SPE & OZONE/NO

A STUDY BASED ON DENTON ET AL. USING MLS AND SOFIE

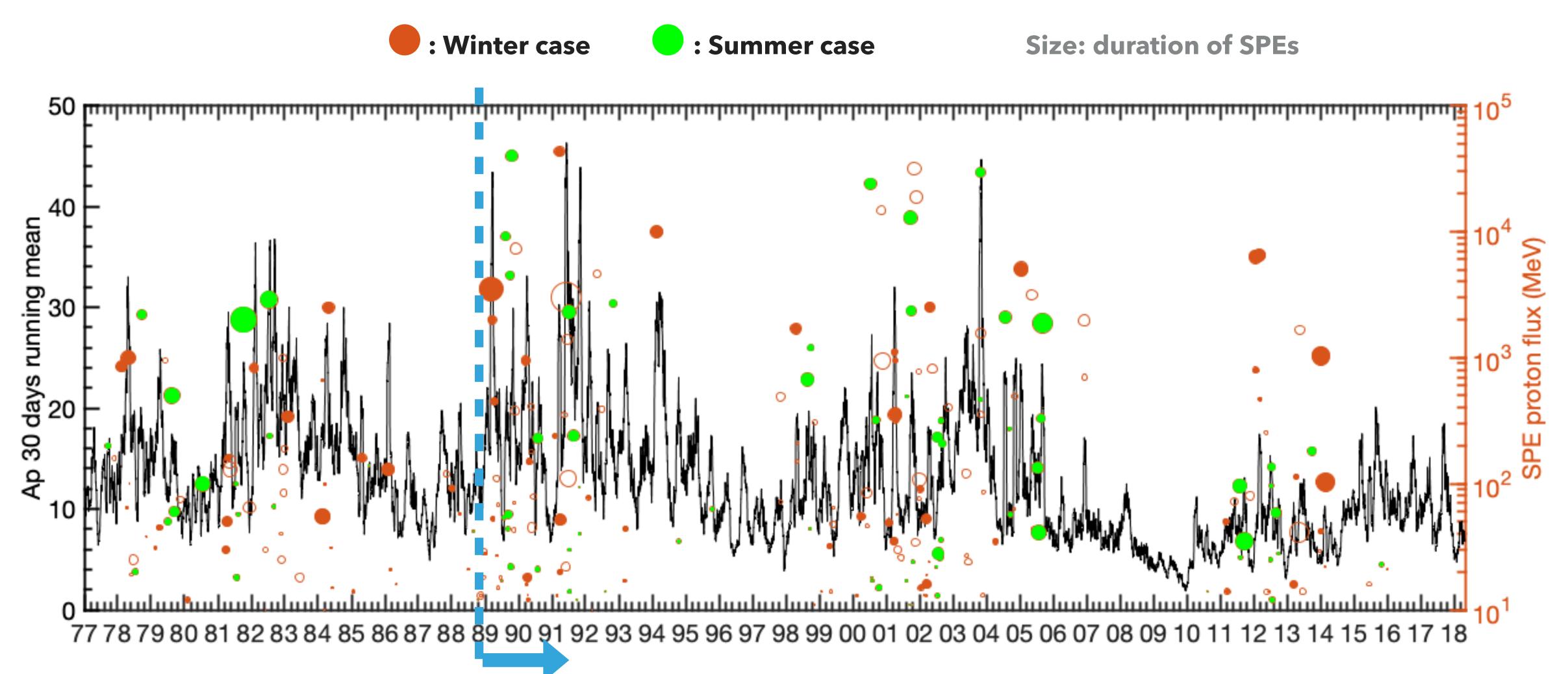
Jia Jia, Antti Kero

SGO, Uni. Oulu

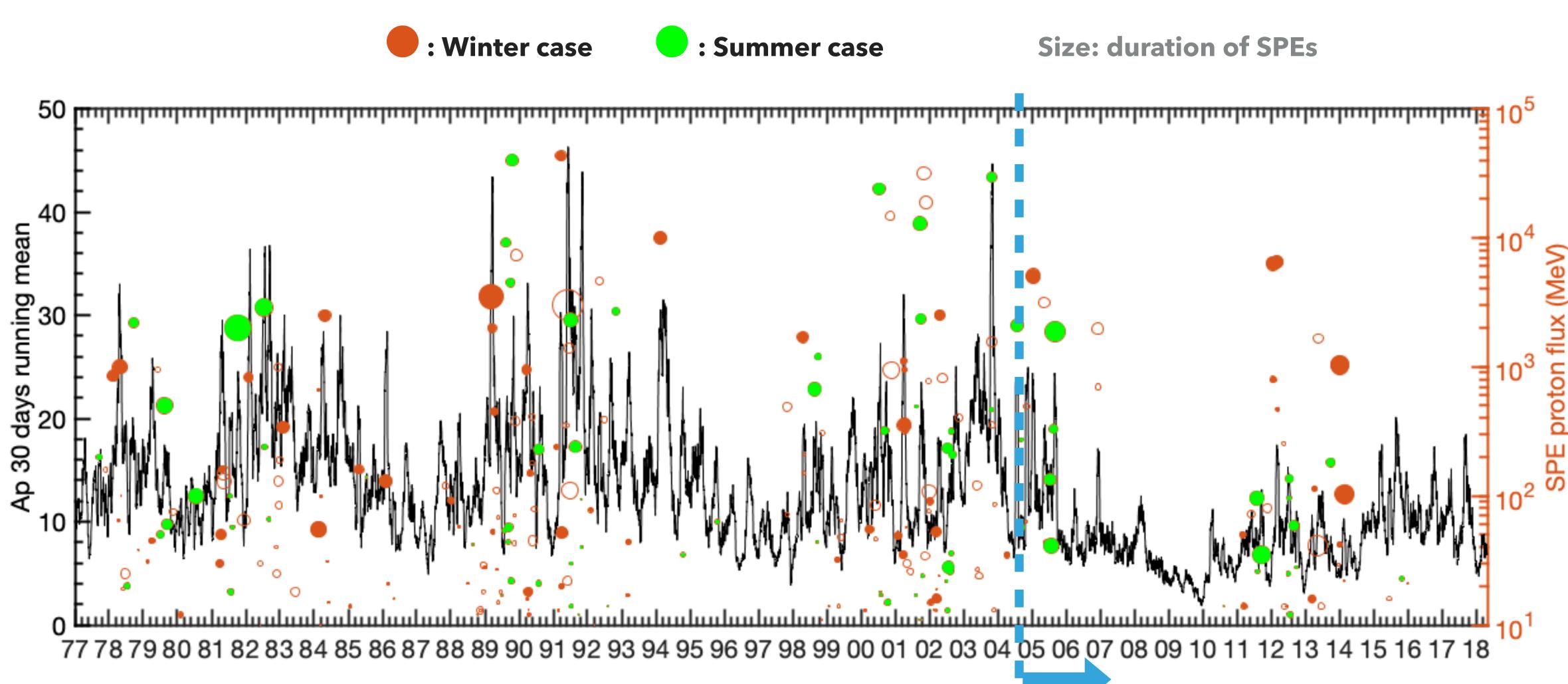
ISSI Bern, Switzerland 2020.02.03 jia.jia@sgo.fi

LIST OF SPE

SPE event list: https://www.ngdc.noaa.gov/stp/satellite/goes/index.html



NUMBER OF SPE DURING MLS OPERATIONAL TIME



NUMBER OF SPE DURING MLS OPERATIONAL TIME

	1, No restriction	2, Energy>50 pfu	3, No overlap in 10 days	4, Energy>50 pff & no overlap in 10 days
All Events	47	26	35	17
Jan-Apr Events	13	7	9	4
Jul-Oct Events	18	10	13	7

METHOD

RESULT EXAMPLE

lılı.

Ozone change: Direct changes in VMR

(Observation - Daily Climatology)

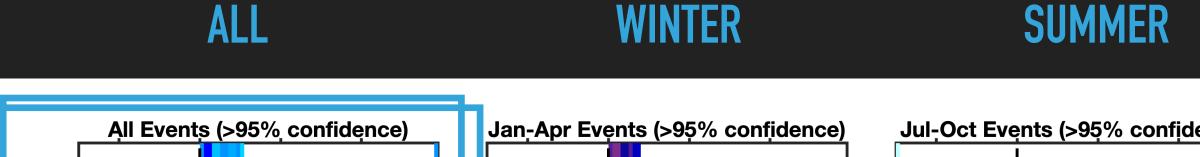


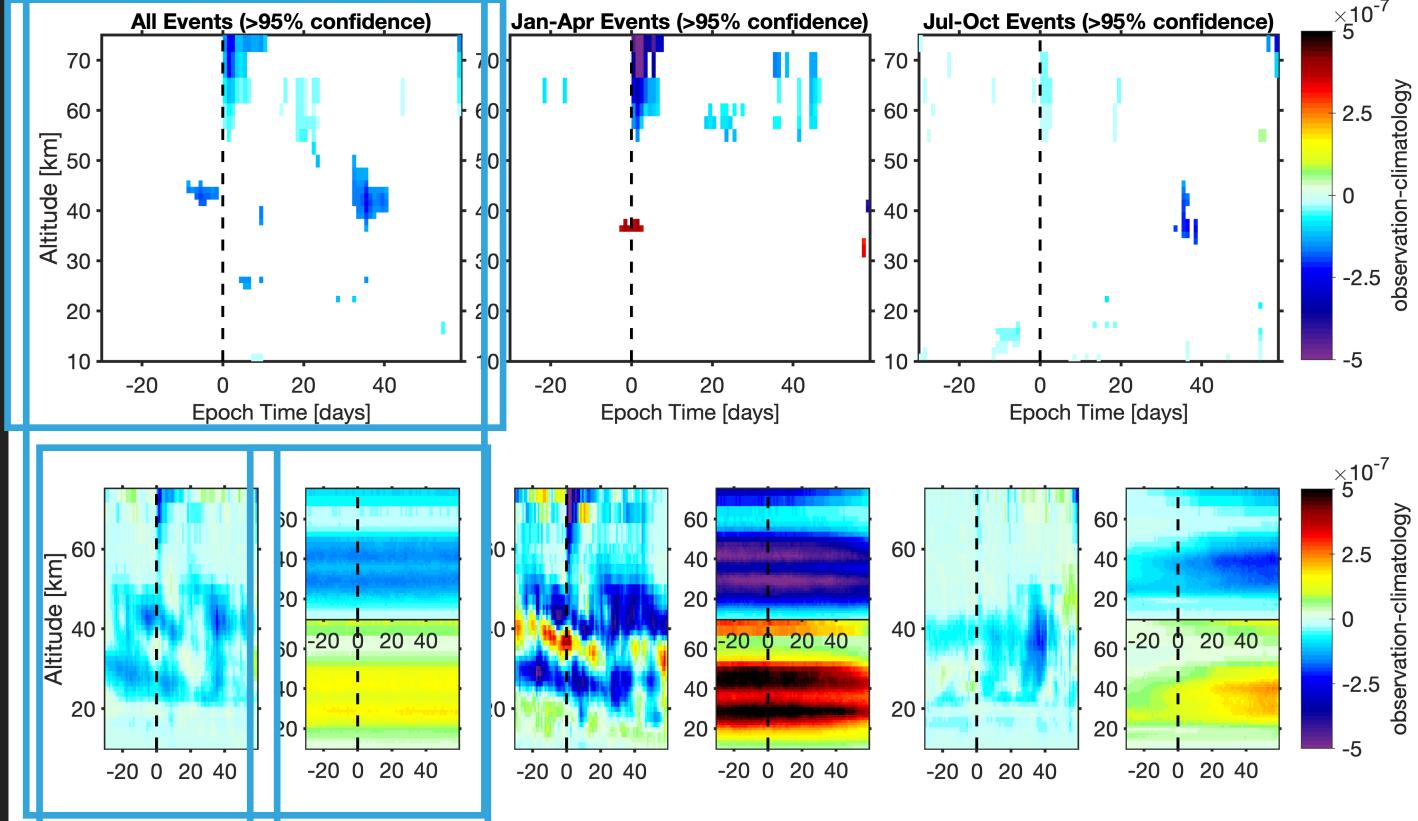
Superposed Epoch Analysis of the set of the SPE events:

30 days before- 60 days after

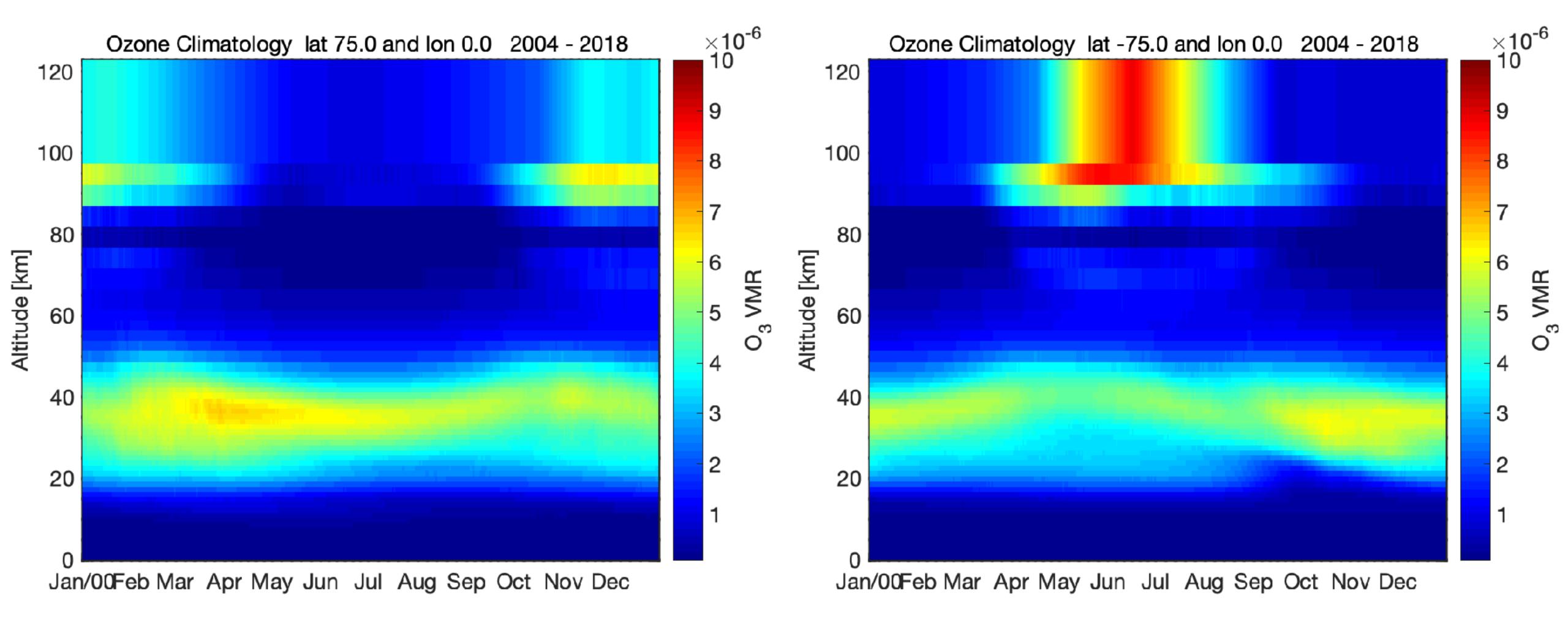


Reference: Superposed Epoch Analysis from 2000 random **set**s of the events



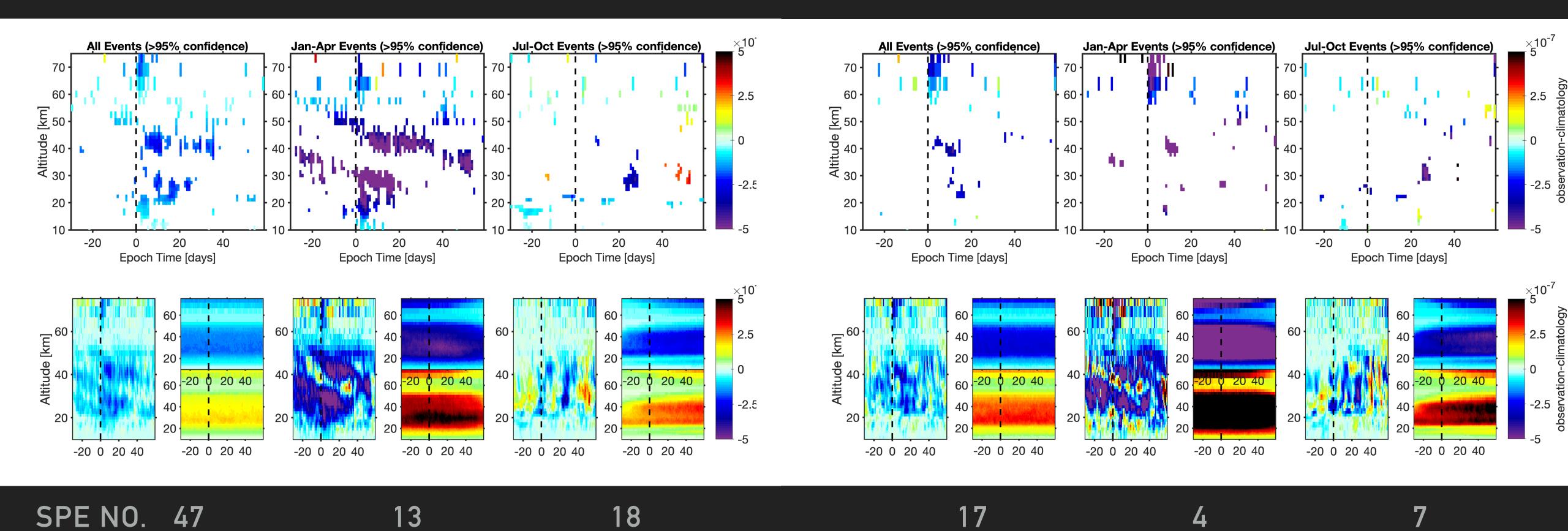


ANTARCTIC POLAR CAP



Ny-Älesund:

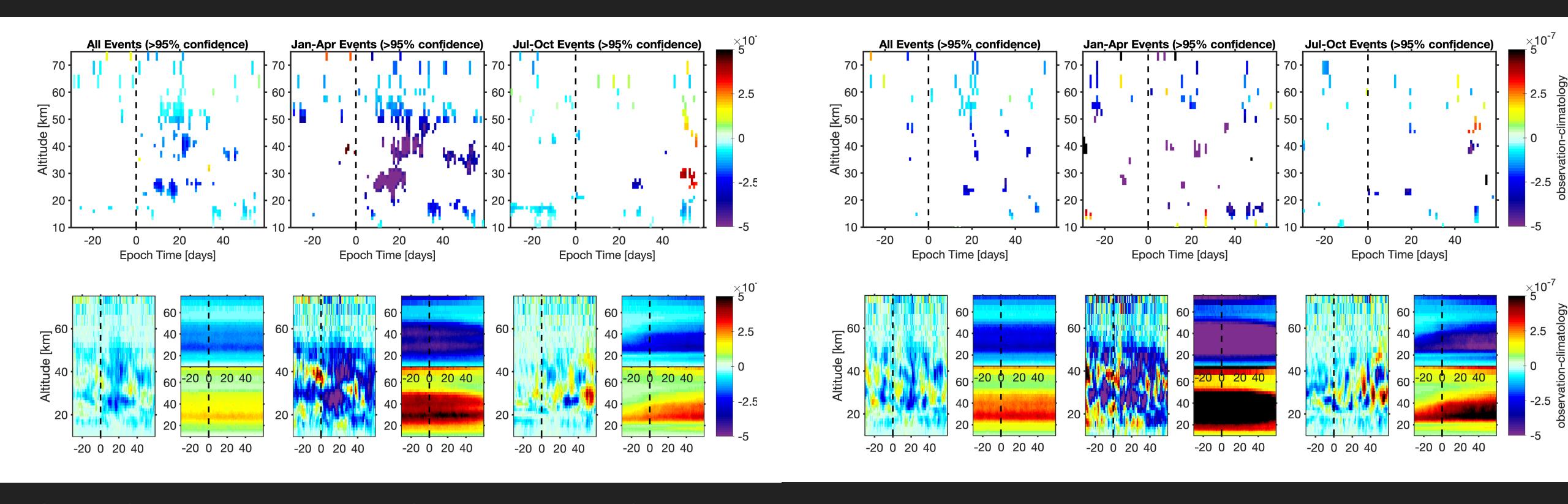
78.9°N +- 2.5°; 12.1°E +- 15°



No restriction

Sodankylä:

67.3°N +- 2.5°; 26.6°E +- 15°

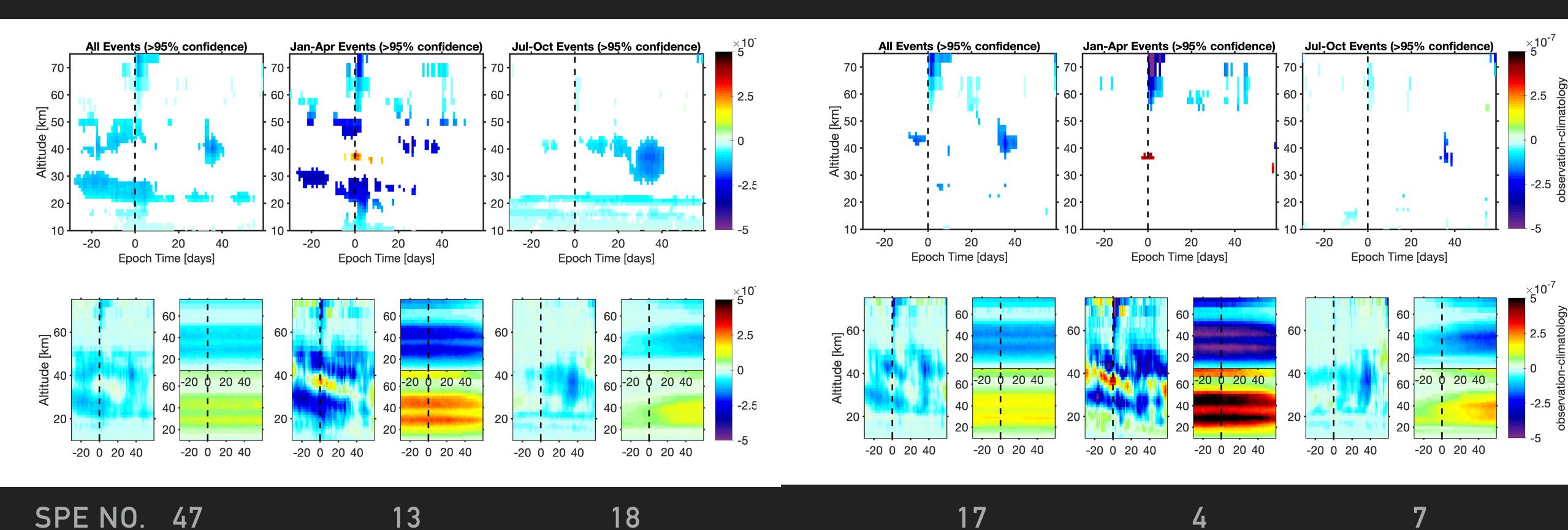


SPE NO. 47 13 18

No restriction

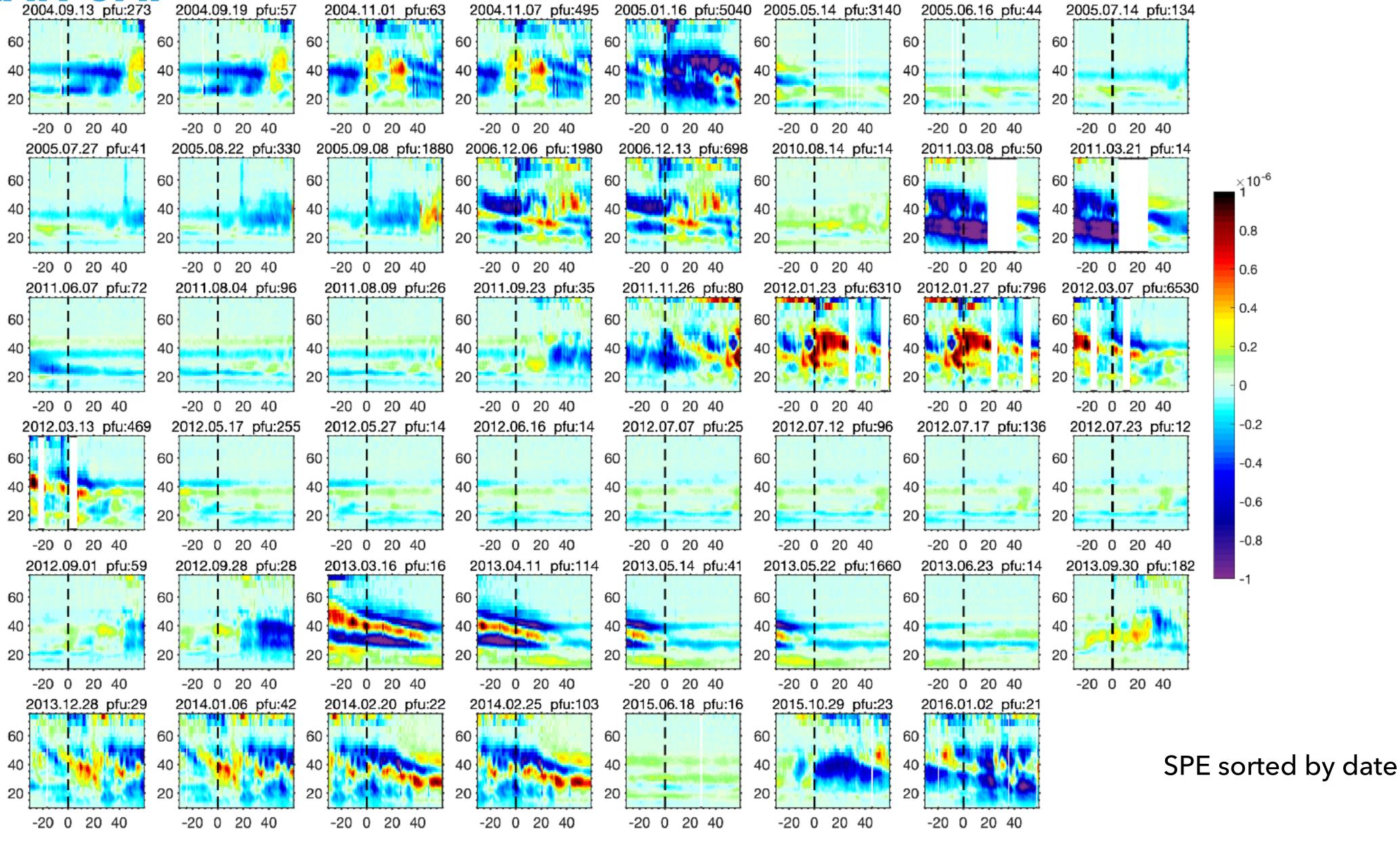
Arctic Polar Cap:

60°N - 90°N



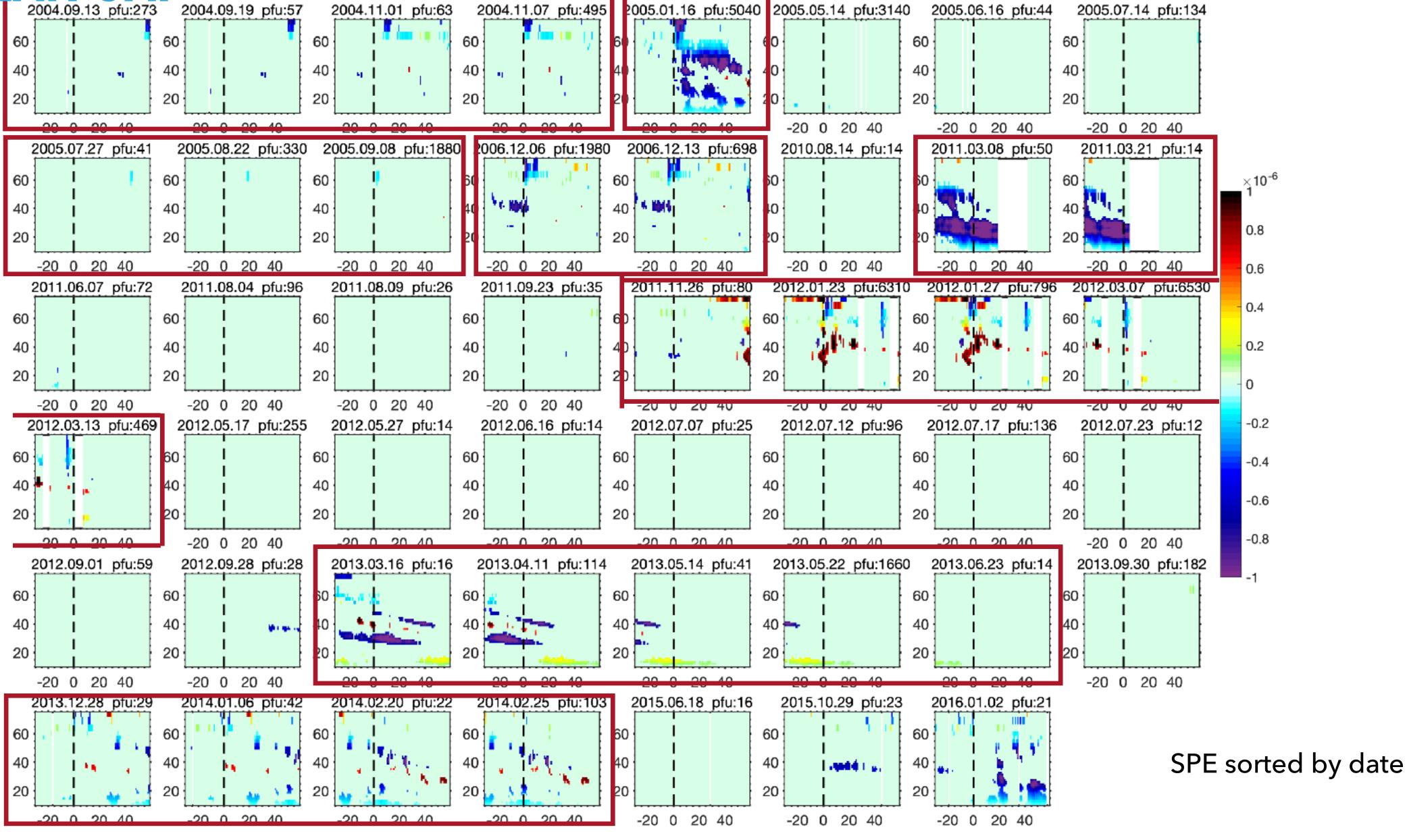
SPE NO.

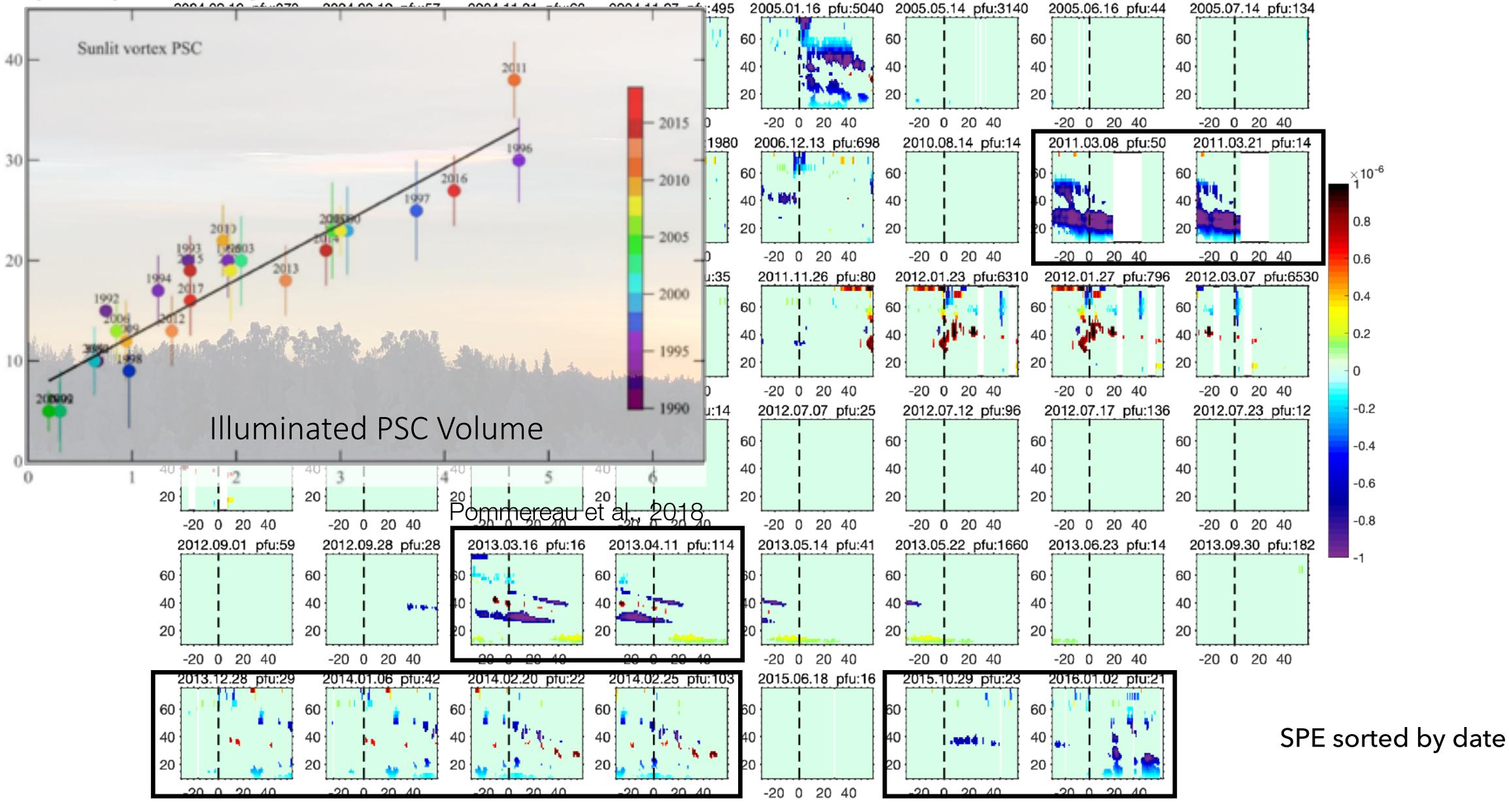
No restriction



Daily MLS O3 observation (VMR)-Daily climatology

ARCTIC POLAR CAP 2004.09.13 pfu:273 60 60 60

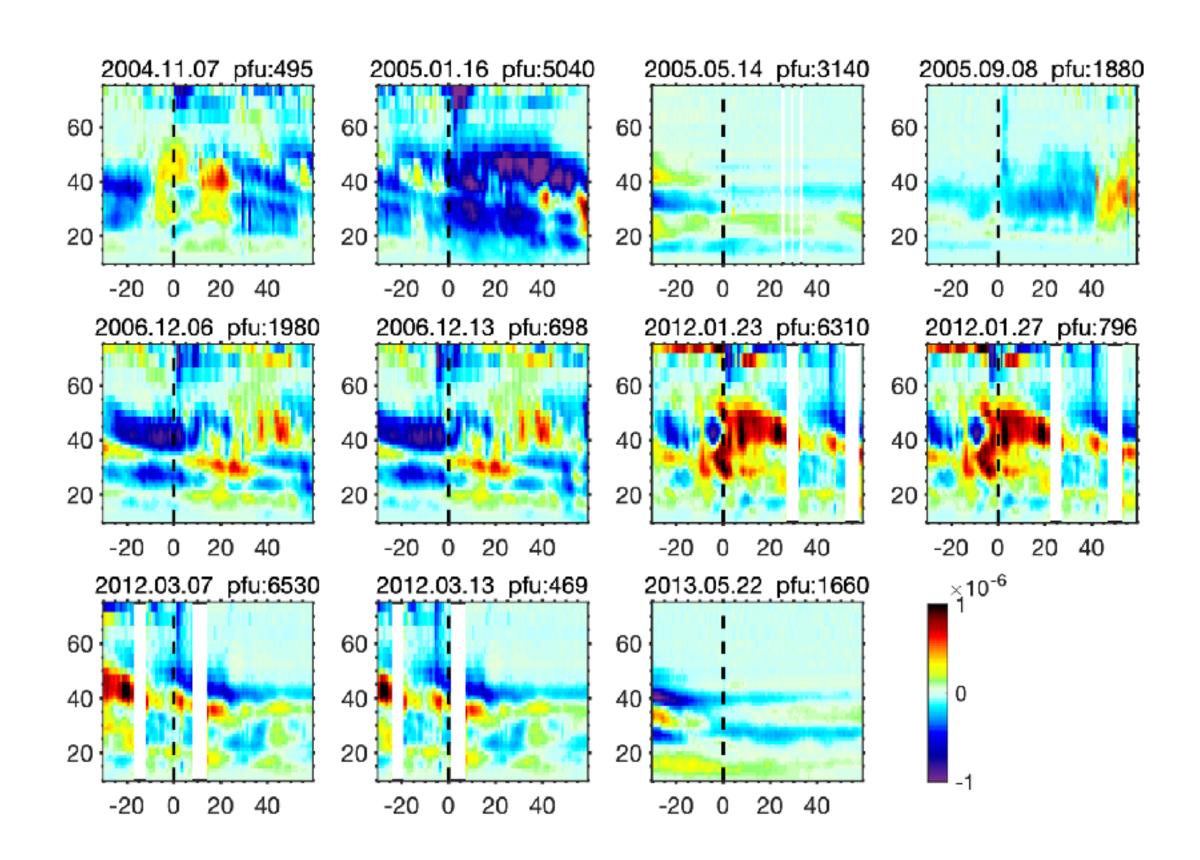




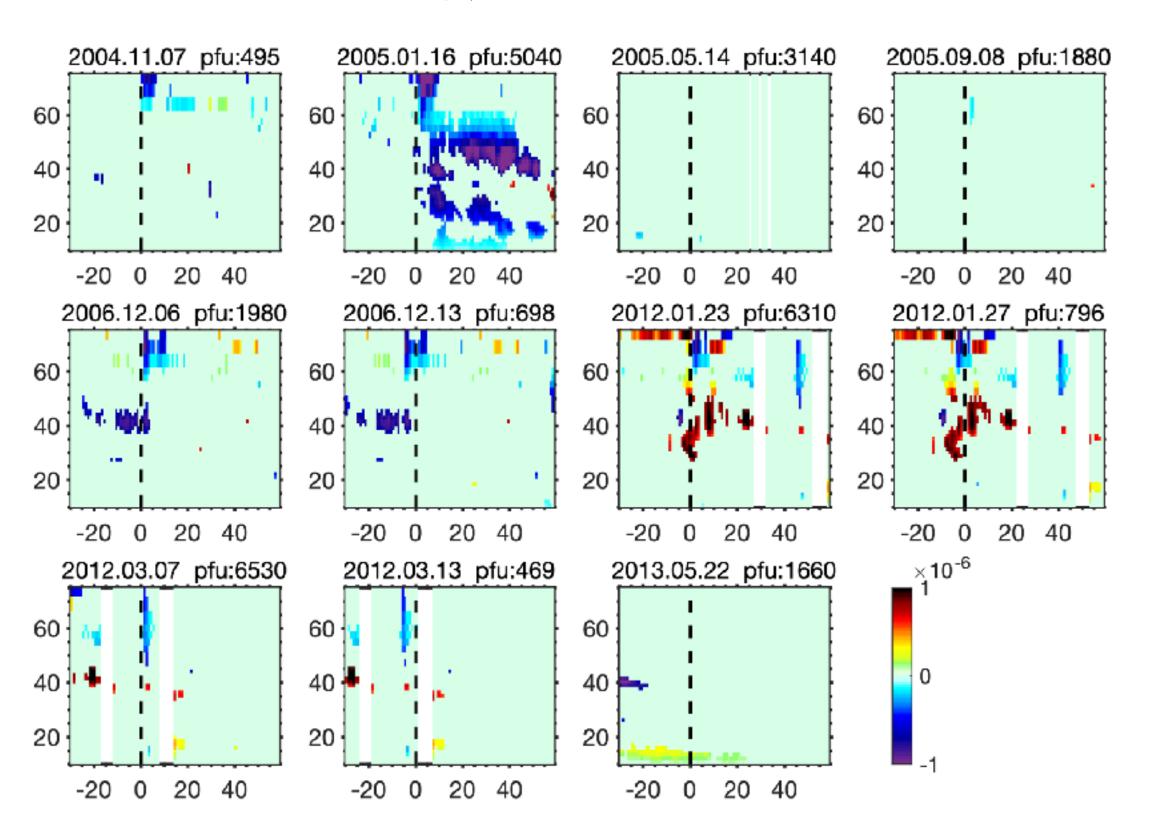
95% confidence

2011.03.08 pfu:50 2011.03.21 pfu:14 2011.06.07 pfu:72 2011.08.04 pfu:96 2011.08.09 pfu:26 100 40 -20 0 20 40 -20 0 20 40 -20 0 20 40 -20 0 20 40 -20 0 20 40 2011.11.26 pfu:80 2012.01.23 pfu:6310 2012.01.27 pfu:796 2012.03.07 pfu:6530 2012.03.13 pfu:469 2012.05.17 pfu:255 2012.05.27 pfu:14 120 100 100 60 60 60 40 -20 0 20 40 -20 0 20 40 -20 0 20 40 -20 0 20 40 -20 0 20 40 -20 0 20 40 -20 0 20 40 2012.07.07 pfu:25 2012.06.16 pfu:14 2012.07.12 pfu:96 2012.07.17 pfu:136 2012.07.23 pfu:12 2012.09.01 pfu:59 2012.09.28 pfu:28 100 100 100 60 60 60 60 60 60 20 -20 0 20 40 -20 0 20 40 -20 0 20 40 -20 0 20 40 -20 0 20 40 -20 0 20 40 -20 0 20 40 2013.09.30 pfu:182 2013.04.11 pfu:114 2013.12.28 pfu:29 2013.03.16 pfu:16 2013.05.14 pfu:41 2013.05.22 pfu:1660 2013.06.23 pfu:14 60 60 - V - 1 -20 0 20 40 -20 0 20 40 -20 0 20 40 -20 0 20 40 -20 0 20 40 -20 0 20 40 -20 0 20 40 2014.02.20 pfu:22 2014.02.25 pfu:103 2015.06.18 pfu:16 2015.10.29 pfu:23 2014.01.06 pfu:42 2016.01.02 pfu:21 120 100 100 100 80 80 60 40 60 60 60 60 SPE sorted by date 40 40 40 40 40 e de la Washington, 1997 20 -20 0 20 40 -20 0 20 40 -20 0 20 40 -20 0 20 40 -20 0 20 40 -20 0 20 40 95% confidence

Daily SOFIE NO observation (ND)-Daily climatology / Daily climatology



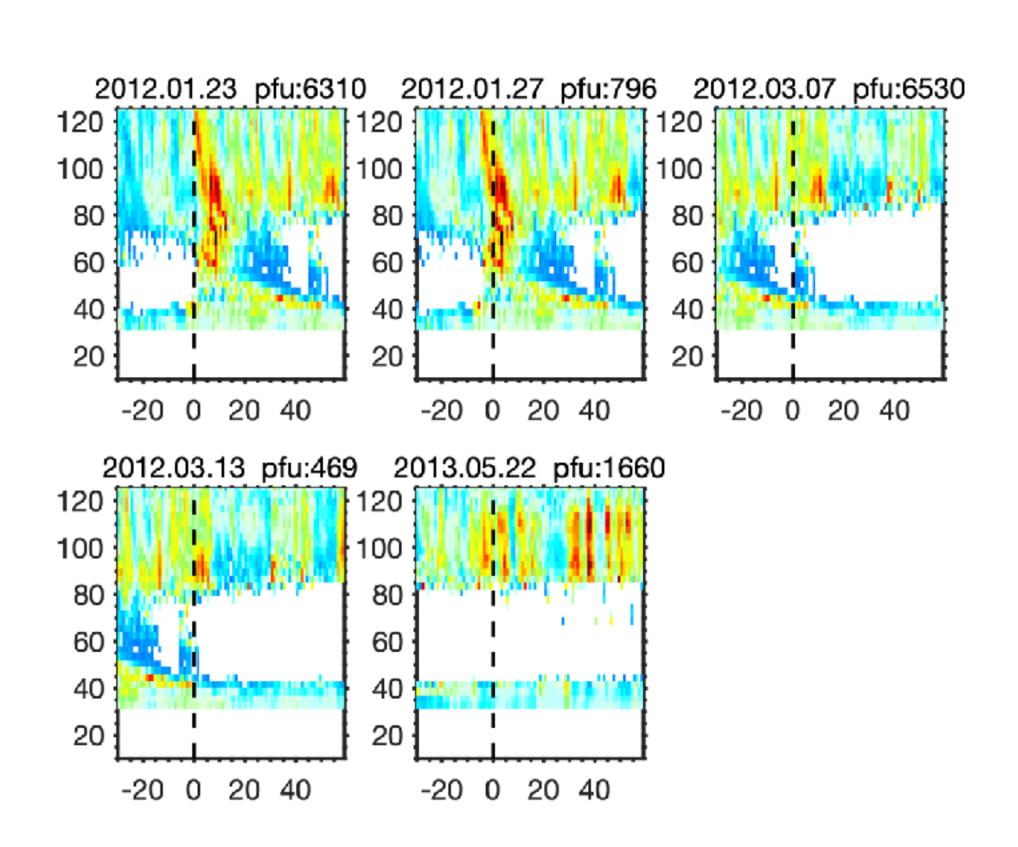
95% confidence



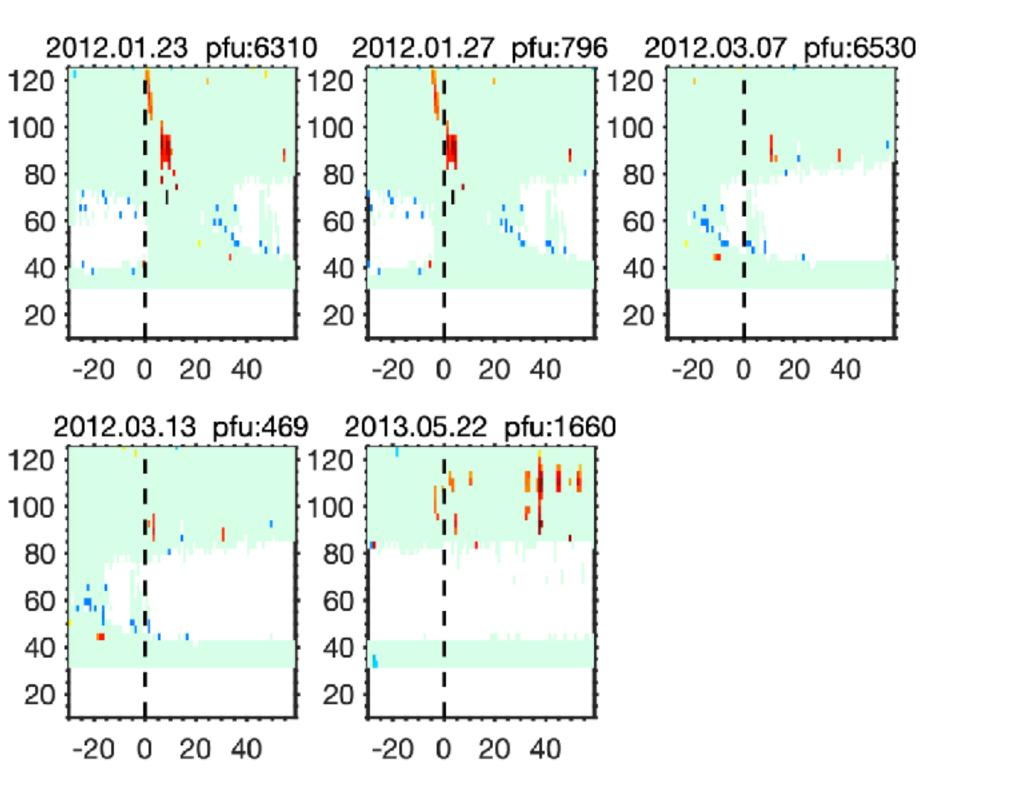
Events with pfu>400

SPE sorted by date

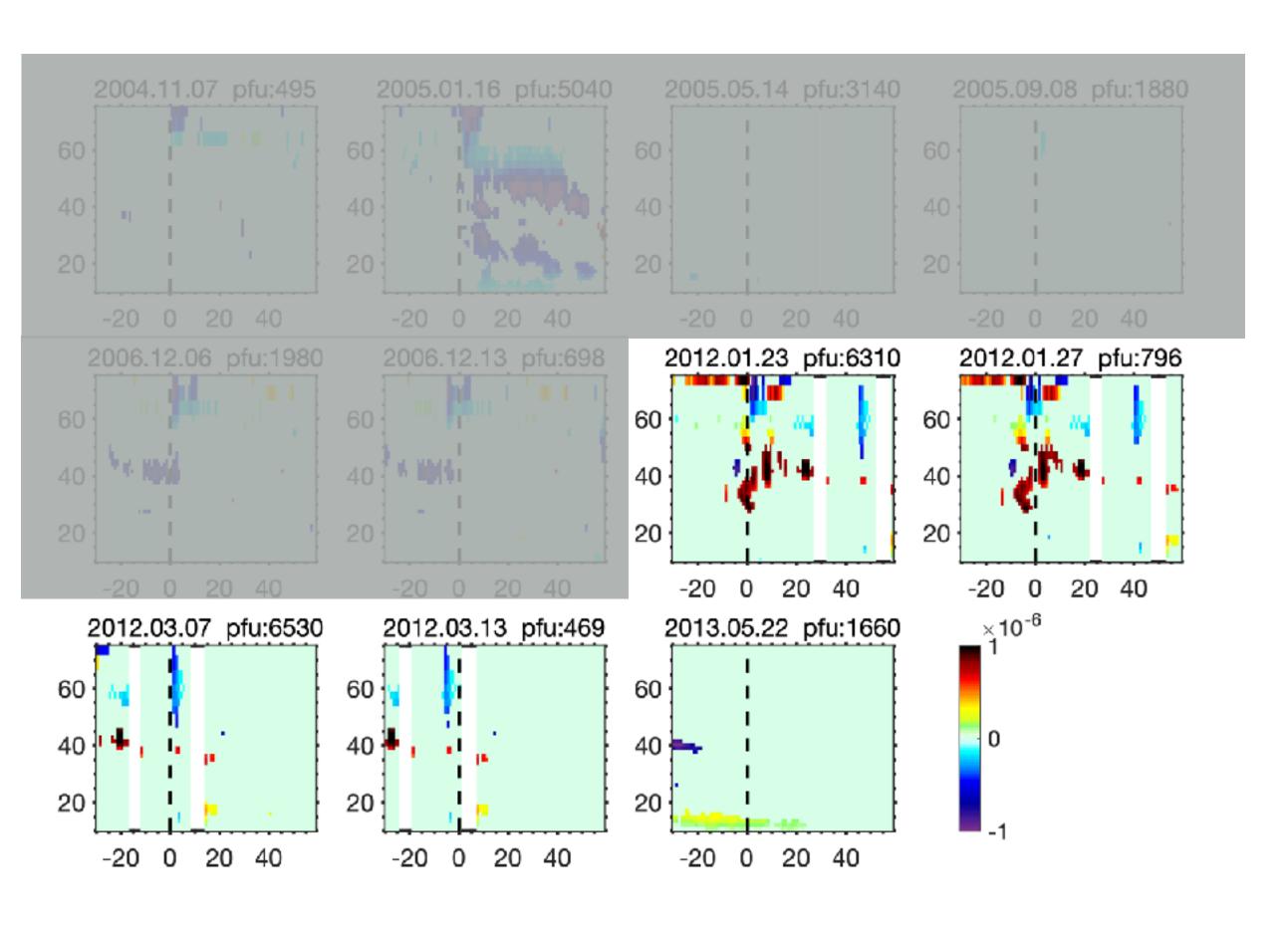
SOFIE NO data!

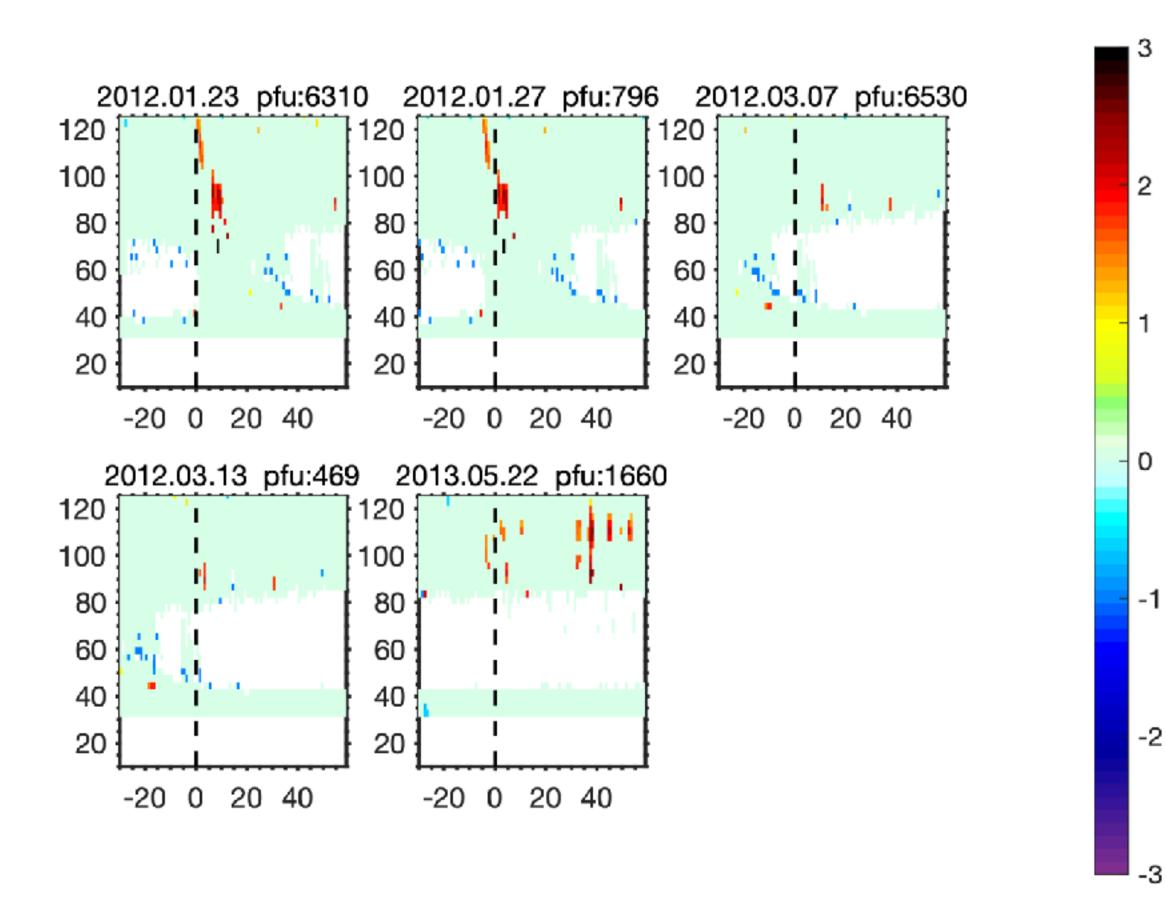






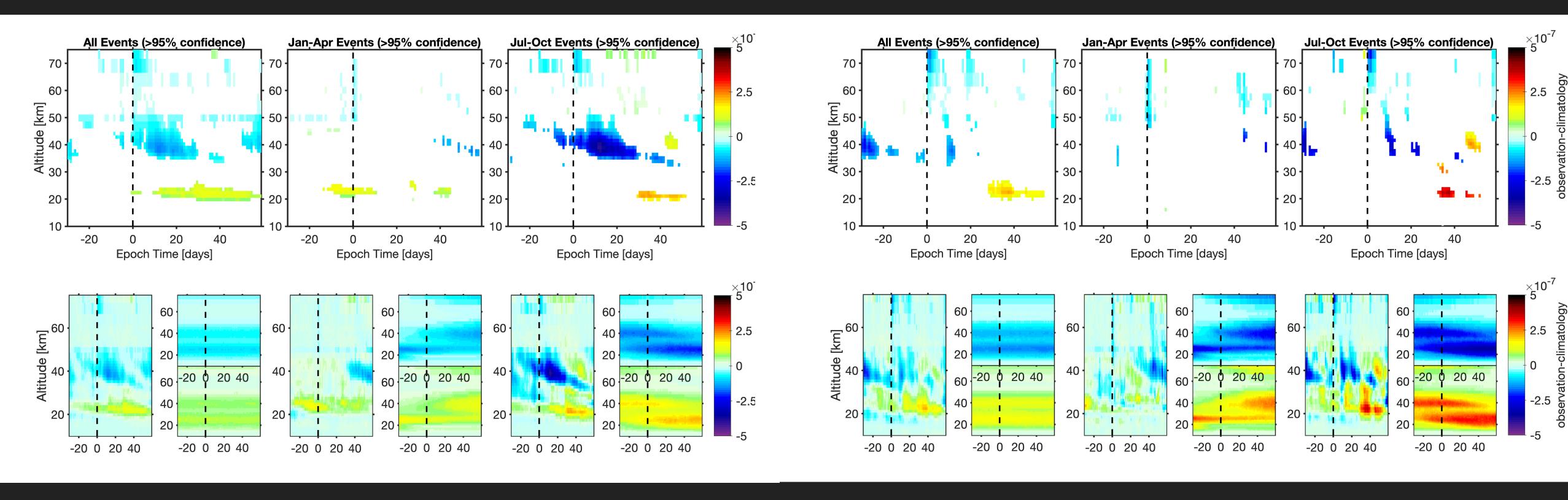
MLS ozone SOFIE NO





Antarctic Polar Cap:

60°S - 90°S



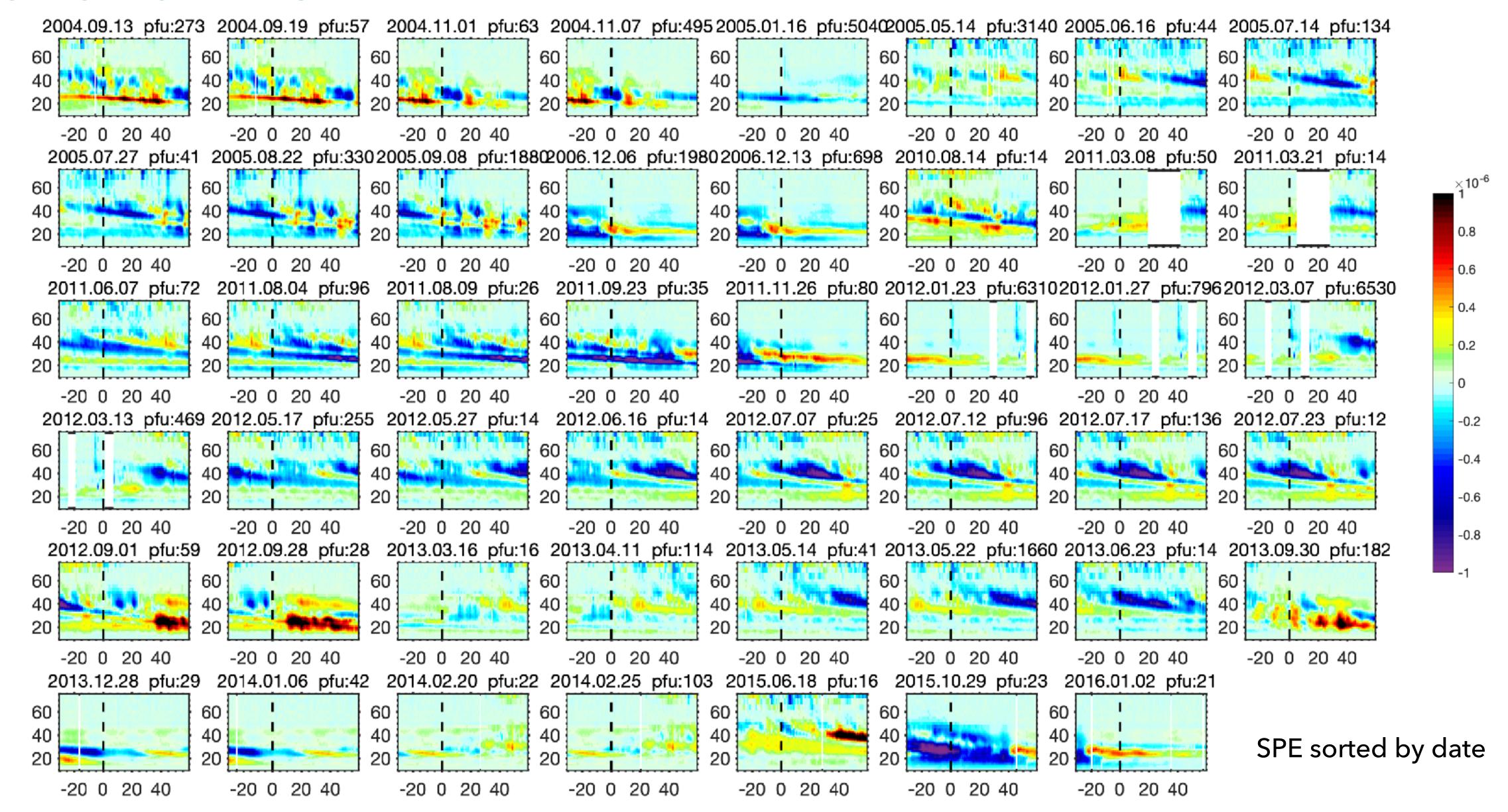
SPE NO. 47 13

7

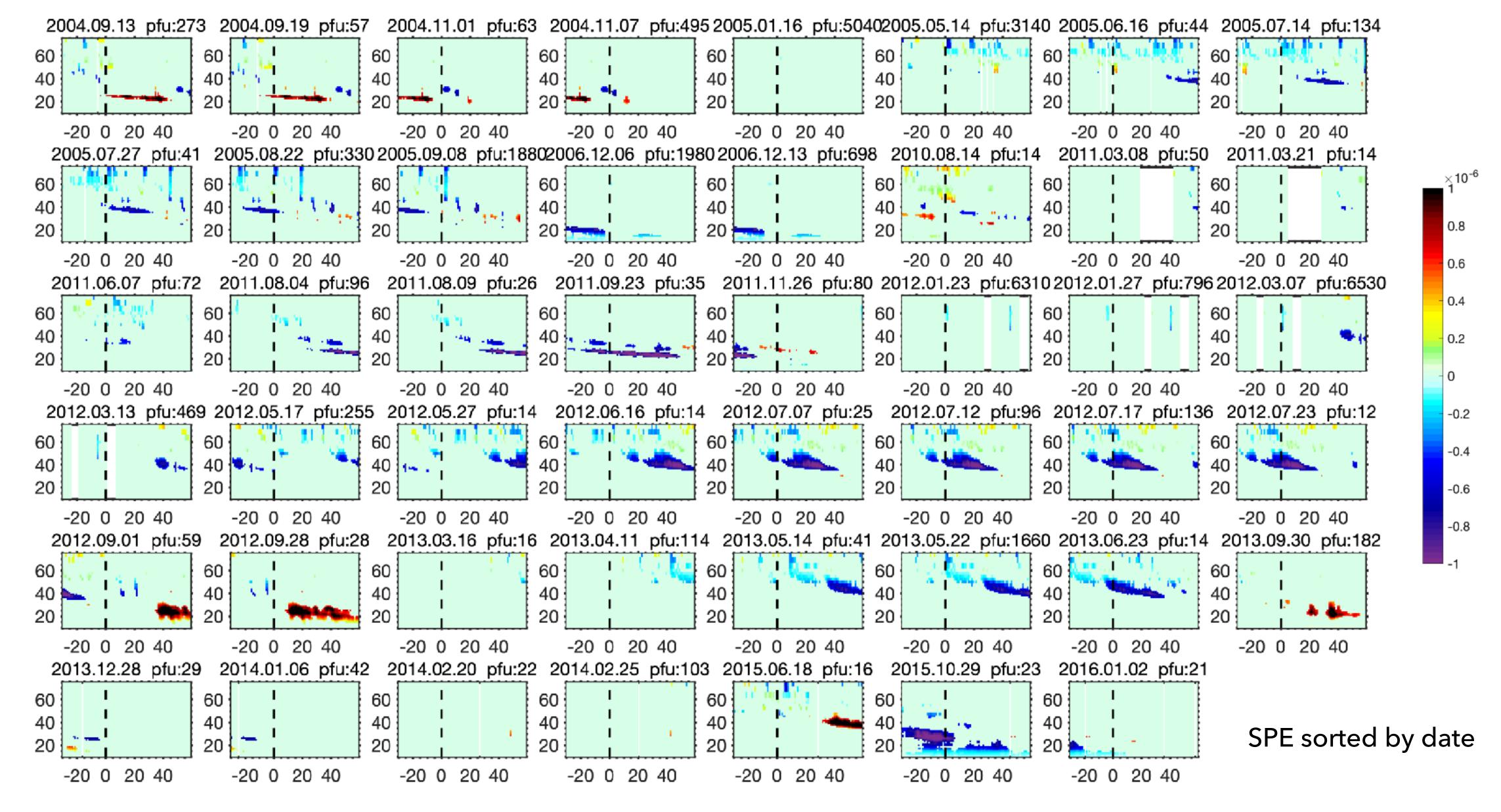
ł

7

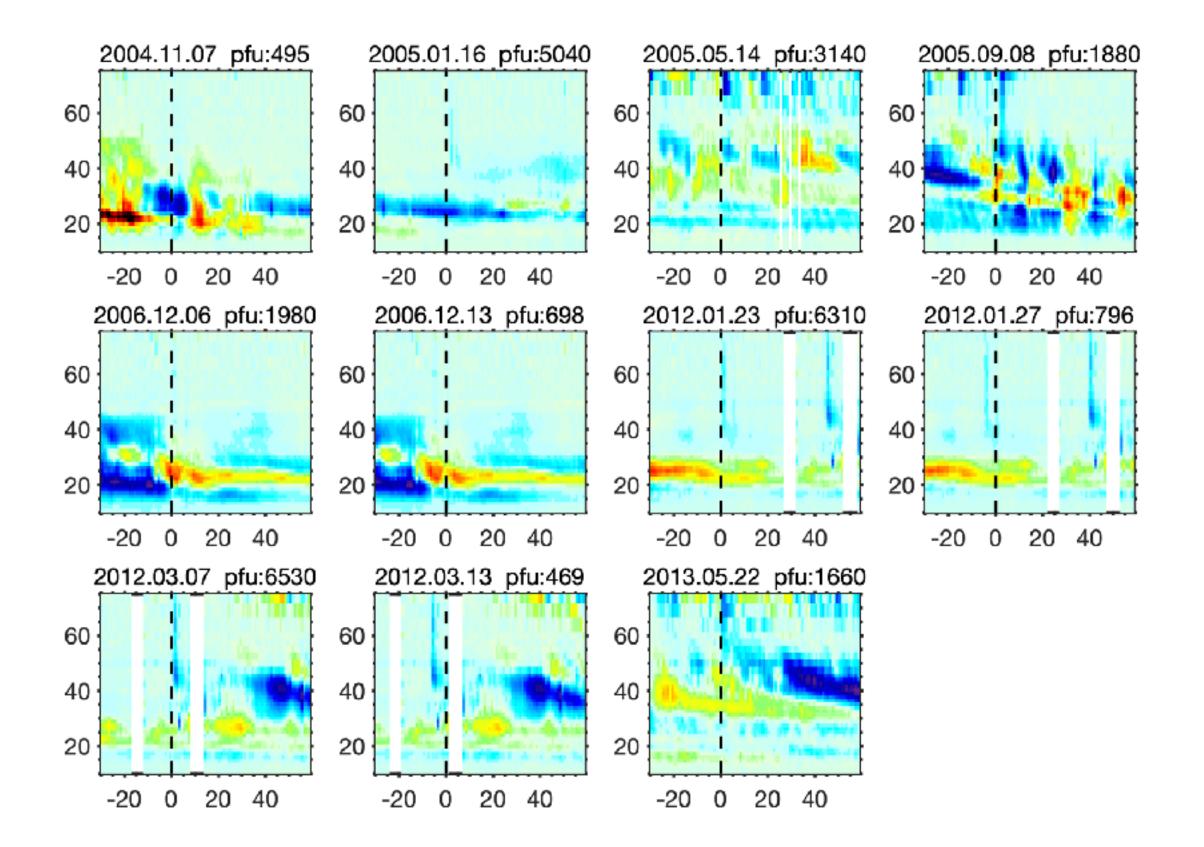
No restriction



Daily MLS O3 observation (VMR)-Daily climatology

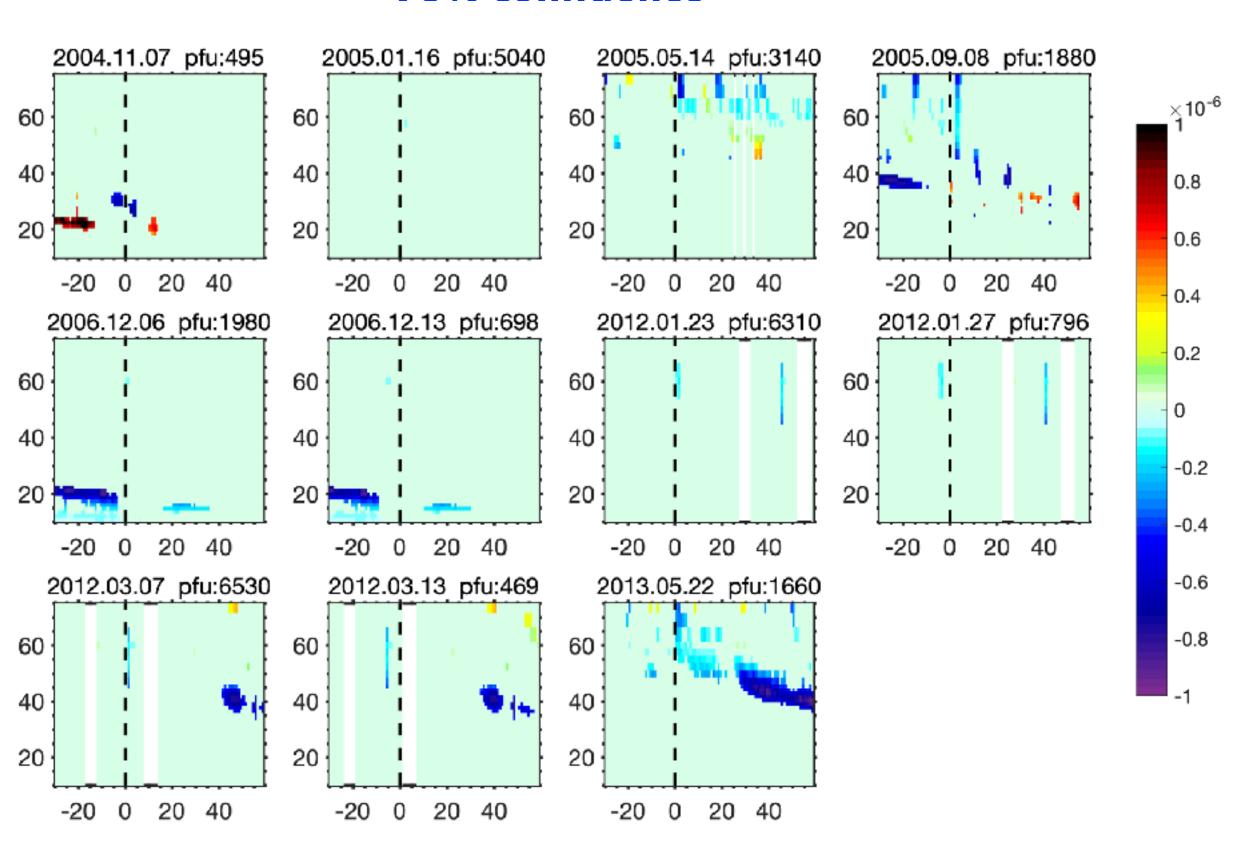


Superposed epoch



Superposed epoch

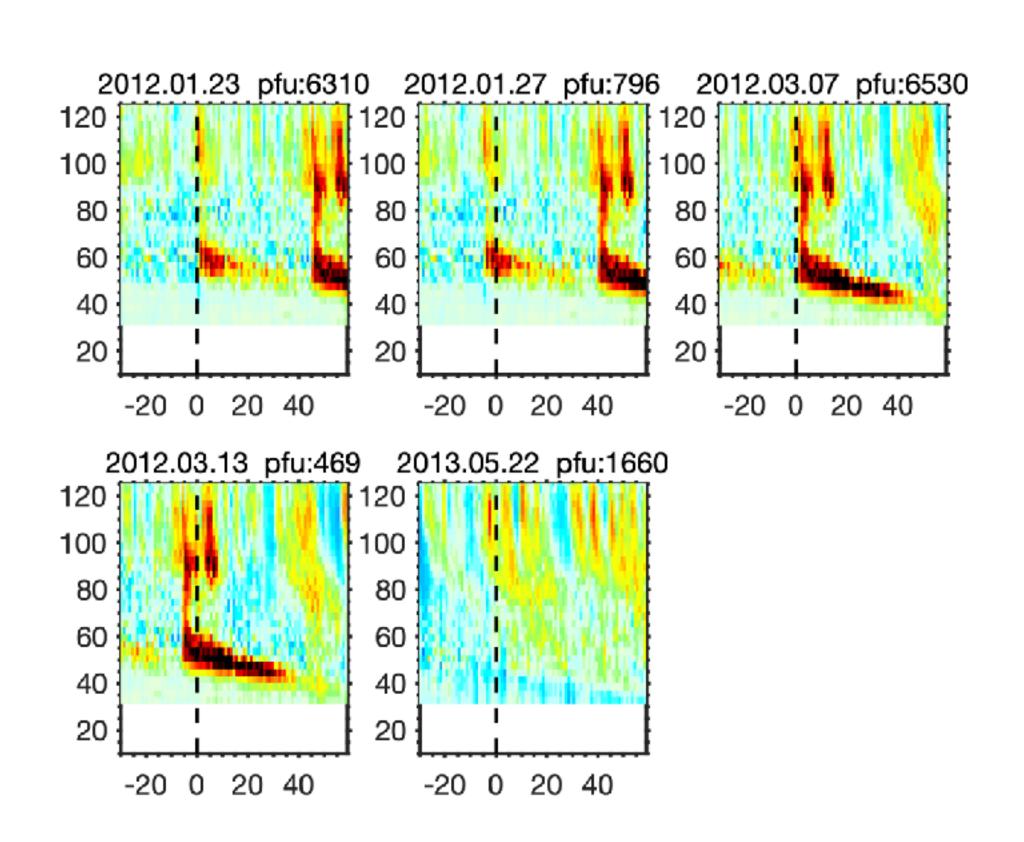
95% confidence



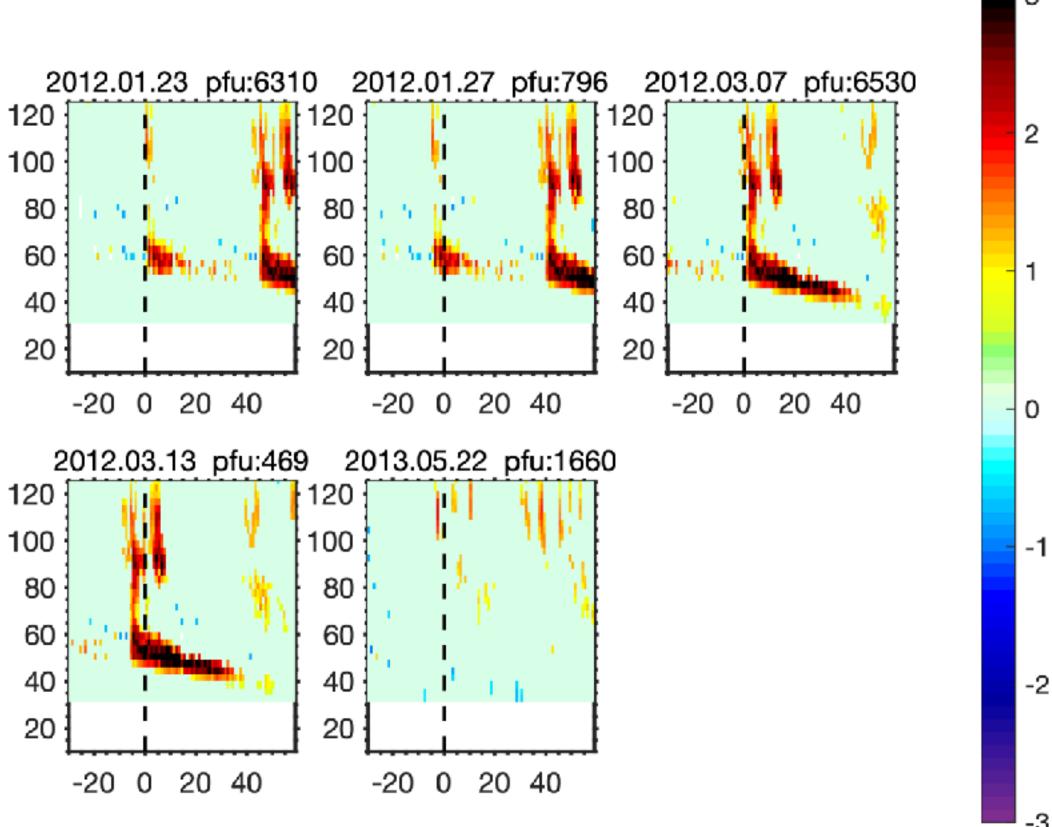
Events with pfu>400

SPE sorted by date

SOFIE NO data!

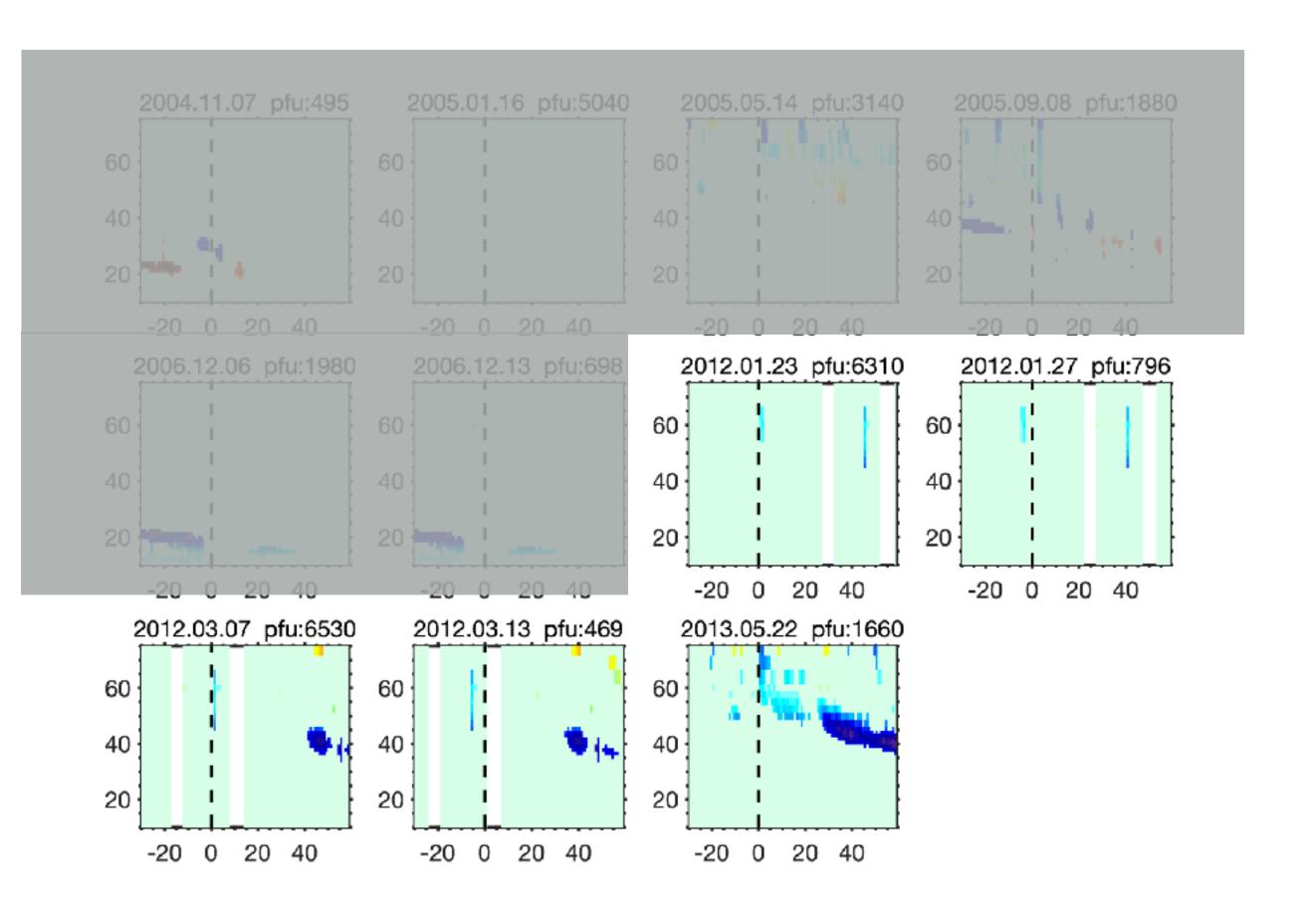


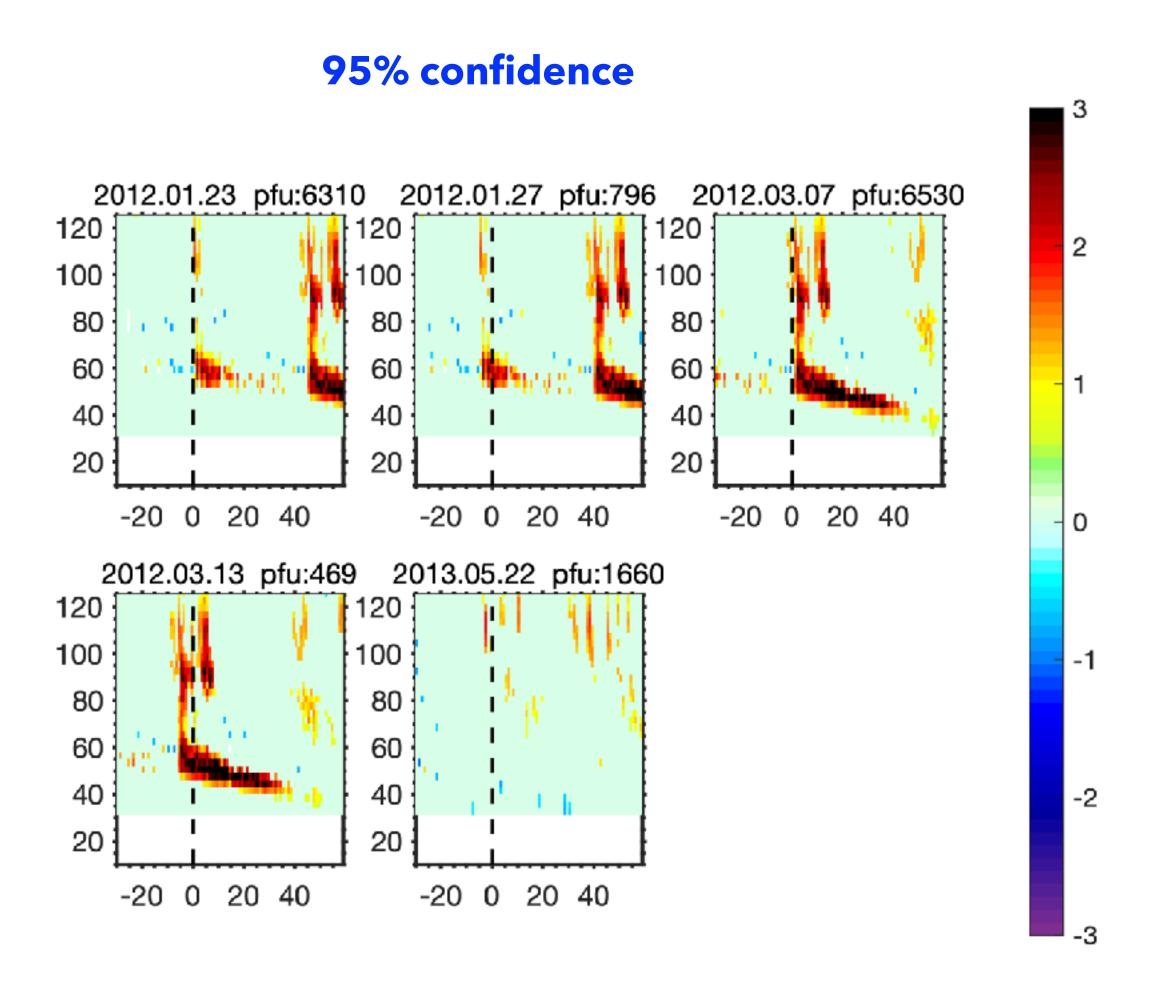
95% confidence



Events with pfu>400

SPE sorted by date



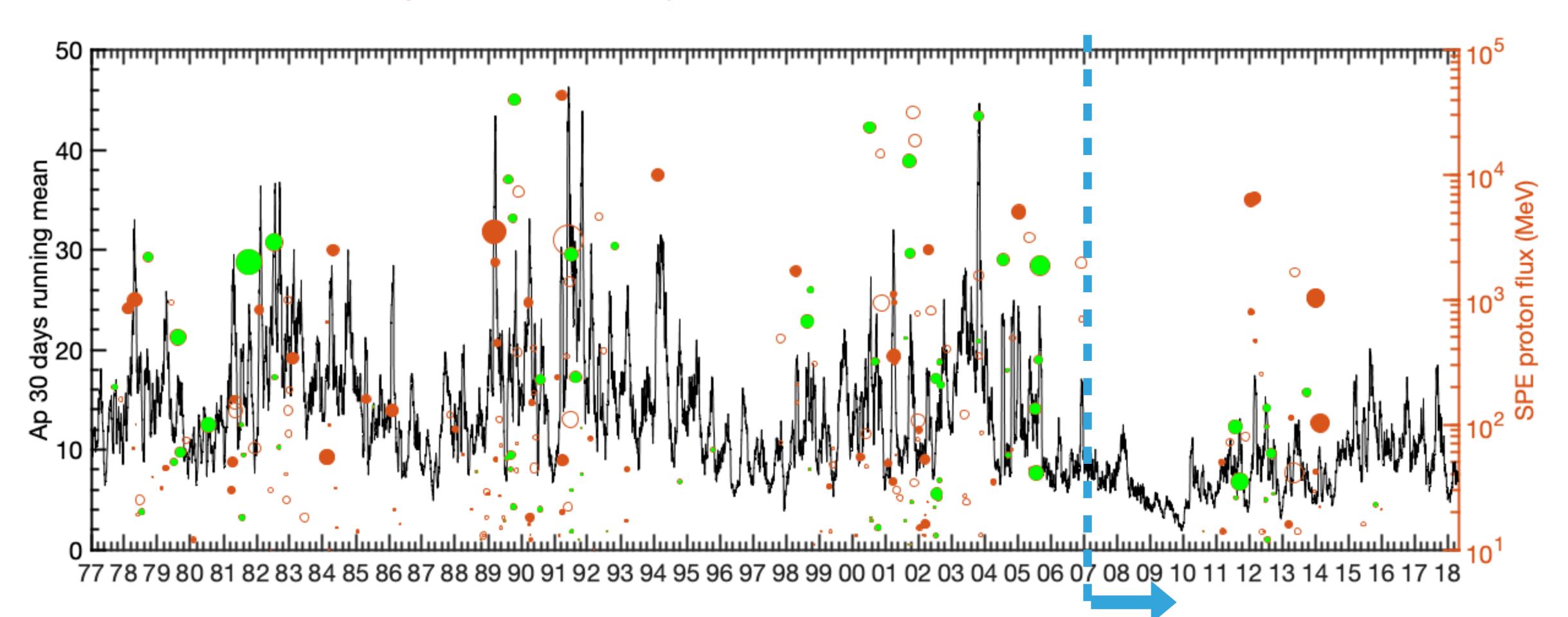


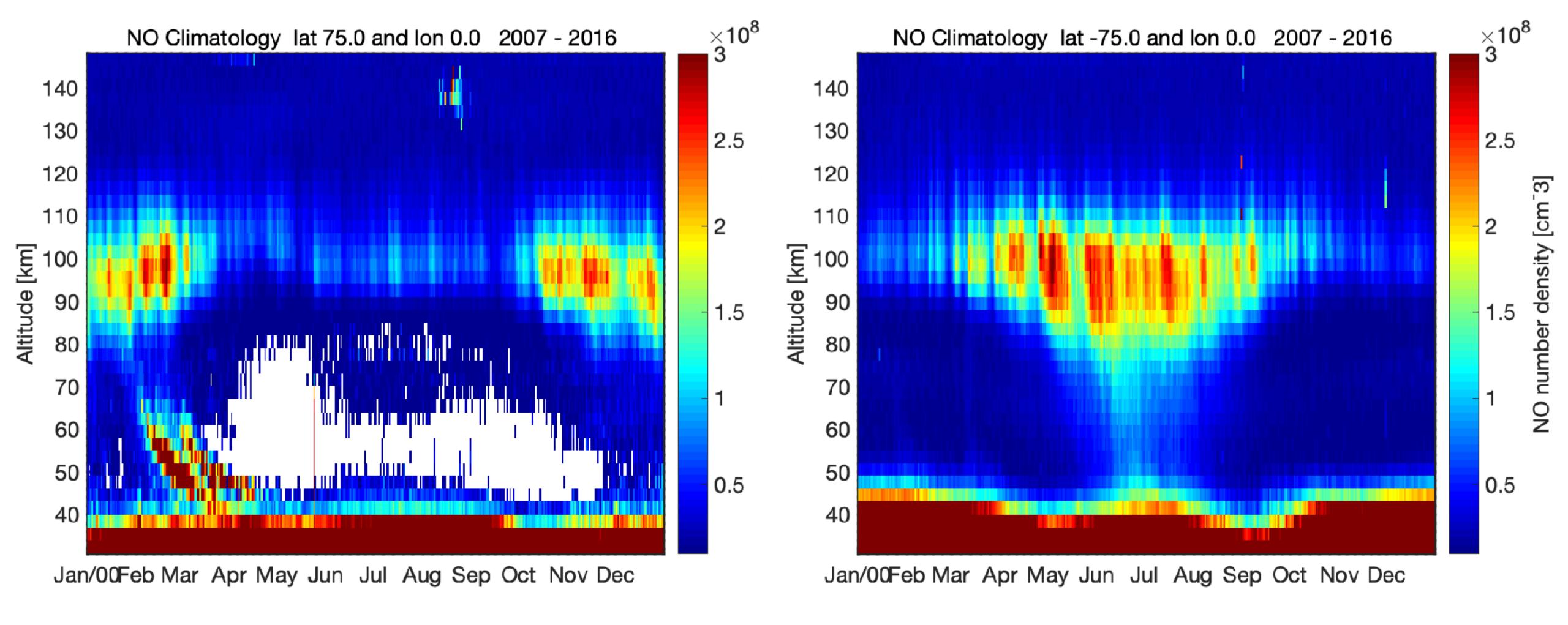
Events with pfu>400

SPE sorted by date

NUMBER OF SPE DURING SOFIE OPERATIONAL TIME

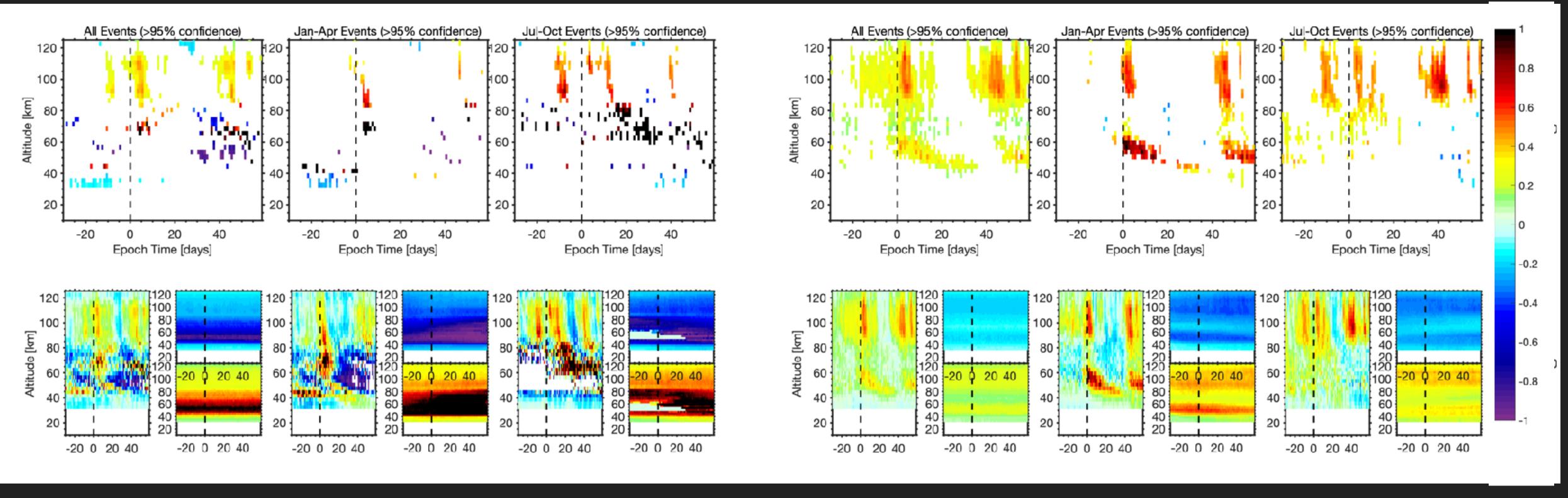
: Winter case : Summer case : Size: duration of SPEs





Arctic Polar Cap NO:

Antarctic Polar Cap NO:

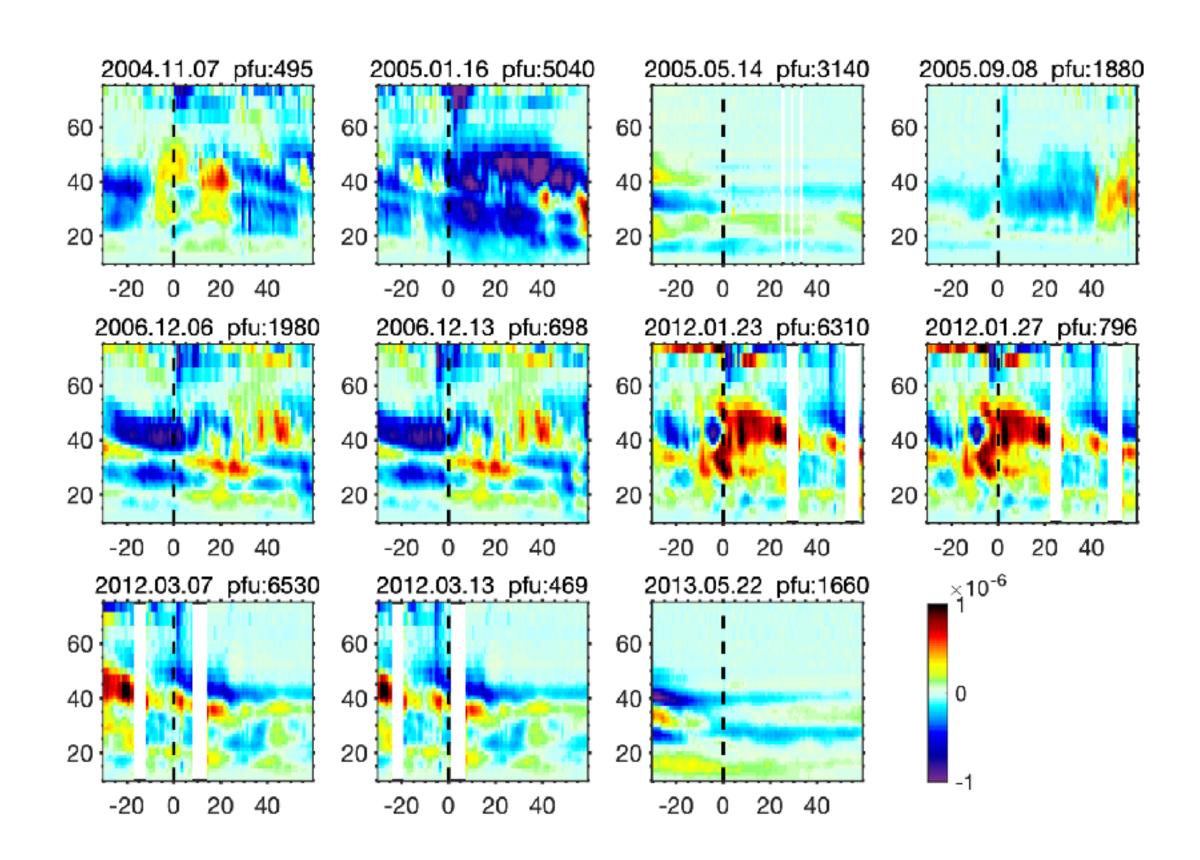


SPE NO. 34 12 12 12

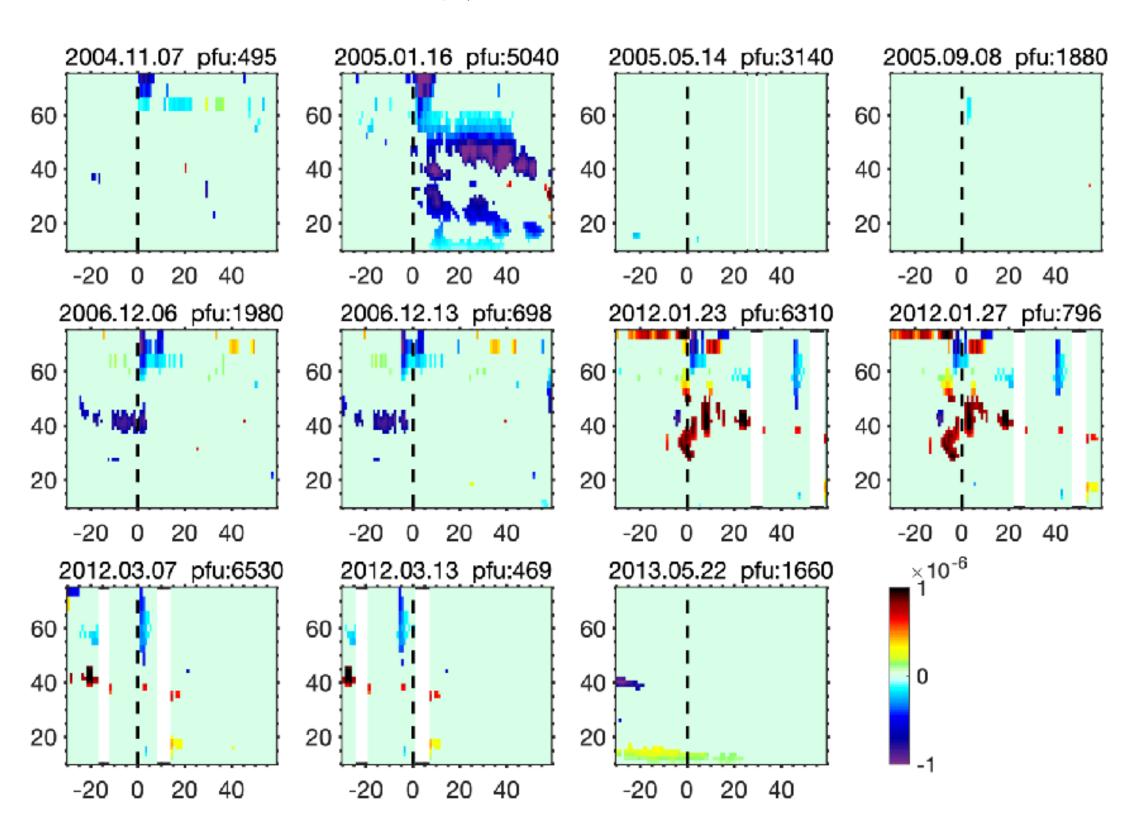
No restriction

No restriction

Thank you



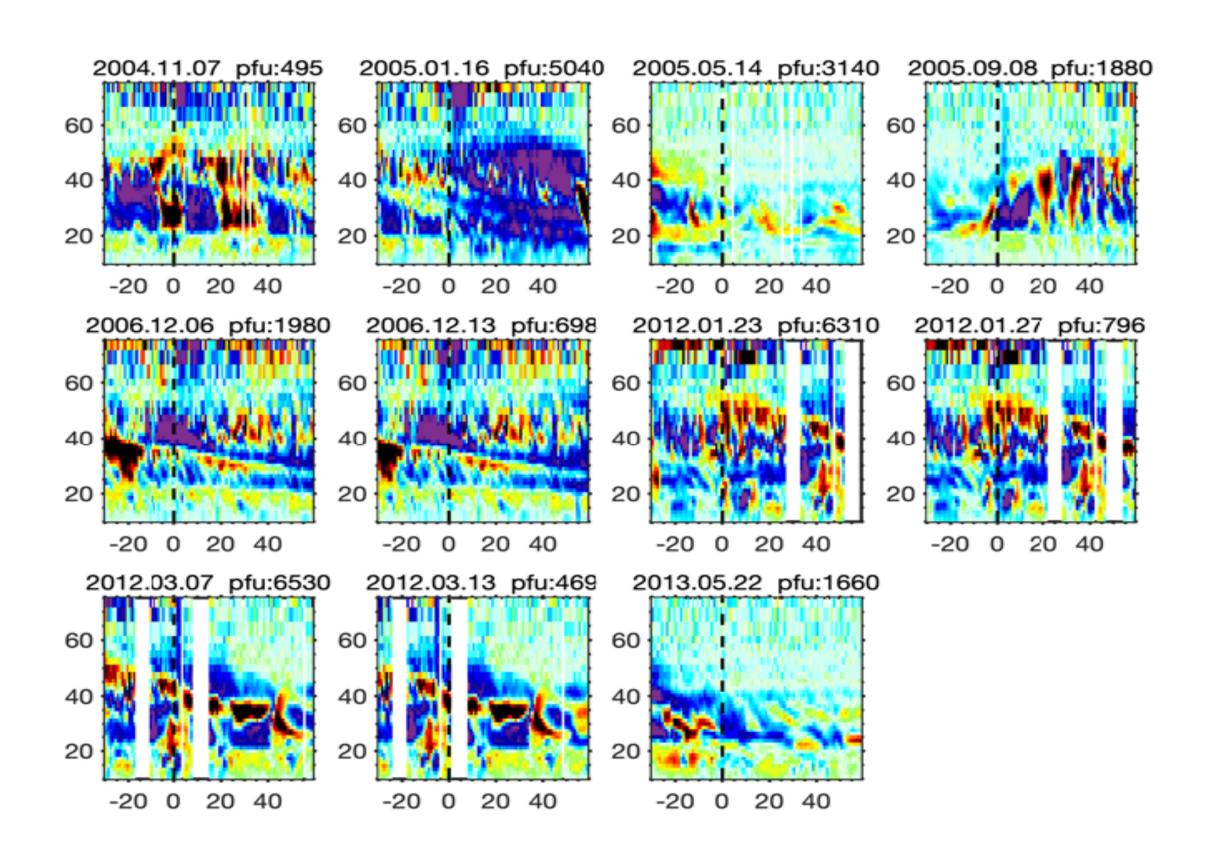
95% confidence



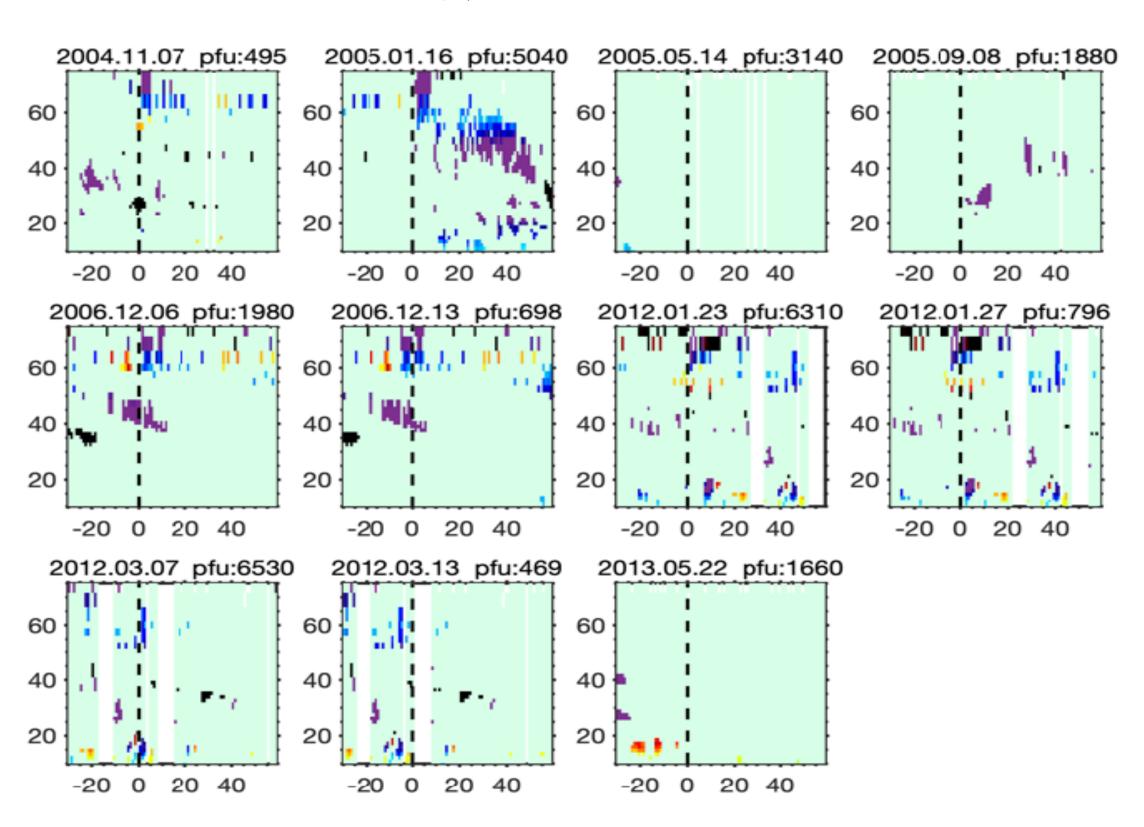
Events with pfu>400

SPE sorted by date

NY-ALESUND



95% confidence



Events with pfu>400

SPE sorted by date