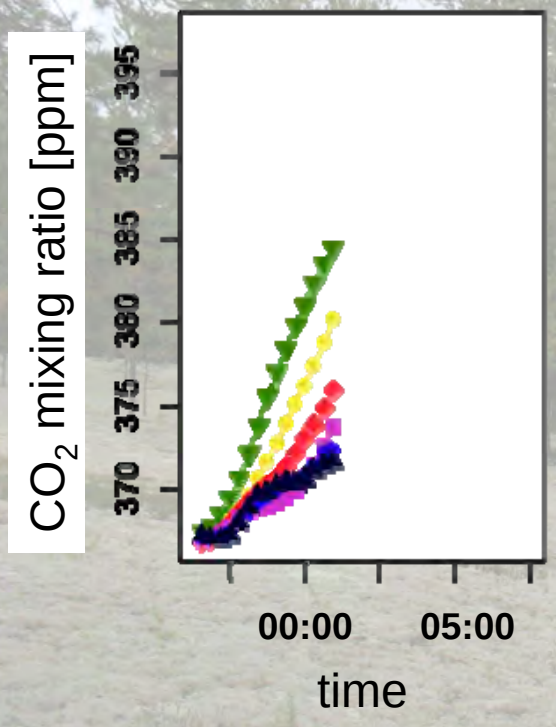


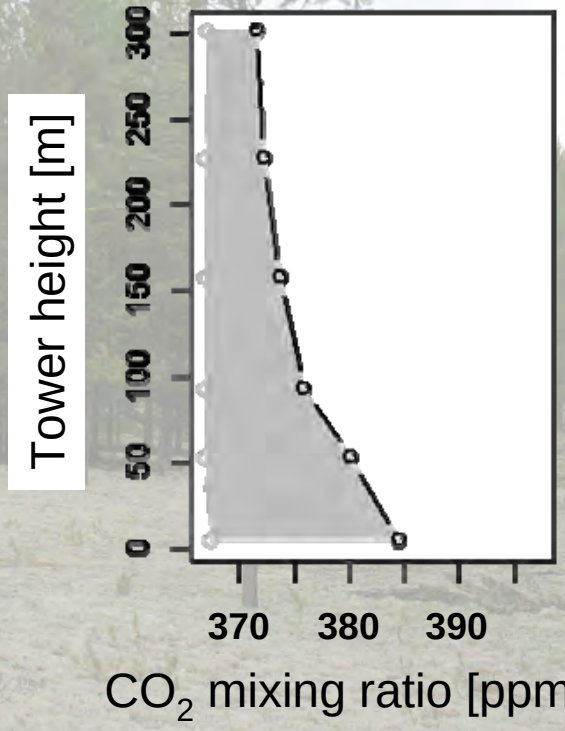


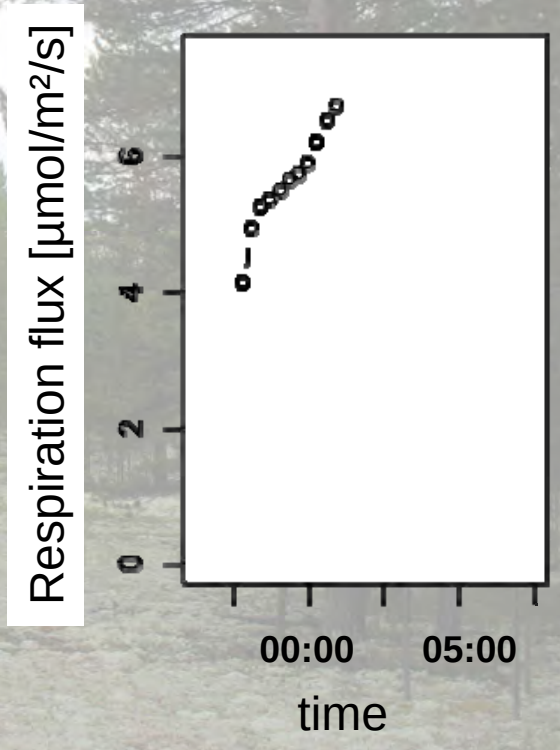

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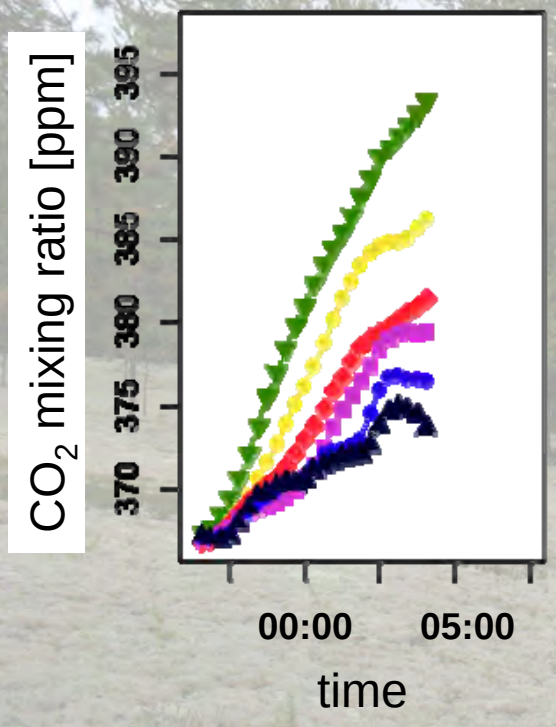


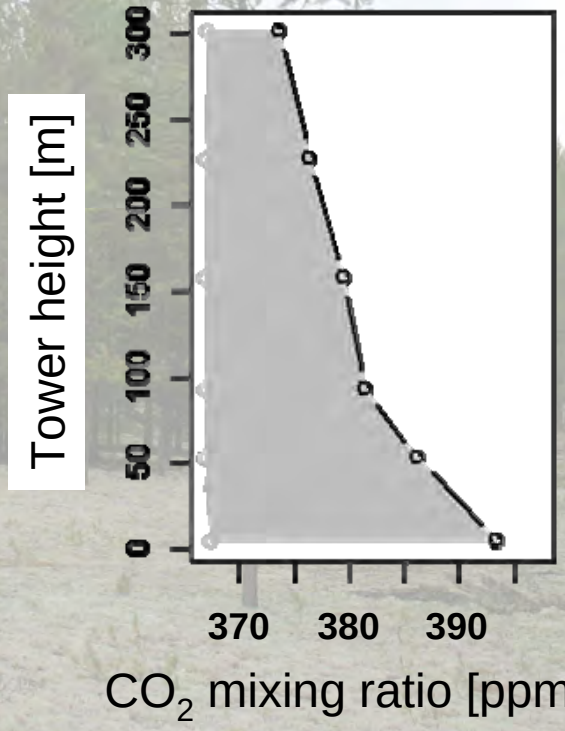


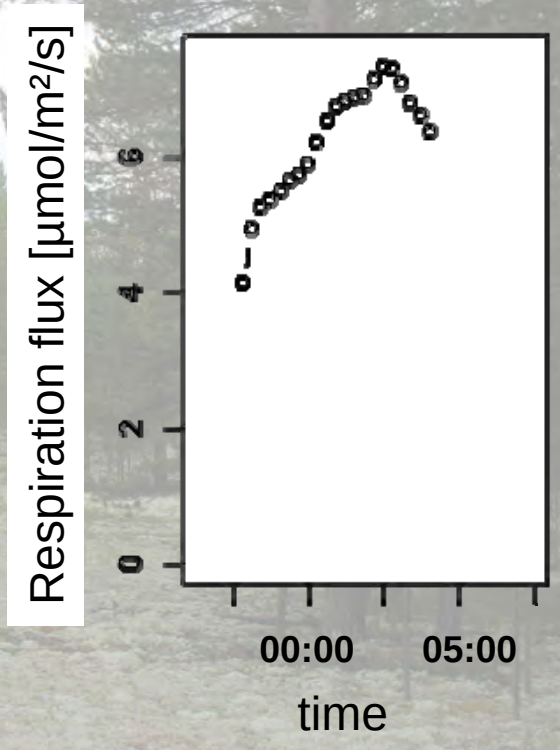

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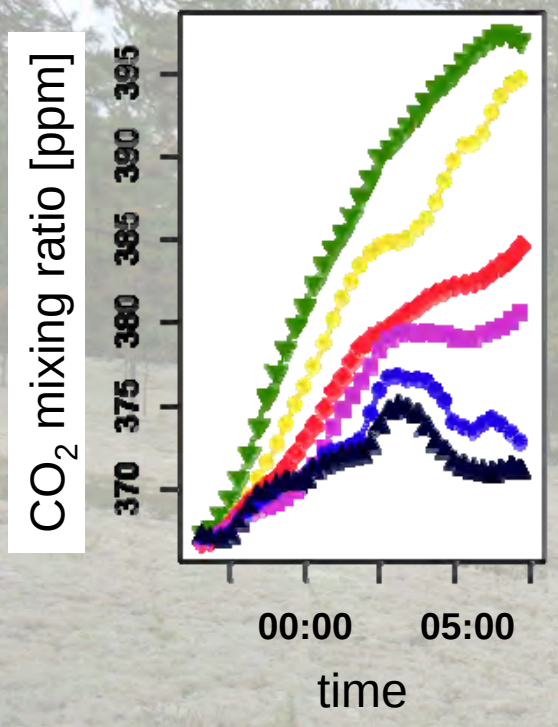


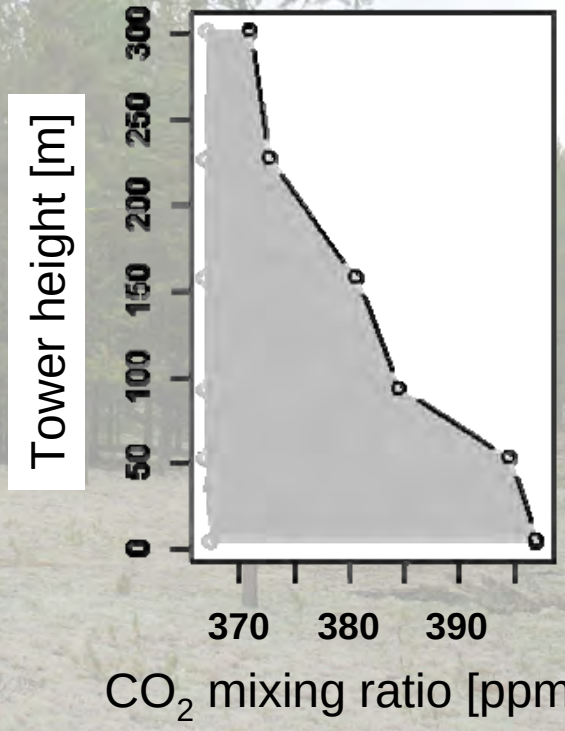


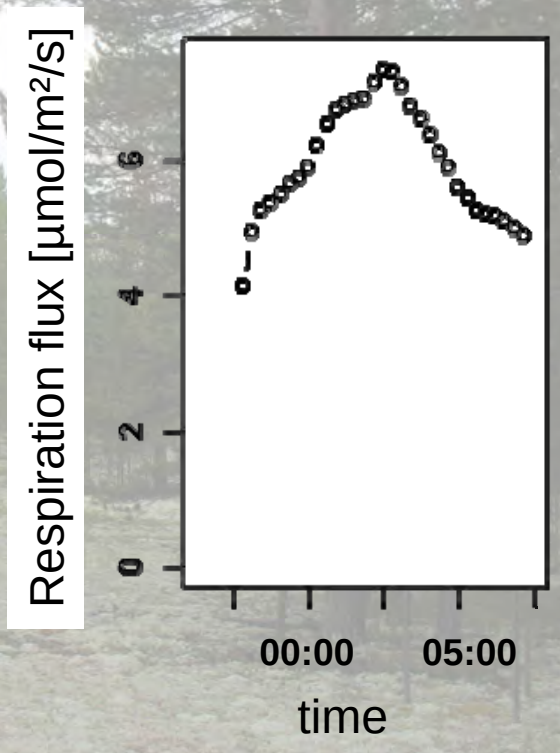

# Conclusions

**Setup**

- Buffer volume

➔ Continuous, low noise data

- No drying
- Minimal calibration

➔ Low maintenance


**Now:** Local flux estimates

**Future:** Regional inversion model

→ Flux estimates for central Siberia

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***Thank you for your attention!***