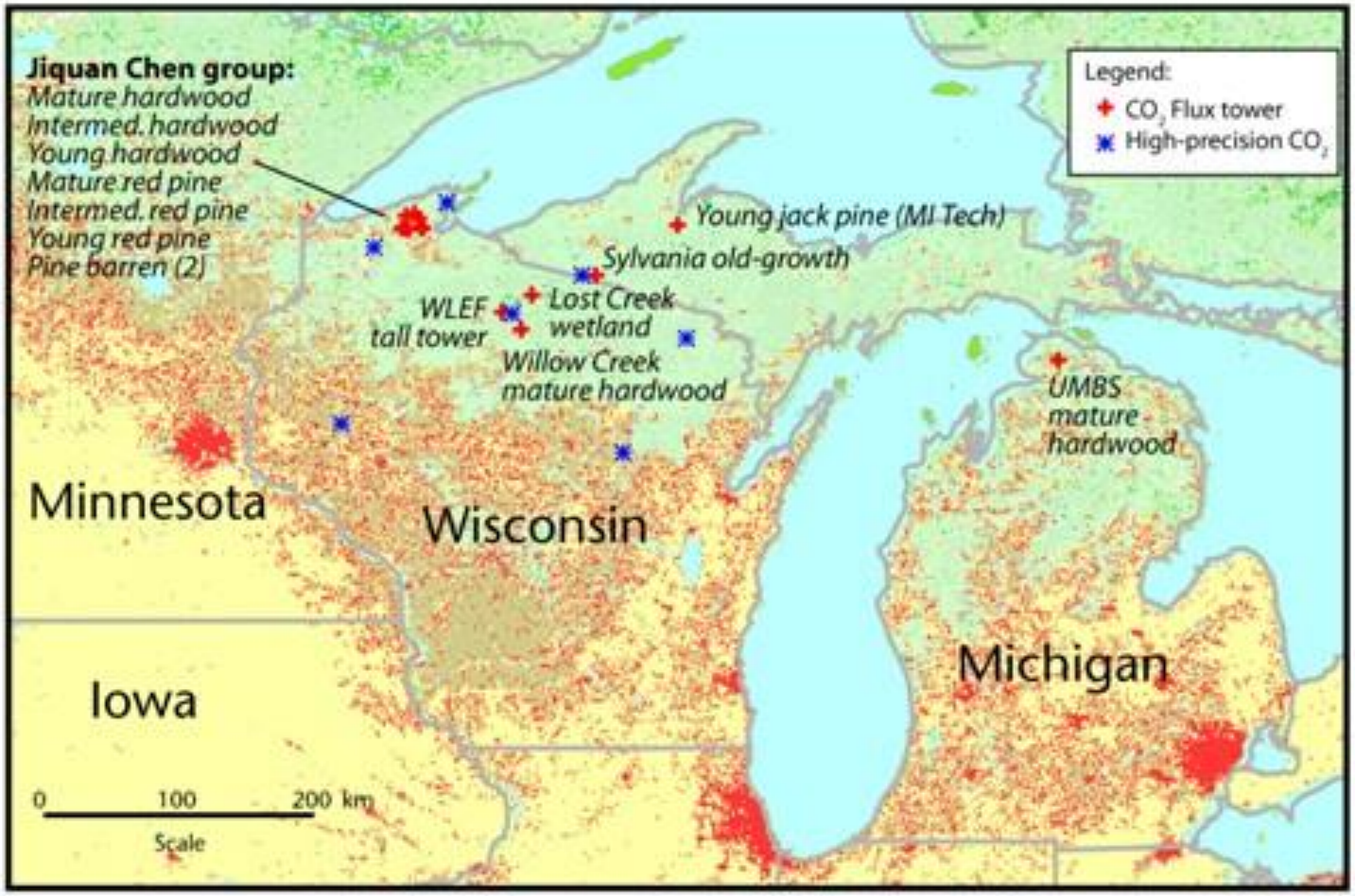
Flux 101

Conceptual Overview

- Flux theory
- What you can do with flux data
- Where you can find flux data

- In general flux sites measure
  - Carbon, water, energy fluxes
  - Meteorology/environmental conditions
- At one spatial location with high temporal frequency (30 minutes)

Eddy Covariance Flux Theory



Eddy Covariance Flux Theory

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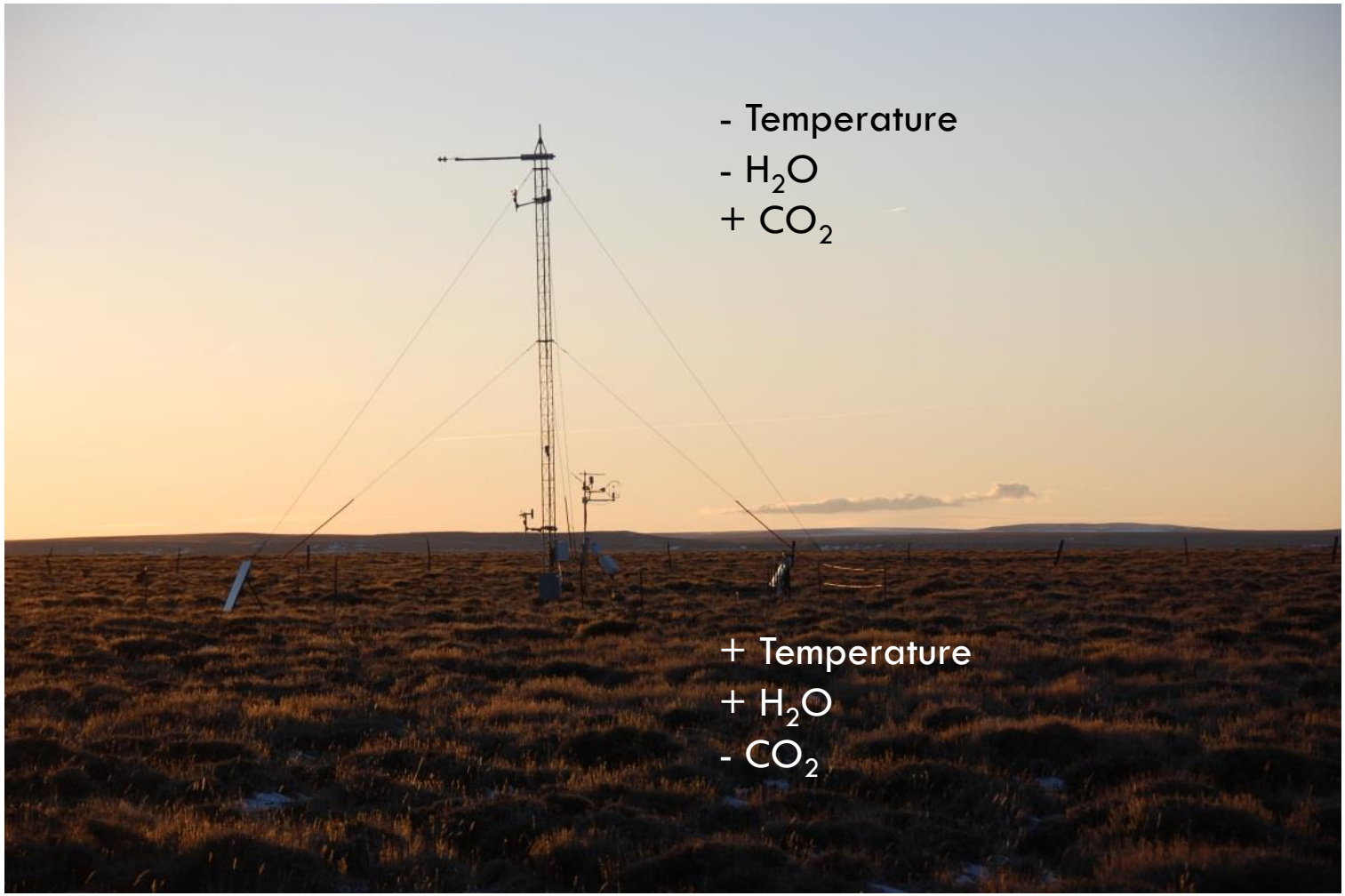
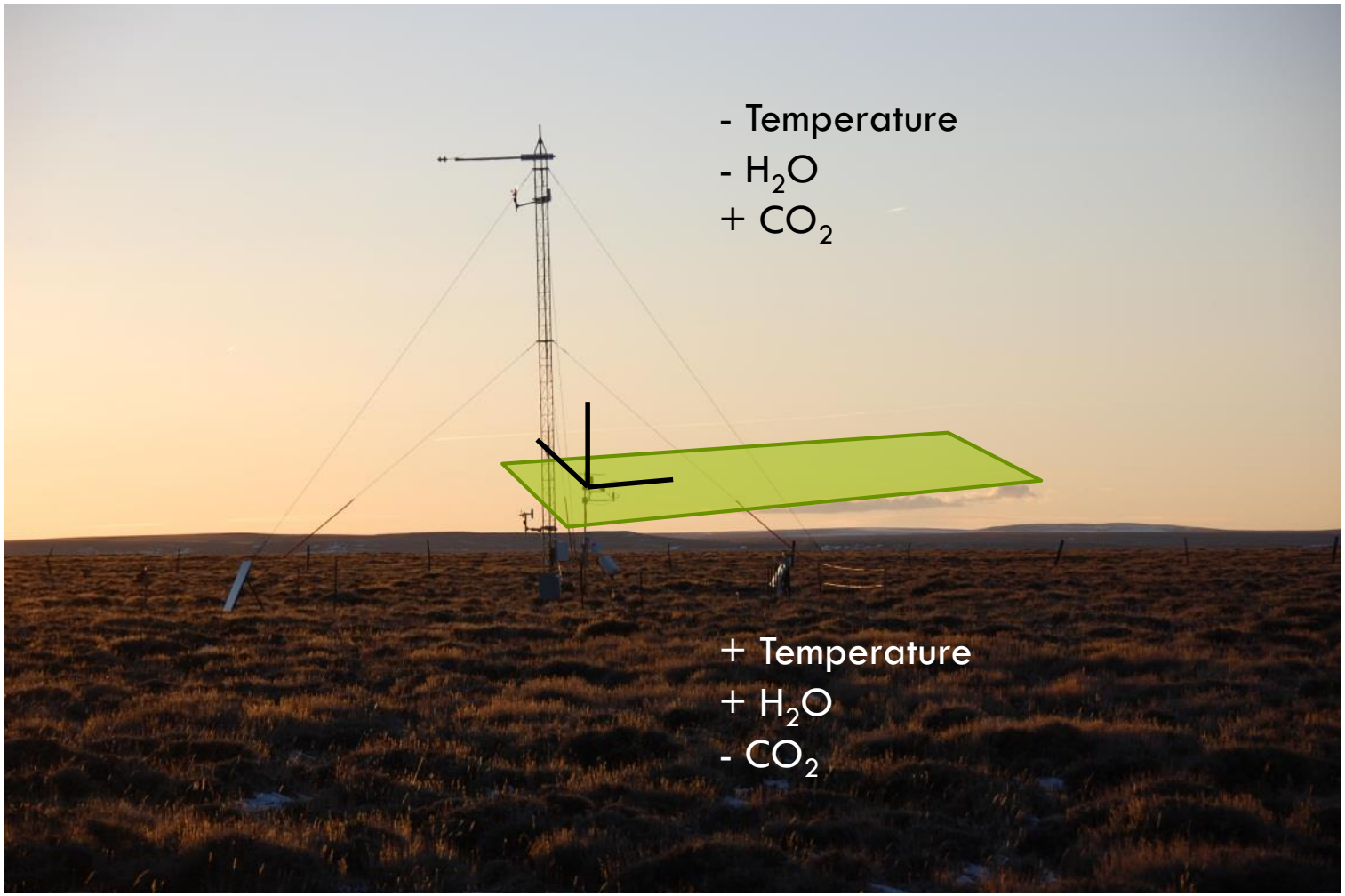
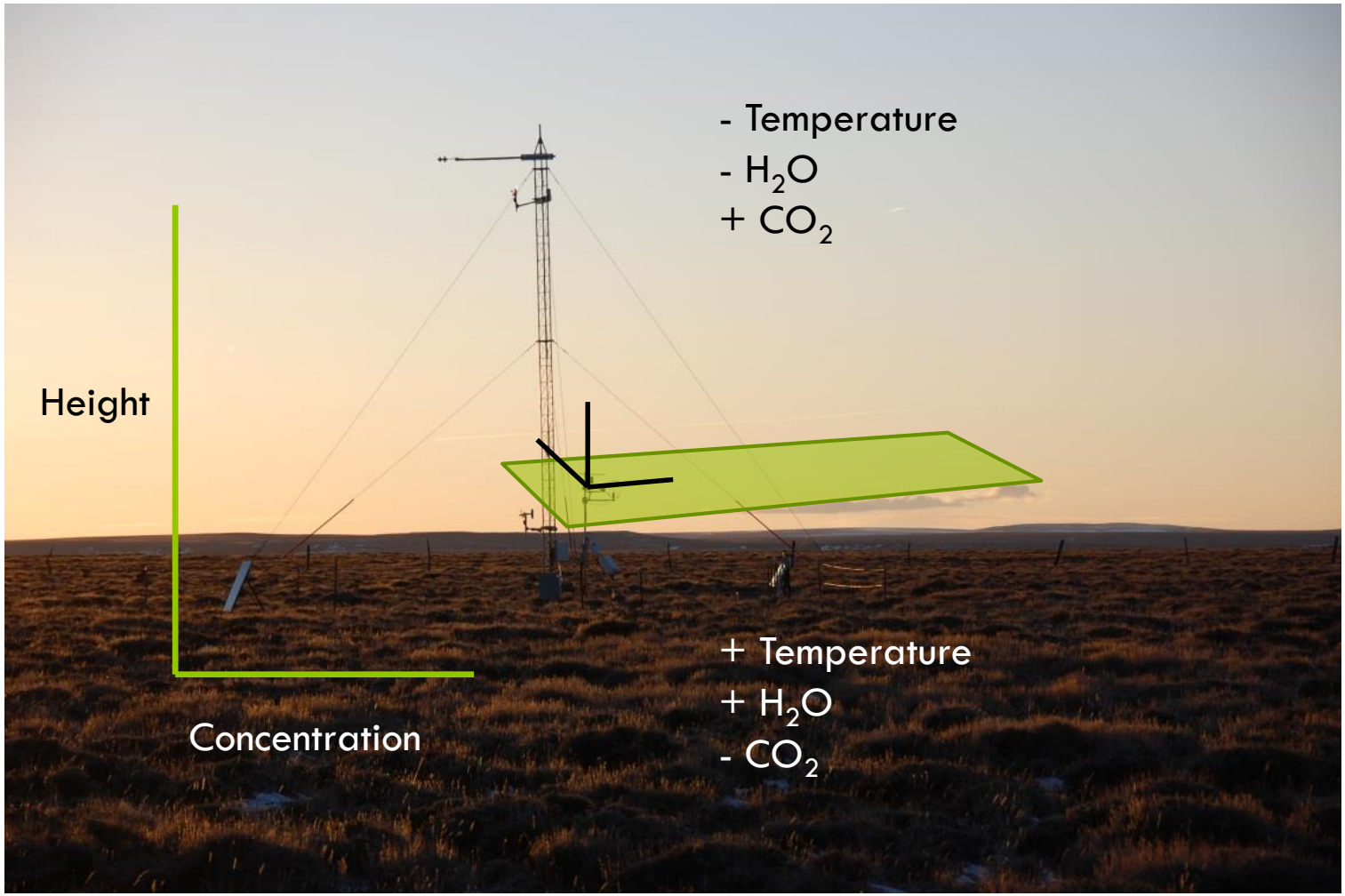


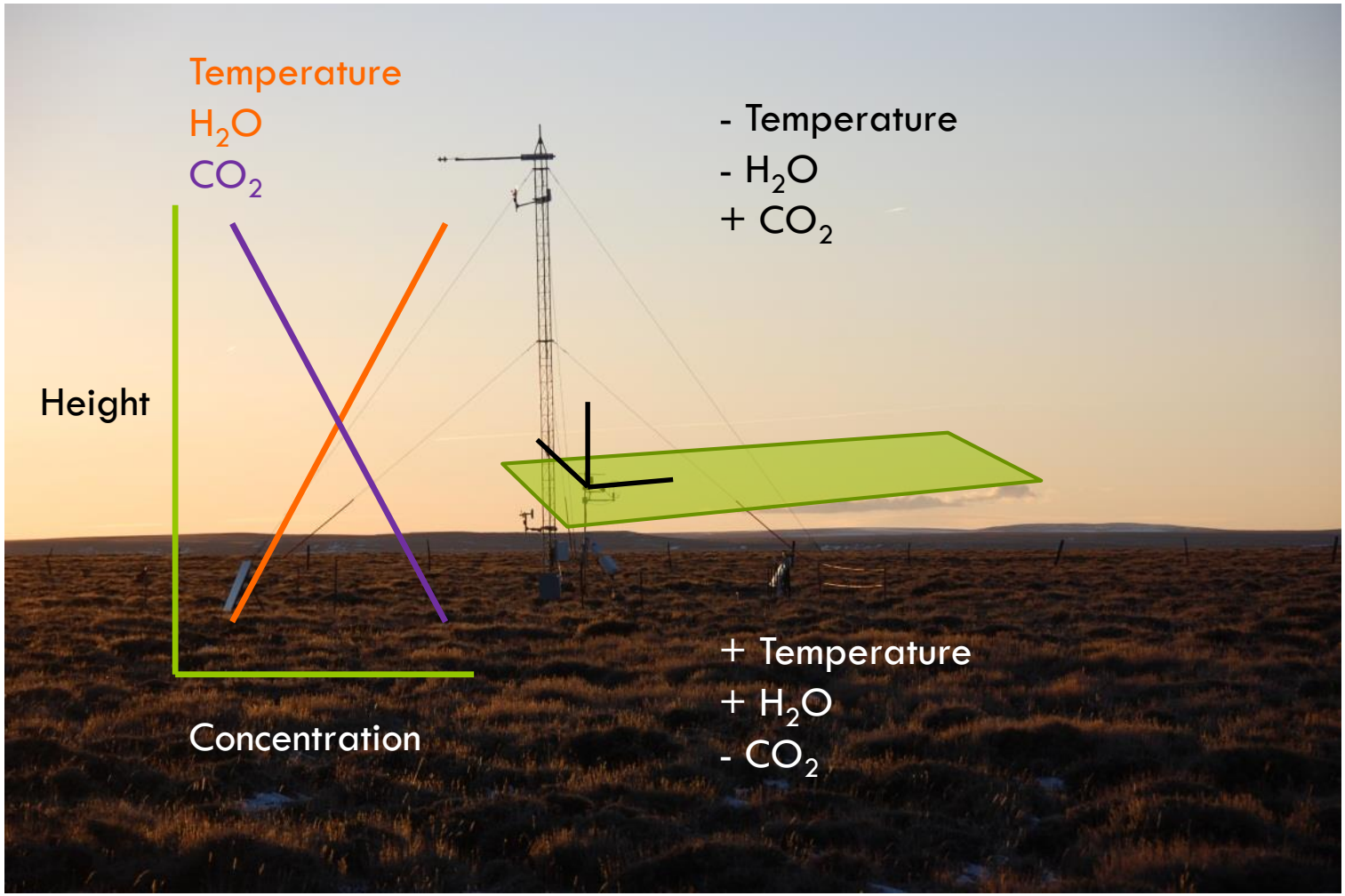
Eddy Covariance Flux Theory



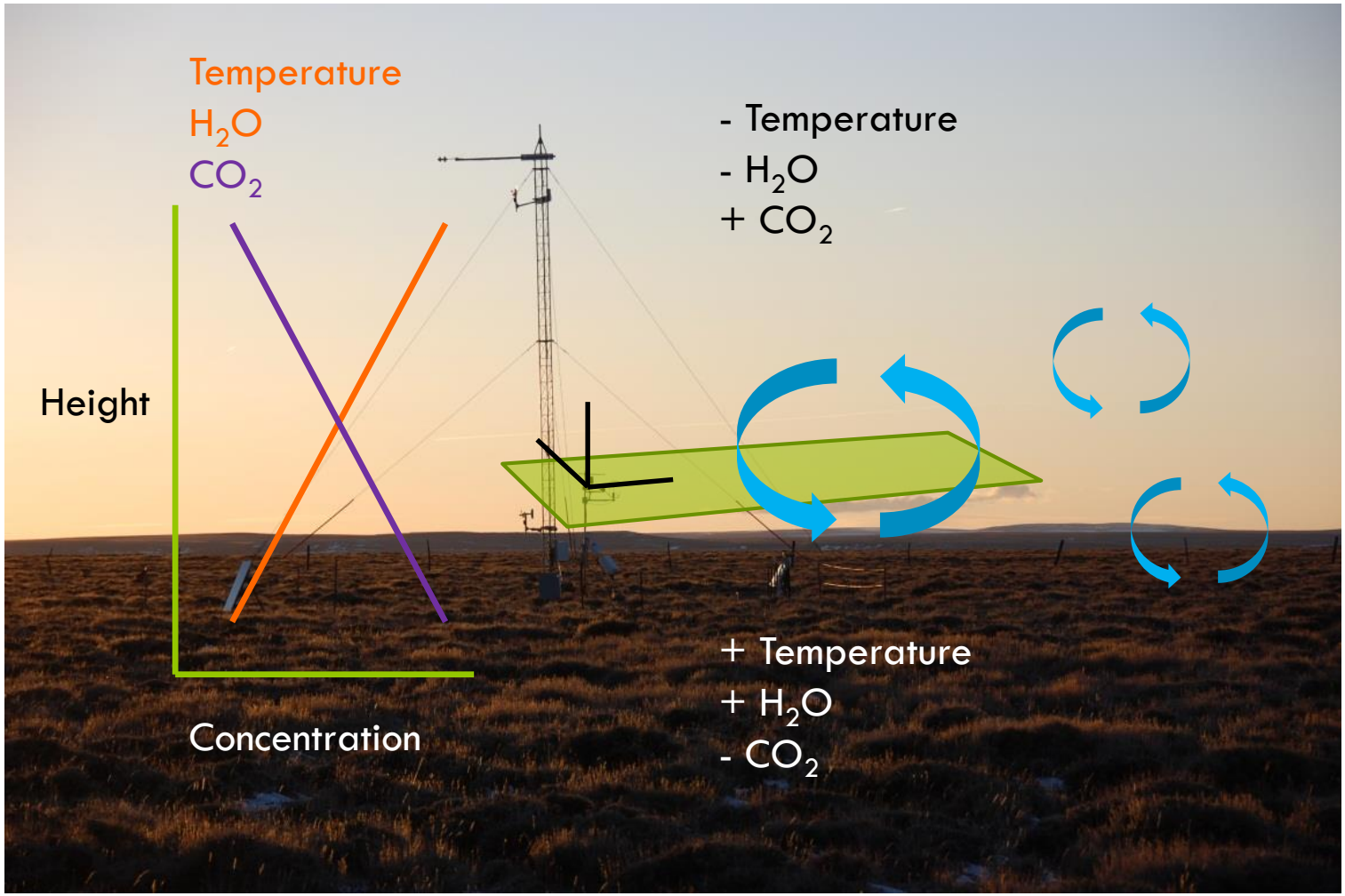
Eddy Covariance Flux Theory



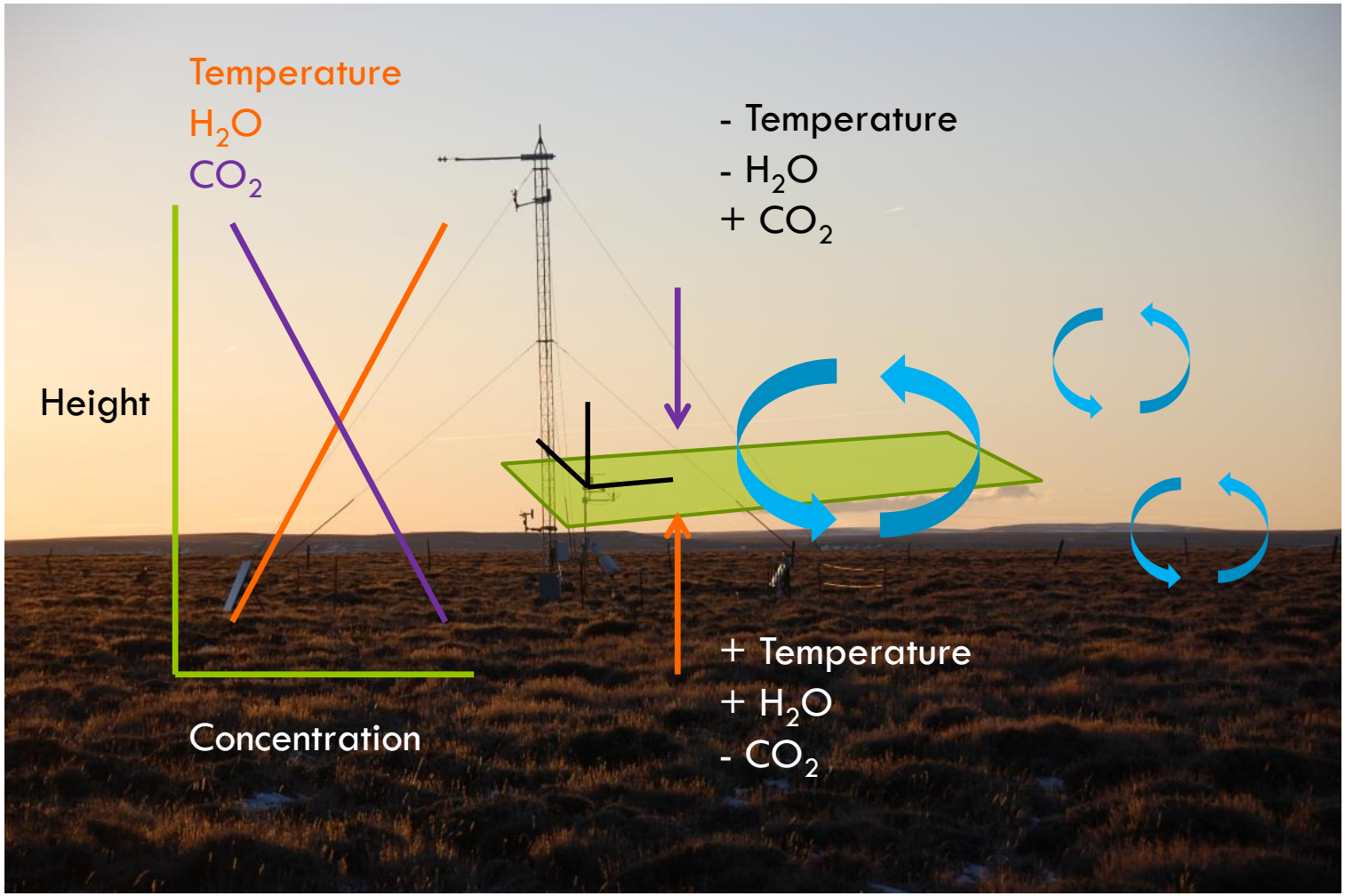
Eddy Covariance Flux Theory



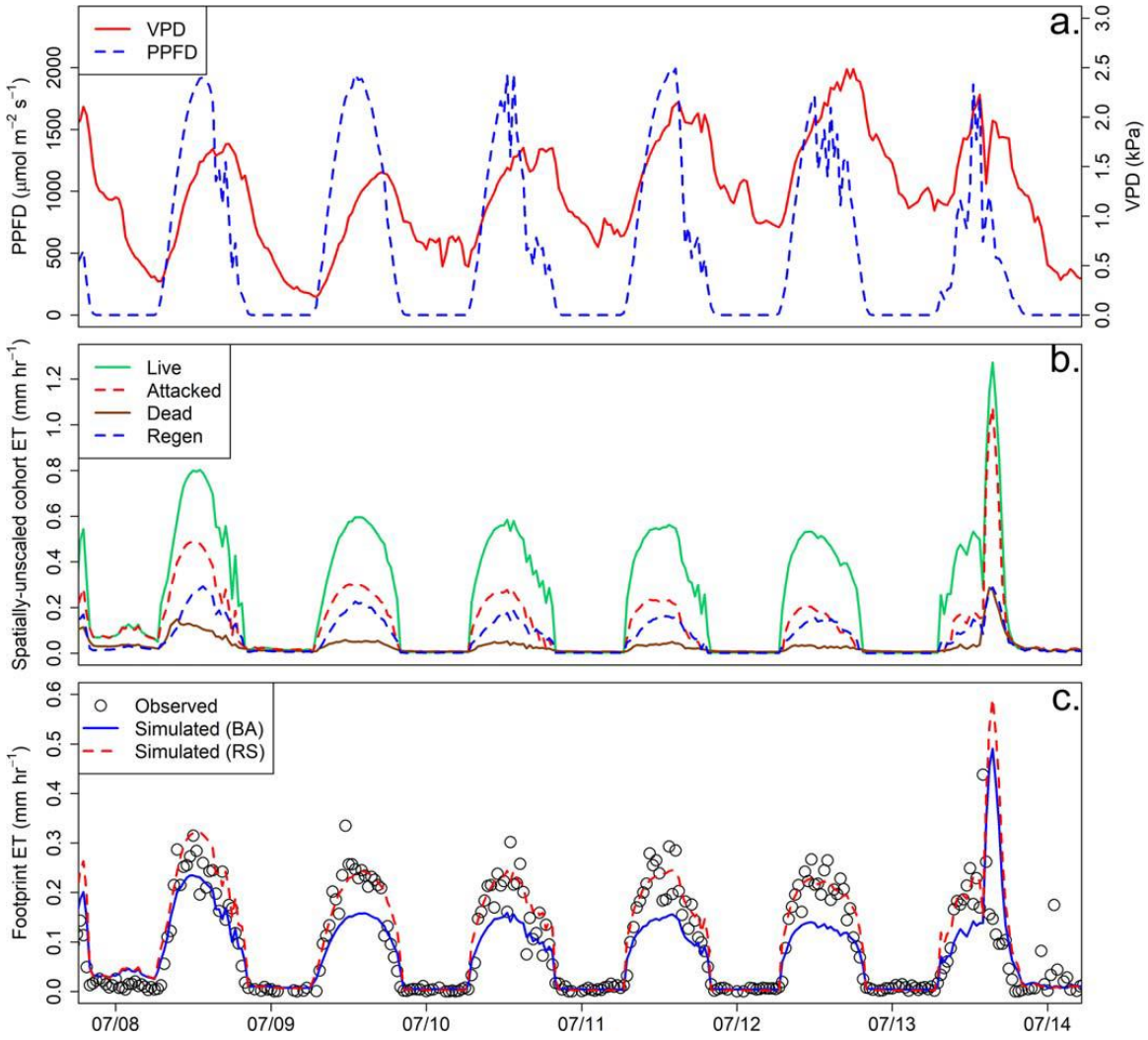
Eddy Covariance Flux Theory



Eddy Covariance Flux Theory

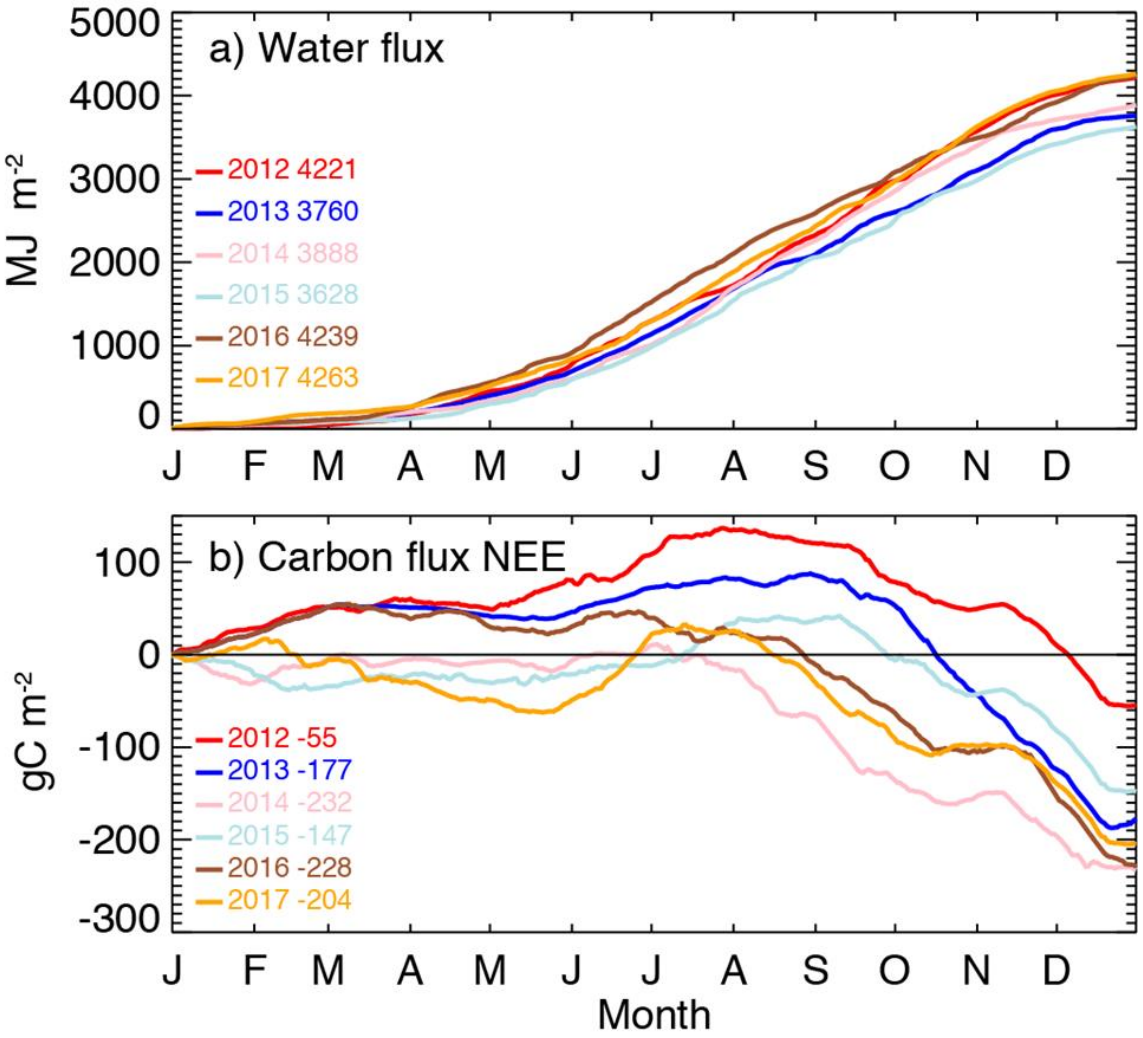


Using Flux Date



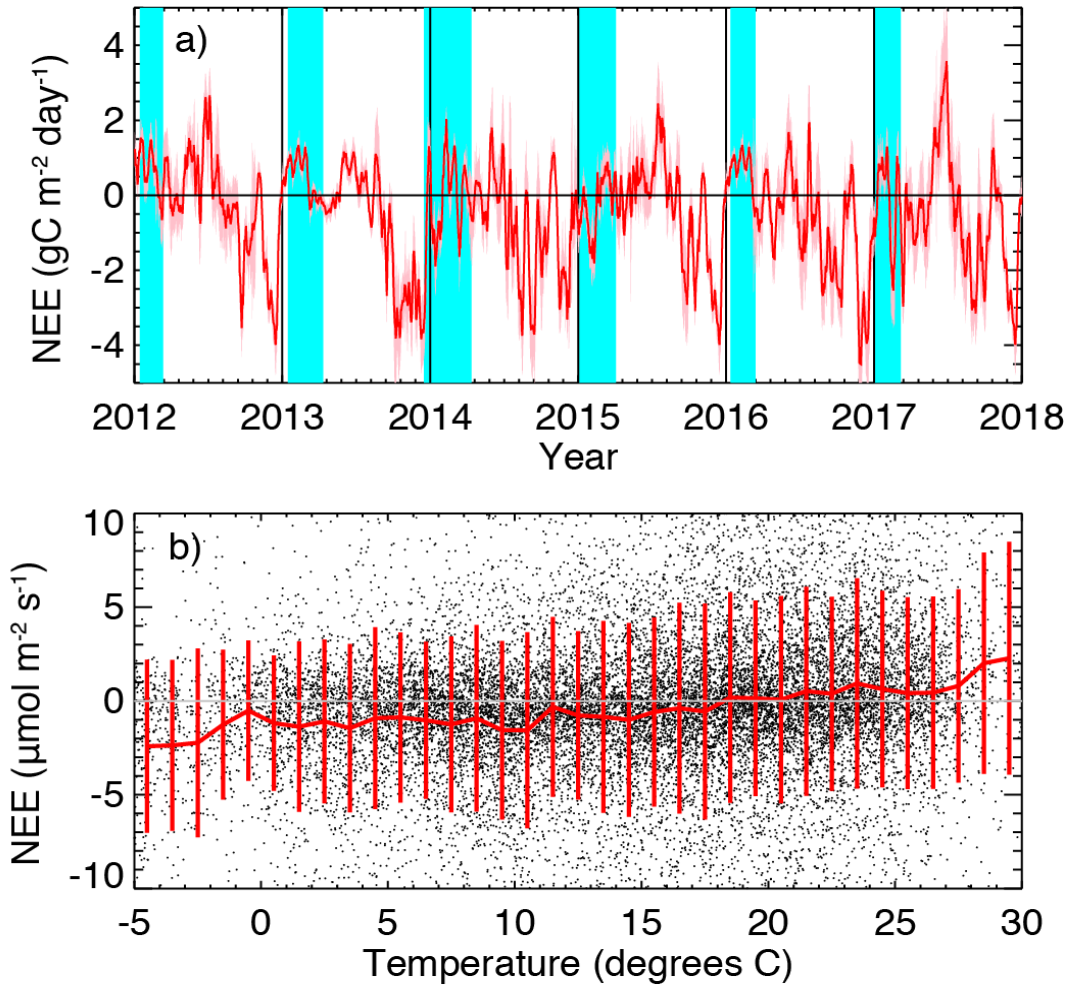
Example time series data set from the 2009 study period, including (a) photosynthetically photon flux density (PPFD) and vapor pressure deficit (VPD), (b) spatially unscaled cohort ET flux estimates, and c) simulated ET using both spatial scaling methods with observed eddy covariance estimates.

Using Flux Date



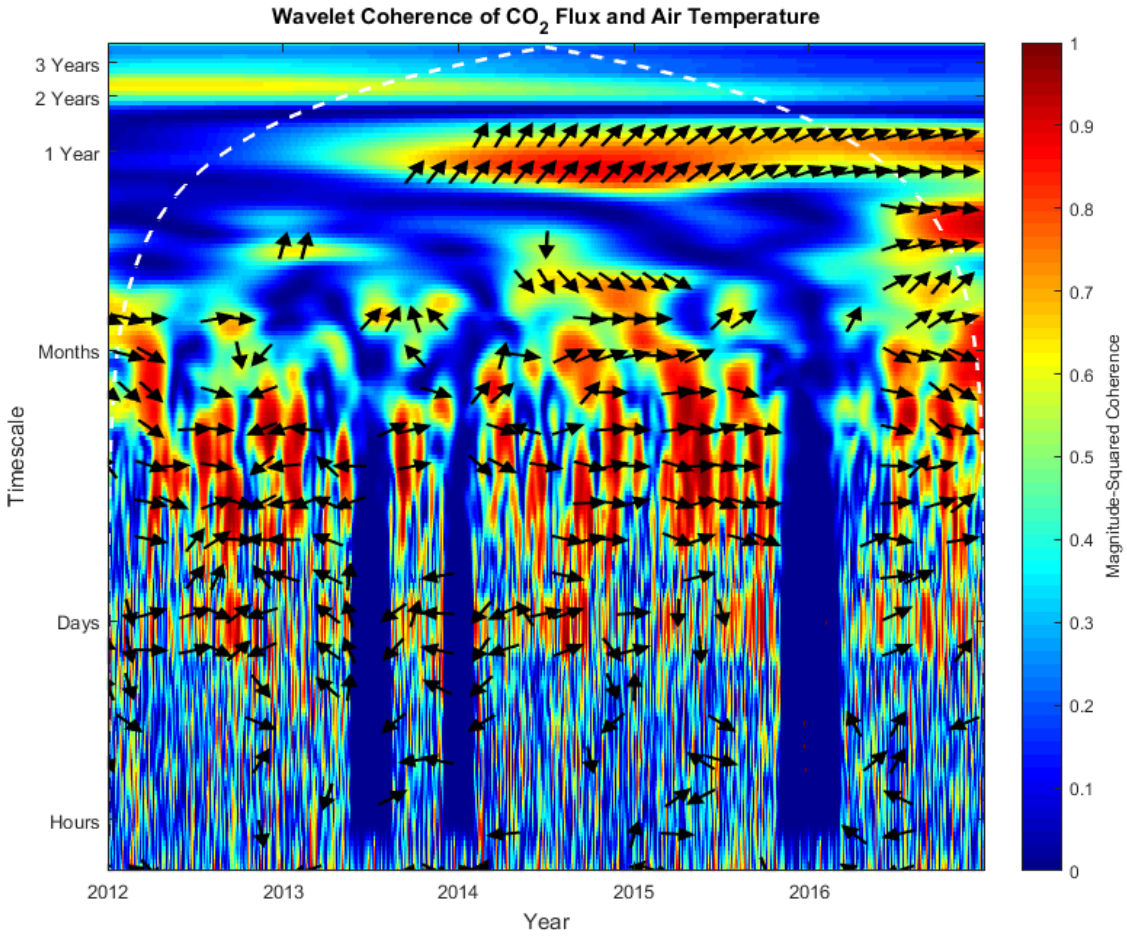
Cumulative annual Lake Mendota sums of water (a) and CO_2 (b) flux for 2012-2017 with annual sums noted.

Using Flux Date



a) Daily gap-filled NEE of carbon dioxide from 2012-2017, blue periods indicating periods of ice overage, with the average non-missing day 71% gap-filled. Positive NEE indicated carbon flux from the lake to the atmosphere. b) Red shows one degree bin averaged NEE and standard deviation

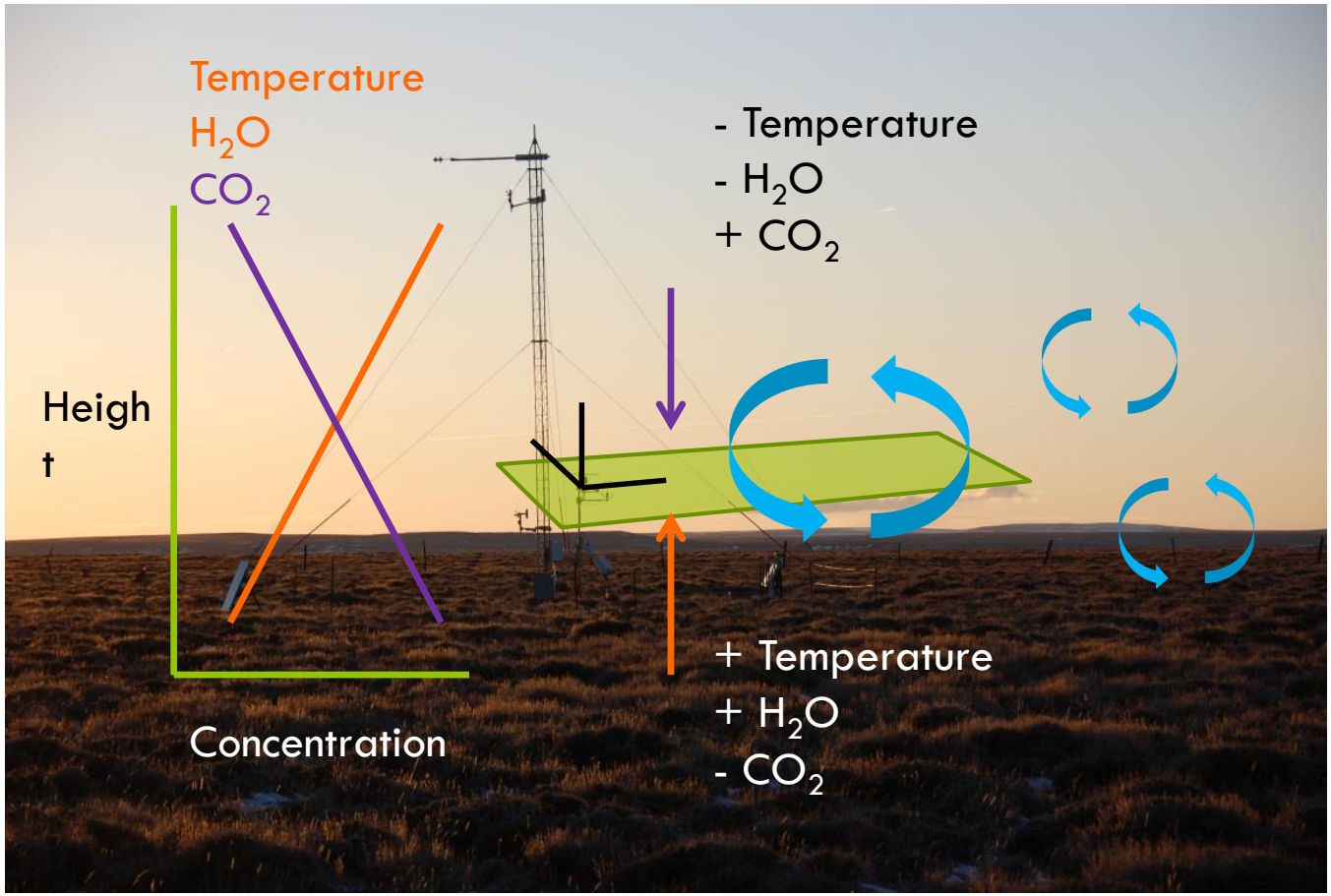
Using Flux Date



Morlet wavelet coherence plot of net CO_2 flux and air temperature for 2012-2016 with Jan 1st of each year labeled. Phase arrows in black represent the time lag between CO_2 flux and air temperature with right facing arrows showing in-phase time series, left facing arrows anti-phase time series, upward facing arrows shows temperature leading flux while a downward facing arrow shows flux leading temperature. Arrows only shown where the coherence is greater than or equal to 0.7. Cone of influence shown in white.

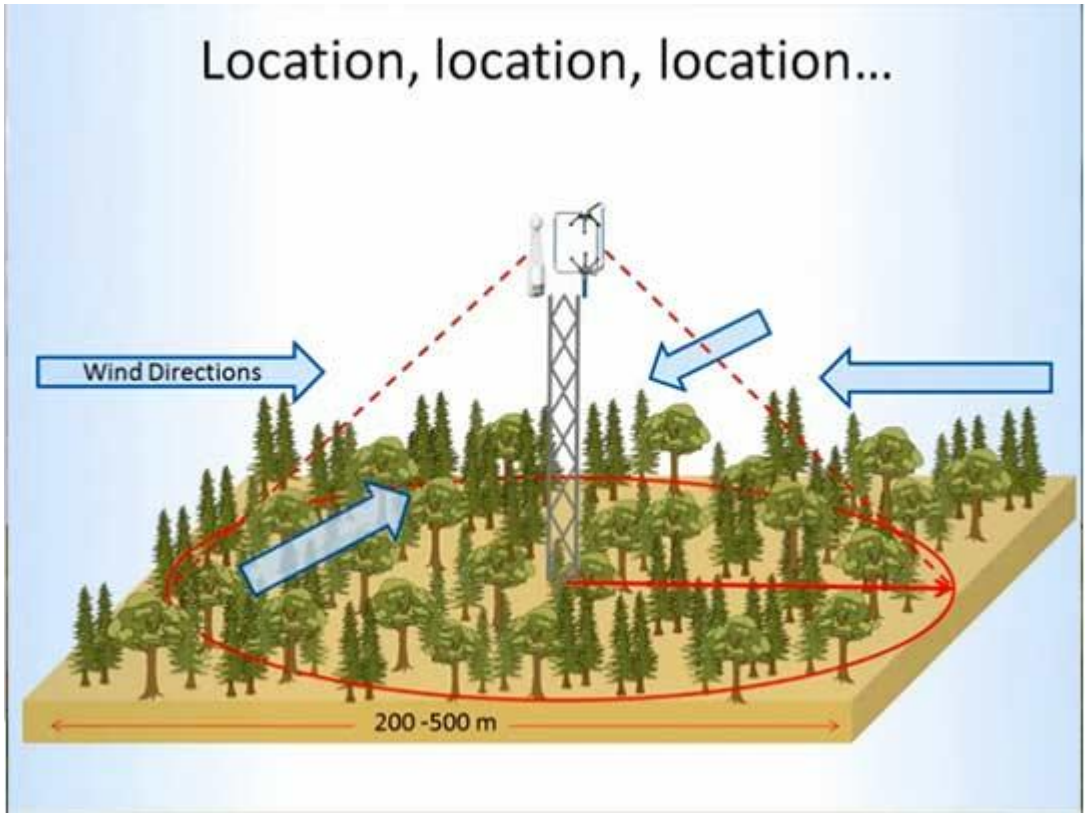
Flux Date, Things To Keep In Mind

Assumption 1: Turbulent Atmosphere



Flux Date, Things To Keep In Mind

Assumption 2: Footprint



Flux Date, Things To Keep In Mind

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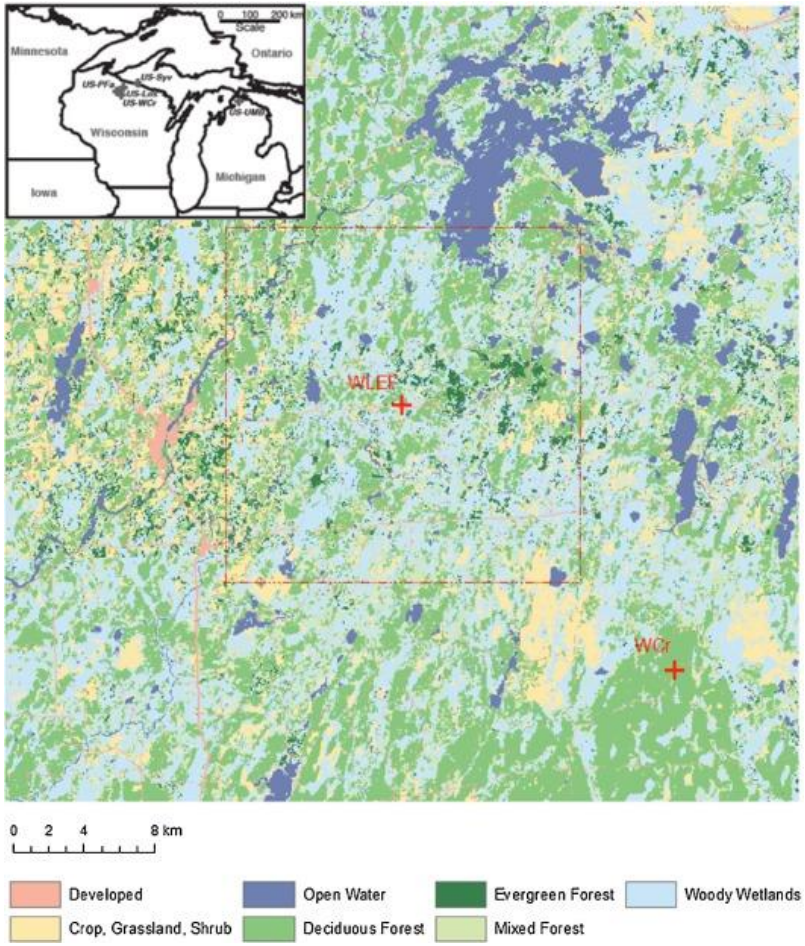

Ke Xu, Stefan Metzger, Ankur R. Desai, Upscaling tower-observed turbulent exchange at fine spatio-temporal resolution using environmental response functions, Agricultural and Forest Meteorology

Flux Date, Things To Keep In Mind

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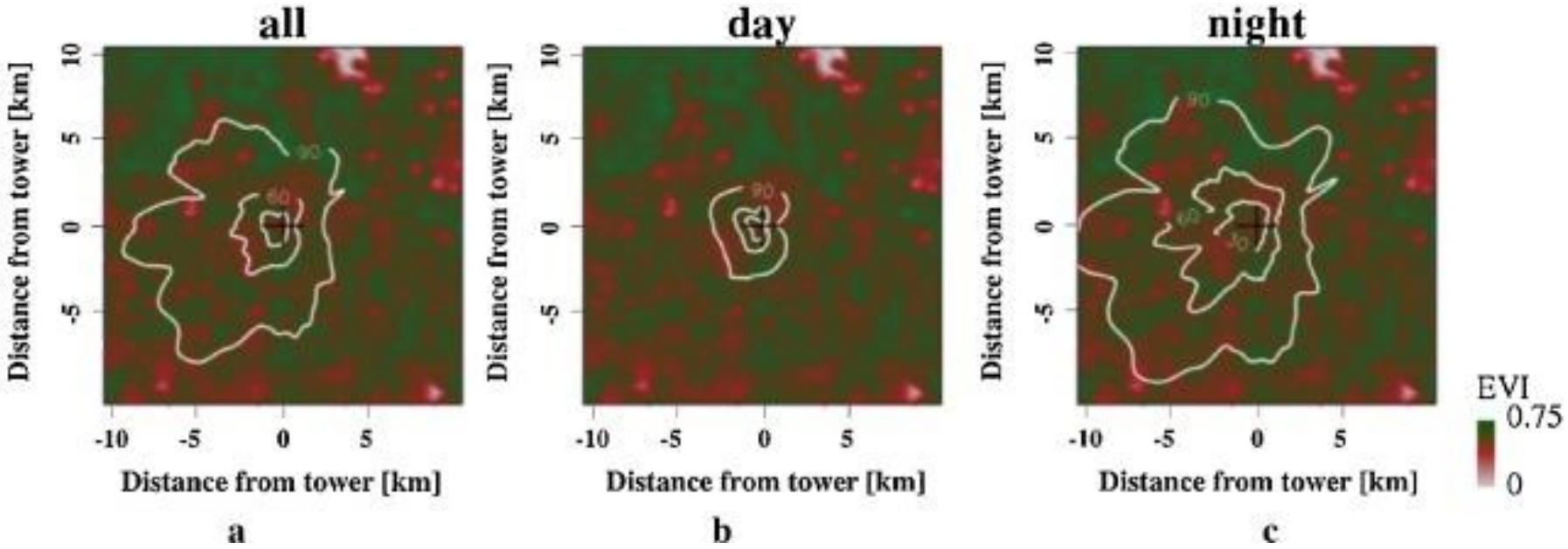
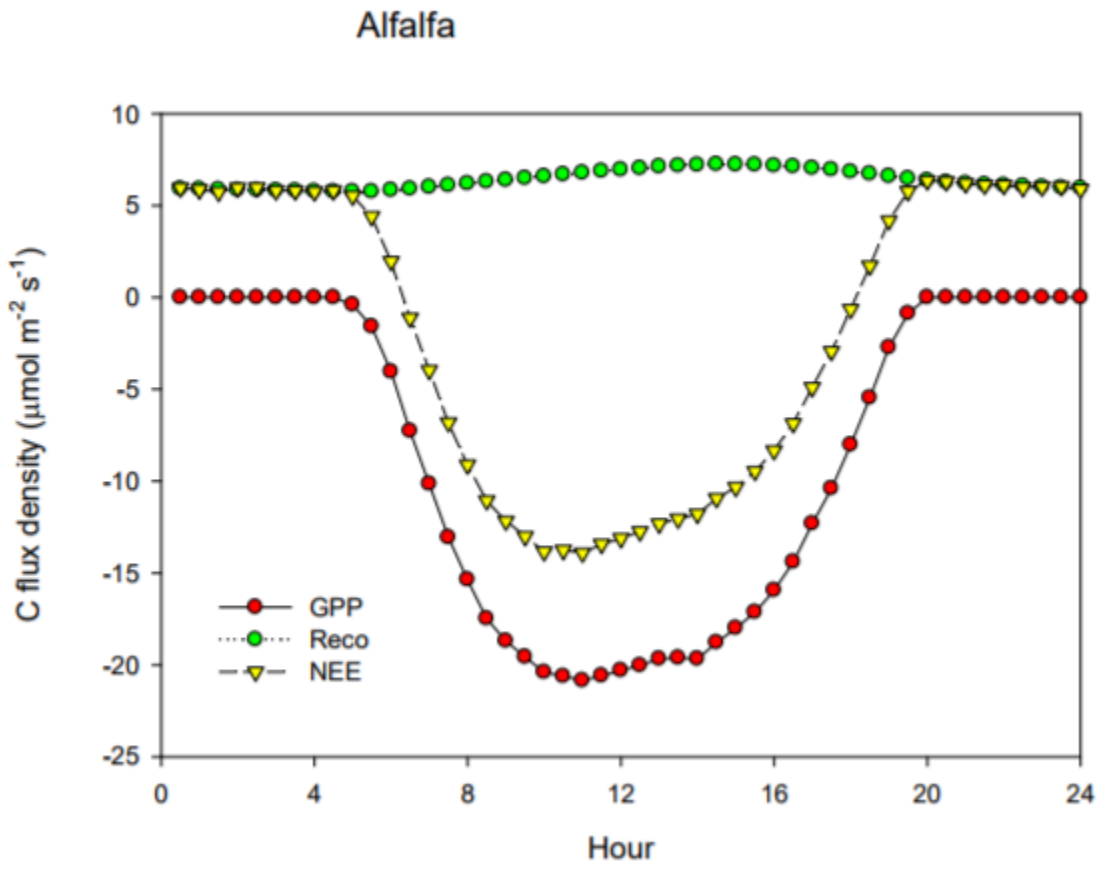


Ke Xu, Stefan Metzger, Ankur R. Desai, Upscaling tower-observed turbulent exchange at fine spatio-temporal resolution using environmental response functions, Agricultural and Forest Meteorology

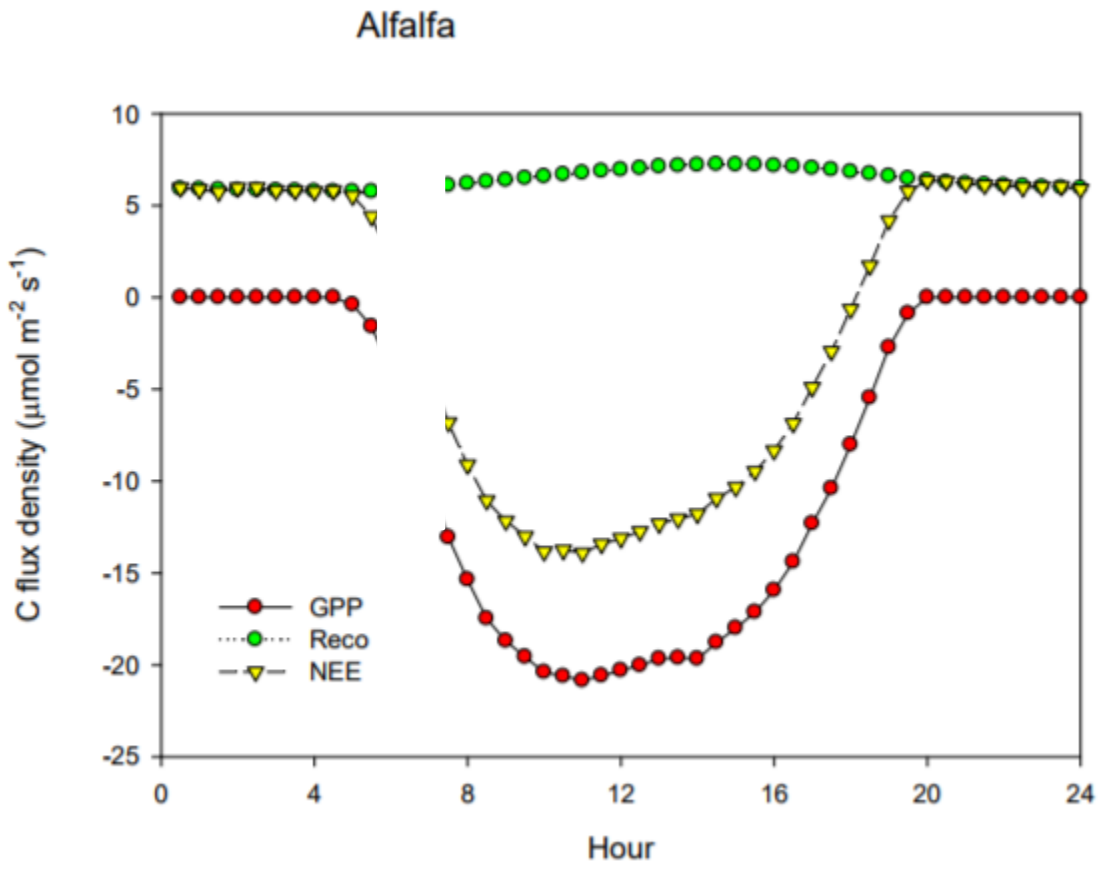
Flux Date, Things To Keep In Mind

Assumption 3: Flux Partitioning



Flux Date, Things To Keep In Mind

Assumption 4: Gap Filling



Flux Date, Things To Keep In Mind

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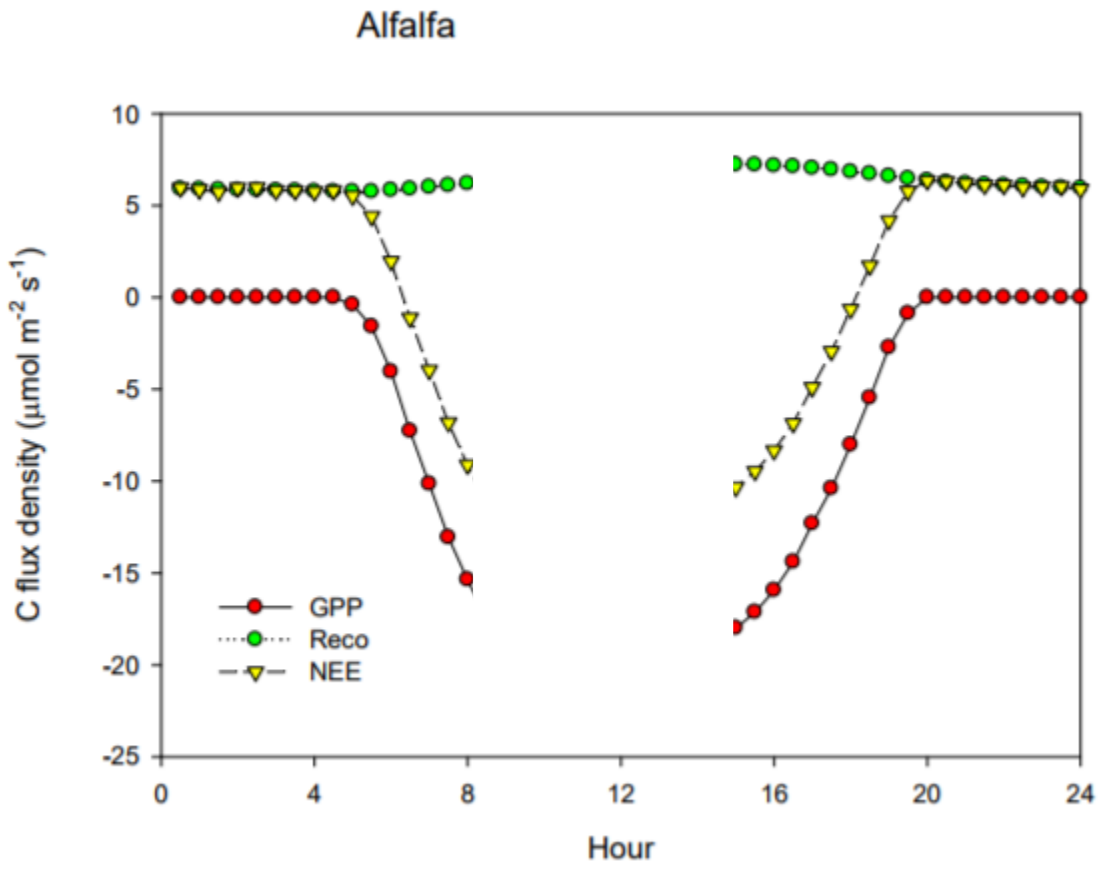

Flux Date, Things To Keep In Mind

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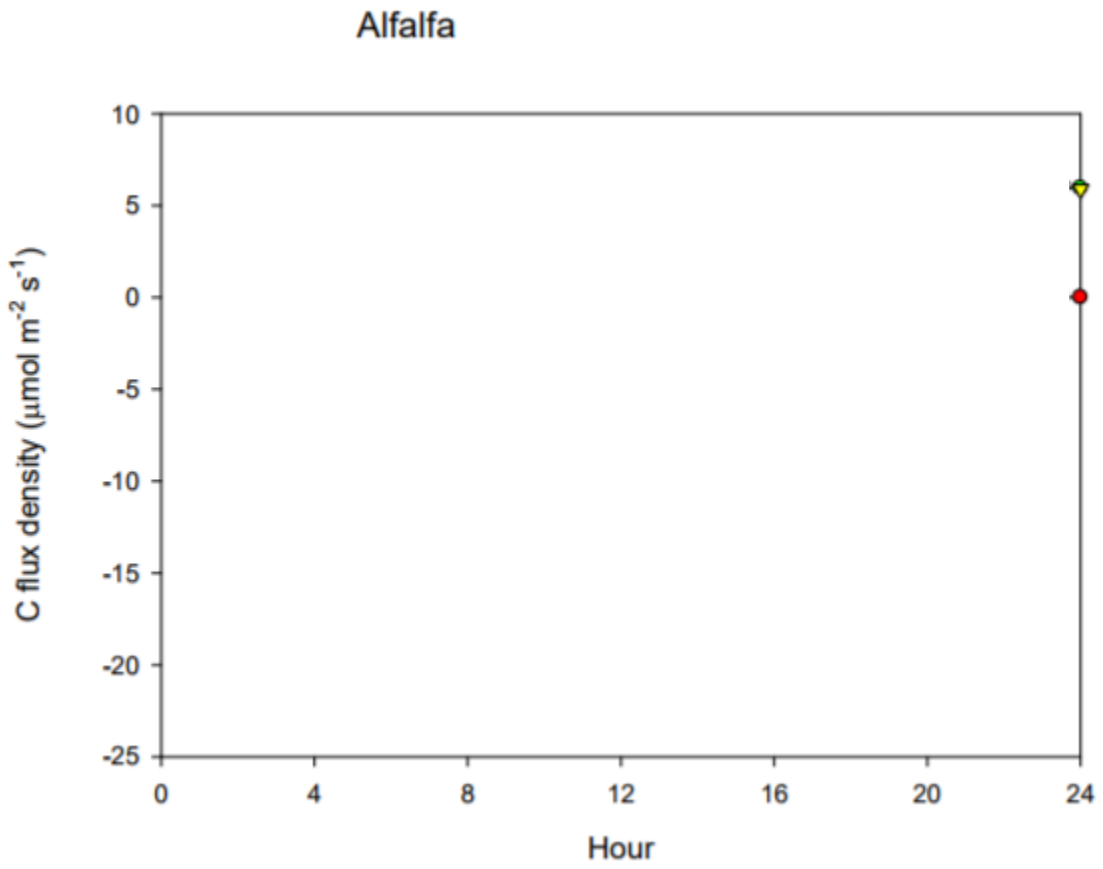
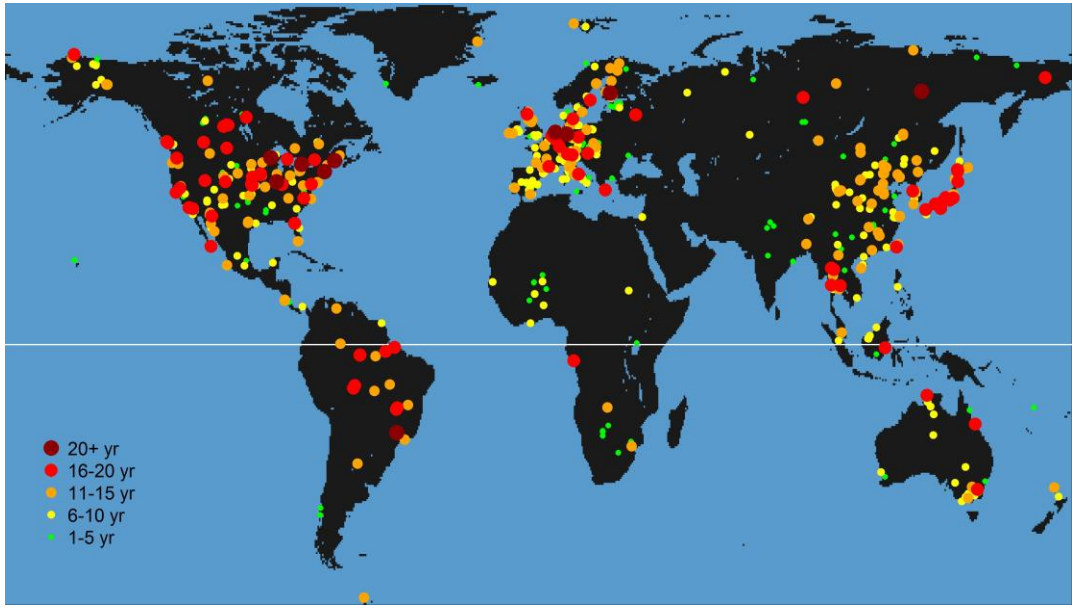
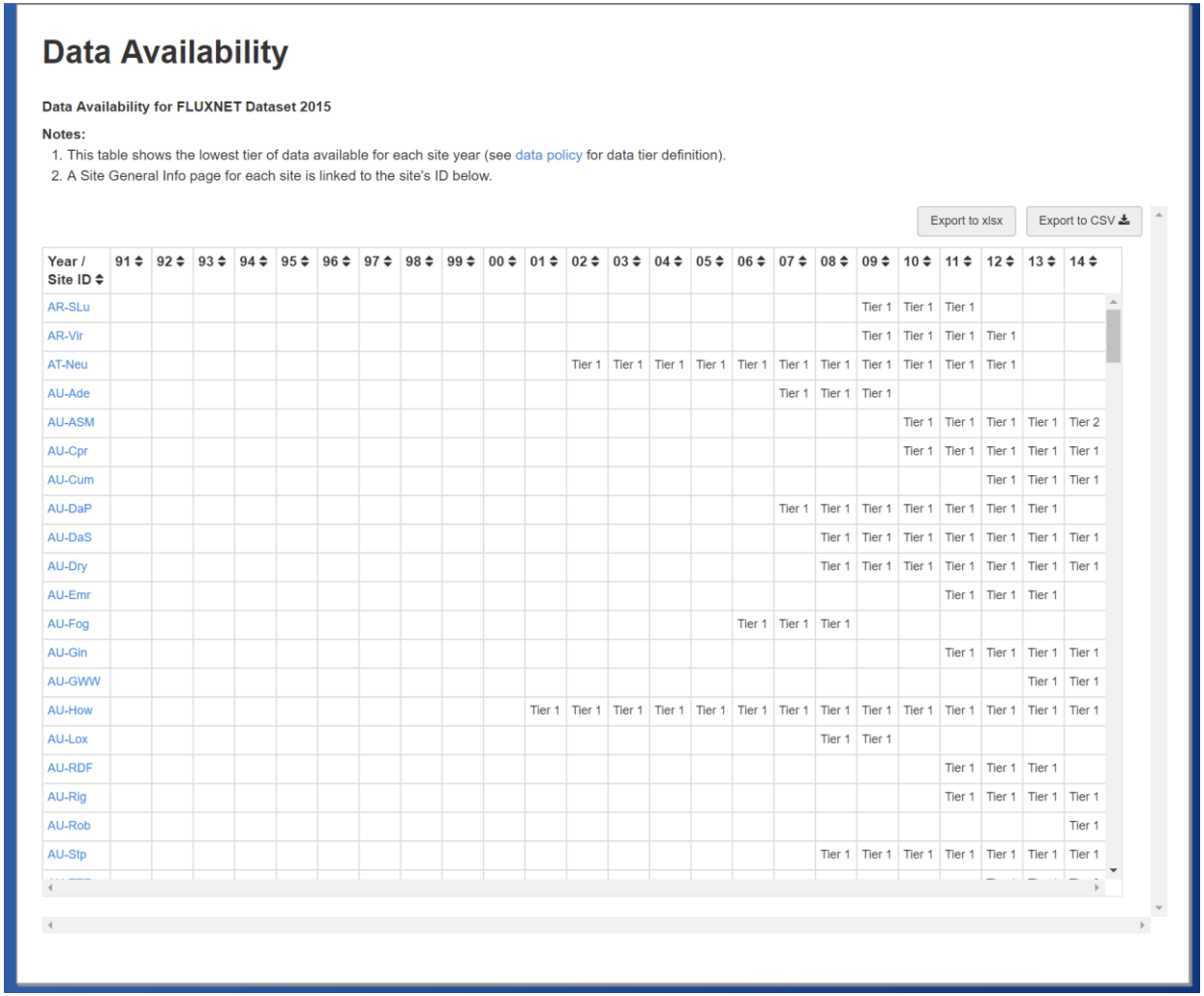


Finding Flux Date

- Fluxnet 2015
  - 1991-2015
- Global data from multiple flux networks



Finding Flux Date



Data Availability

Data Availability for FLUXNET Dataset 2015

Notes:

1. This table shows the lowest tier of data available for each site year (see data policy for data tier definition).
2. A Site General Info page for each site is linked to the site's ID below.

Export to xlsx | Export to CSV

Year / Site ID	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14
AR-SLu																			Tier 1	Tier 1	Tier 1			
AR-Vir																			Tier 1	Tier 1	Tier 1	Tier 1		
AT-Neu												Tier 1	Tier 1	Tier 1	Tier 1	Tier 1	Tier 1	Tier 1	Tier 1	Tier 1	Tier 1	Tier 1		
AU-Ade																	Tier 1	Tier 1	Tier 1					
AU-ASM																				Tier 1	Tier 1	Tier 1	Tier 1	Tier 2
AU-Cpr																				Tier 1	Tier 1	Tier 1	Tier 1	Tier 1
AU-Cum																						Tier 1	Tier 1	Tier 1
AU-DaP																	Tier 1	Tier 1	Tier 1	Tier 1	Tier 1	Tier 1	Tier 1	
AU-DaS																		Tier 1	Tier 1	Tier 1	Tier 1	Tier 1	Tier 1	Tier 1
AU-Dry																		Tier 1	Tier 1	Tier 1	Tier 1	Tier 1	Tier 1	Tier 1
AU-Emr																					Tier 1	Tier 1	Tier 1	
AU-Fog																Tier 1	Tier 1	Tier 1						
AU-Gin																					Tier 1	Tier 1	Tier 1	Tier 1
AU-GWW																							Tier 1	Tier 1
AU-How											Tier 1	Tier 1	Tier 1	Tier 1	Tier 1	Tier 1	Tier 1	Tier 1	Tier 1	Tier 1	Tier 1	Tier 1	Tier 1	Tier 1
AU-Lox																		Tier 1	Tier 1					
AU-RDF																					Tier 1	Tier 1	Tier 1	
AU-Rig																					Tier 1	Tier 1	Tier 1	Tier 1
AU-Rob																								Tier 1
AU-Stp																		Tier 1	Tier 1	Tier 1	Tier 1	Tier 1	Tier 1	Tier 1

Finding Flux Date

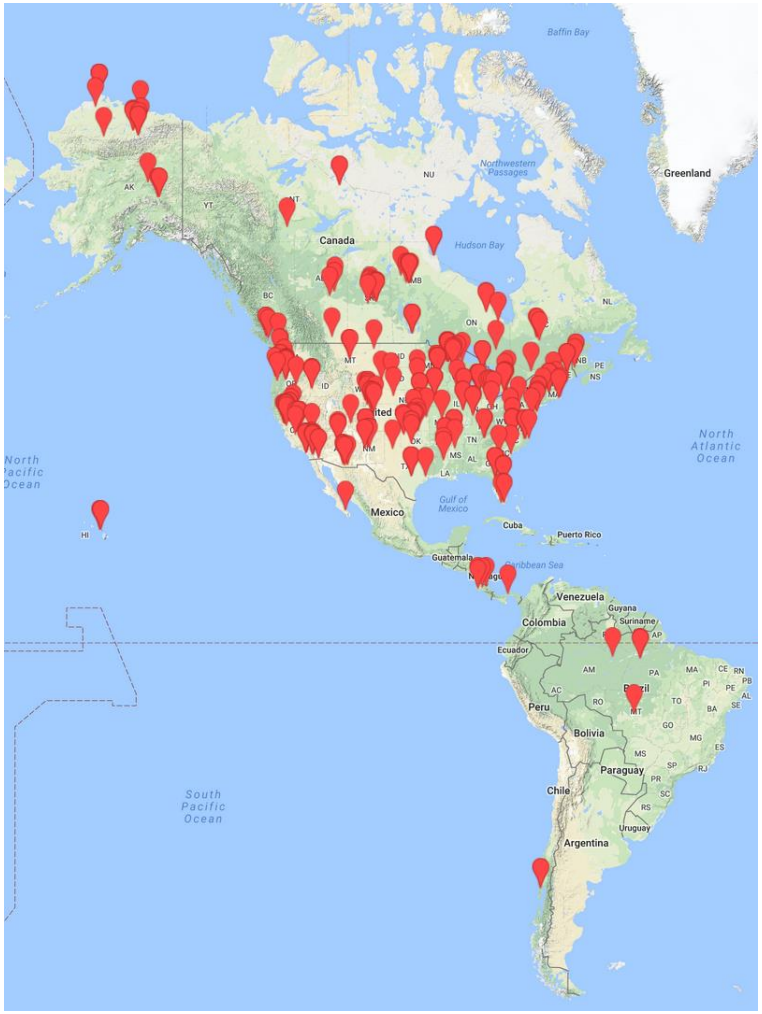
Return to fluxnet.fluxdata.org

General Site Information	
Site ID:	US-Sta
Site Name:	Saratoga
Tower Team:	PI: Brent Ewers <BEEwers@uwyo.edu> - University of Wyoming PI: Elise Pendall <e.pendall@westernsydney.edu.au> - University of Wyoming DataManager: David Reed <david.edwin.reed@gmail.com> - University of Wyoming
Latitude:	41.3966
Longitude:	-106.8024
Elevation (m):	2069
Network	AmeriFlux
IGBP:	OSH (Open Shrublands)
Mean Annual Temperature (degrees C):	5.1
Data Products:	FLUXNET2015 Dataset
Data Availability:	FLUXNET2015: 5 years (Duration: 2005 - 2009)
Data Downloads to Date:	FLUXNET2015: 333 unique downloads
Description:	Sagebrush steppe ecosystem
Site image(s):	No images.

These pages show the current information available at http://fluxnet.fluxdata.org about this tower.
If any of this information is wrong or missing, please submit corrections and updates via http://fluxnet.fluxdata.org

Finding Flux Date

- Ameriflux
  - 1991-2017
- As name implies, focuses on American sites



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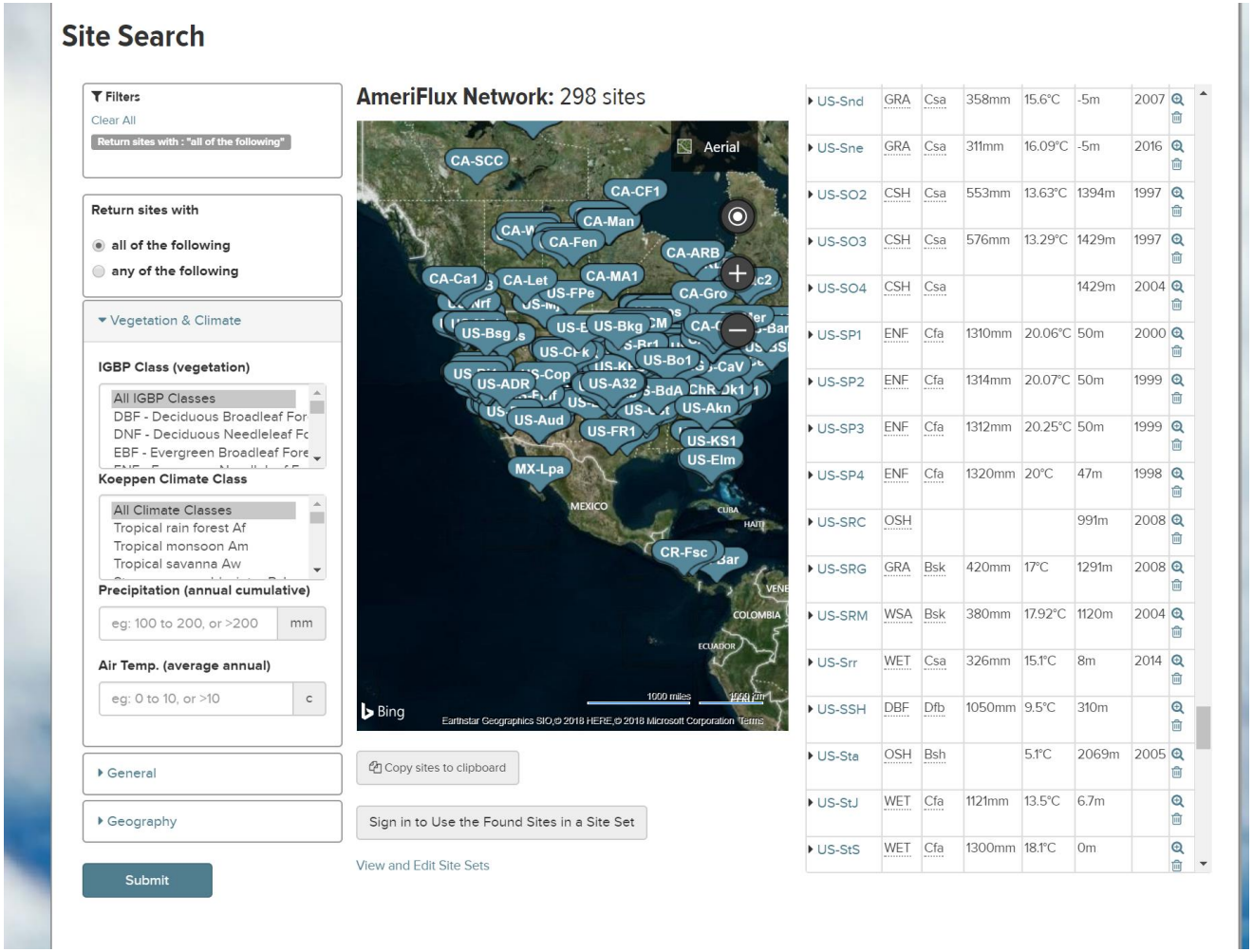

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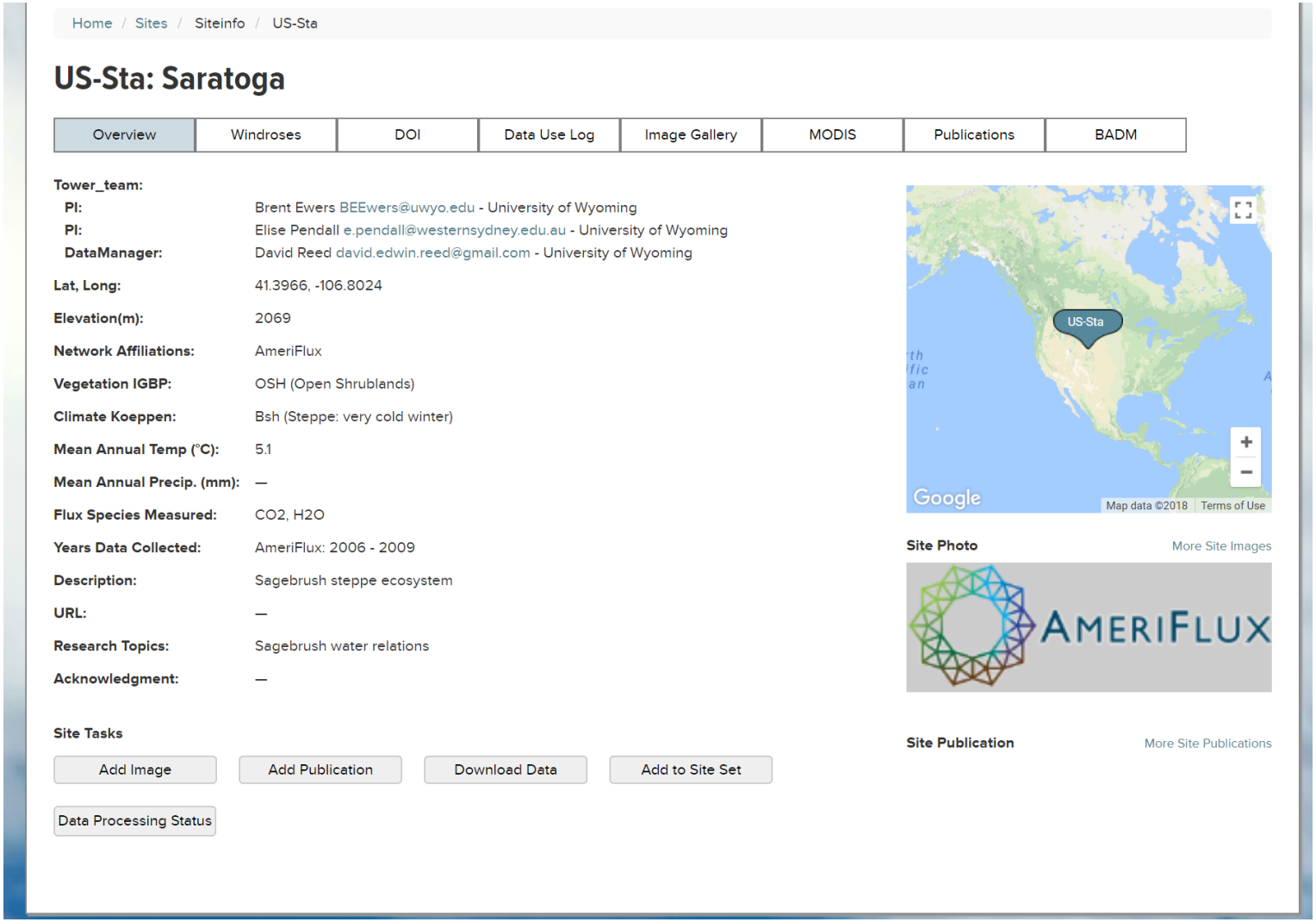

Finding Flux Date