

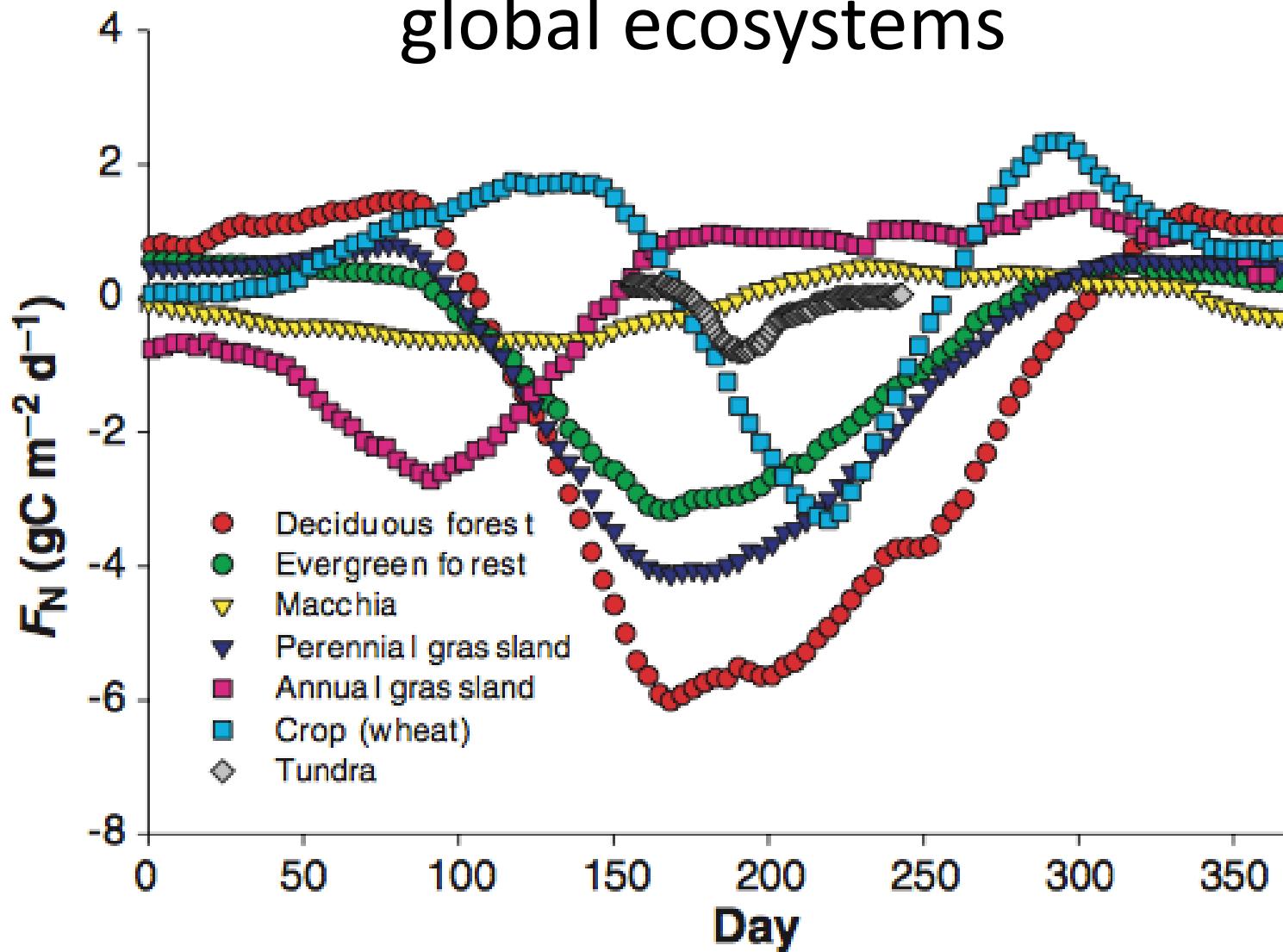
# Phenology of Carbon Exchange in an Australian Temperate Woodland

Elise Pendall

Thanks! To Peter Isaac, Victor Resco de Dios ,Craig Barton, Chelsea Maier, Matthias Boer, Alexis Renchon

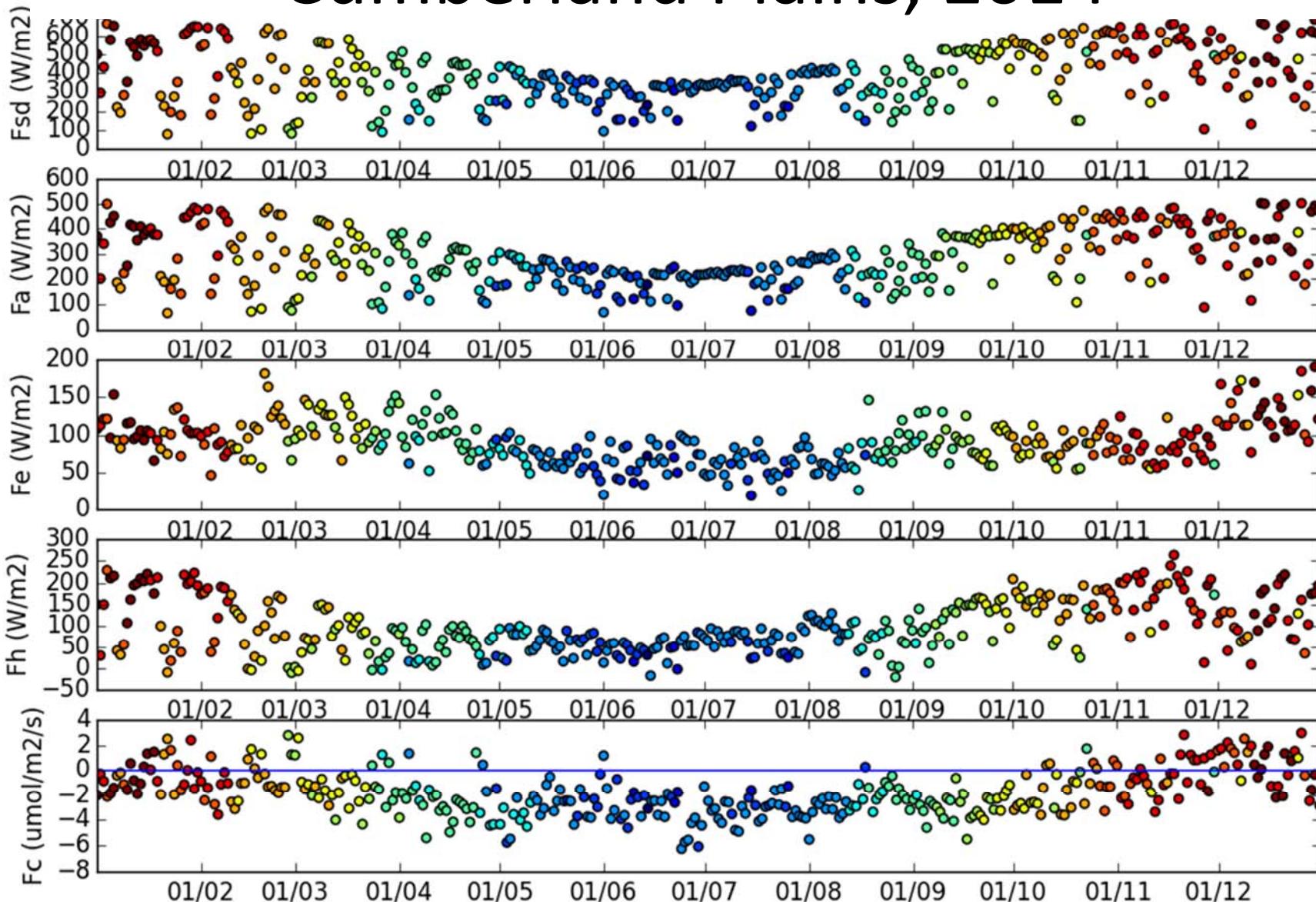


# Phenology of net C fluxes across global ecosystems



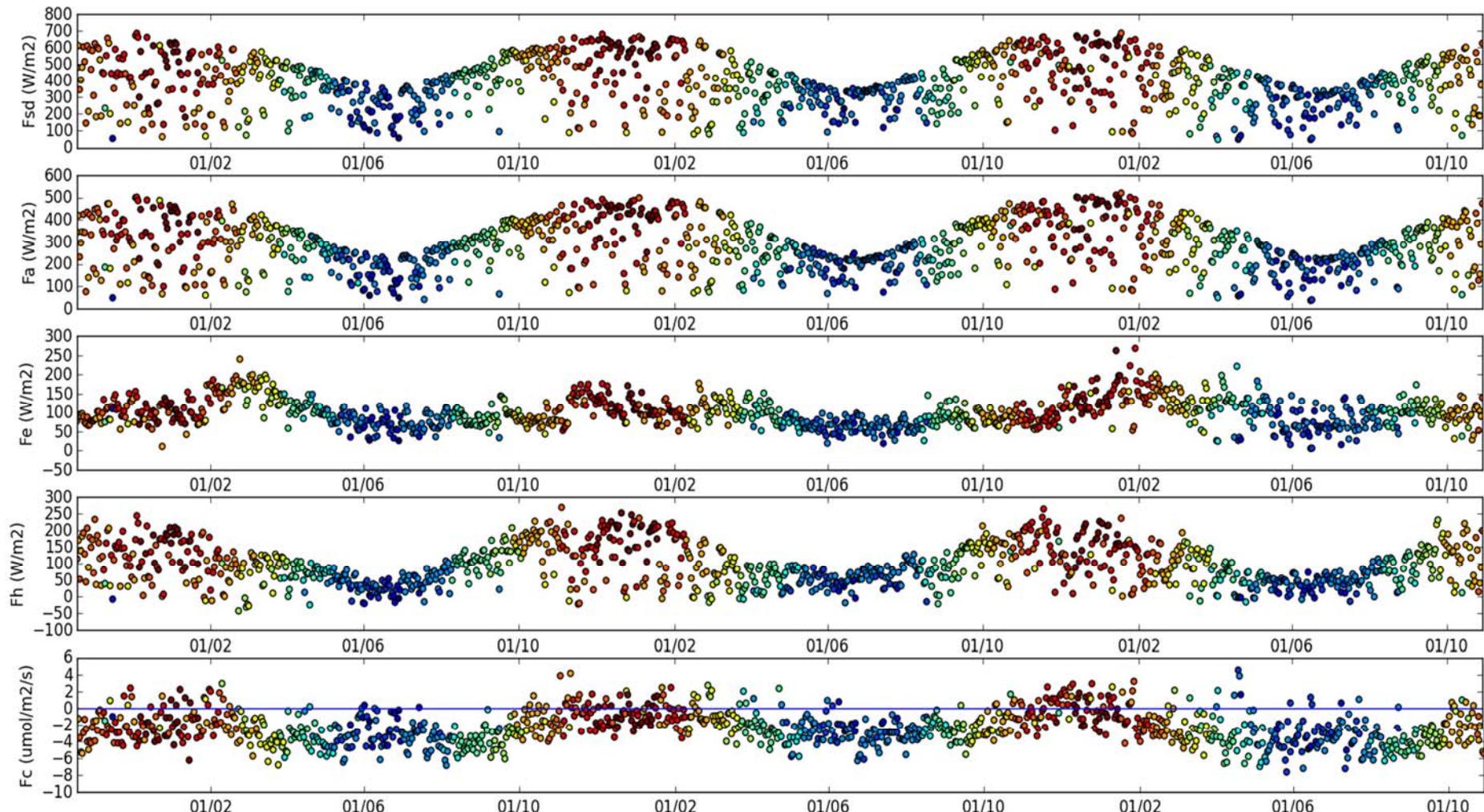
# Flux phenology

## Cumberland Plains, 2014

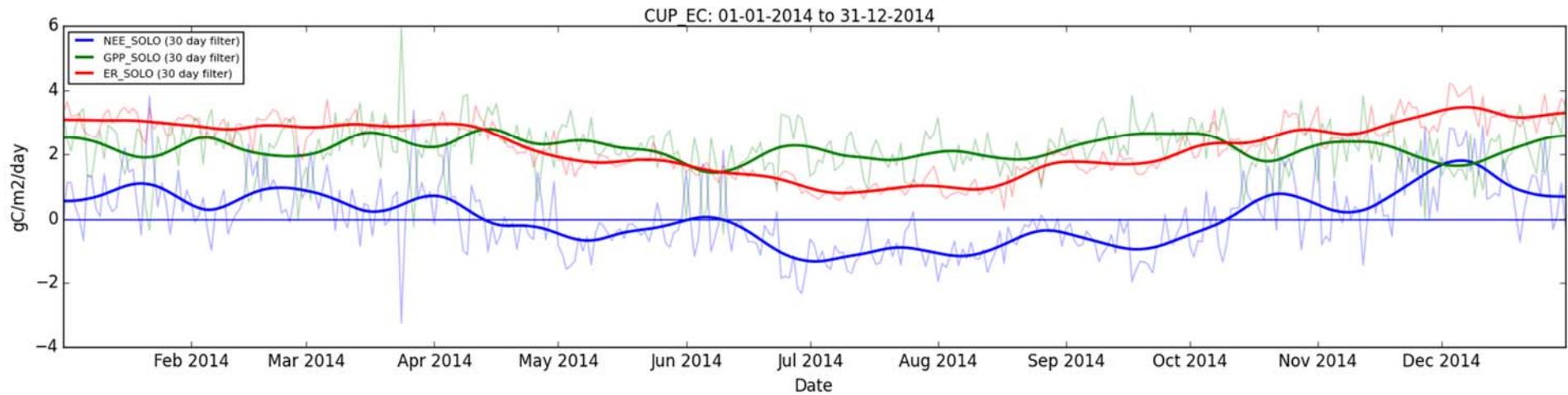


# Net winter uptake is not a fluke

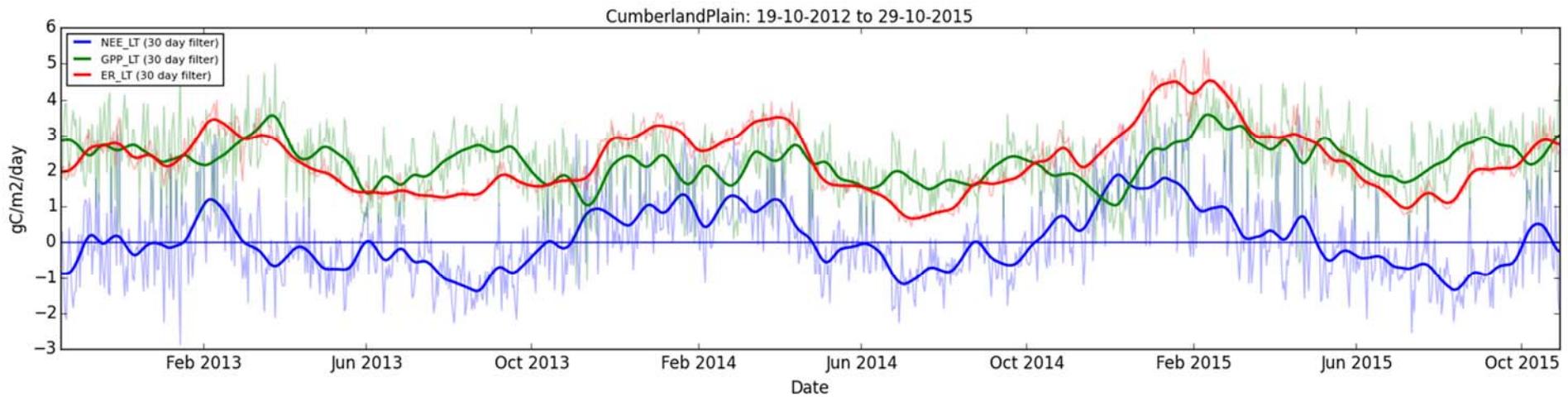
CumberlandPlain: 2012-10-19 00:30:00 to 2015-10-30 00:00:00



# Is net winter uptake driven more by GPP or ER?



# Seems like a consistent story for three years!



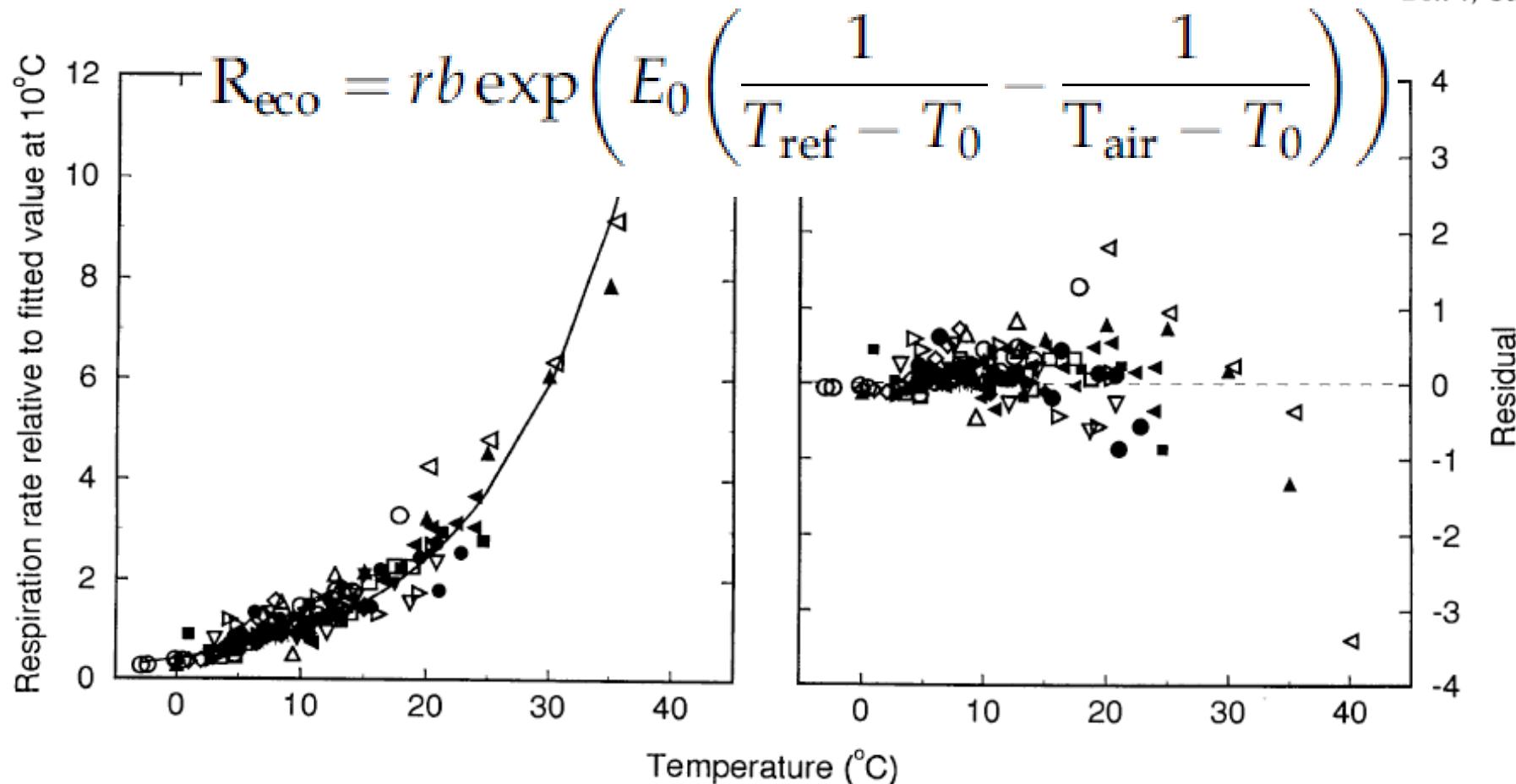
Does temperature sensitivity change seasonally, with soil moisture?  
Why is GPP so aseasonal?

# On the temperature dependence of soil respiration

J. LLOYD and J. A. TAYLOR\*

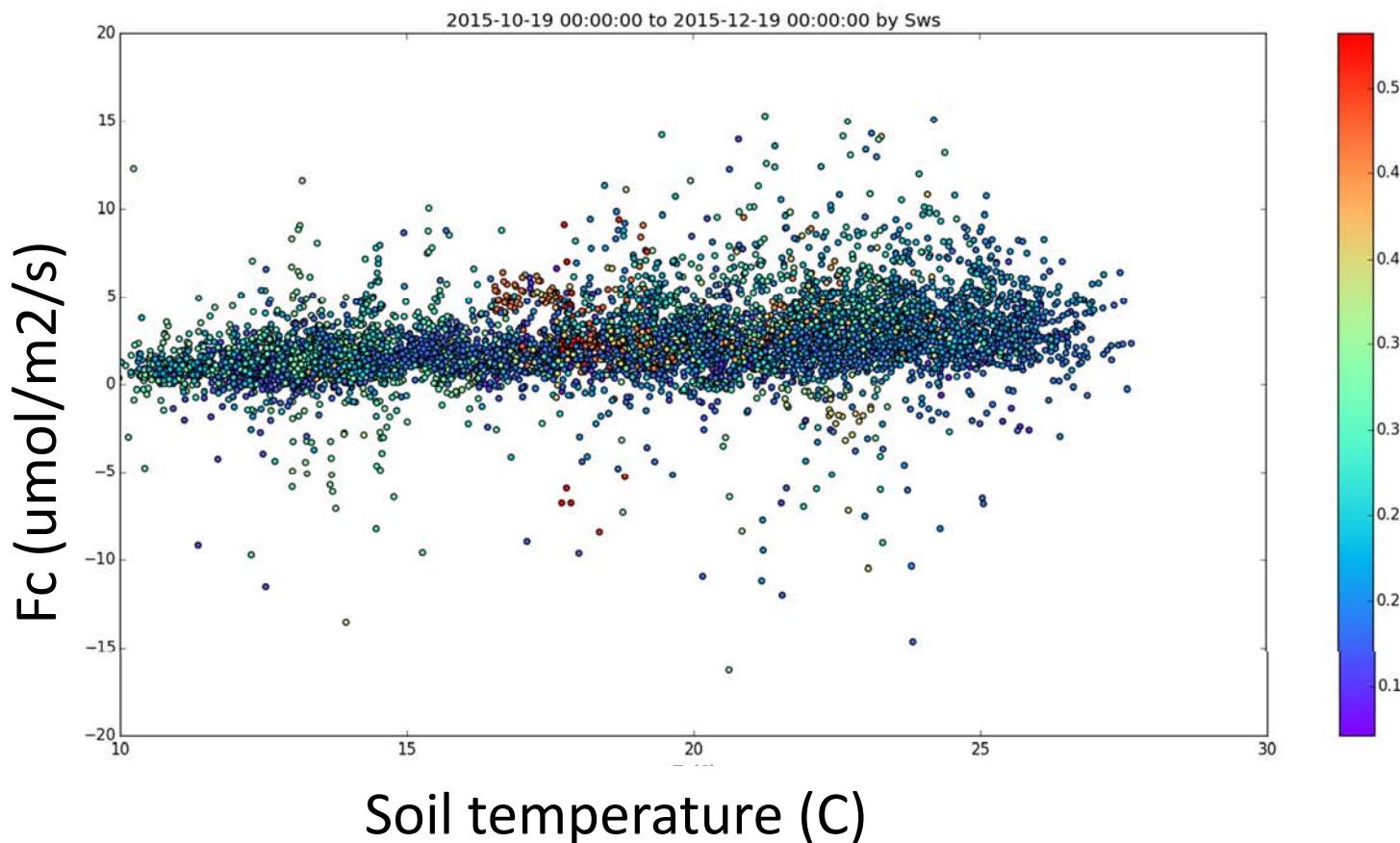
Environmental Biology Group, Research School of Biological Sciences, Institute of Advanced Studies,  
Australian National University, GPO Box 475, Canberra ACT 2601 and \*Centre for Resource and

Environmental Sciences, Research School of Biological Sciences, Institute of Advanced Studies, GPO Box 4, Canberra



How good is the fit? What do the residuals tell us? Is this applicable to ecosystem respiration?

# Does temperature sensitivity vary with soil moisture?



# Separation of net ecosystem exchange into assimilation and respiration using a light response curve approach: critical issues and global evaluation

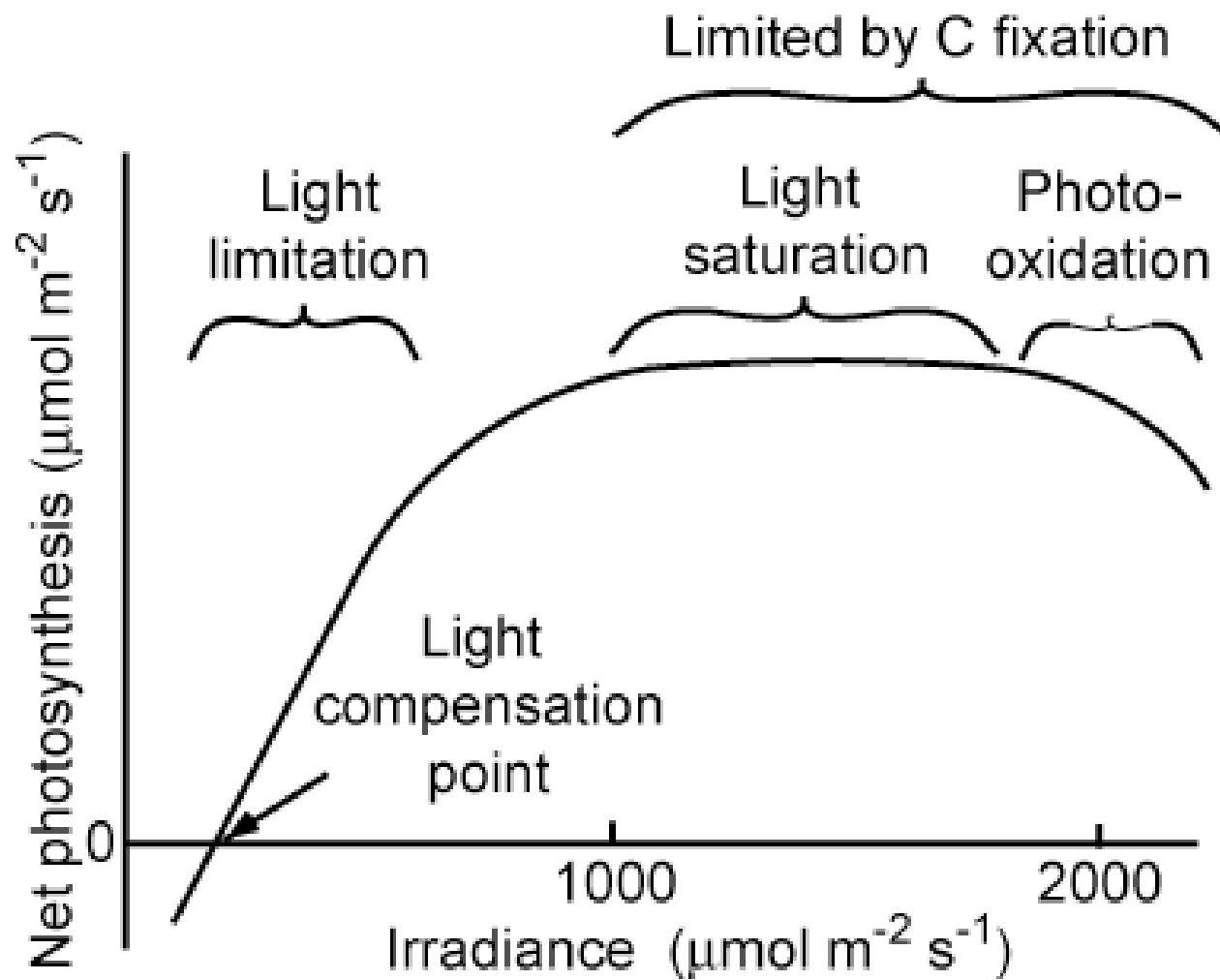
GITTA LASSLOP\*, MARKUS REICHSTEIN\*, DARIO PAPALE†, ANDREW D. RICHARDSON‡, ALMUT ARNETH§, ALAN BARR¶, PAUL STOY|| and GEORG WOHLFAHRT\*\*

$$\text{NEE} = \frac{\alpha\beta R_g}{\alpha R_g + \beta}$$

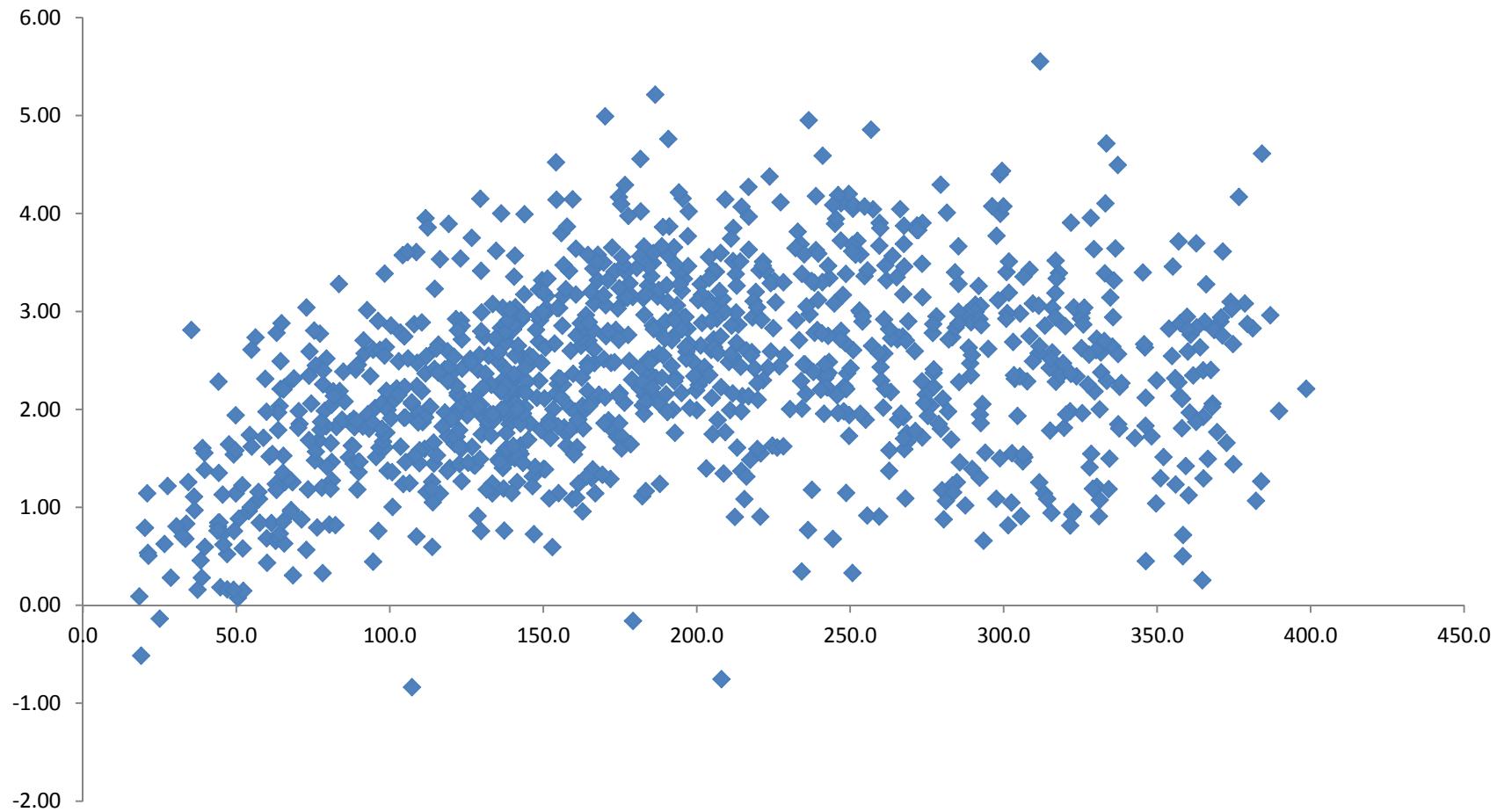
$\alpha$  = slope of light response function  
 $\beta$  = uptake at light saturation  
 $R_g$  = global radiation

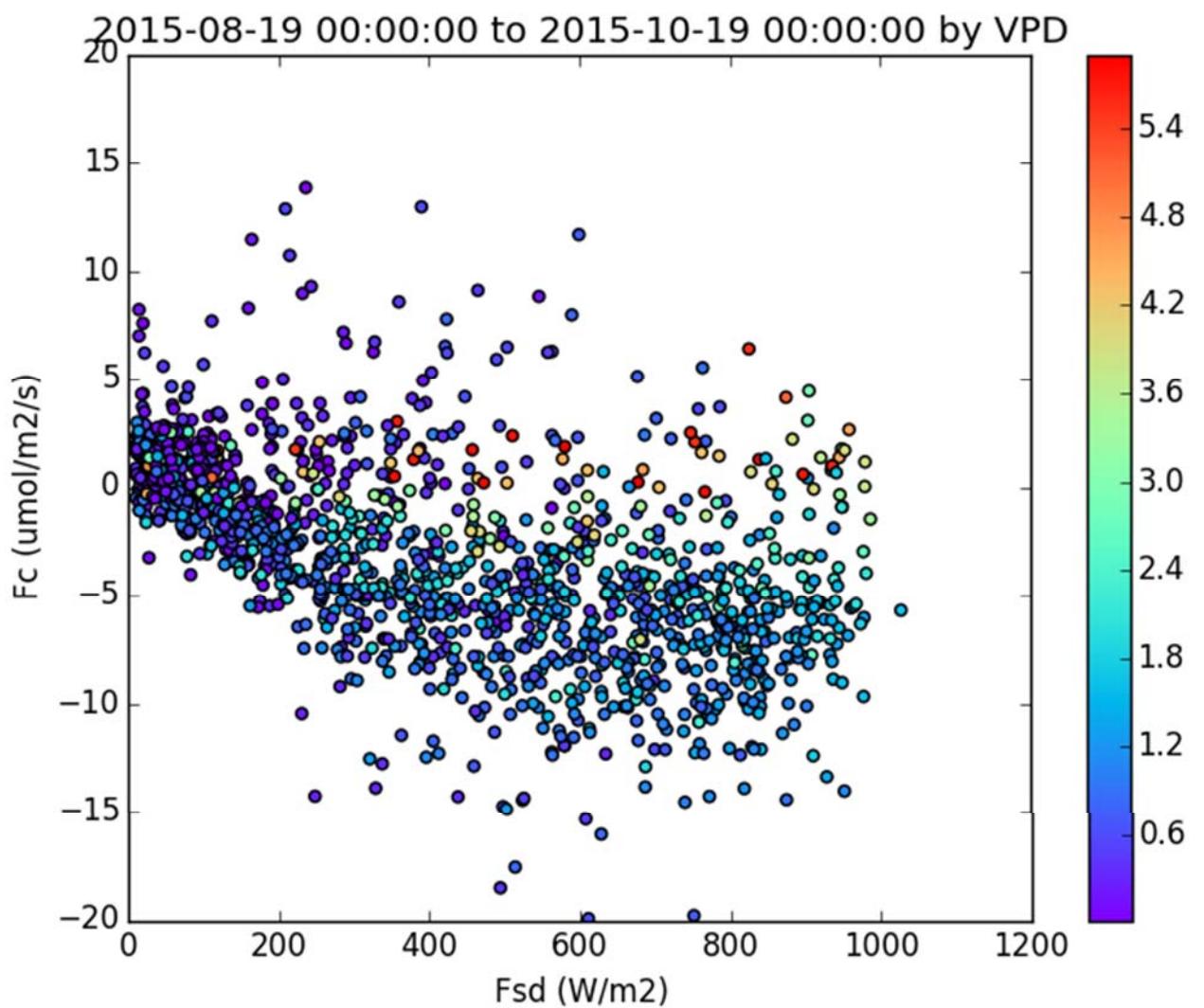
$$+ rb \exp \left( E_0 \left( \frac{1}{T_{\text{ref}} - T_0} - \frac{1}{T_{\text{air}} - T_0} \right) \right).$$

# Does light use efficiency vary over seasons?

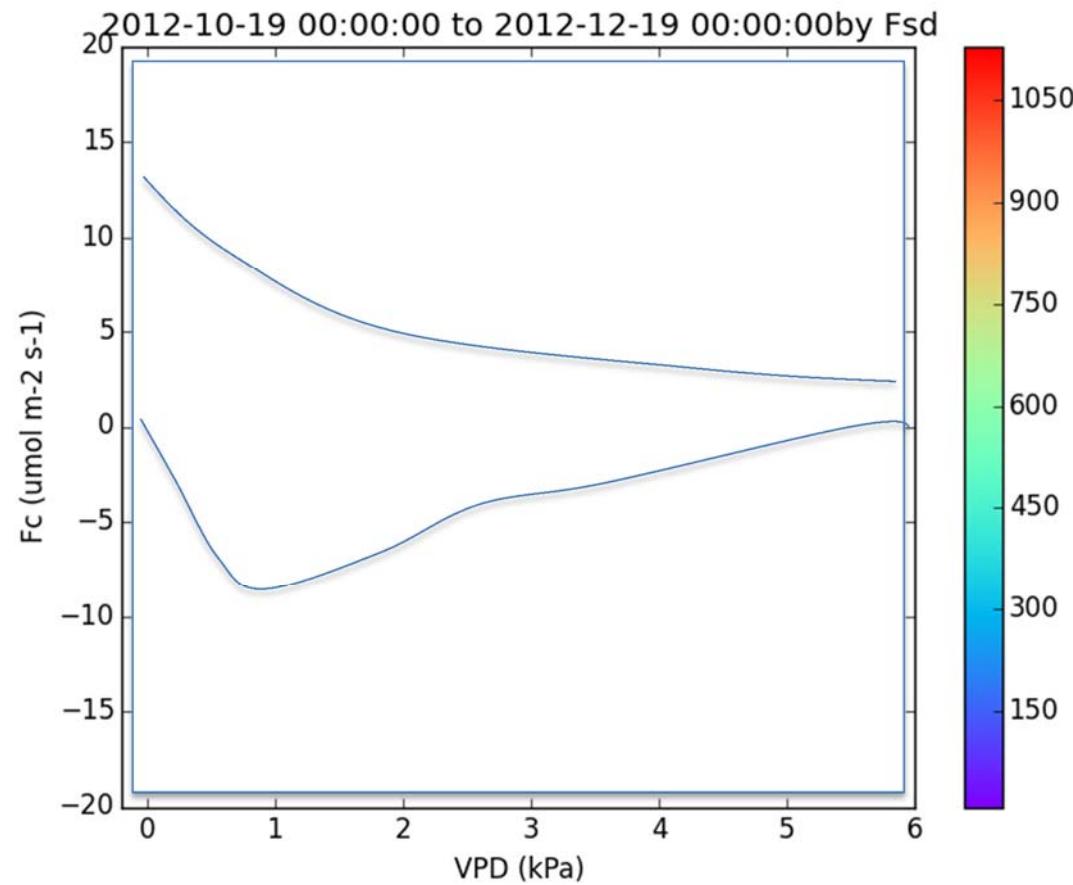


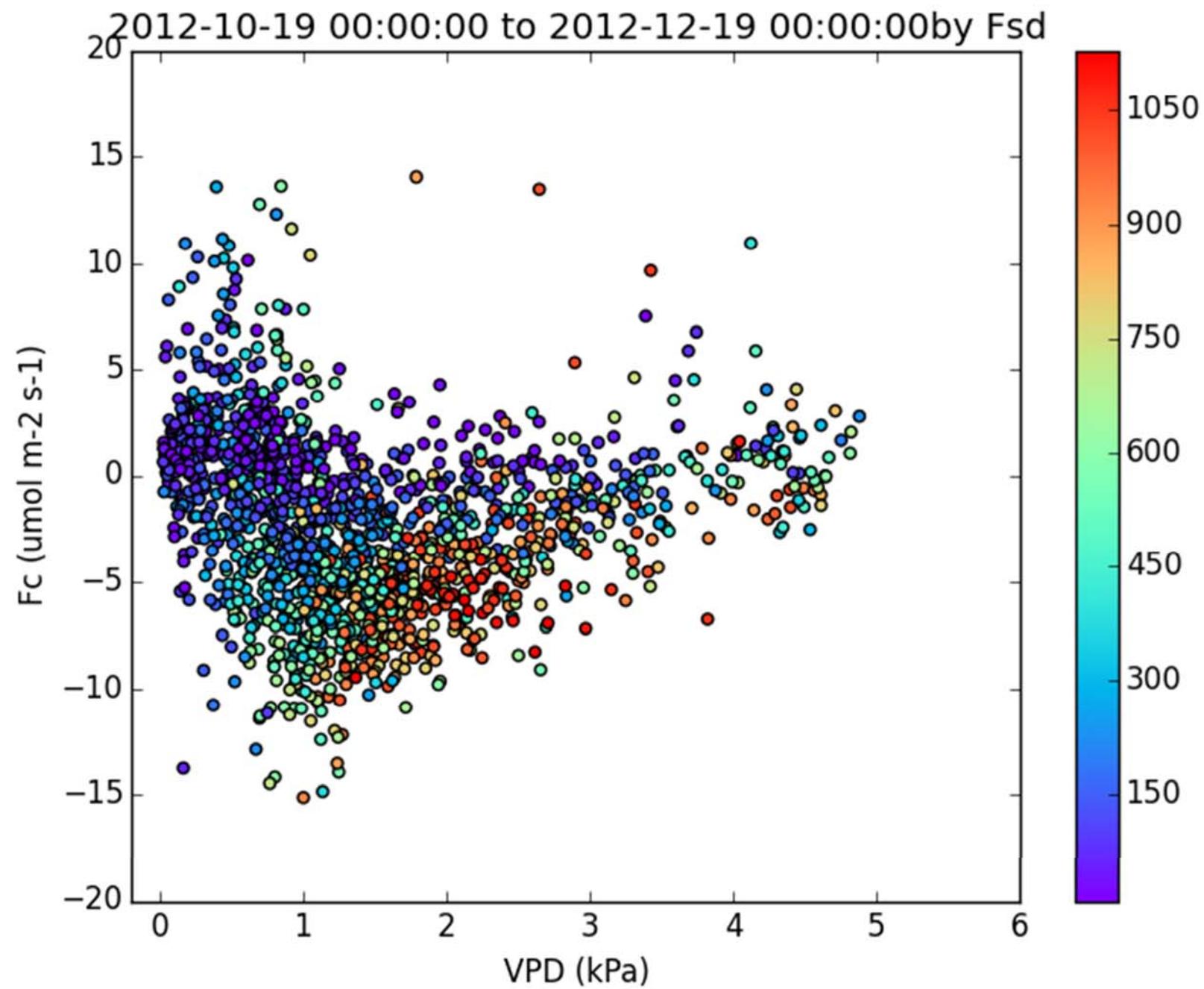
# Daily GPP vs. Fsd

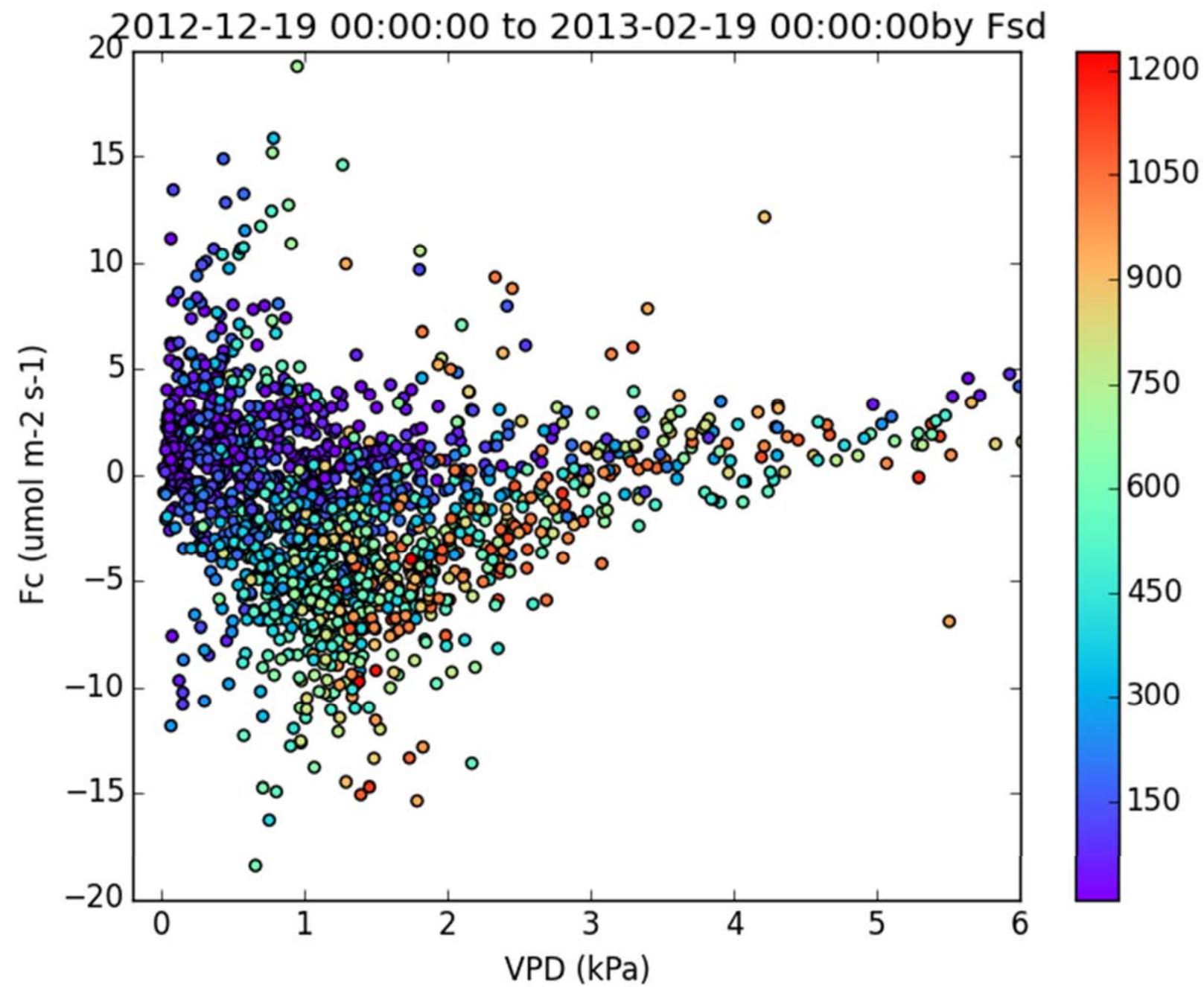


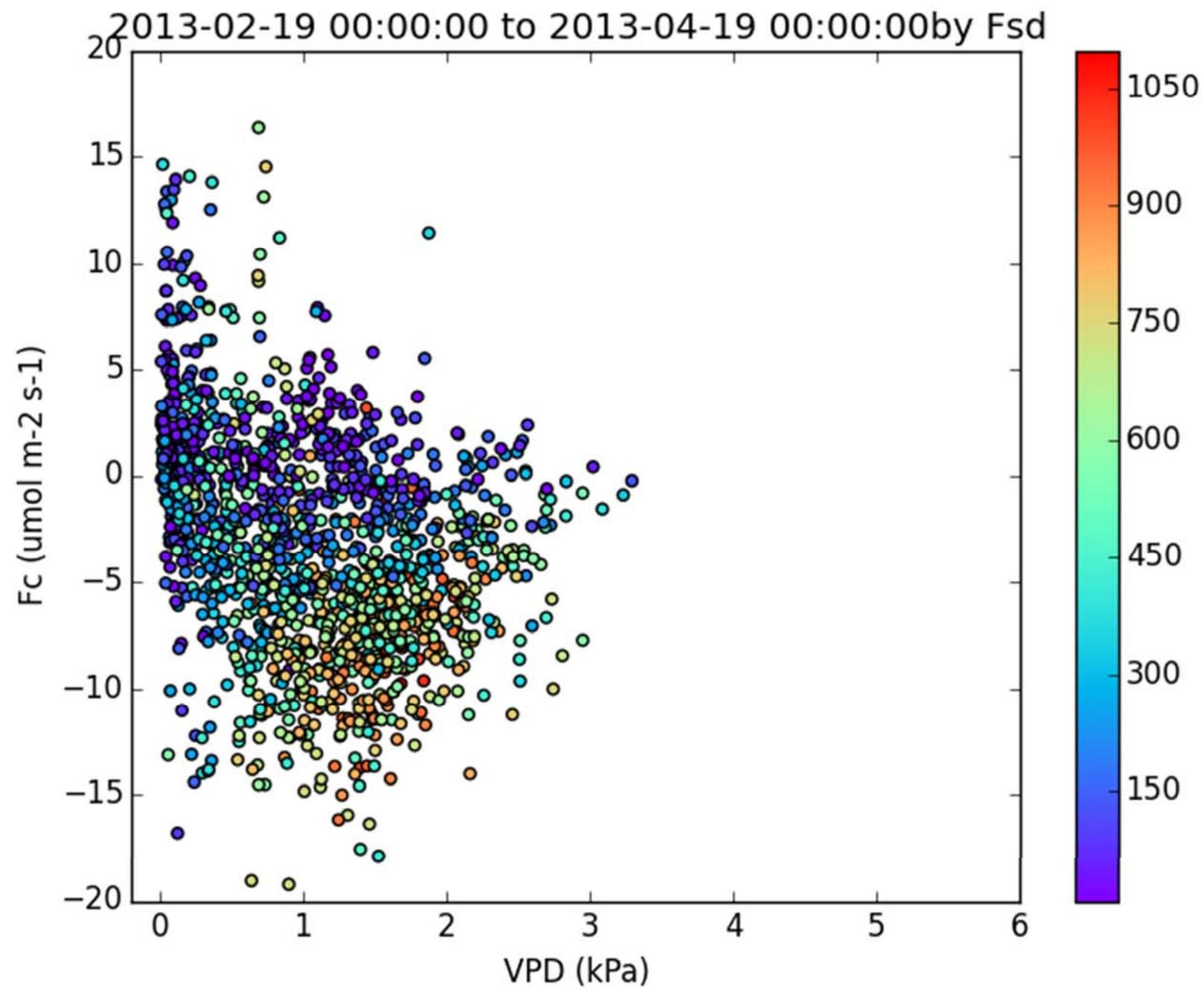


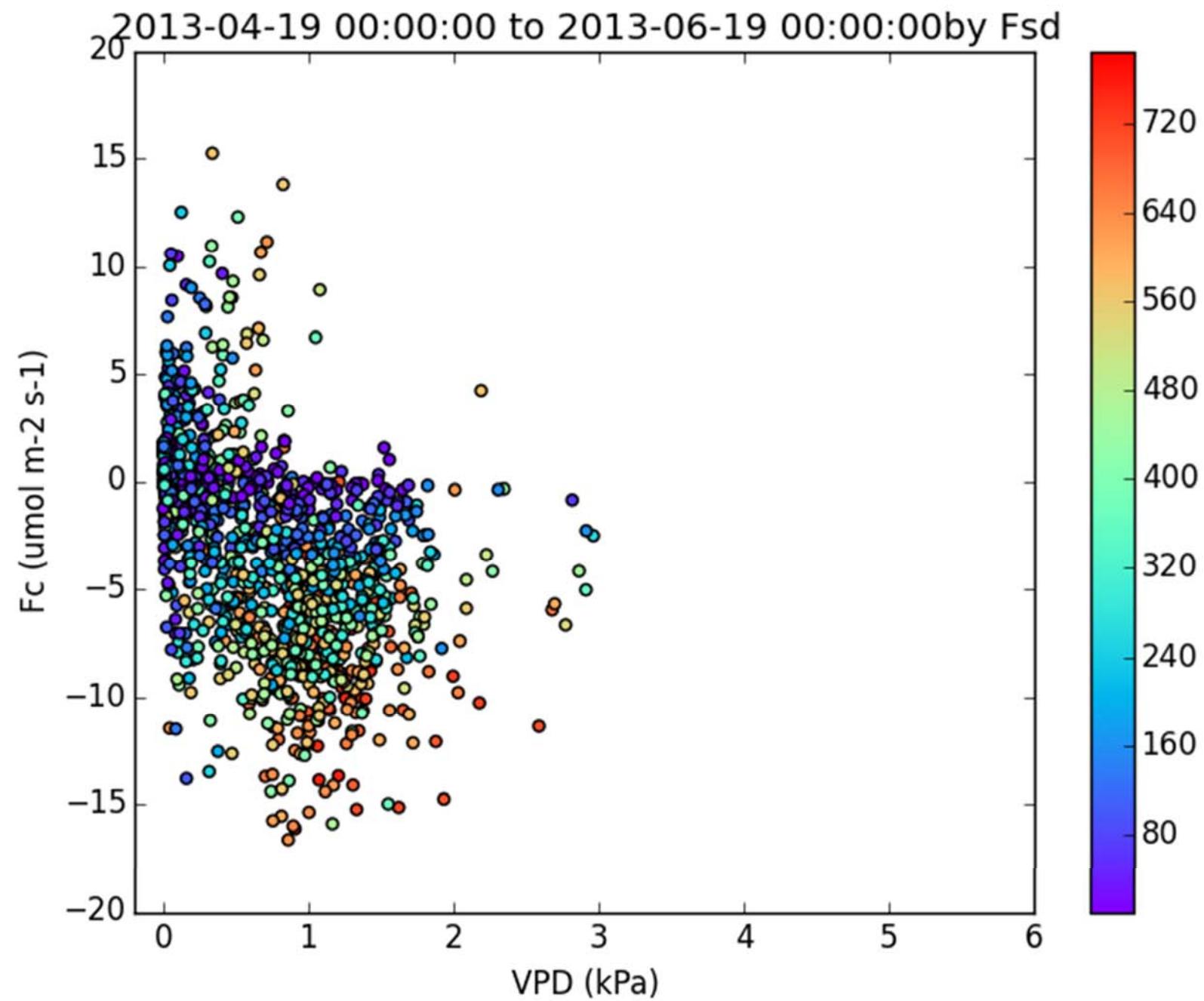
# Does Fc vary as a function of VPD?

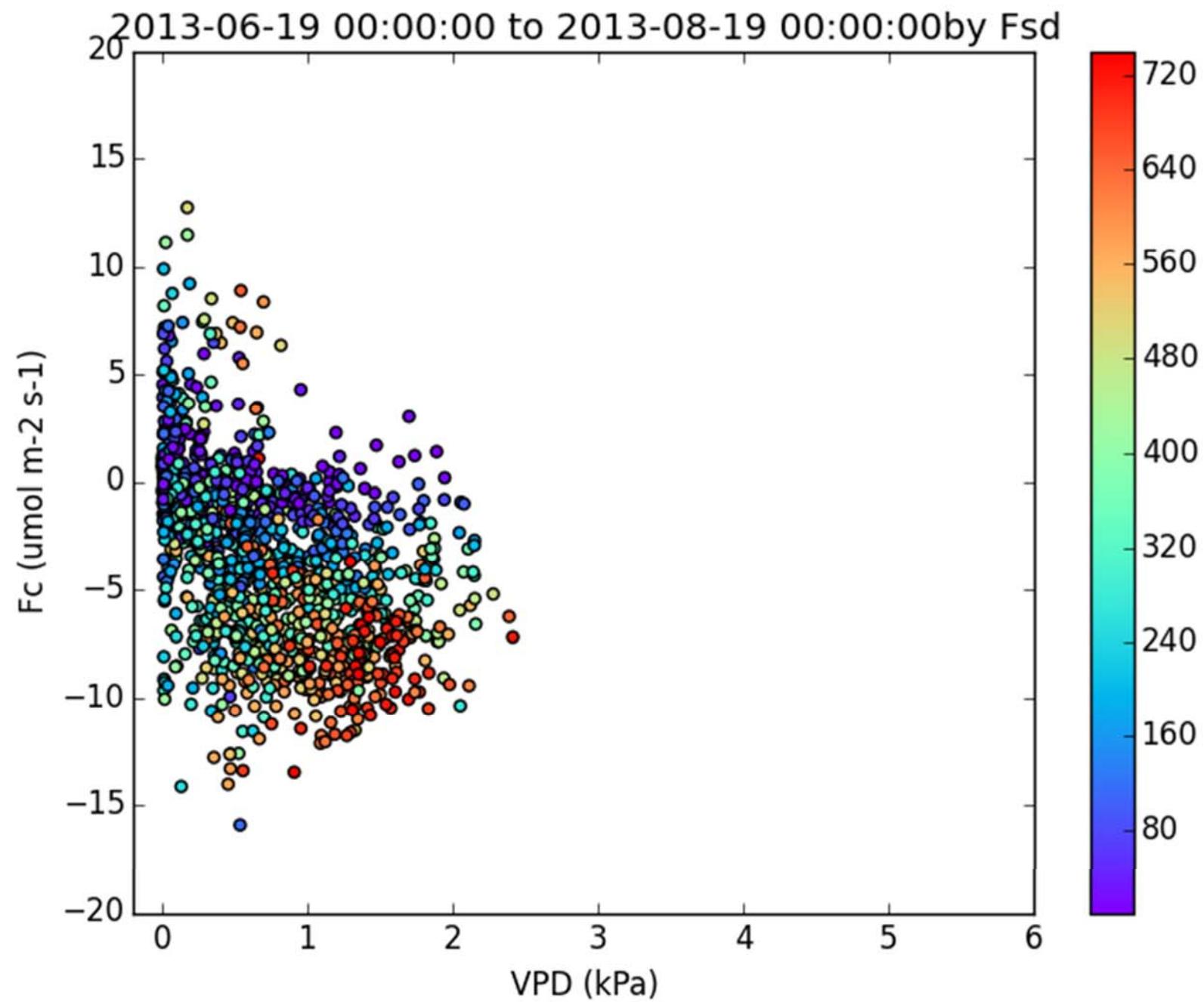


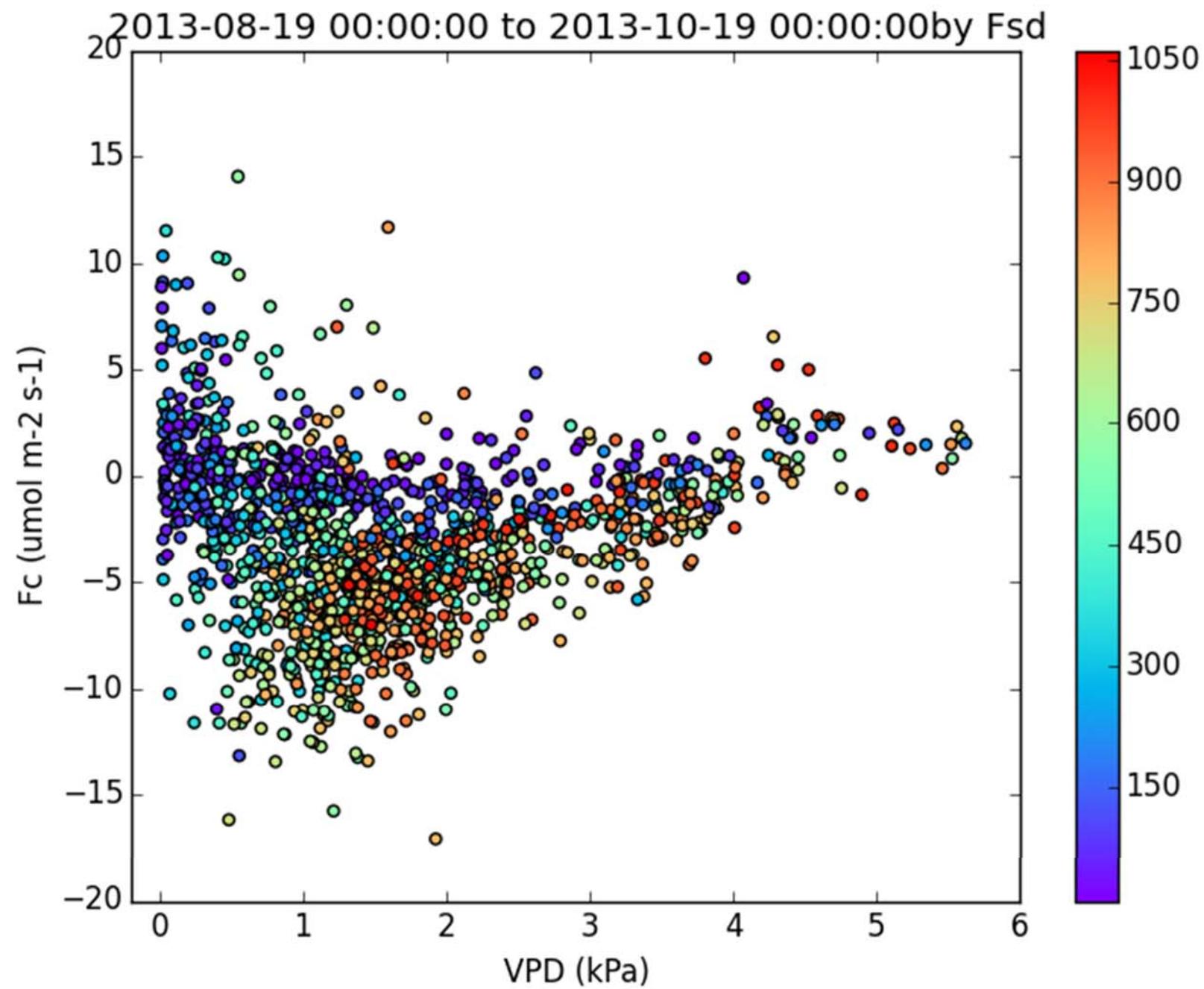


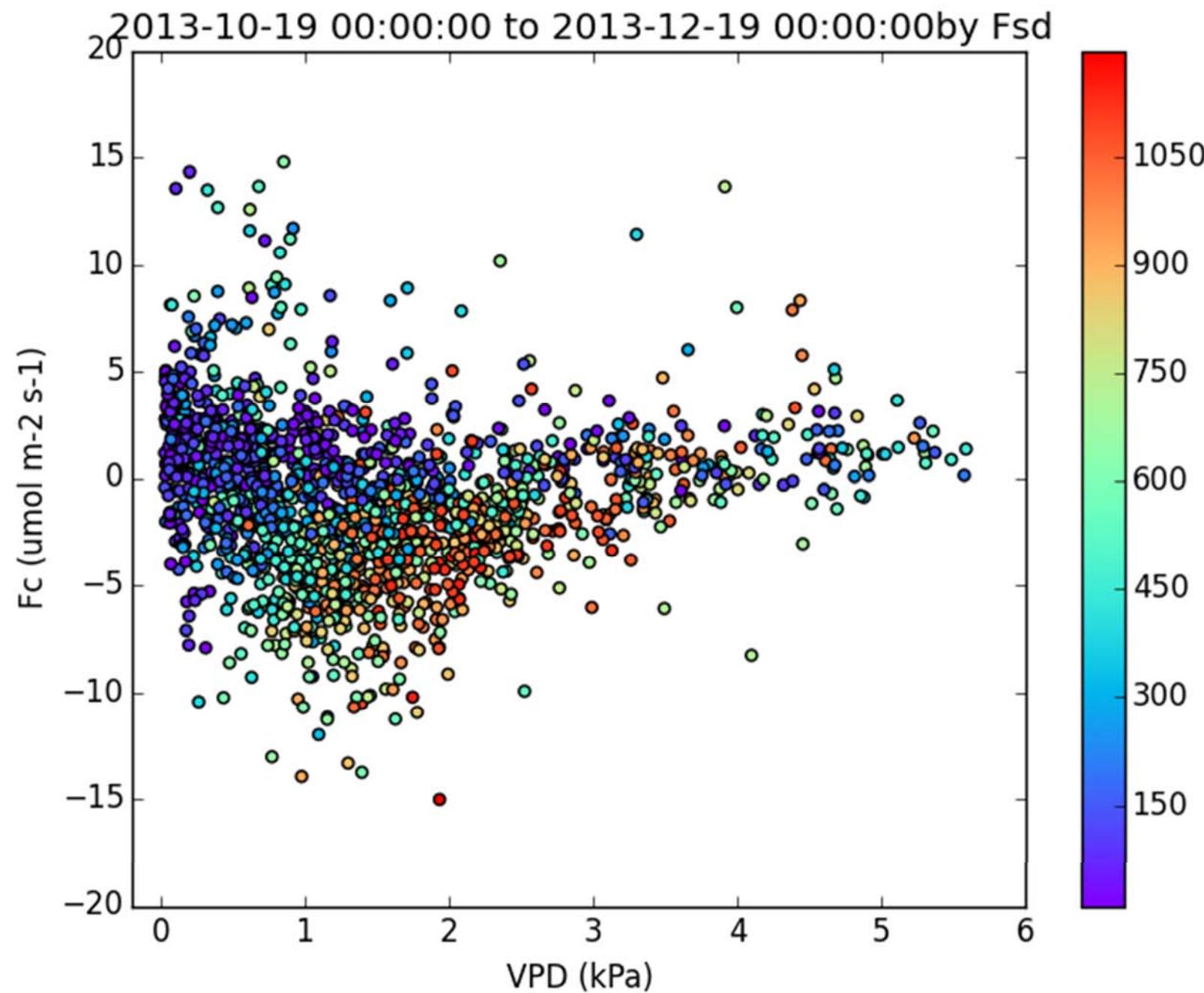


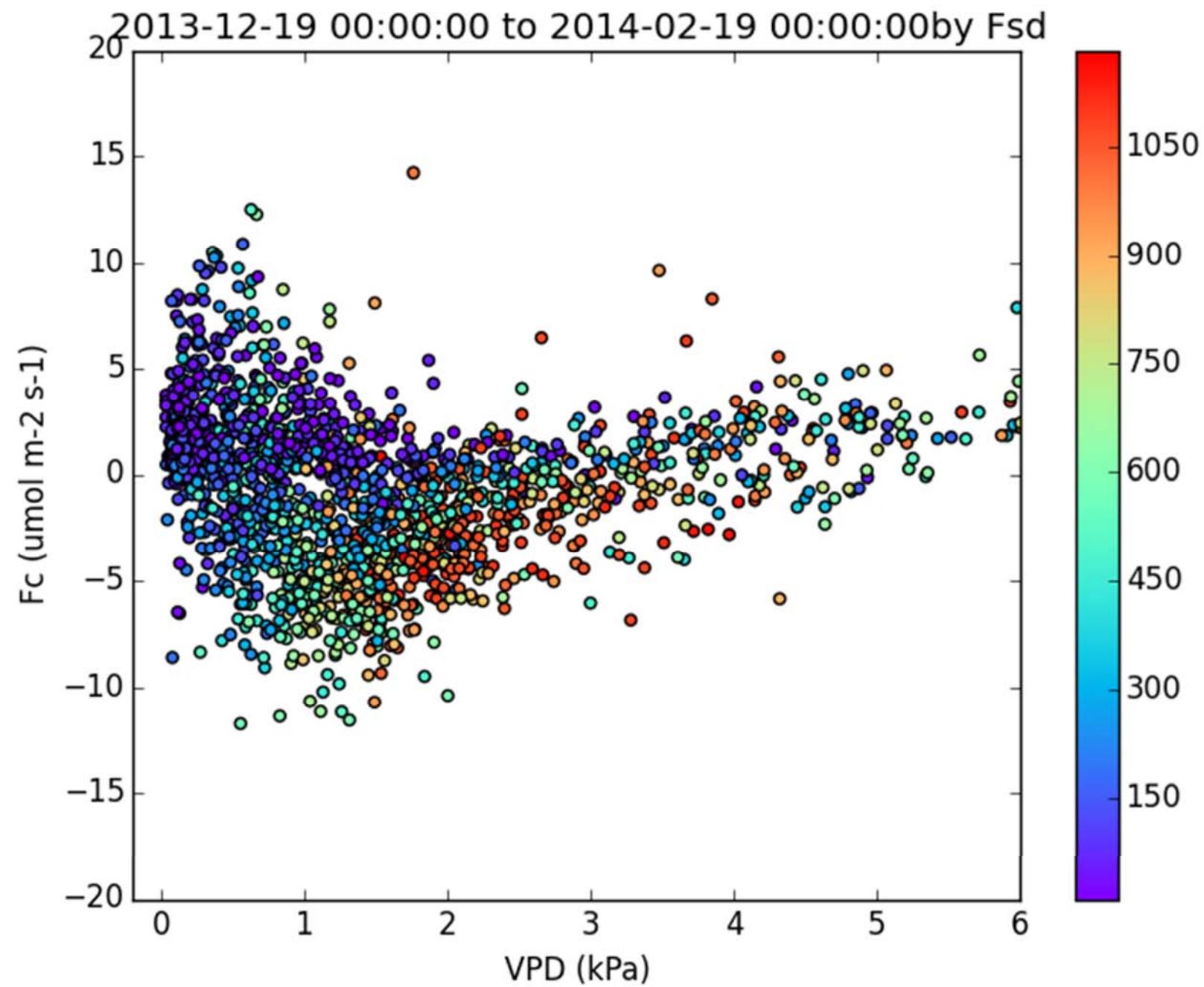


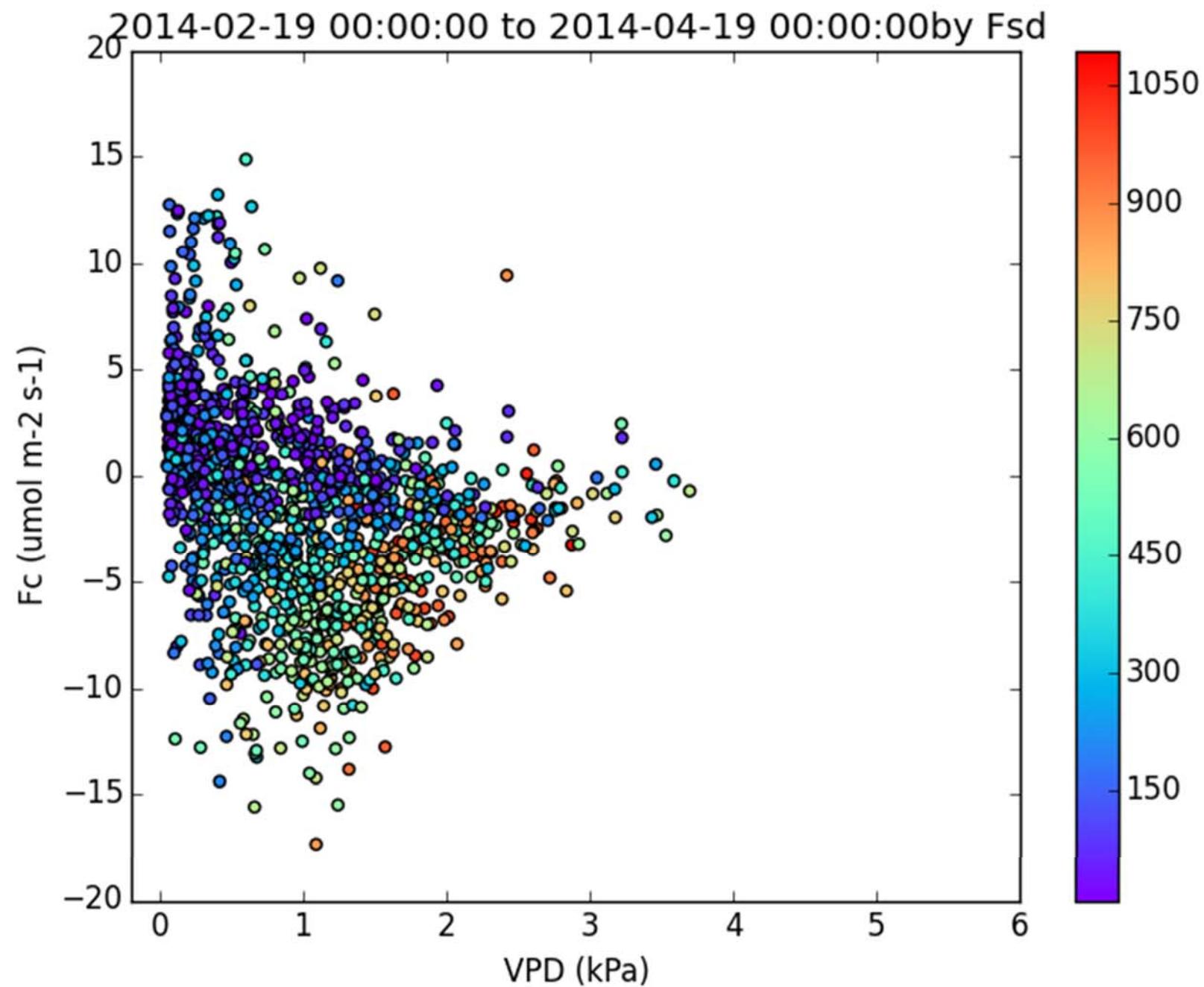


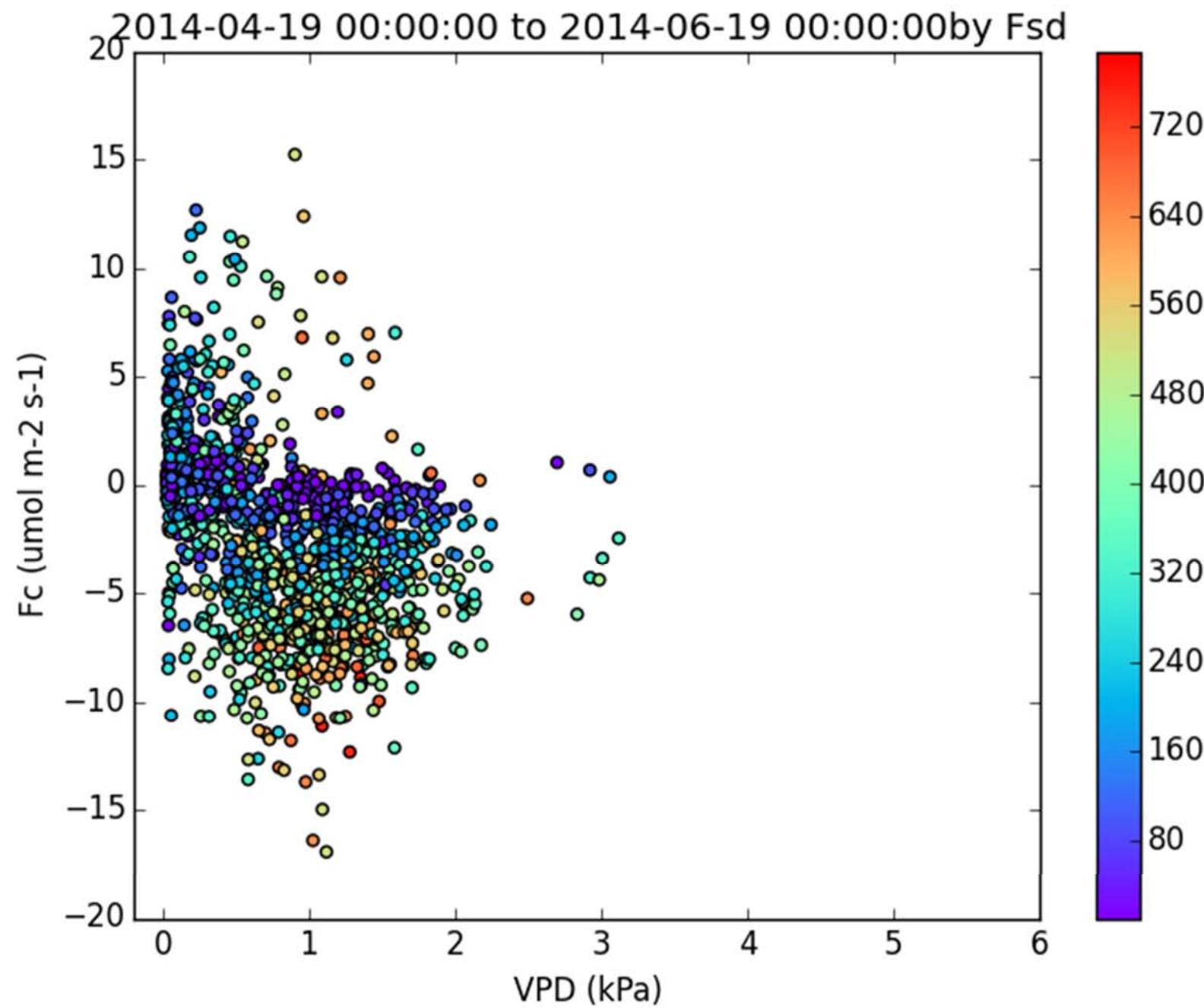


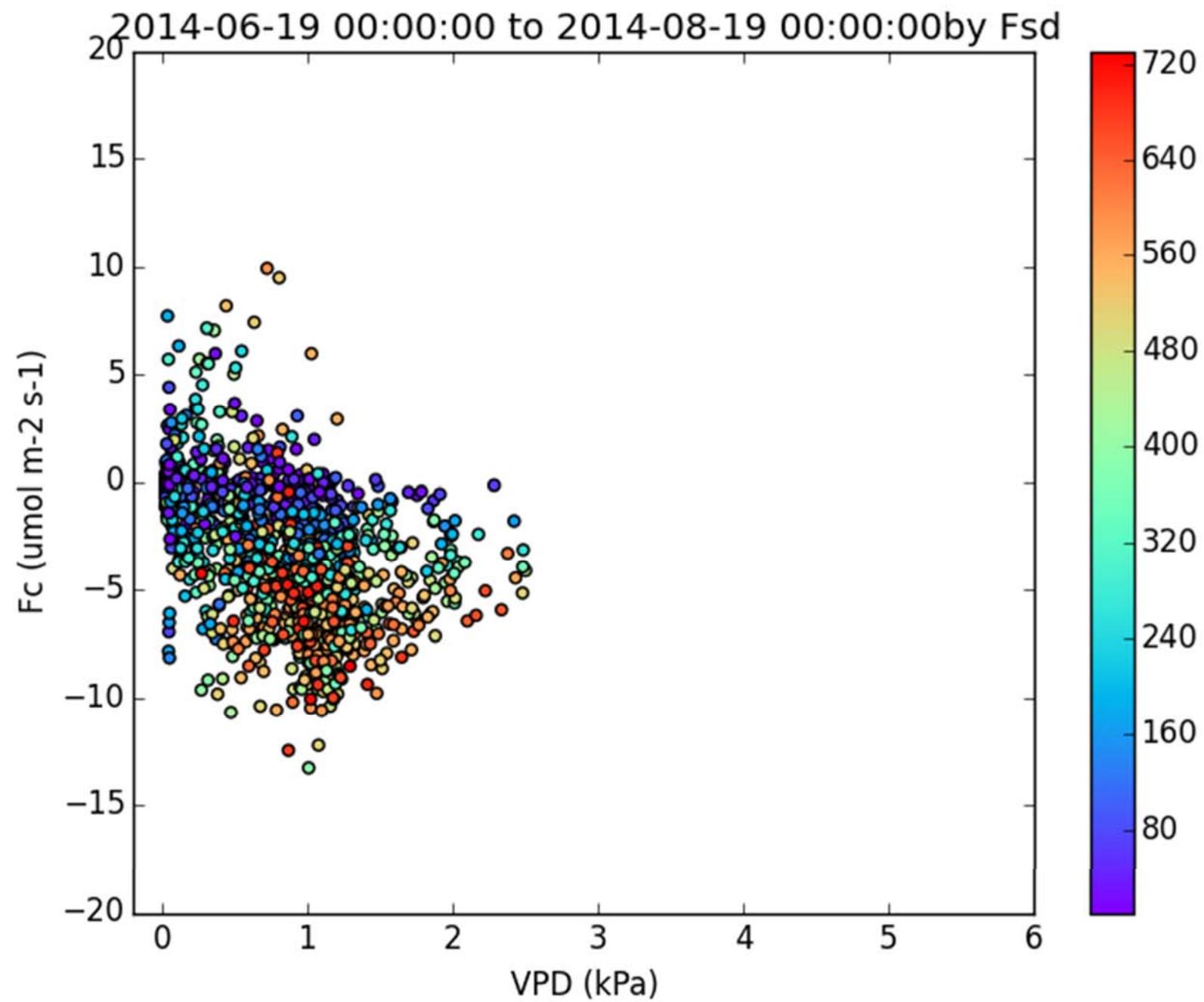


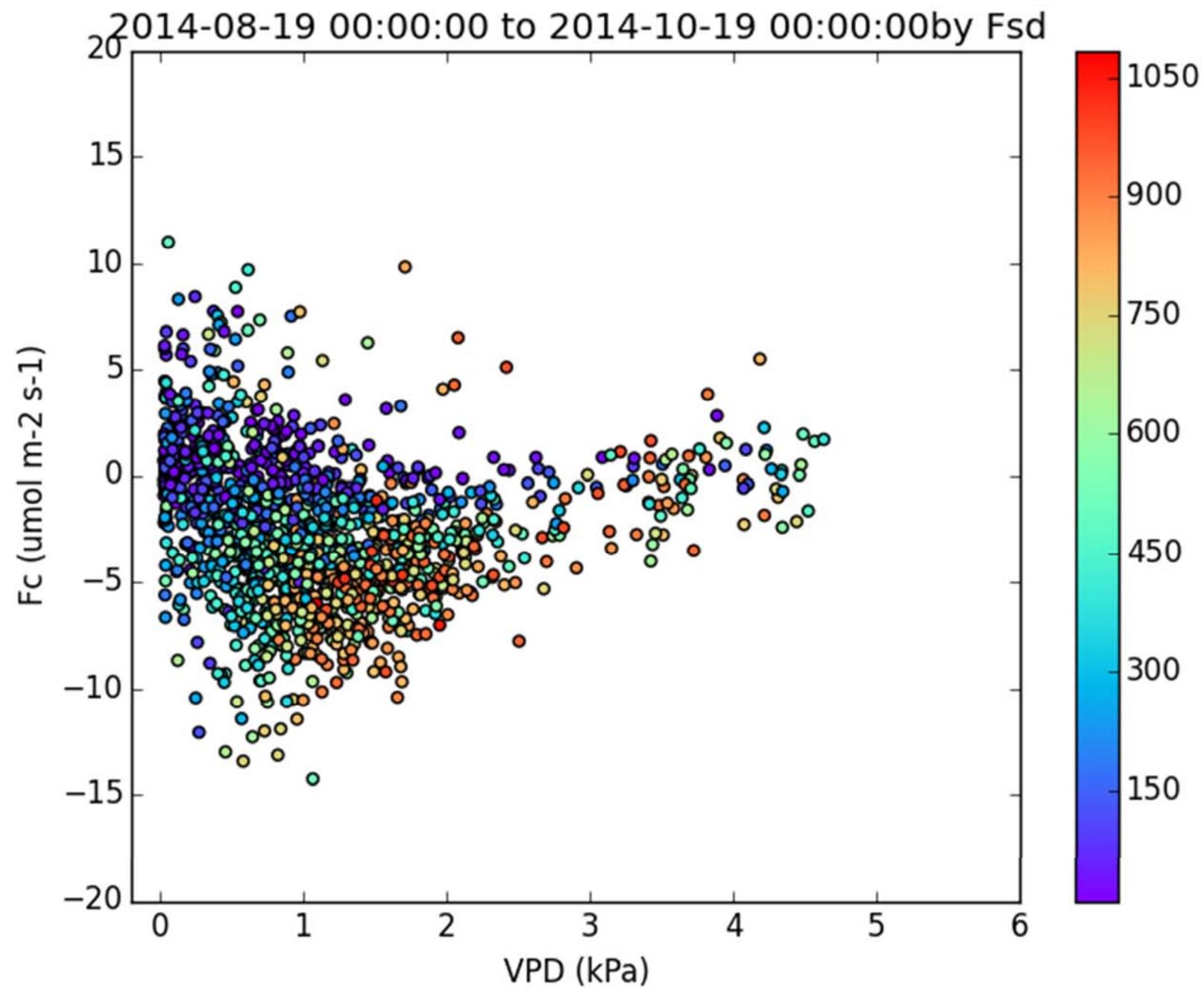


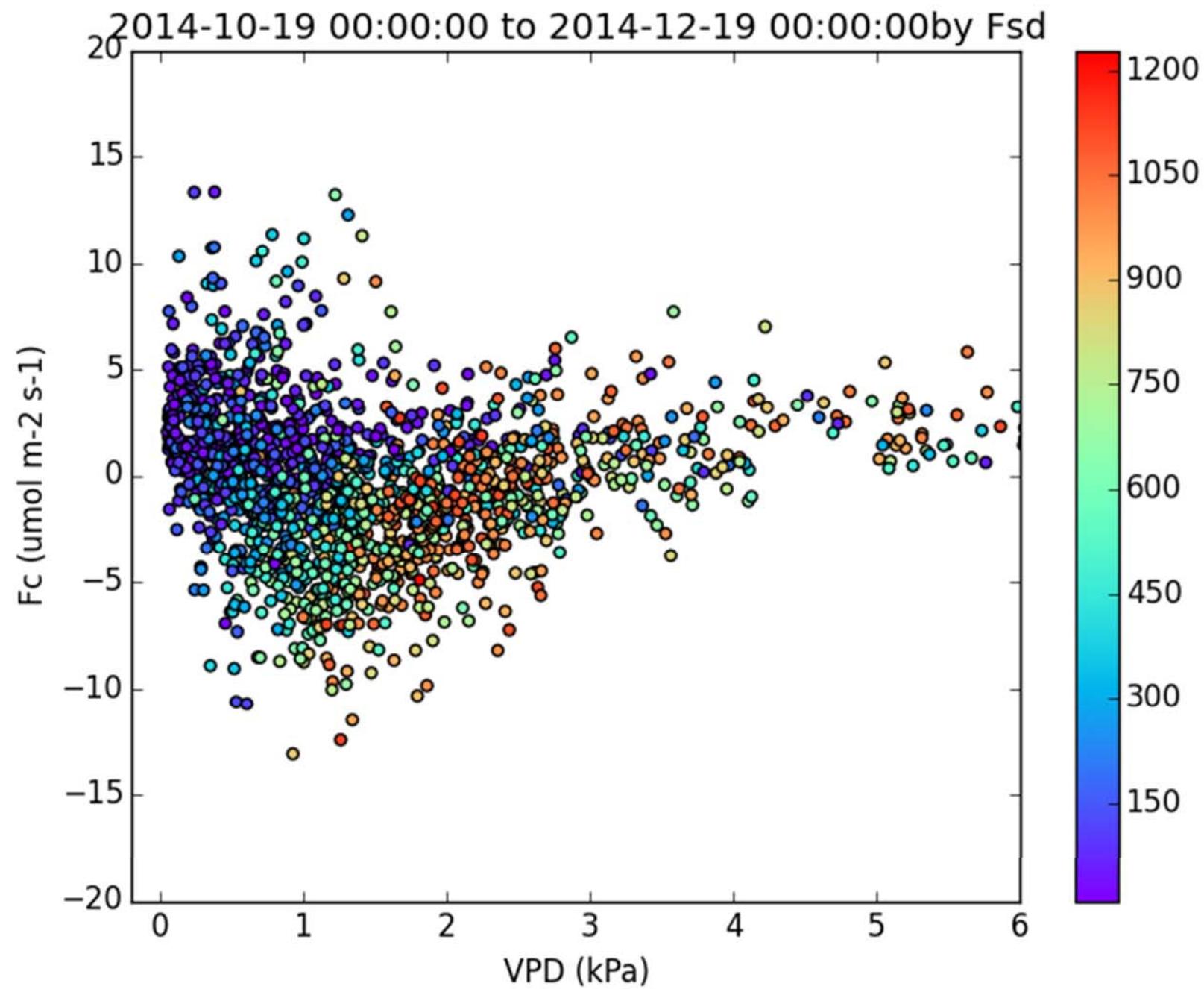


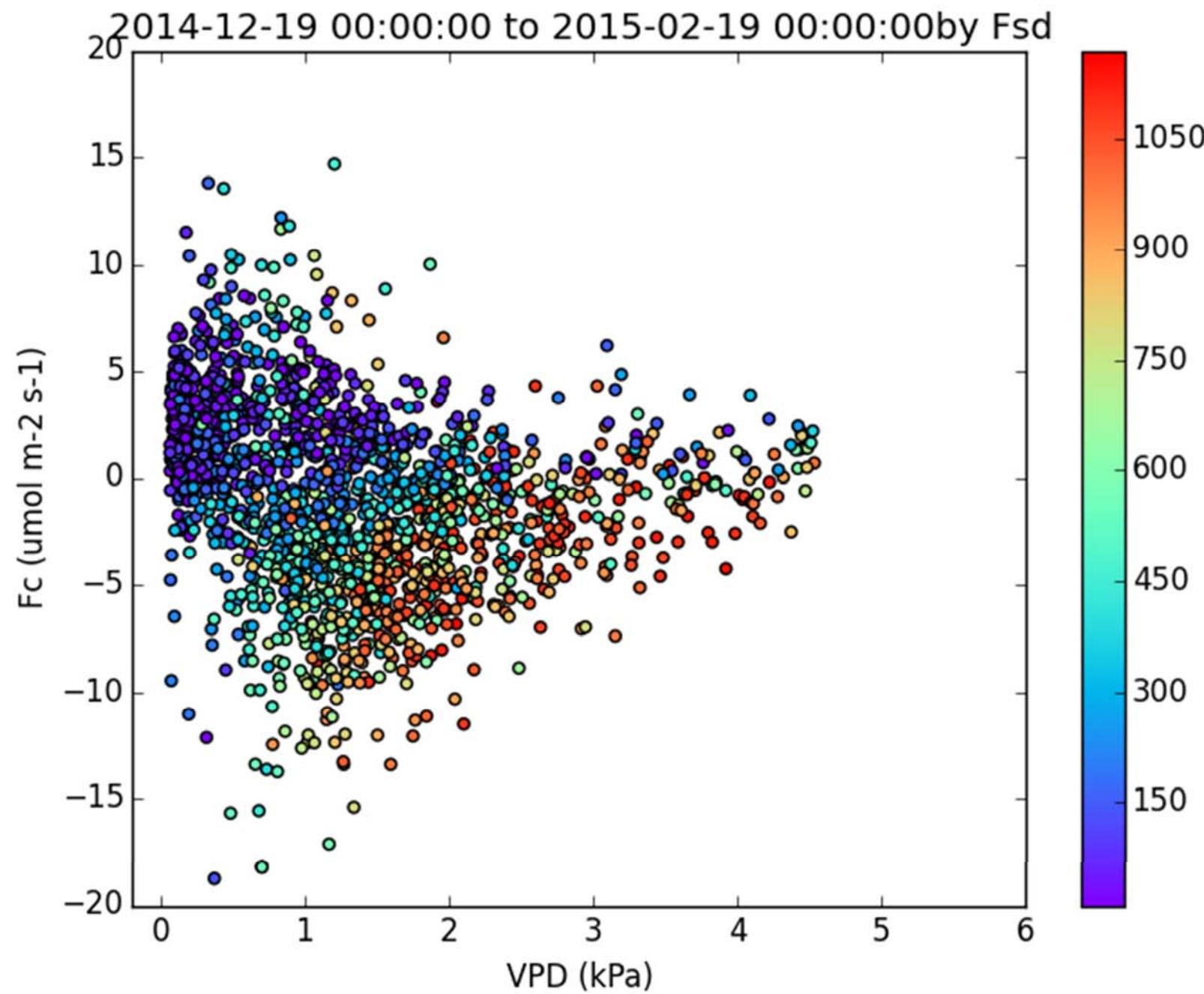


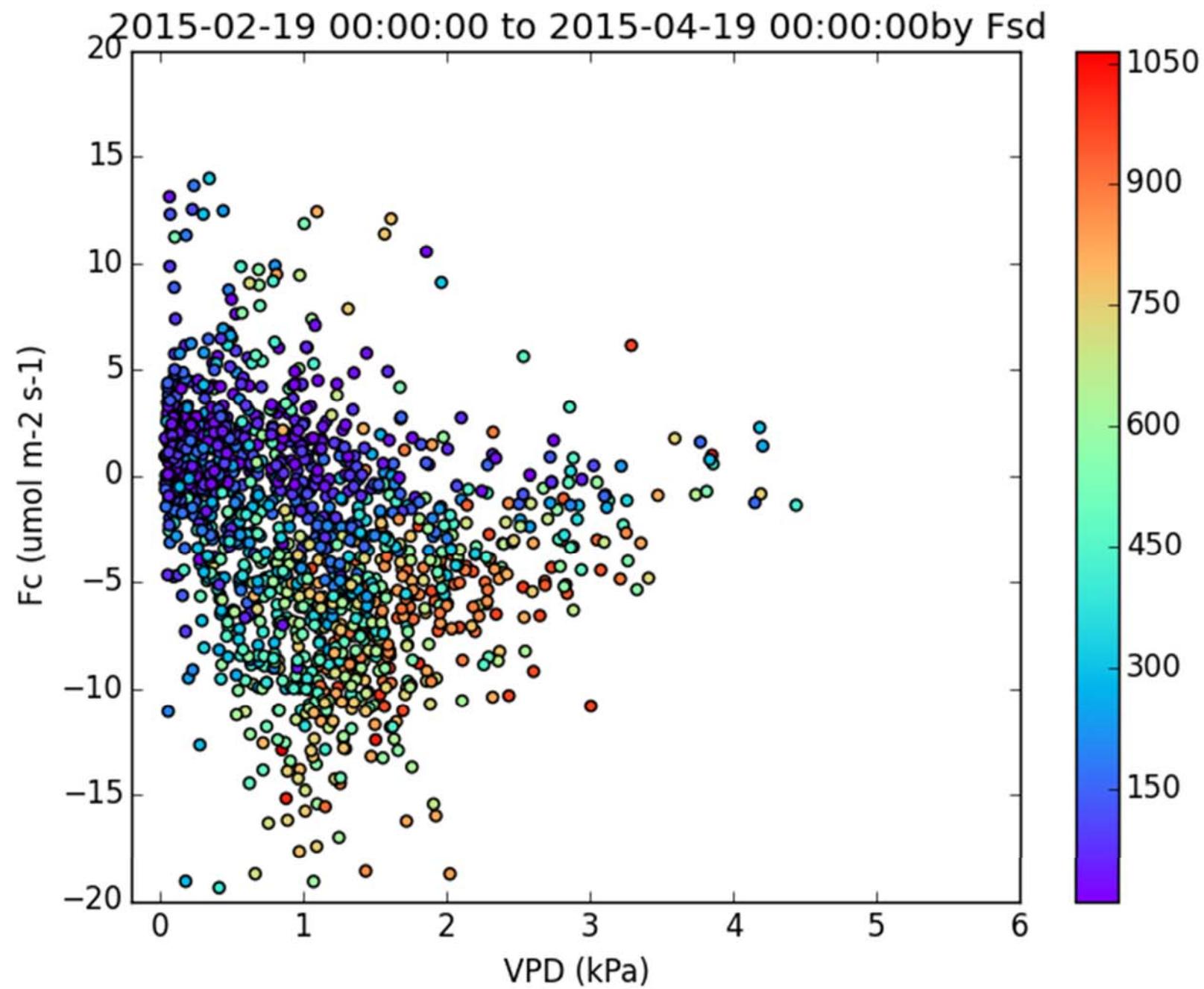


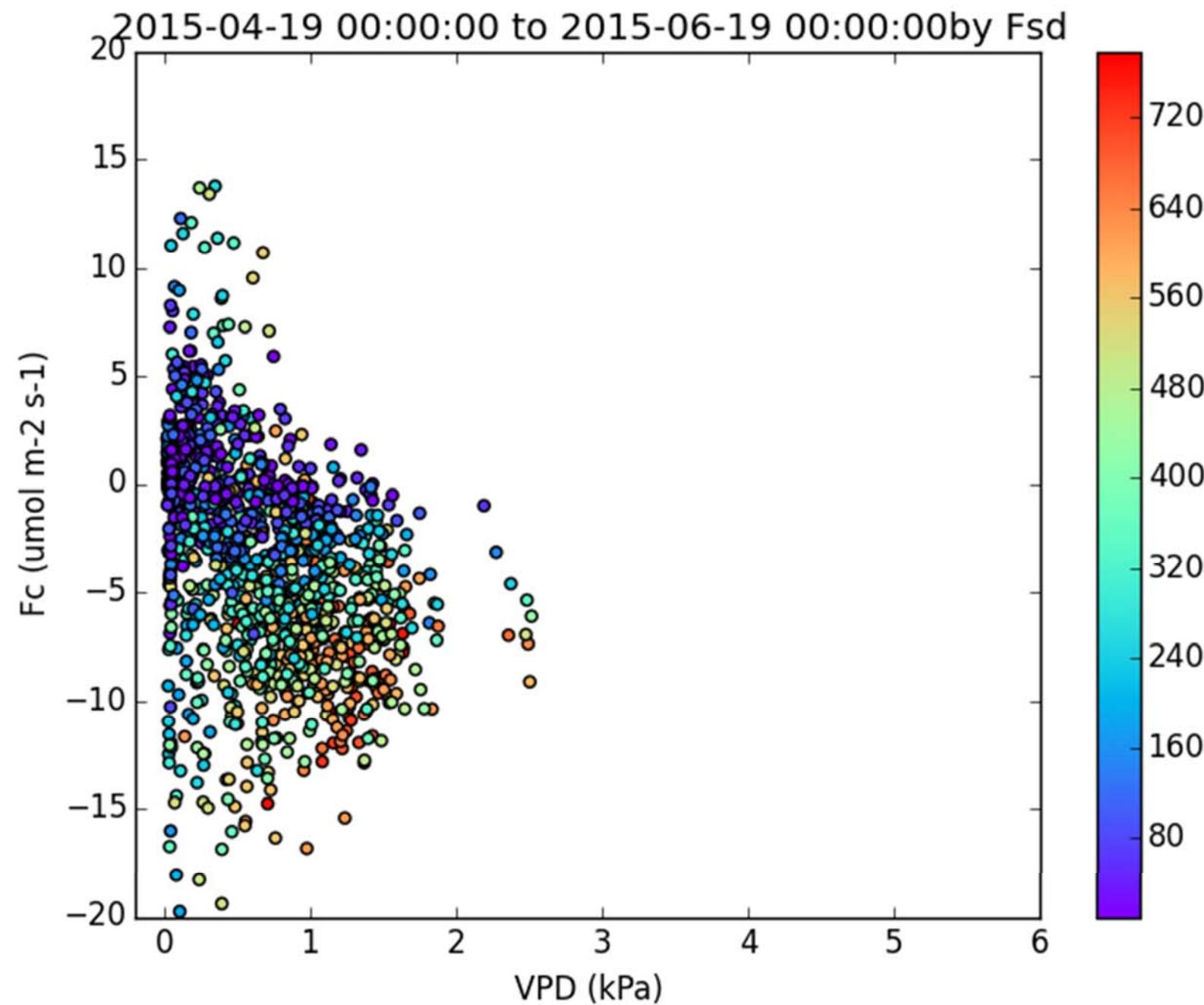


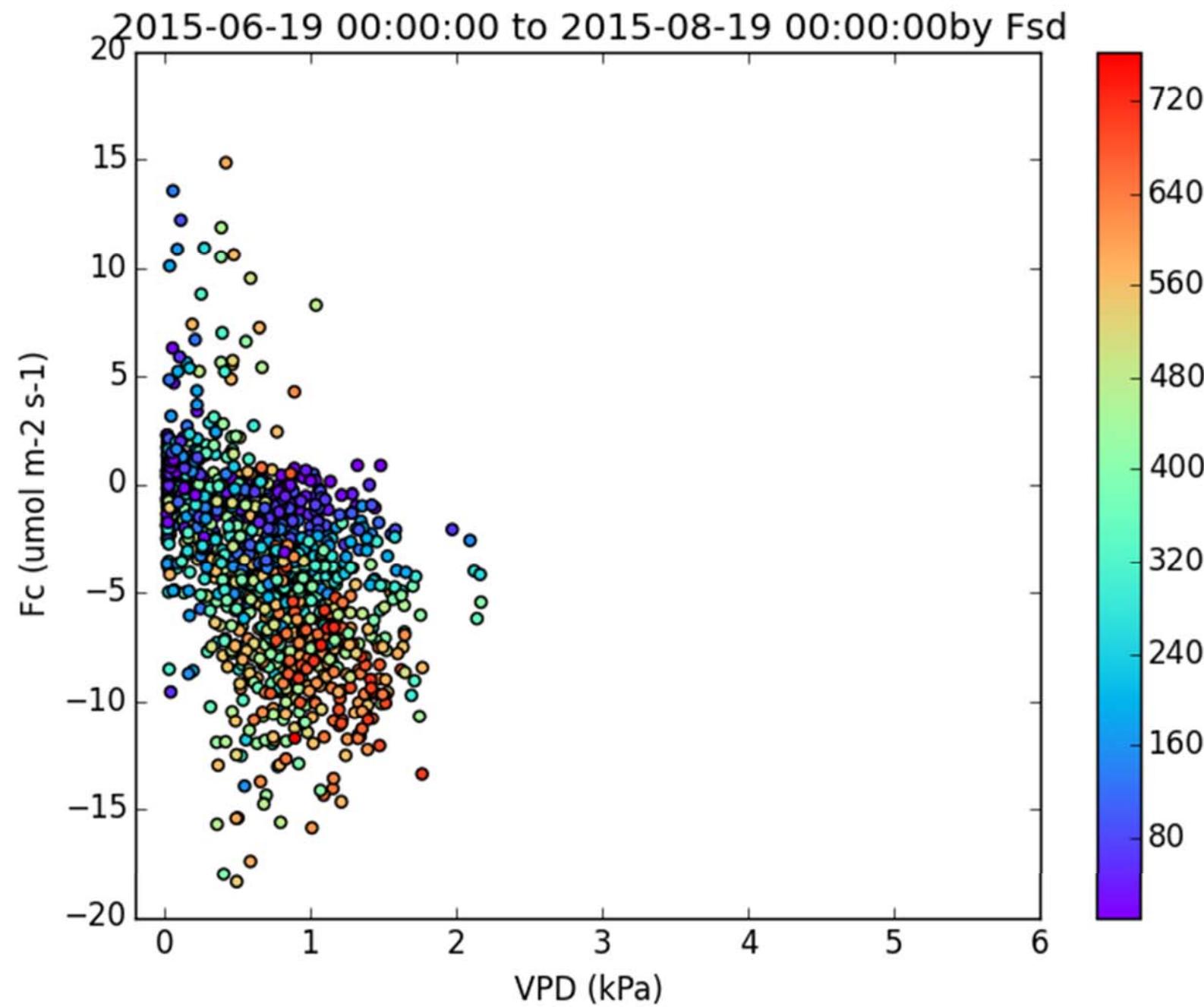


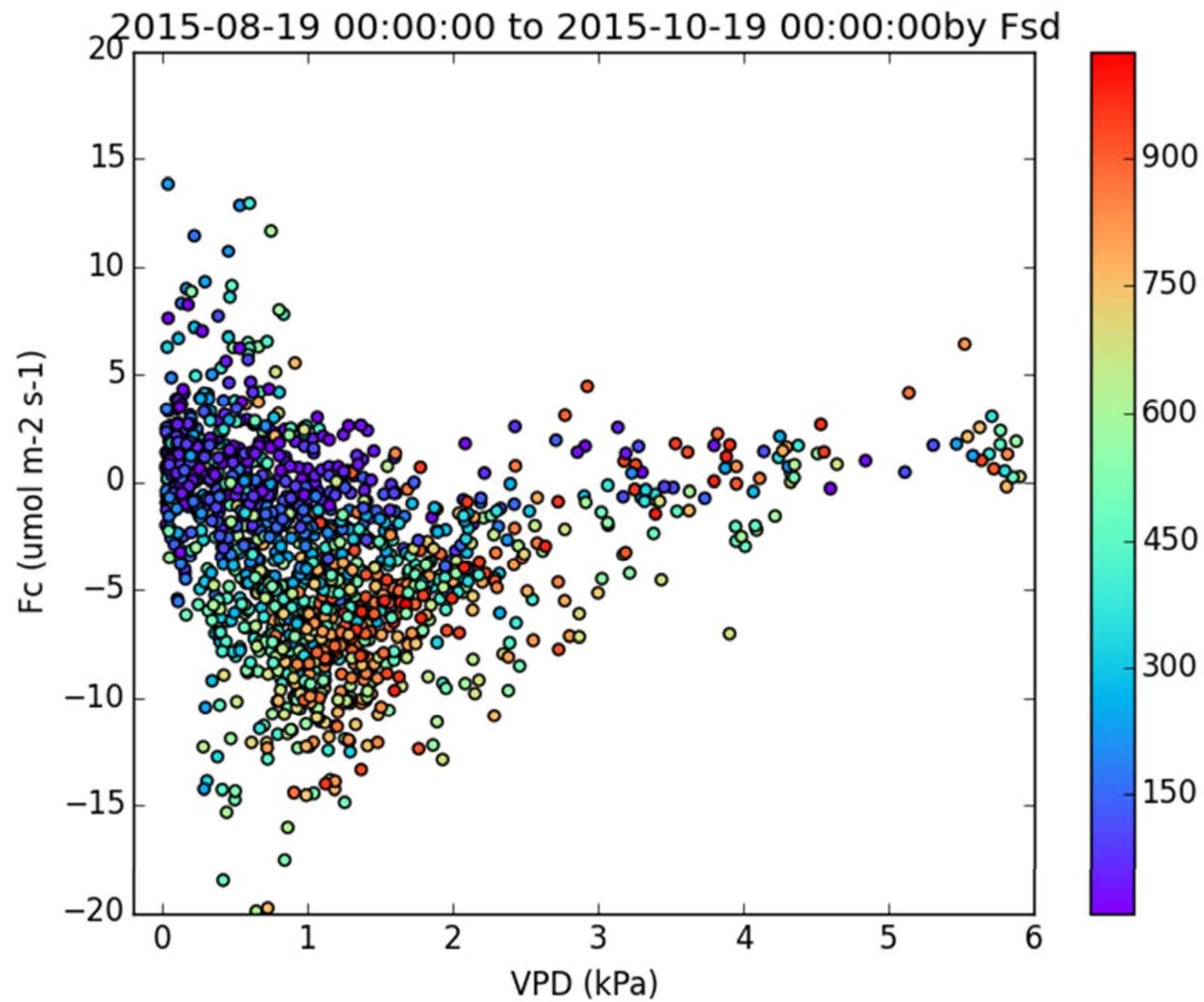




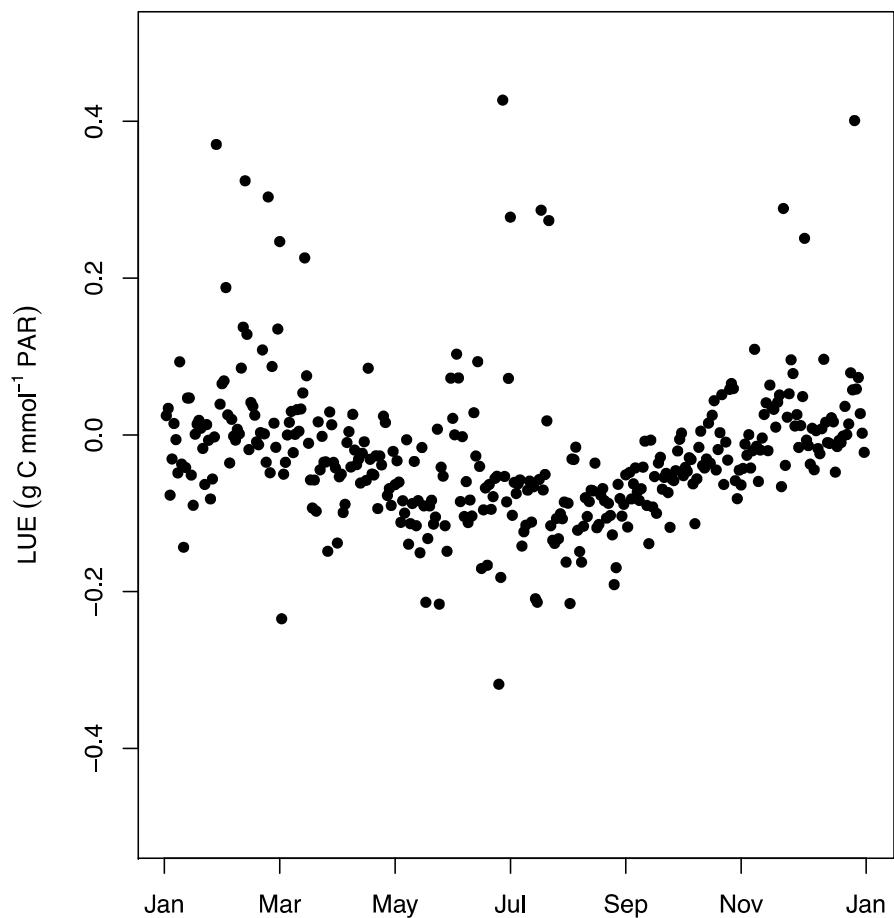
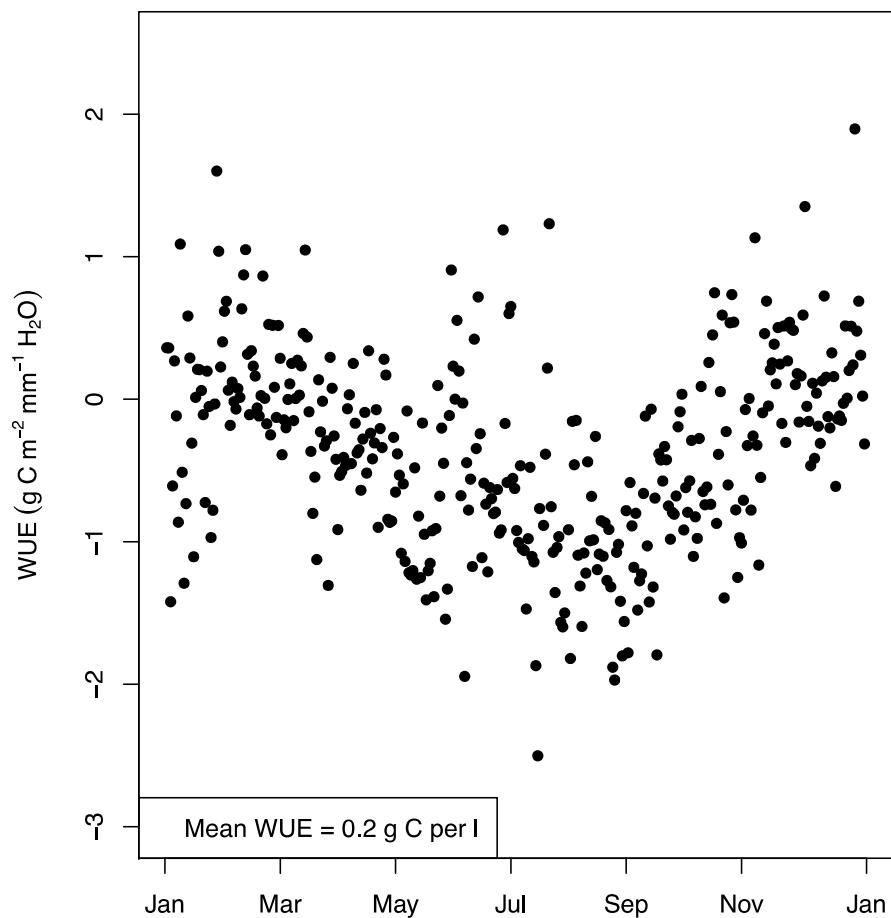




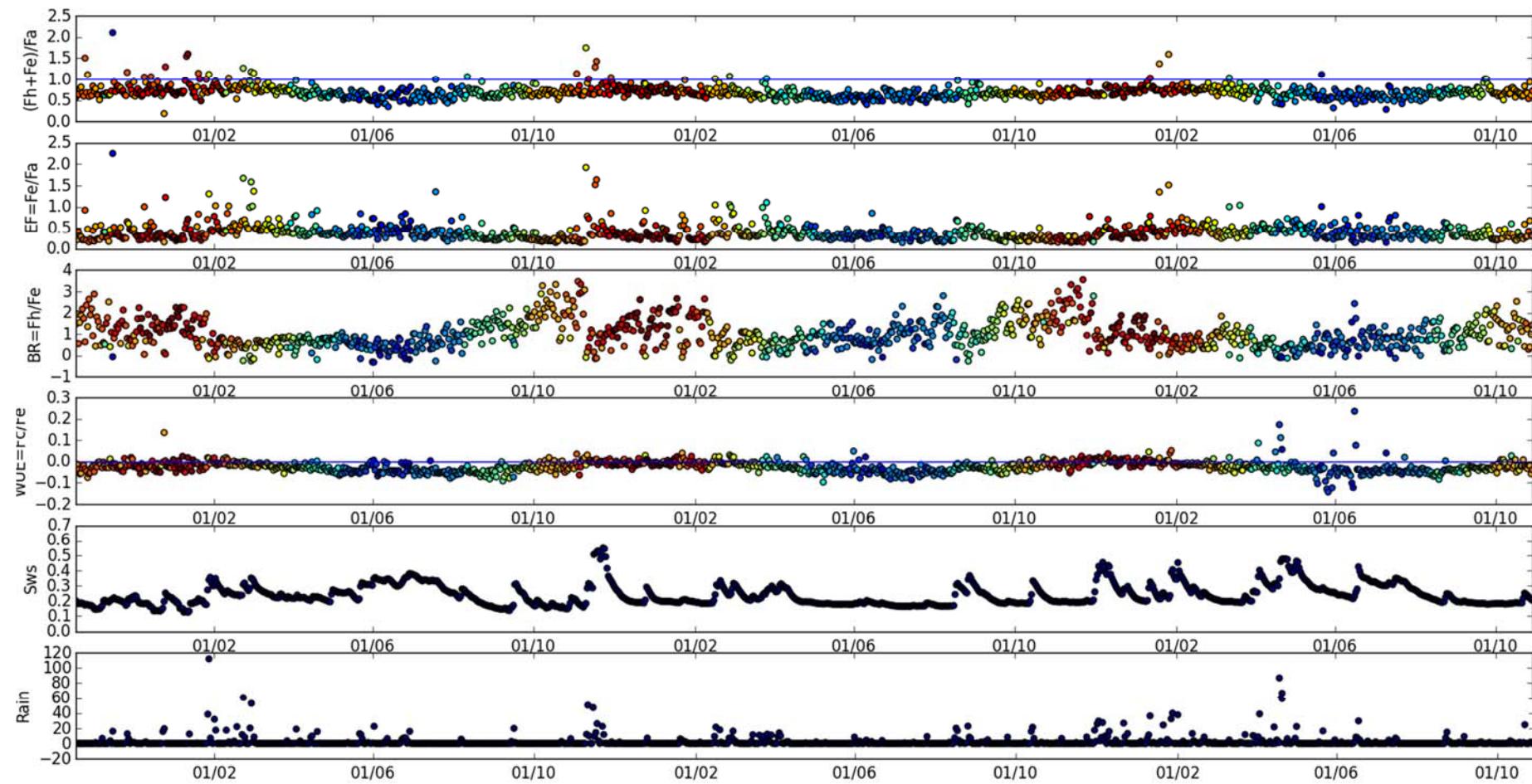




# Why is GPP so aseasonal?



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# Separation of net ecosystem exchange into assimilation and respiration using a light response curve approach: critical issues and global evaluation

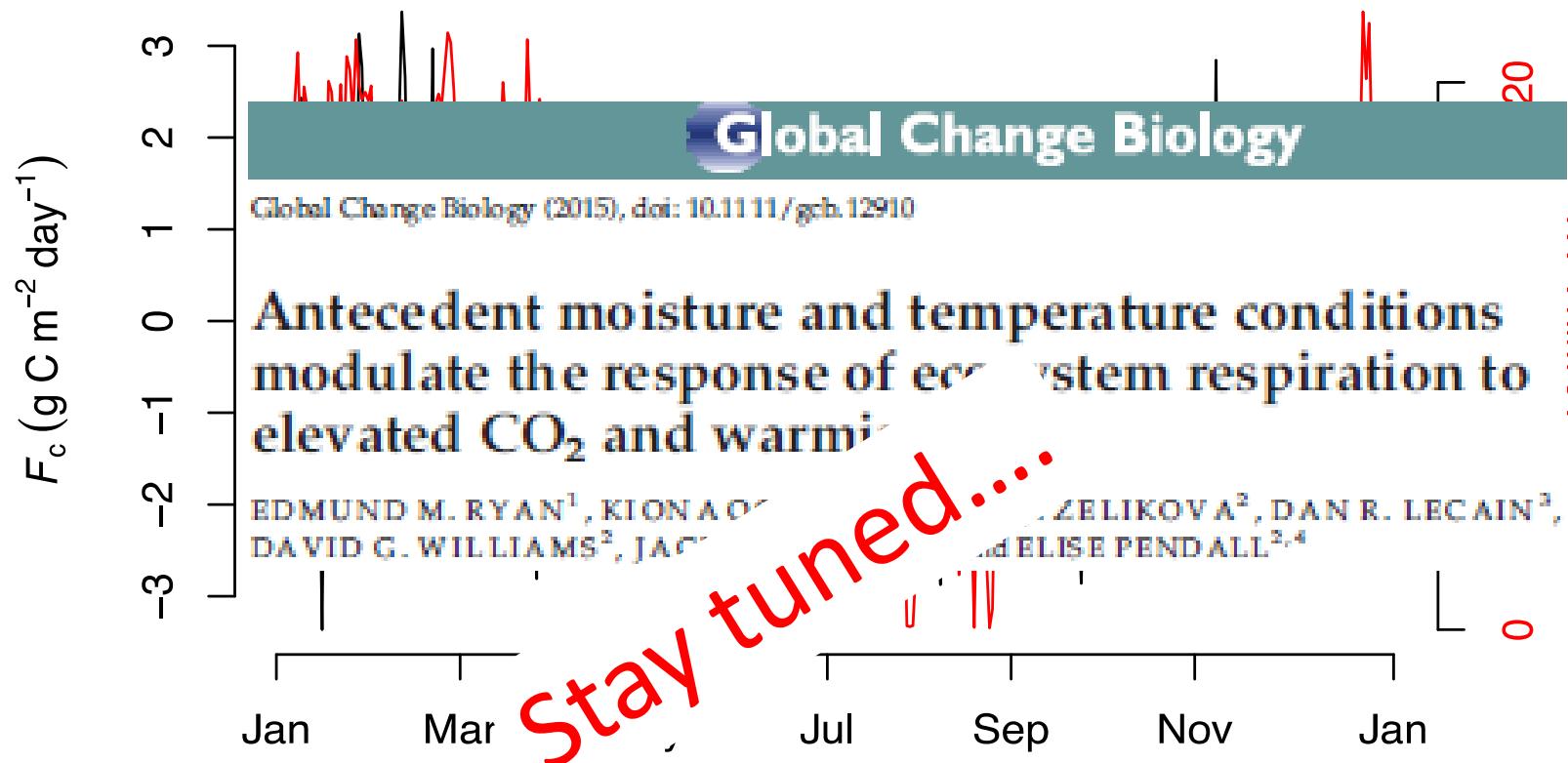
GITTA LASSLOP\*, MARKUS REICHSTEIN\*, DARIO PAPALE†, ANDREW D. RICHARDSON‡, ALMUT ARNETH§, ALAN BARR¶, PAUL STOY|| and GEORG WOHLFAHRT\*\*

$$\text{NEE} = \frac{\alpha\beta R_g}{\alpha R_g + \beta} + n \left( \frac{1}{T_{\text{ref}} - T_0} - \frac{1}{T_{\text{air}} - T_0} \right)$$

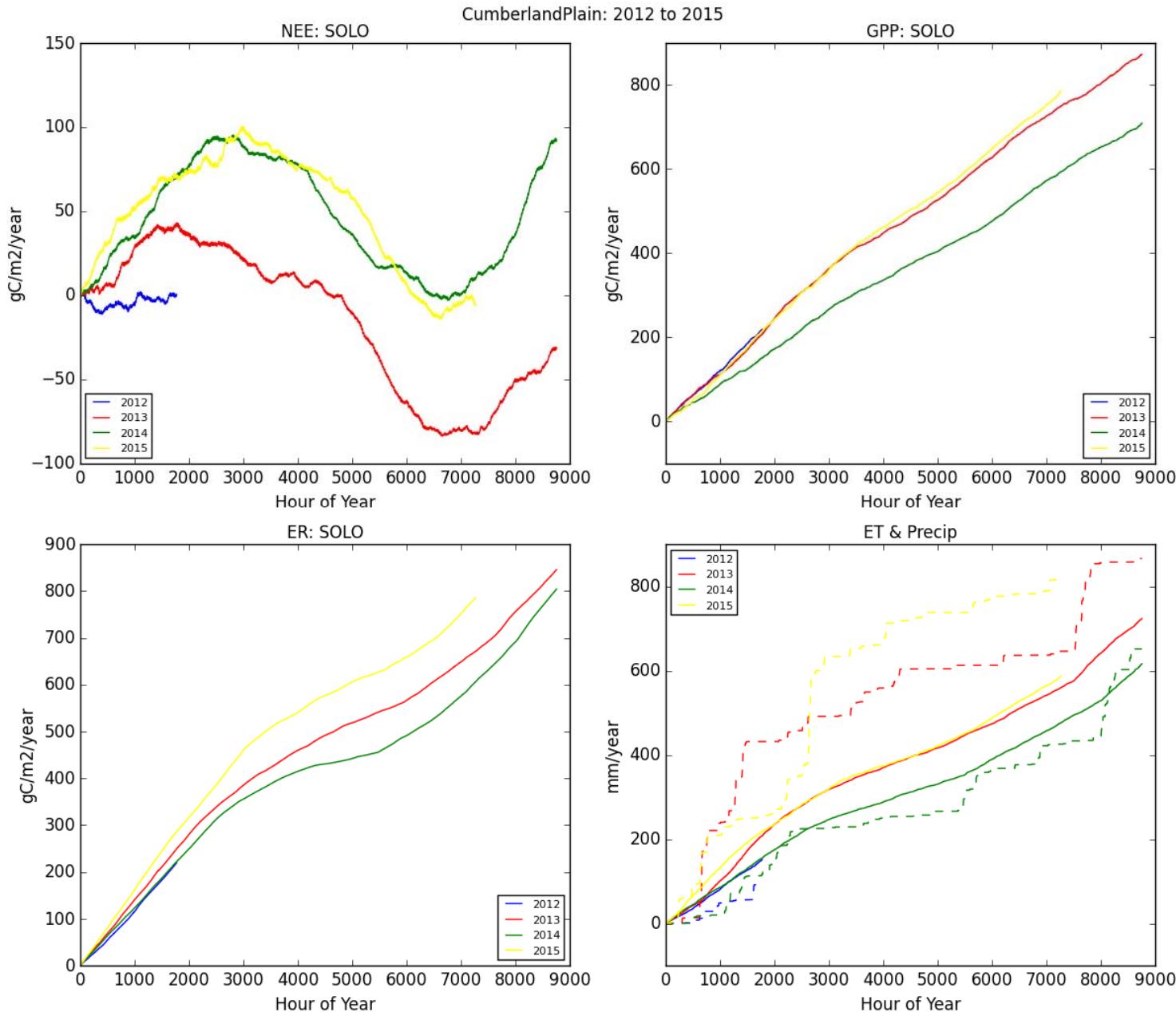
*Stay tuned...*

$\alpha$  = slope of light response function  
 $\beta$  = light saturation  
 $n$  = radiation

# How important are antecedent conditions?



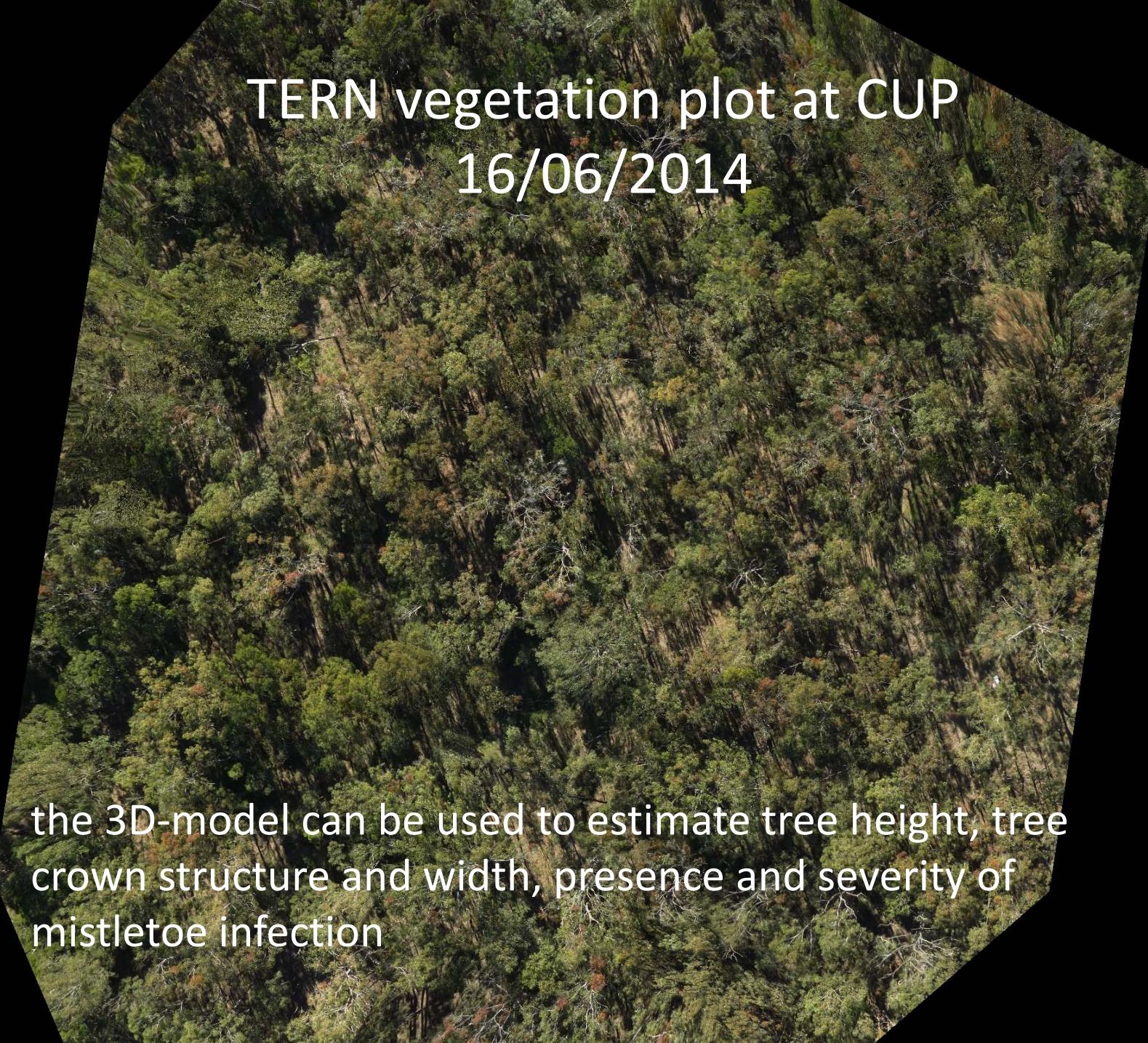
# Nearly neutral C balance: why?



Wouter Maes and drone



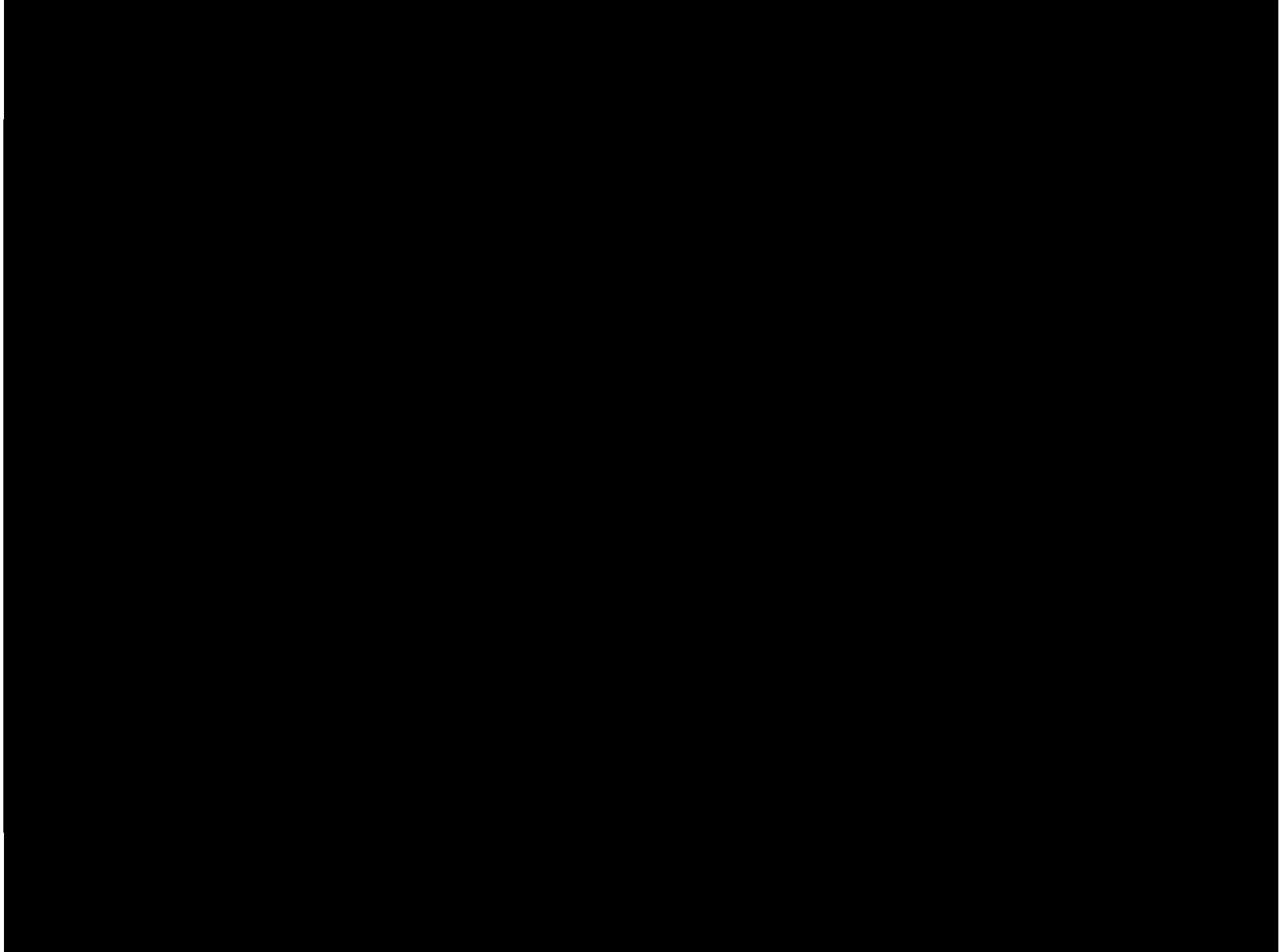




# TERN vegetation plot at CUP

16/06/2014

the 3D-model can be used to estimate tree height, tree crown structure and width, presence and severity of mistletoe infection



# Contributions

- Eva van Gorsel, Helen Cleugh and Ray Leuning
  - site selection
- Craig Barton, Chelsea Meier – CUP tech team
- Peter Isaac, James Cleverly, Ozflux – data processing
- Matthias Boer, Wouter Maes & Alfredo Huete
  - Vegetation structure & composition
- Funding from TERN & Western Sydney Uni.