

Towards a comprehensive understanding of greenhouse gas exchanges in the high arctic

A story by

Torben R. Christensen & Mikhail Mastepanov
Charlotte Sigsgaard, Edward J. Dlugokencky, Sander
Houweling, Lena Ström, Mikkel P. Tamstorf

Presented by

Morten Rasch

Towards a comprehensive understanding of greenhouse gas exchanges in the high arctic

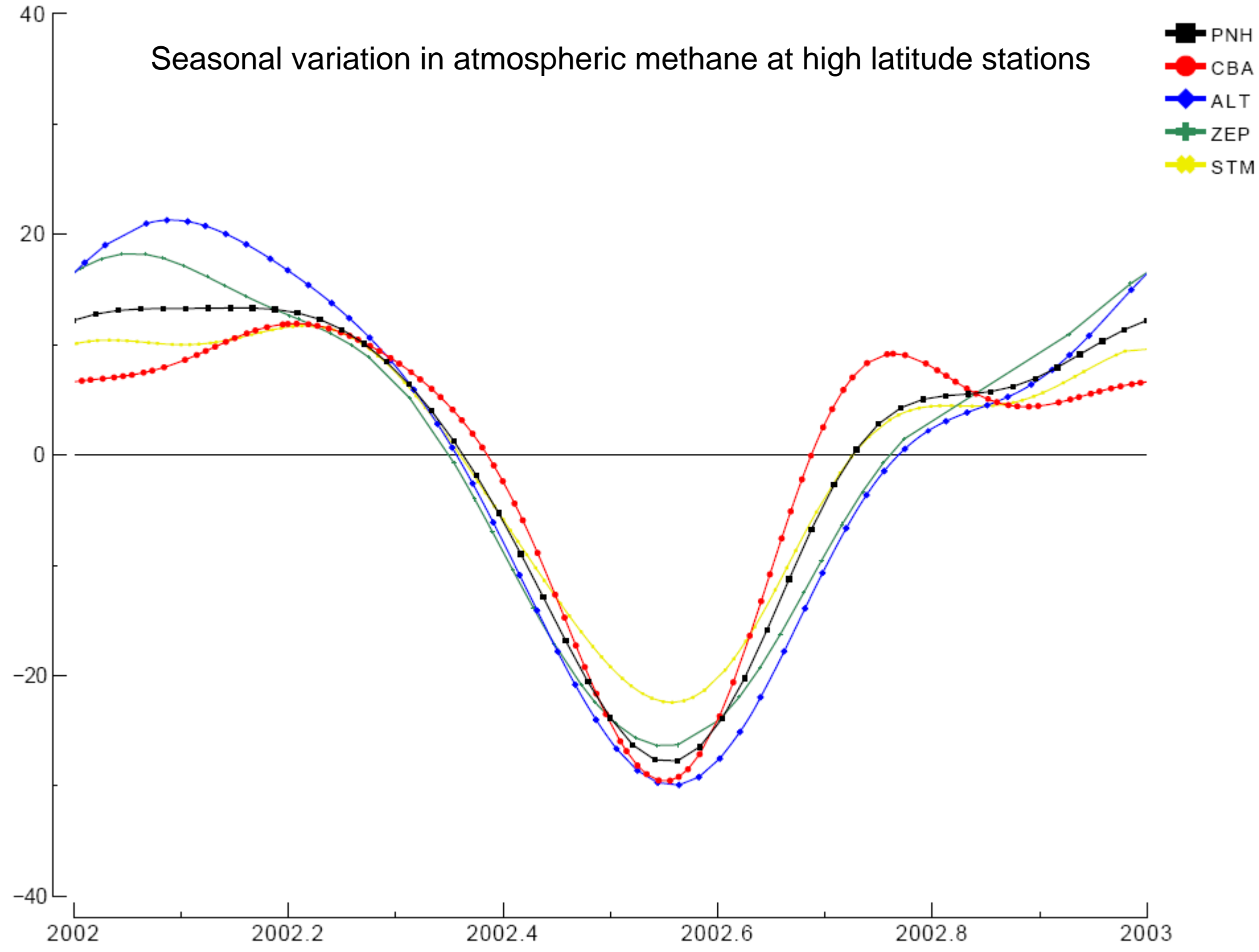
**Towards a comprehensive
understanding of greenhouse gas
exchanges in the high arctic**

– or –

**How Mother Nature maintains her
beautiful right to show us something
unexpected**



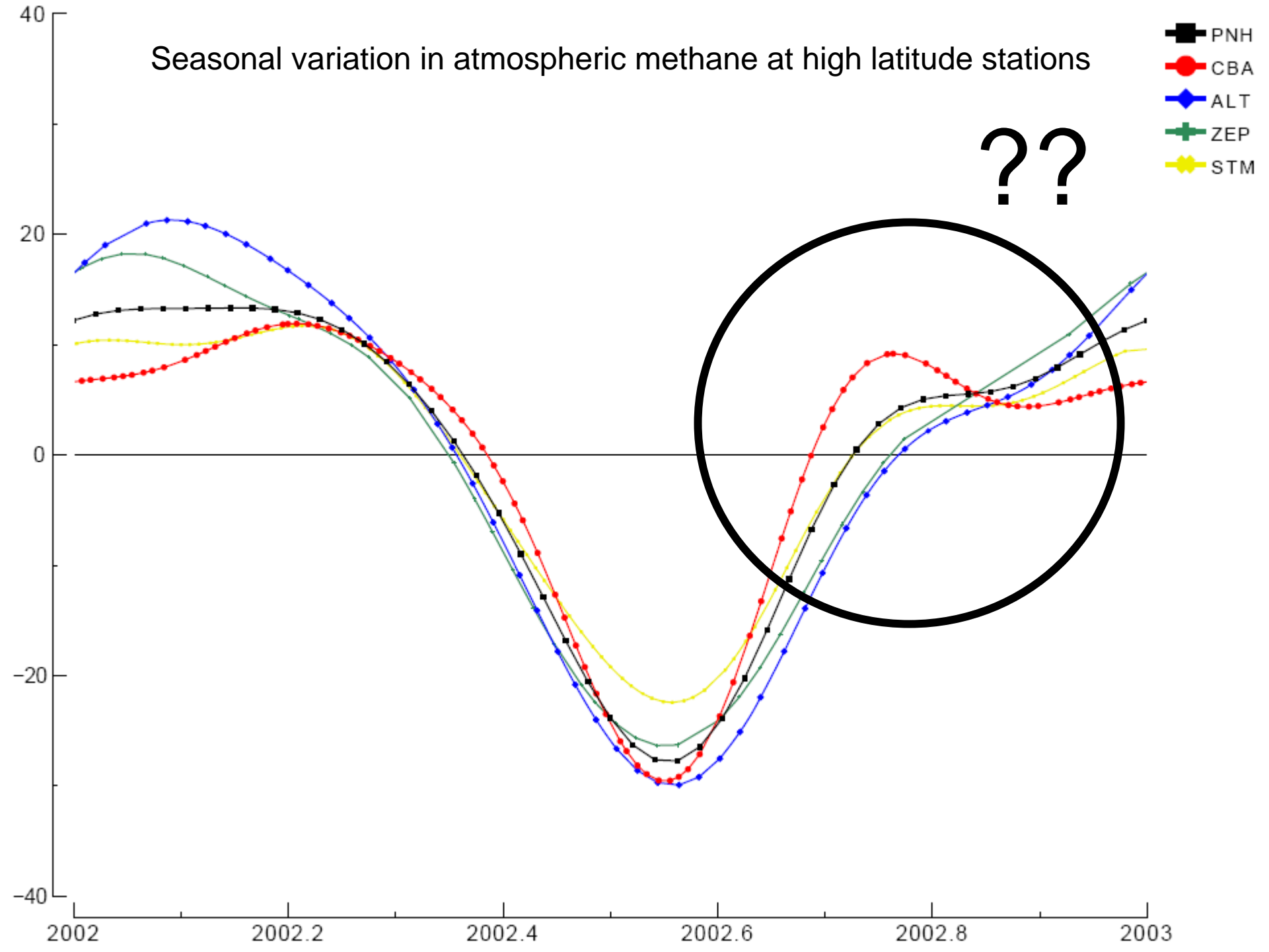
Seasonal variation in atmospheric methane at high latitude stations



Seasonal variation in atmospheric methane at high latitude stations

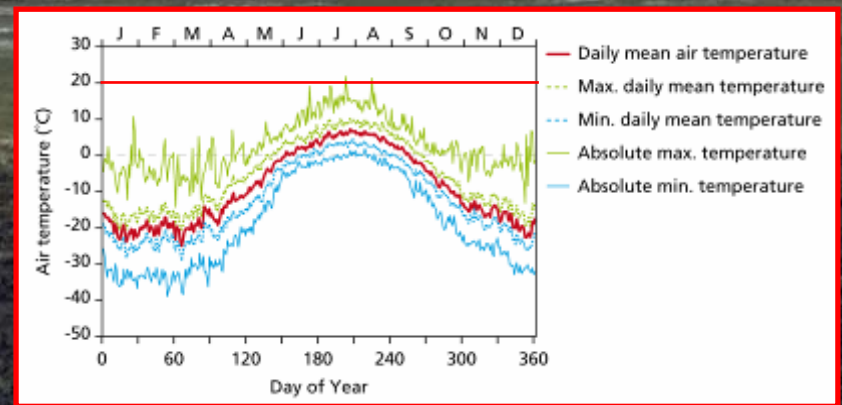
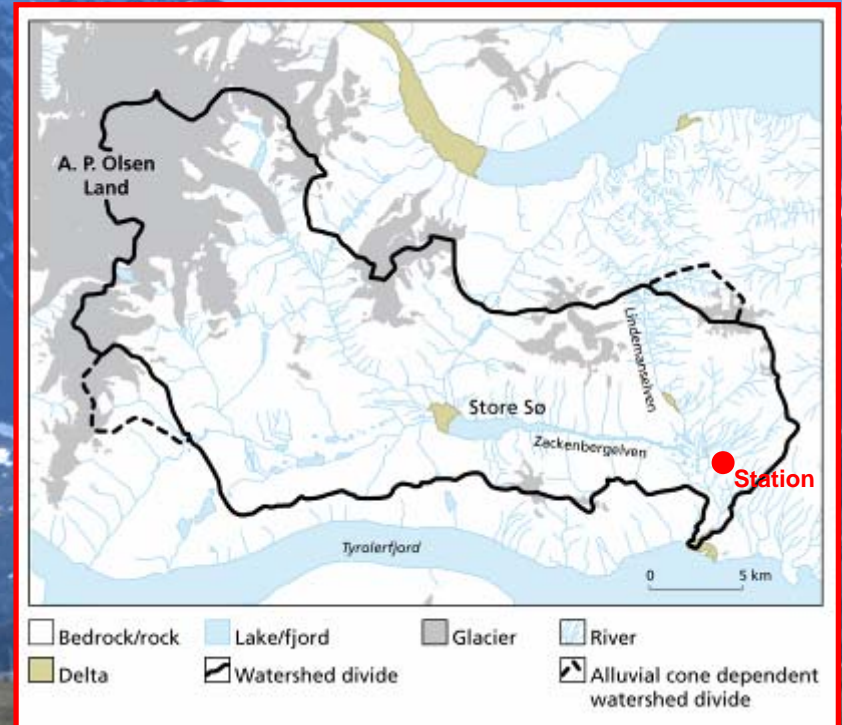
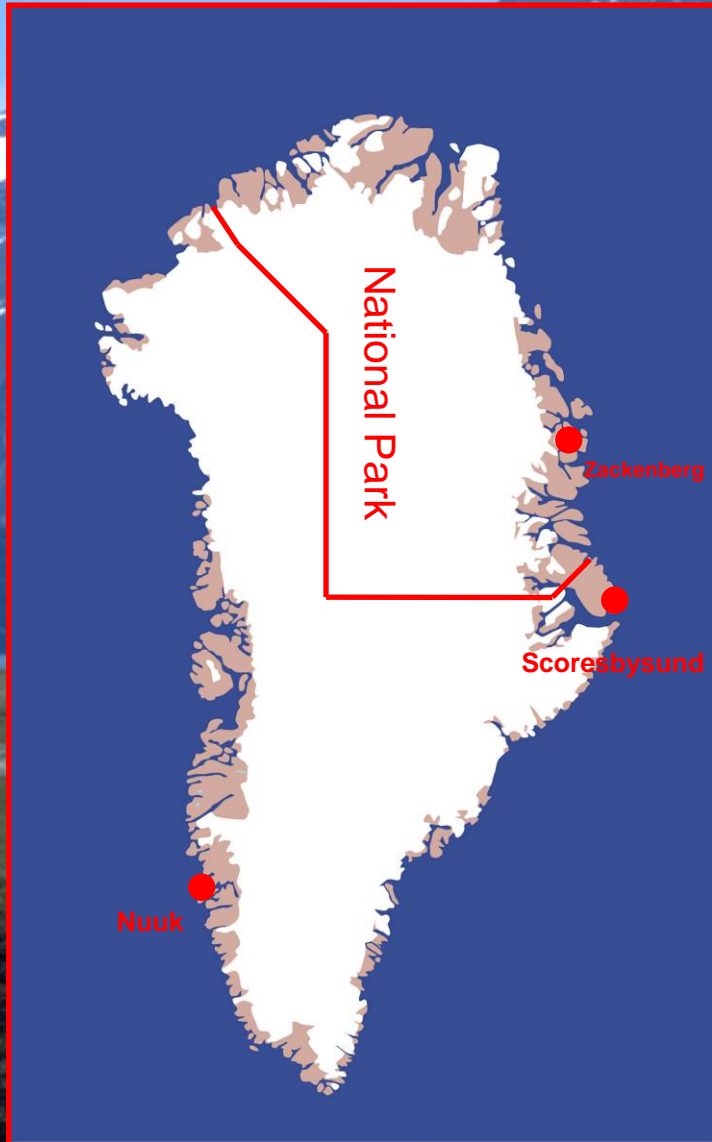
- PNH
- CBA
- ALT
- ZEP
- STM

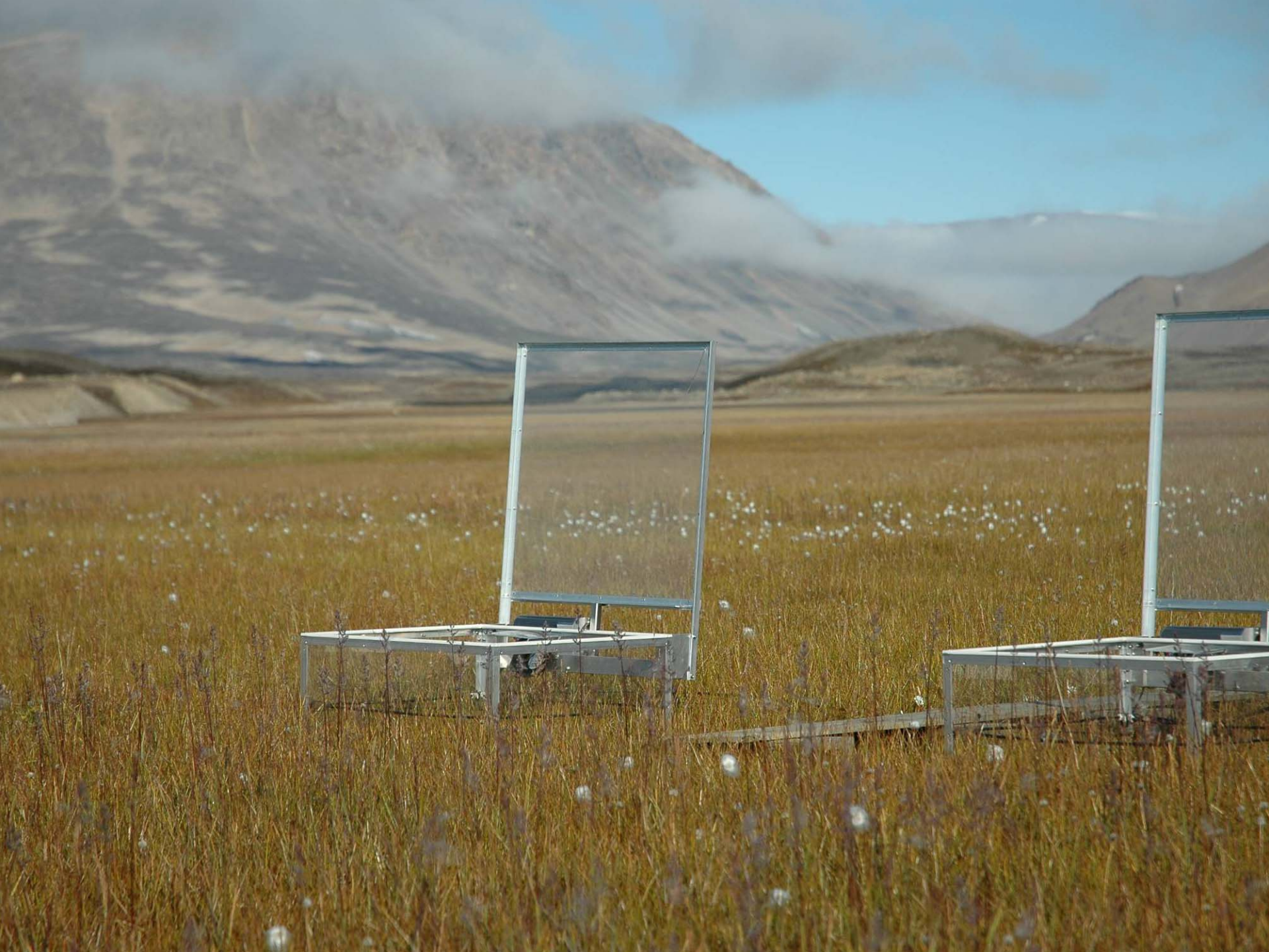
??



Zackenberg Ecological Research Operations (ZERO)

Zackenberg Basic

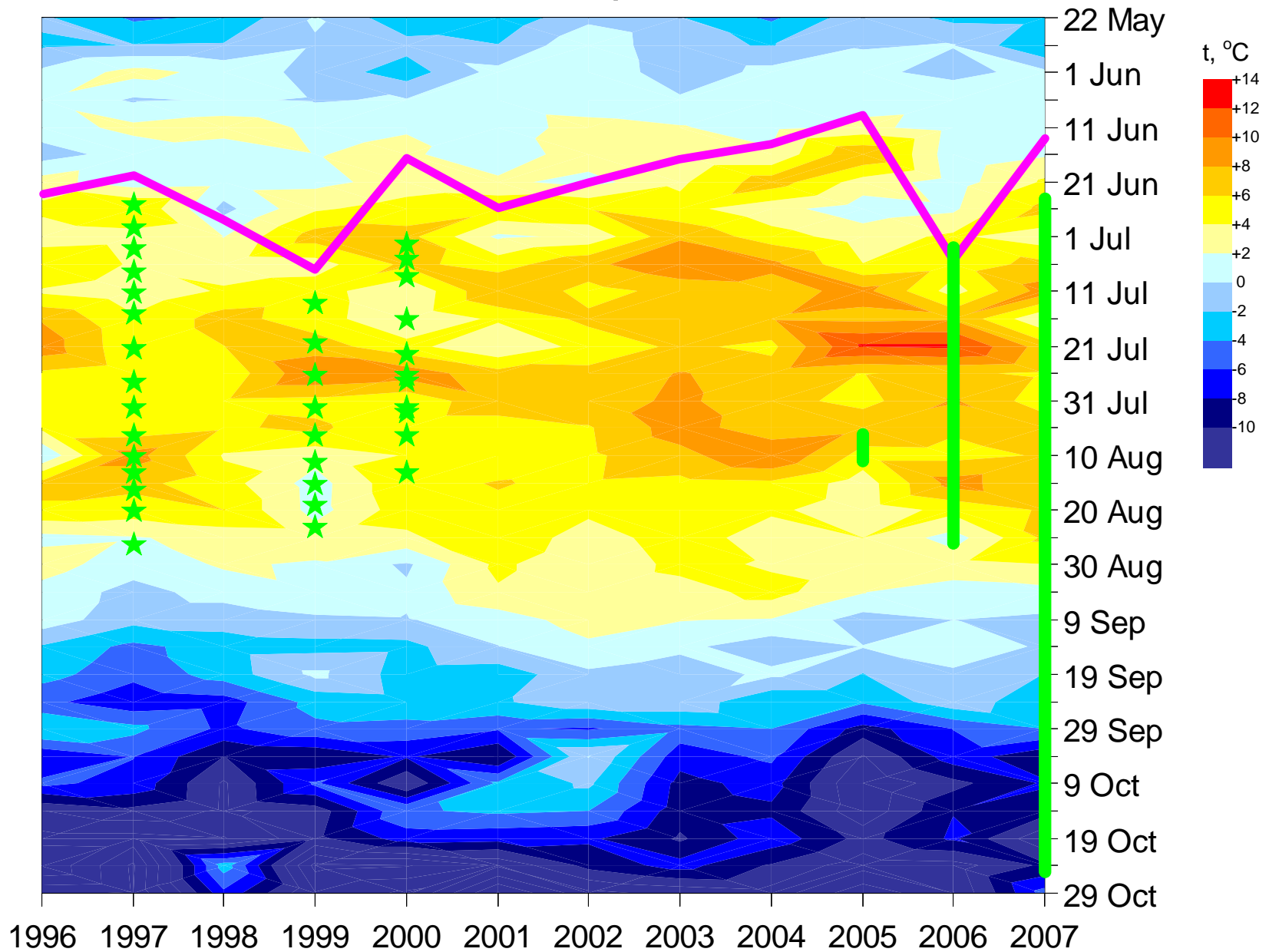








Air temperature



★ Individual measurements

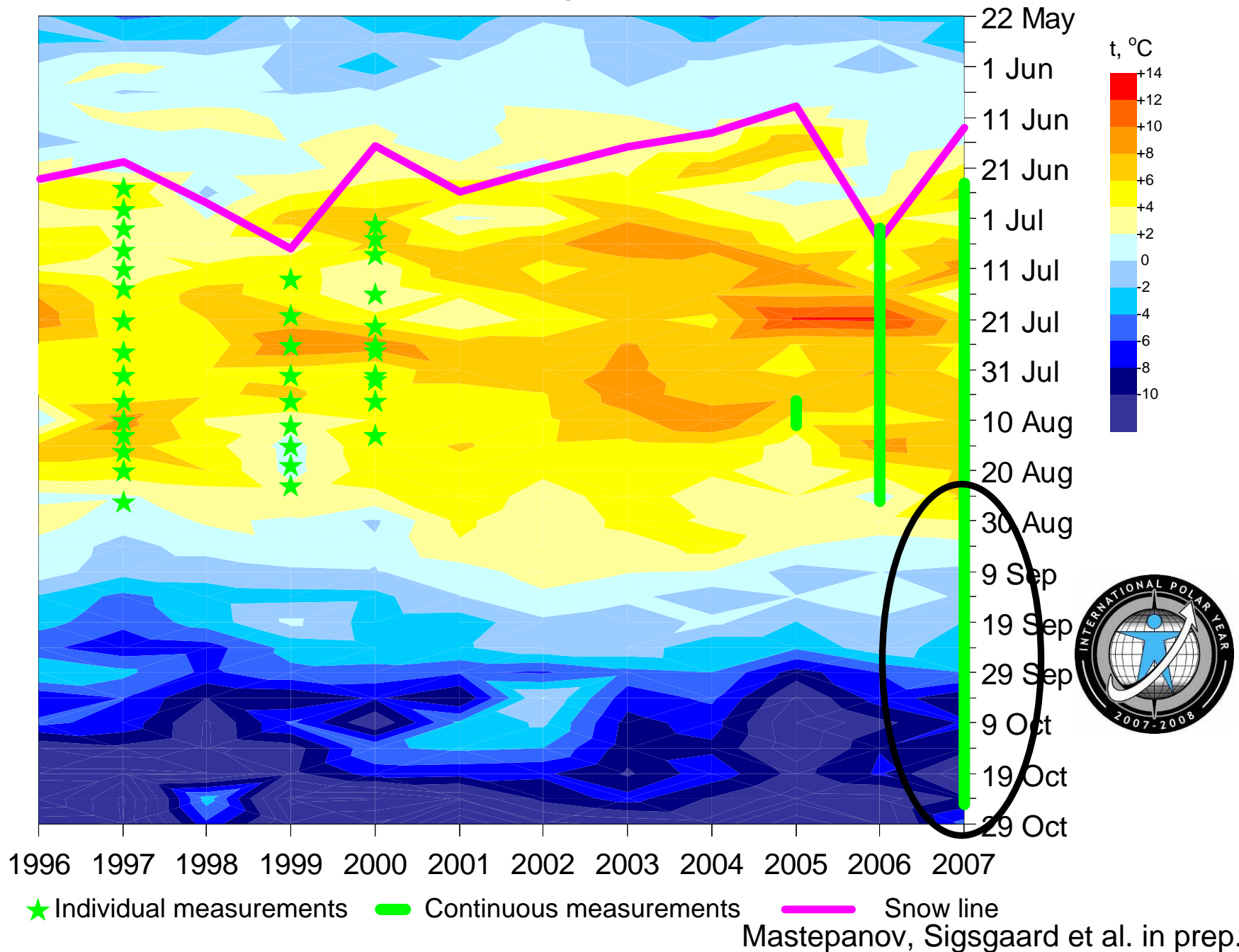
Continuous measurements

— Snow line

Mastepanov, Sigsgaard et al. in prep.

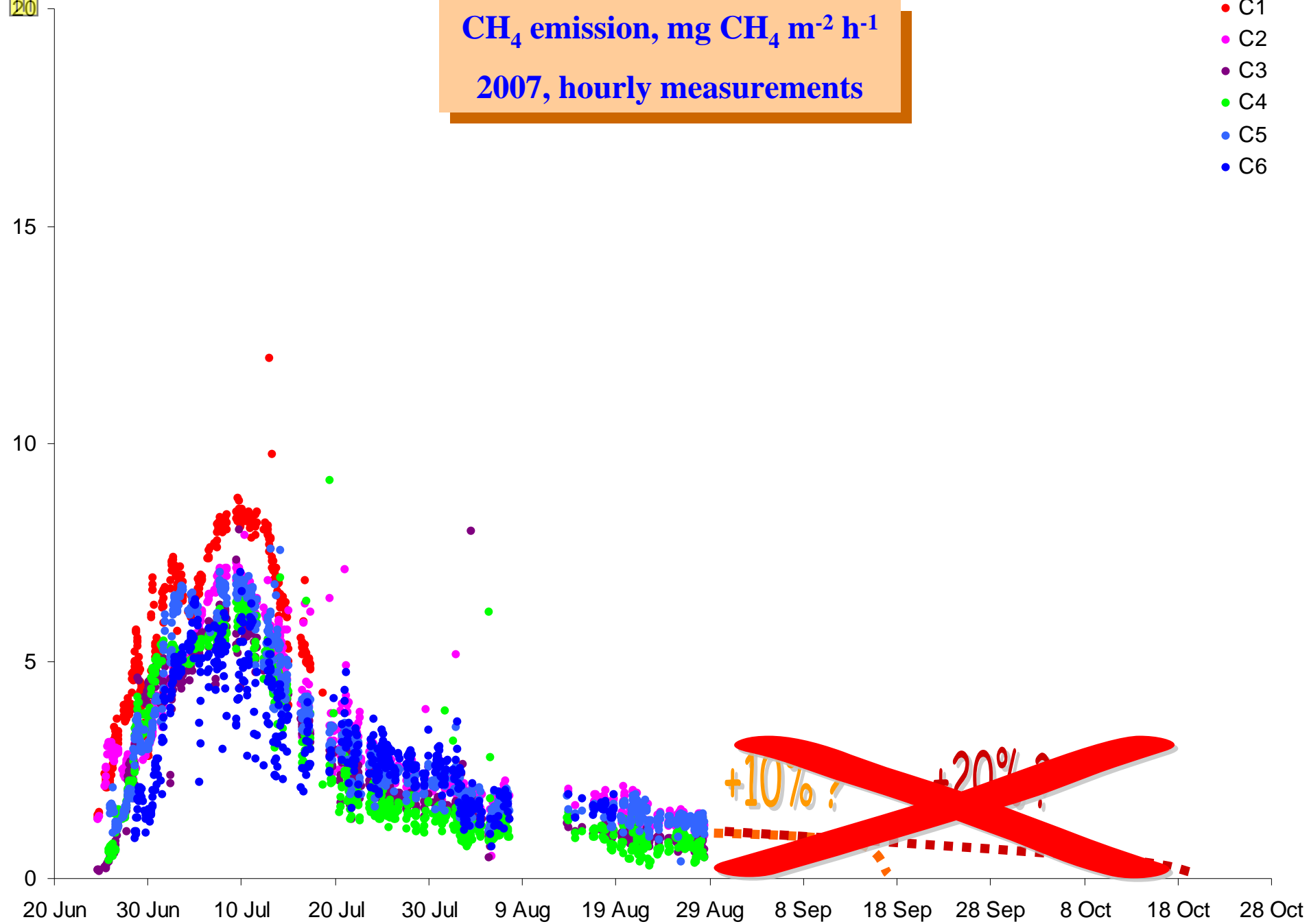


Air temperature



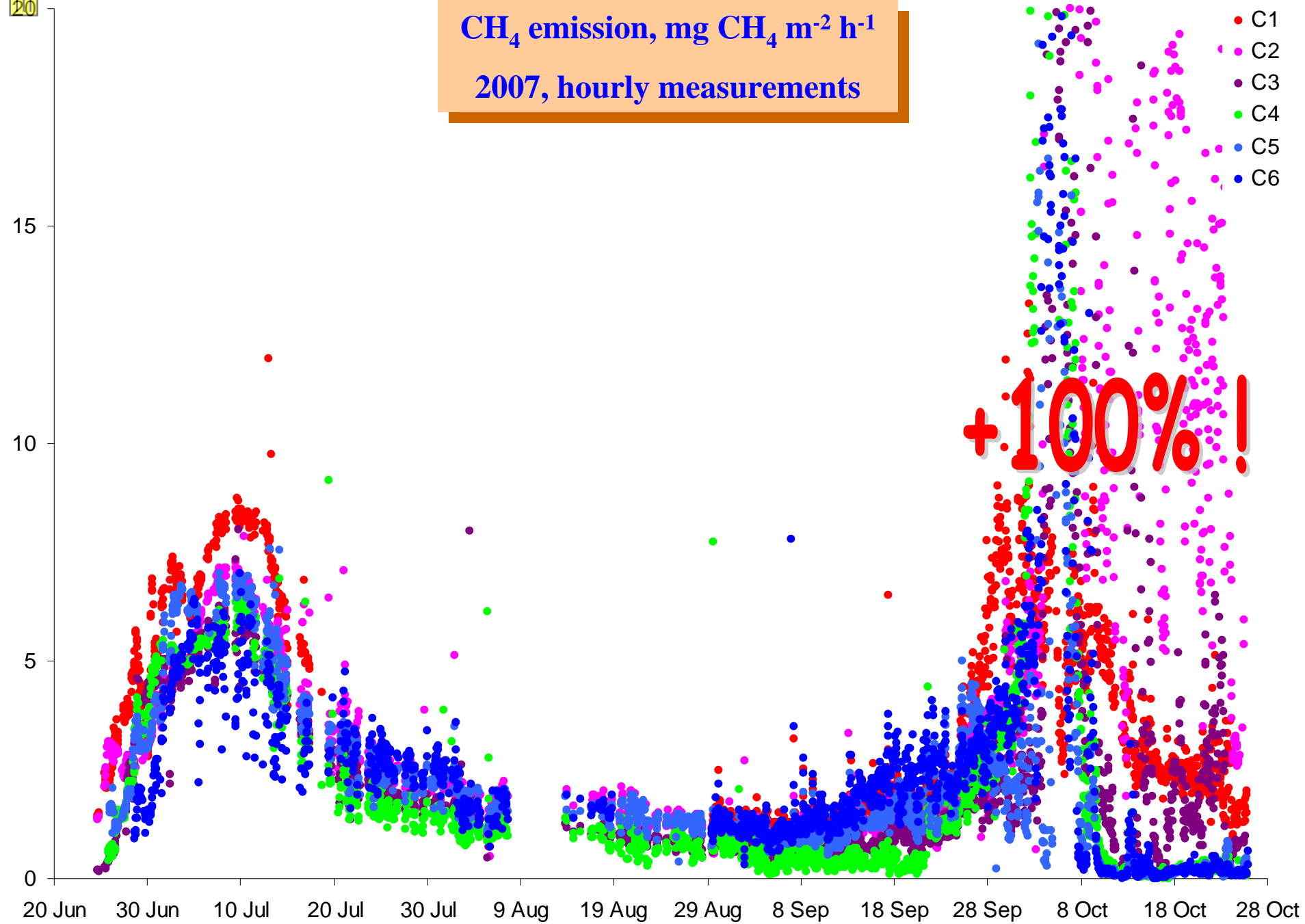
CH_4 emission, $\text{mg CH}_4 \text{ m}^{-2} \text{ h}^{-1}$
2007, hourly measurements

- C1
- C2
- C3
- C4
- C5
- C6



CH_4 emission, $\text{mg CH}_4 \text{ m}^{-2} \text{ h}^{-1}$
2007, hourly measurements

C1
C2
C3
C4
C5
C6





120

110

100

90

80

70

60

50

40

30

20

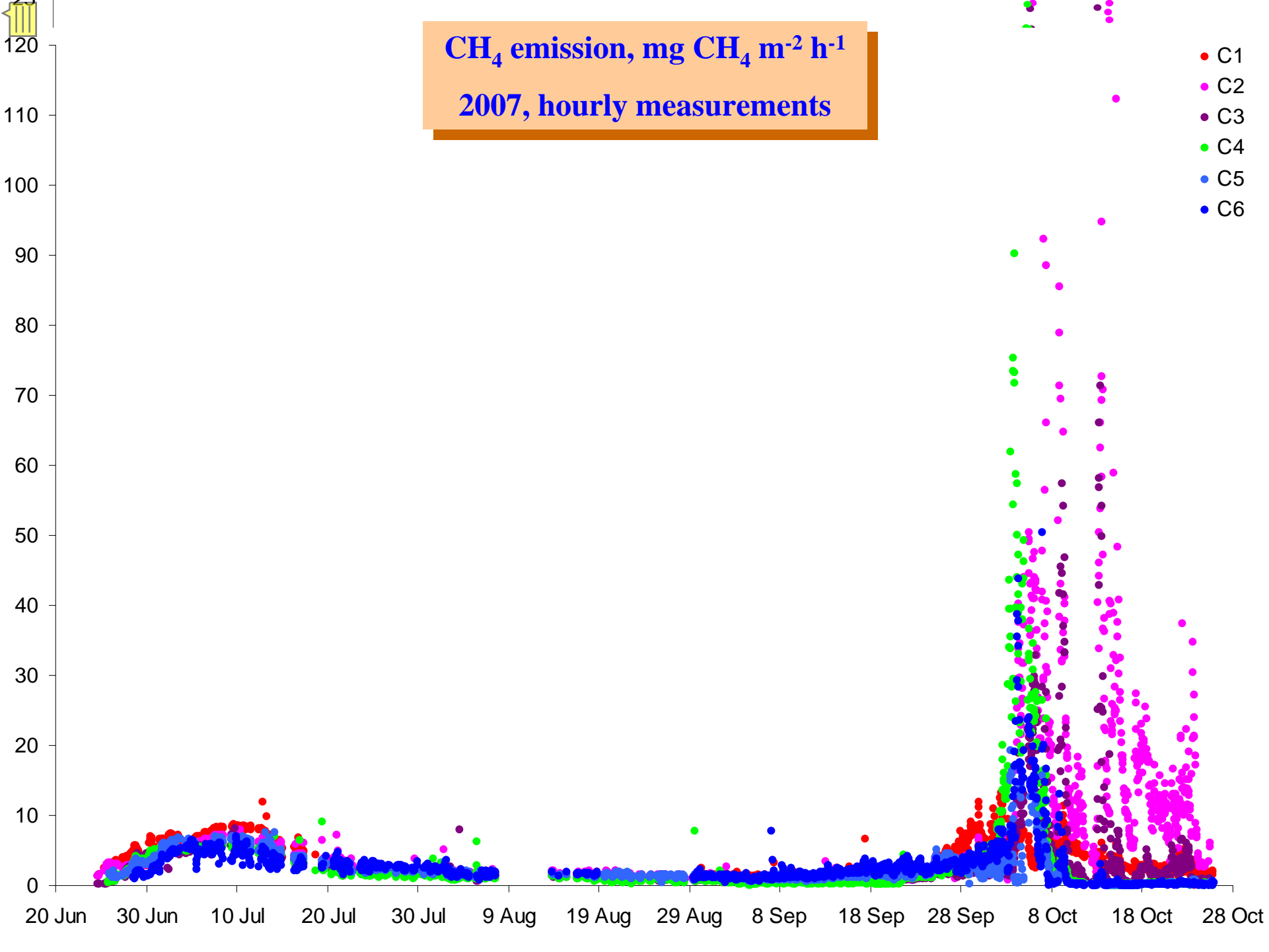
10

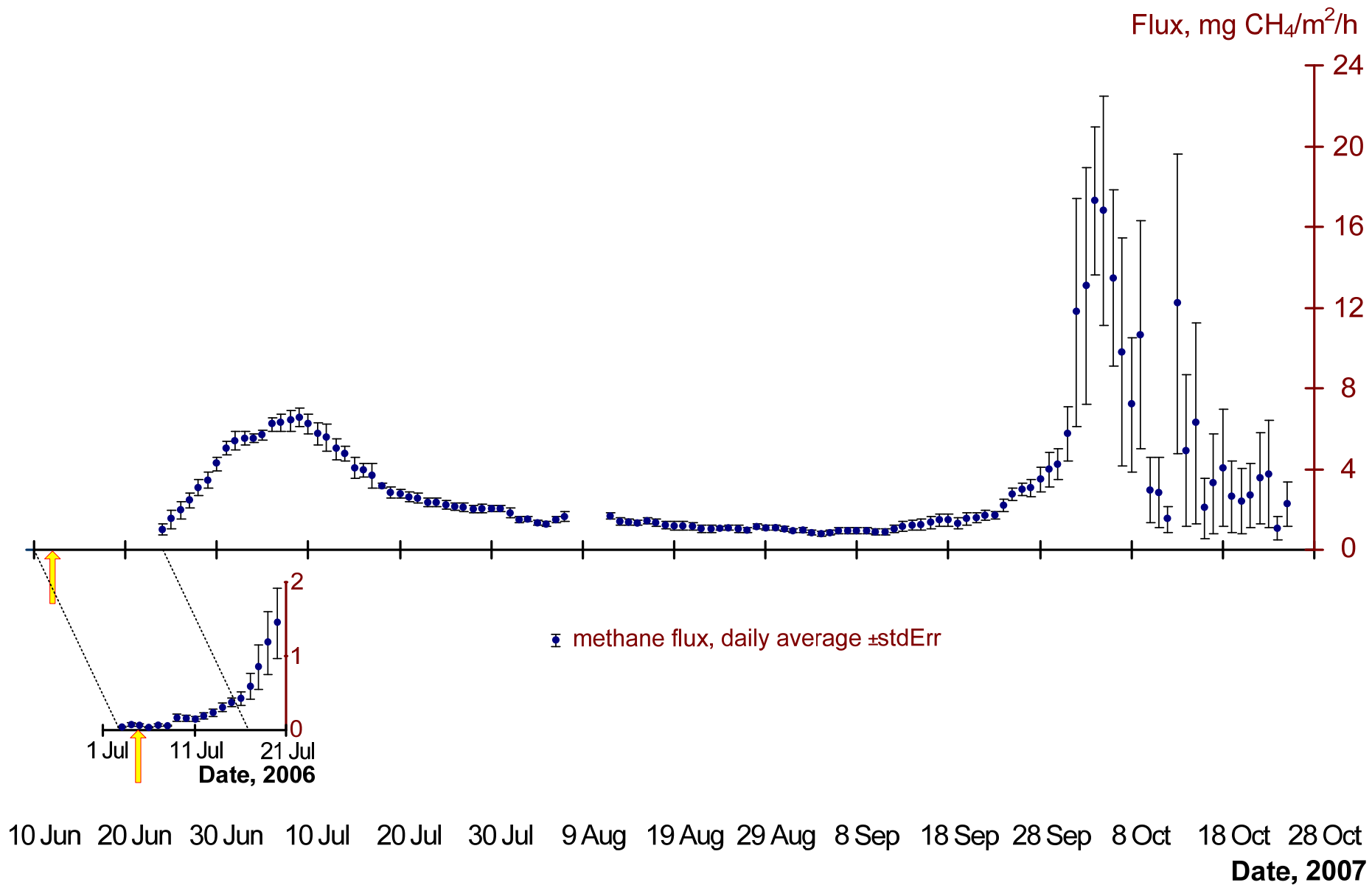
0

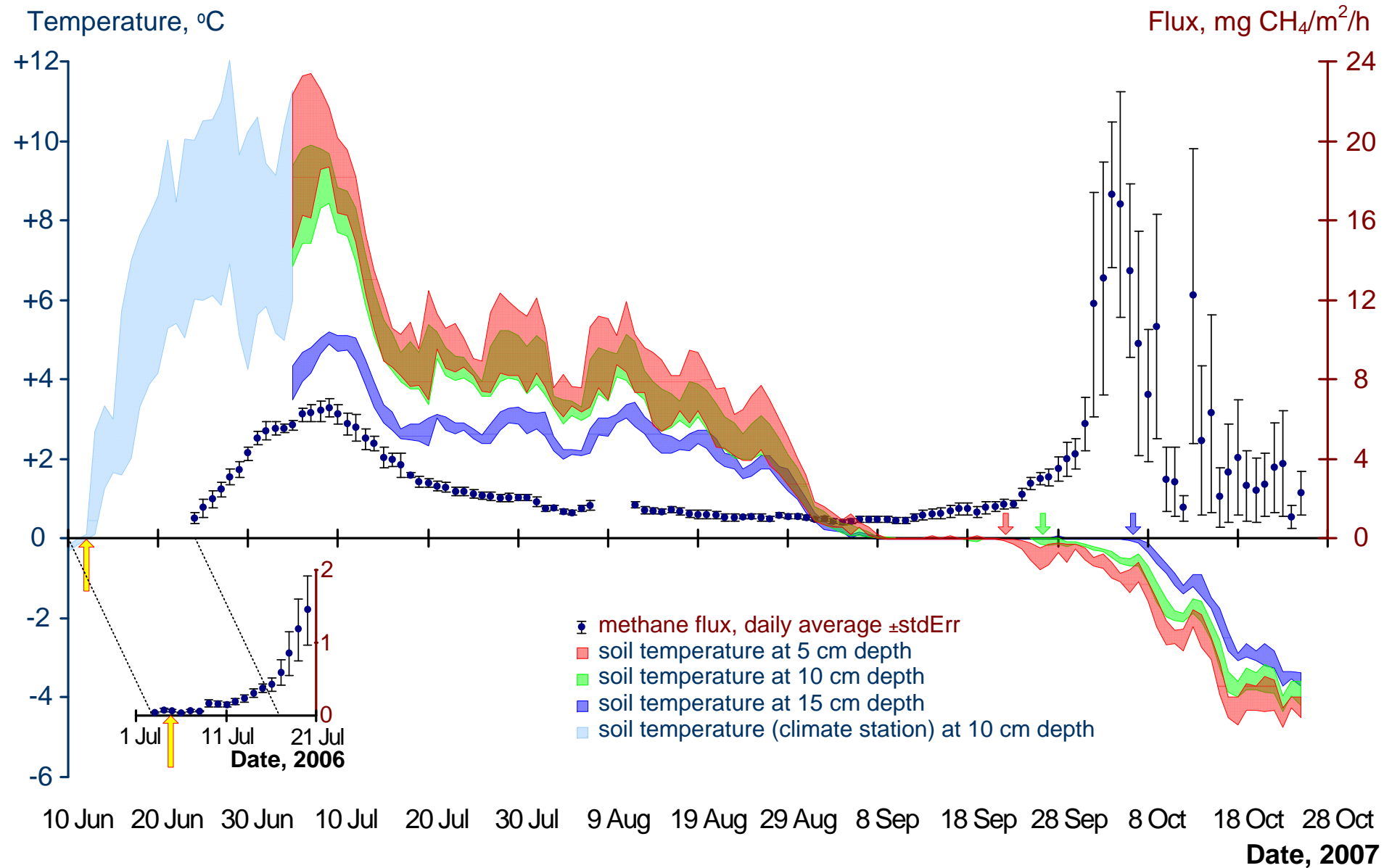
CH₄ emission, mg CH₄ m⁻² h⁻¹
2007, hourly measurements

- C1
- C2
- C3
- C4
- C5
- C6

20 Jun 30 Jun 10 Jul 20 Jul 30 Jul 9 Aug 19 Aug 29 Aug 8 Sep 18 Sep 28 Sep 8 Oct 18 Oct 28 Oct







But what is the mechanism?



Physical squeezing out of gas from the unfrozen soil layers??

