

2007

- 20+ yr
- 15-19 yr

Flux Everywhere, All of the Time ?

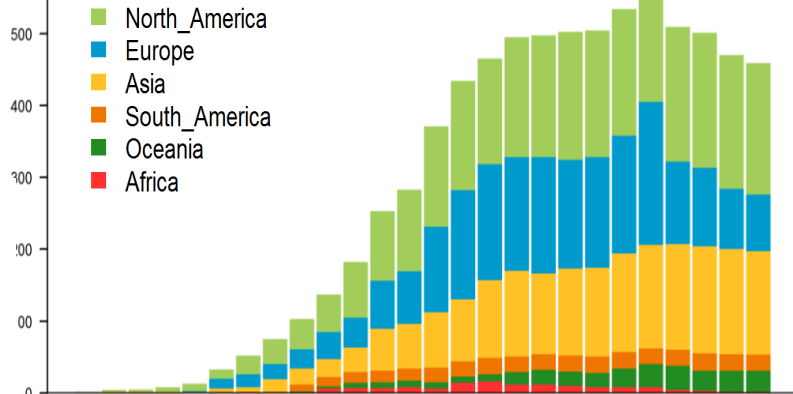
2017

- 20+ yr
- 15-19 yr
- 10-14 yr
- 5-9 yr
- 1-4 yr

*Housen Chu, Dennis Baldocchi, UC Berkeley
FLUXNET Contributors*

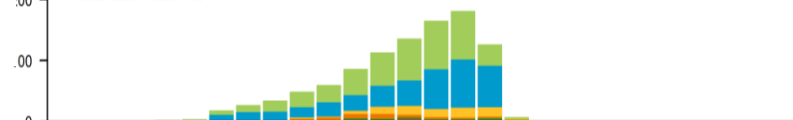
(a) Registered Tower Sites

Total Registered Sites: 914
Total Site-Year: 7479
Active Sites in 2016: 459



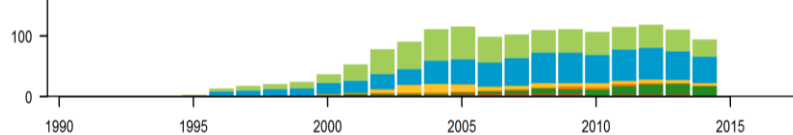
(b) Tower Sites in La Thuile Dataset

Total Sites: 252
Total Site-Year: 965

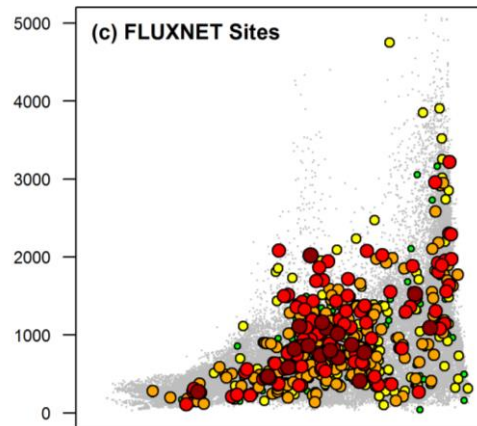


(c) Tower Sites in FLUXNET2015 Dataset

Total Sites: 212
Total Site-Year: 1531

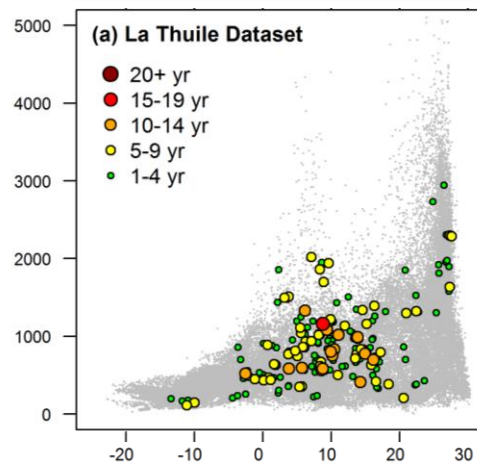


(c) FLUXNET Sites

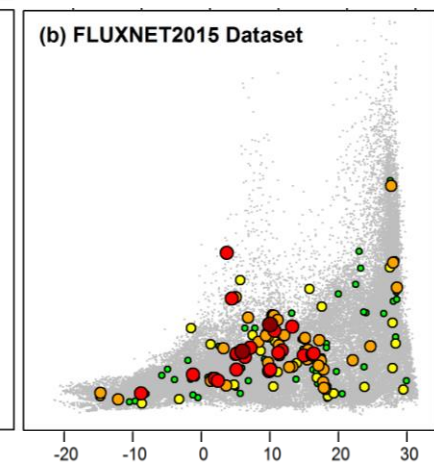


(a) La Thuile Dataset

- 20+ yr
- 15-19 yr
- 10-14 yr
- 5-9 yr
- 1-4 yr

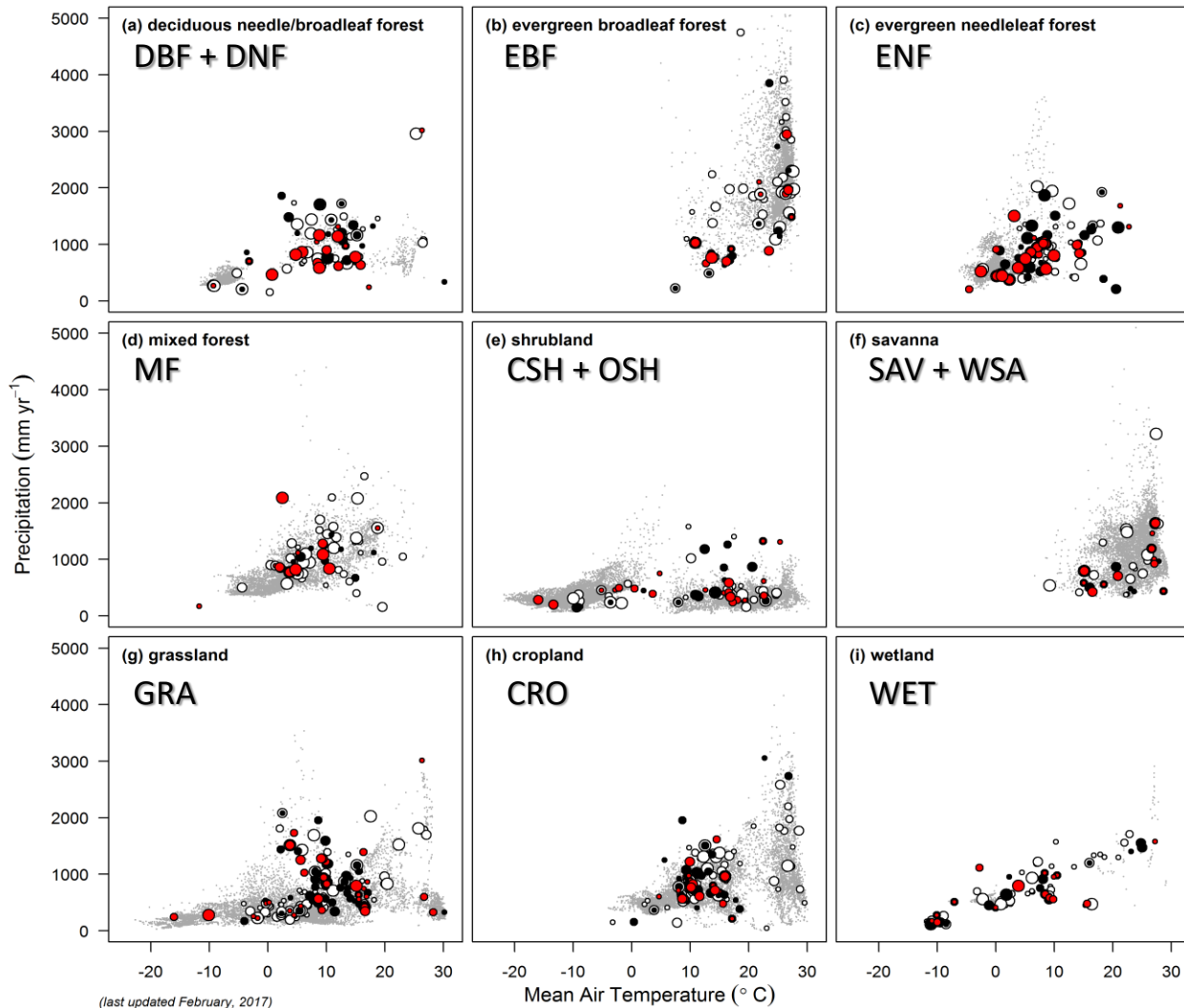


(b) FLUXNET2015 Dataset



Year

Air Temperature (°C)



(last updated February, 2017)

Site Operation

- 15+ yr
- 10-14 yr
- 5-9 yr
- 1-4 yr

Data Available
(Network)

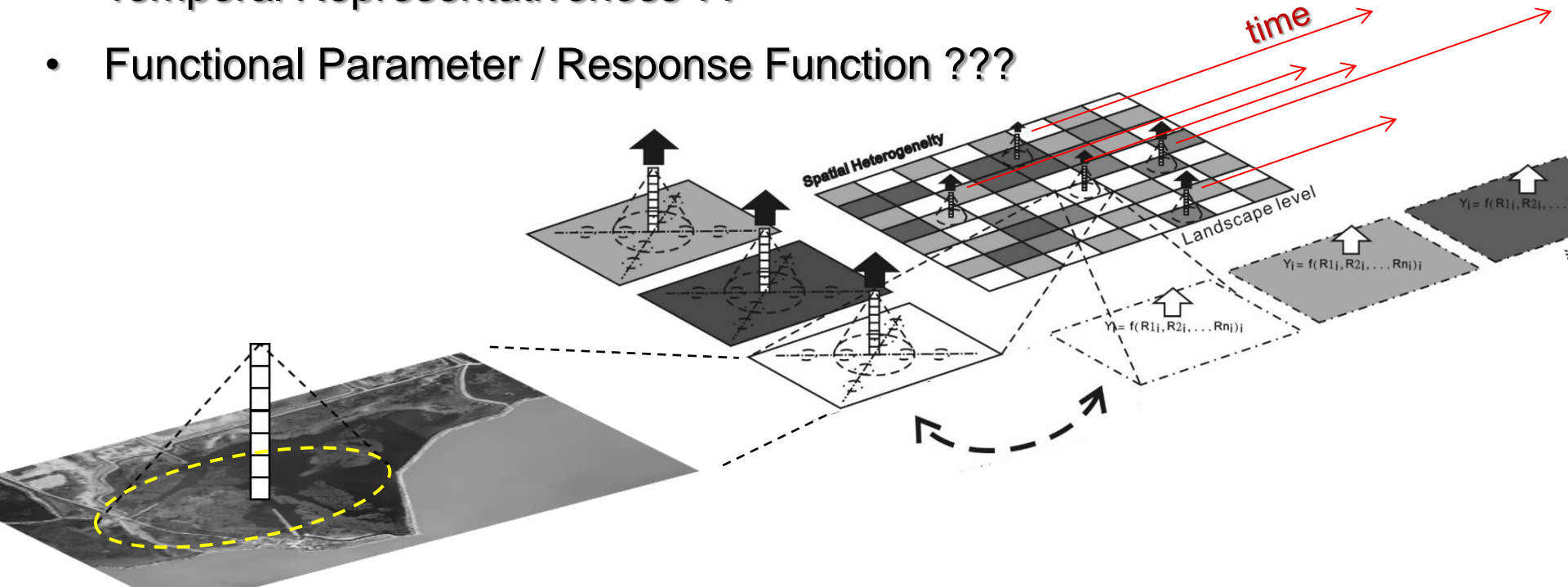
- 15+ yr
- 10-14 yr
- 5-9 yr
- 1-4 yr

FLUXNET2015

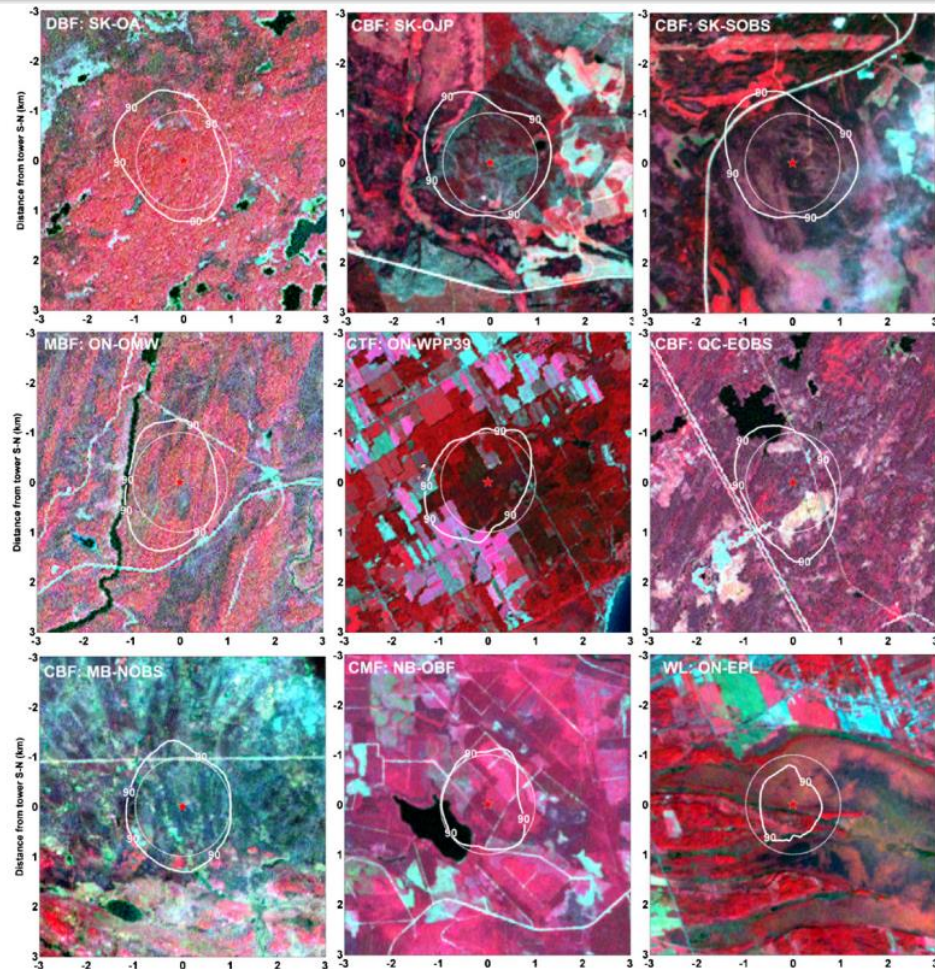
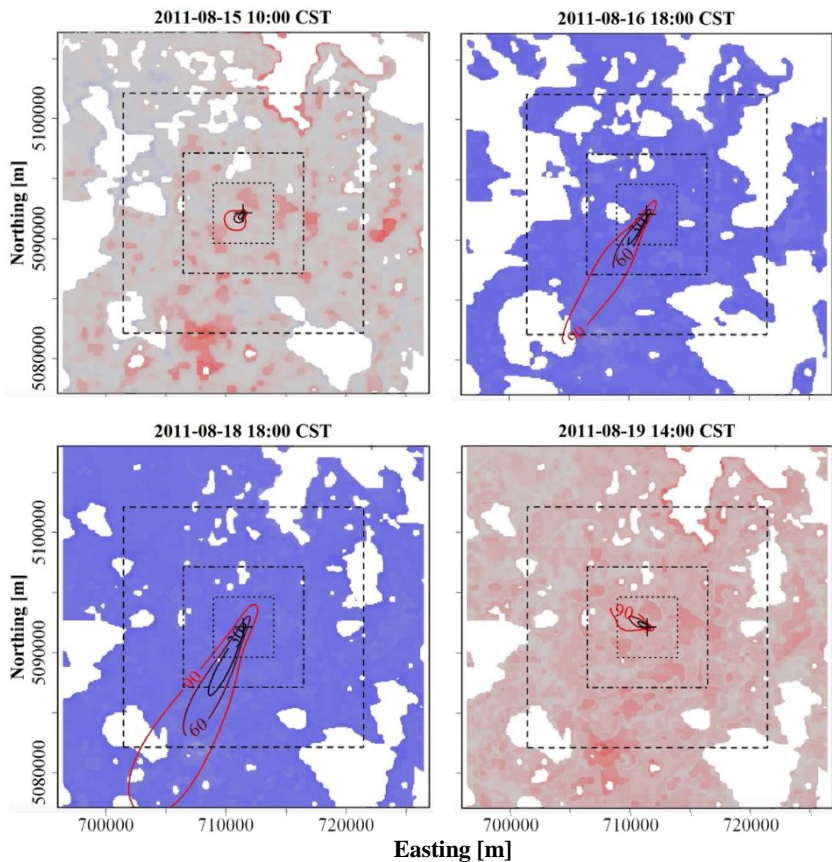
- 15+ yr
- 10-14 yr
- 5-9 yr
- 1-4 yr

Flux Everywhere, All of the Time ?

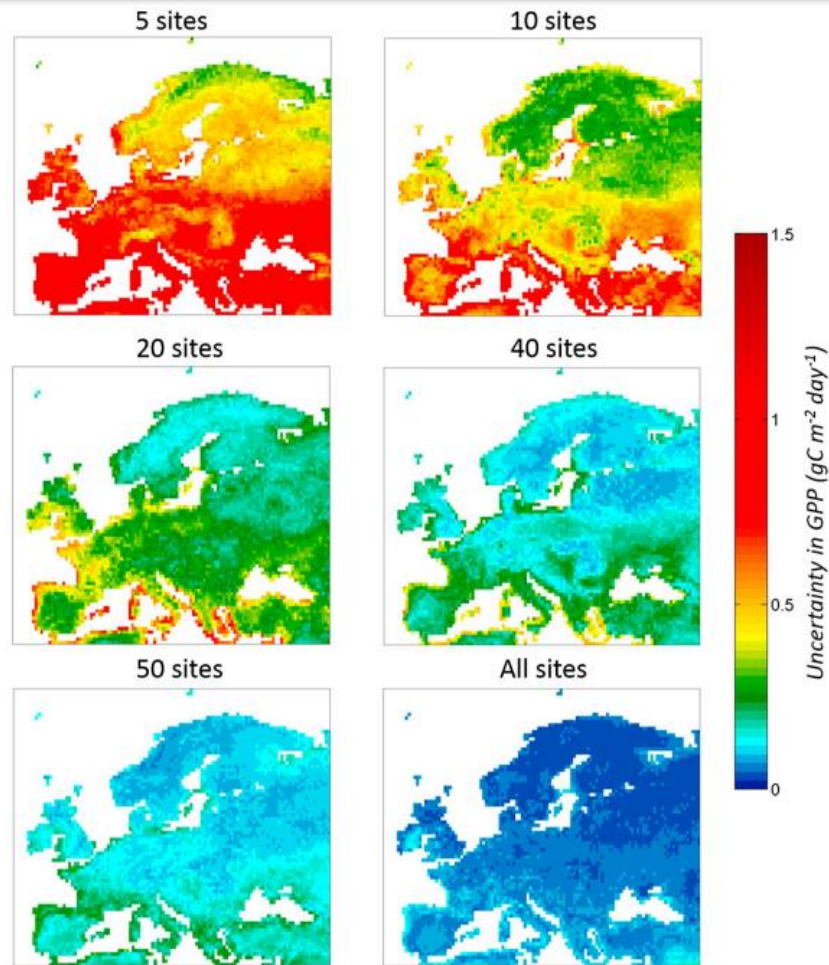
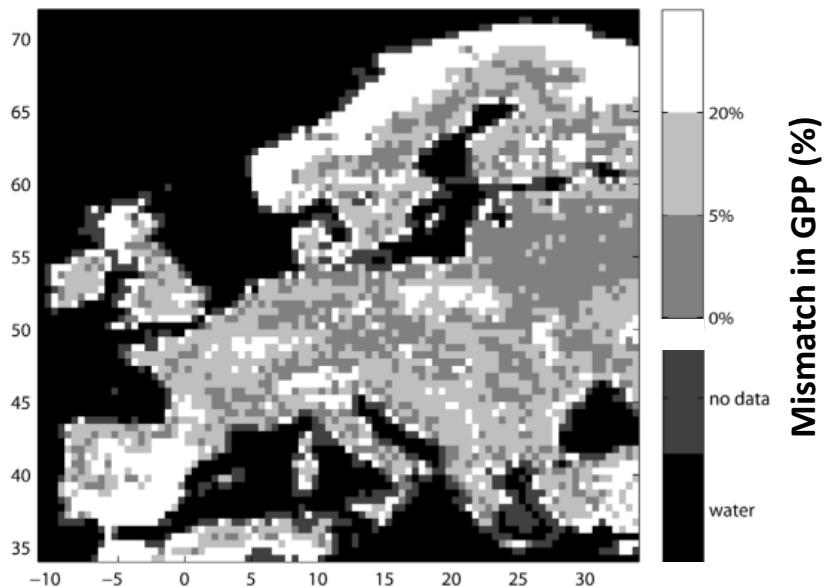
- Footprint-to-Grid Representativeness ??
- Grid-to-Grid Representativeness ?
- Temporal Representativeness ??
- Functional Parameter / Response Function ???

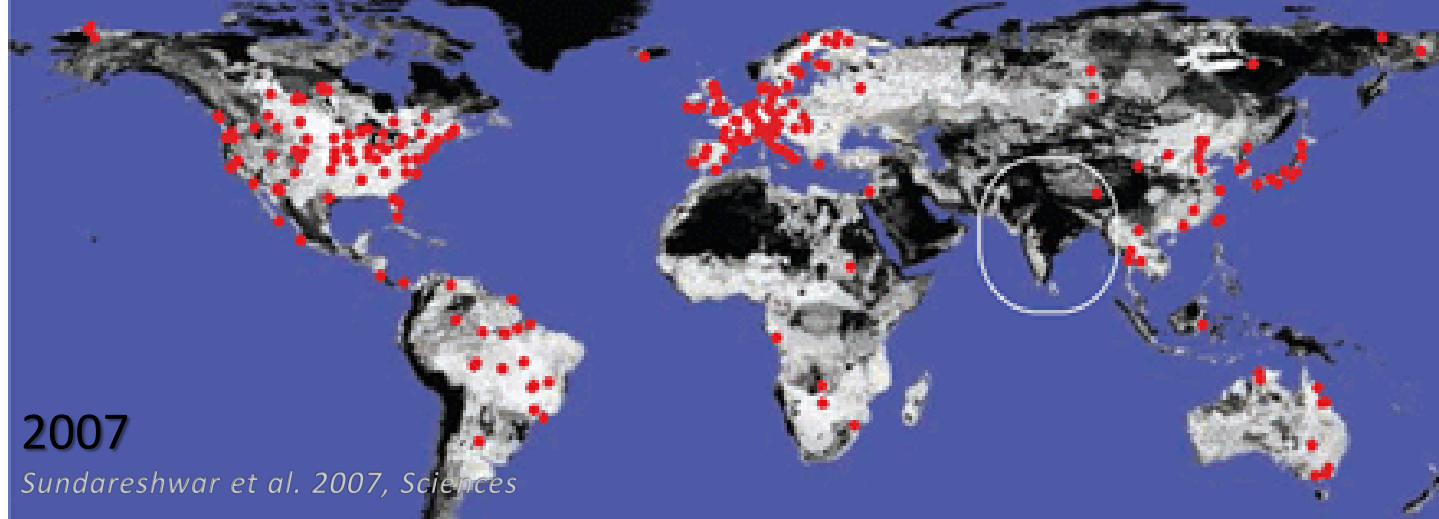


Footprint-to-Grid Representativeness



Grid-to-Grid Representativeness



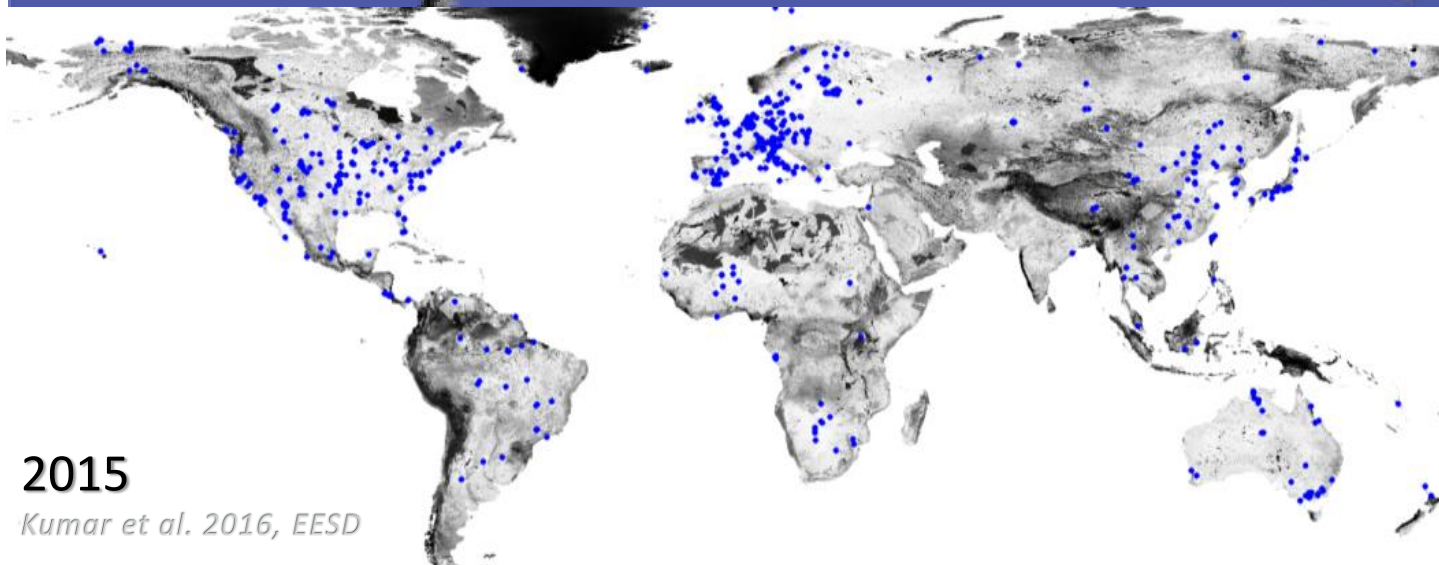


Driver-based Representativeness

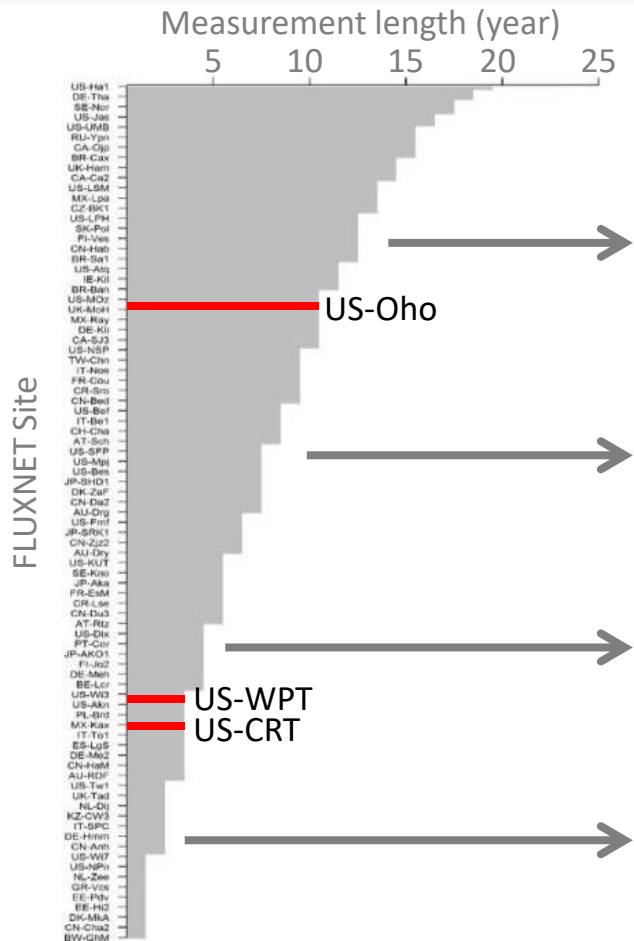
Well represented

Poorly represented

● ● FLUXNET sites



Temporal Representativeness

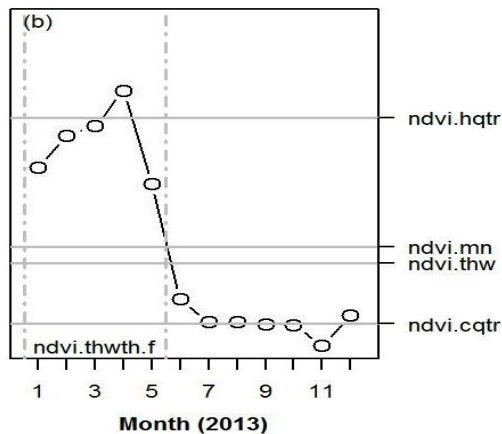


Driver-based Representativeness

(Hargrove et al. 2003; Sulkava et al., 2011)

CRU TS, ERA-Interim, GIMMS (1982-2013)

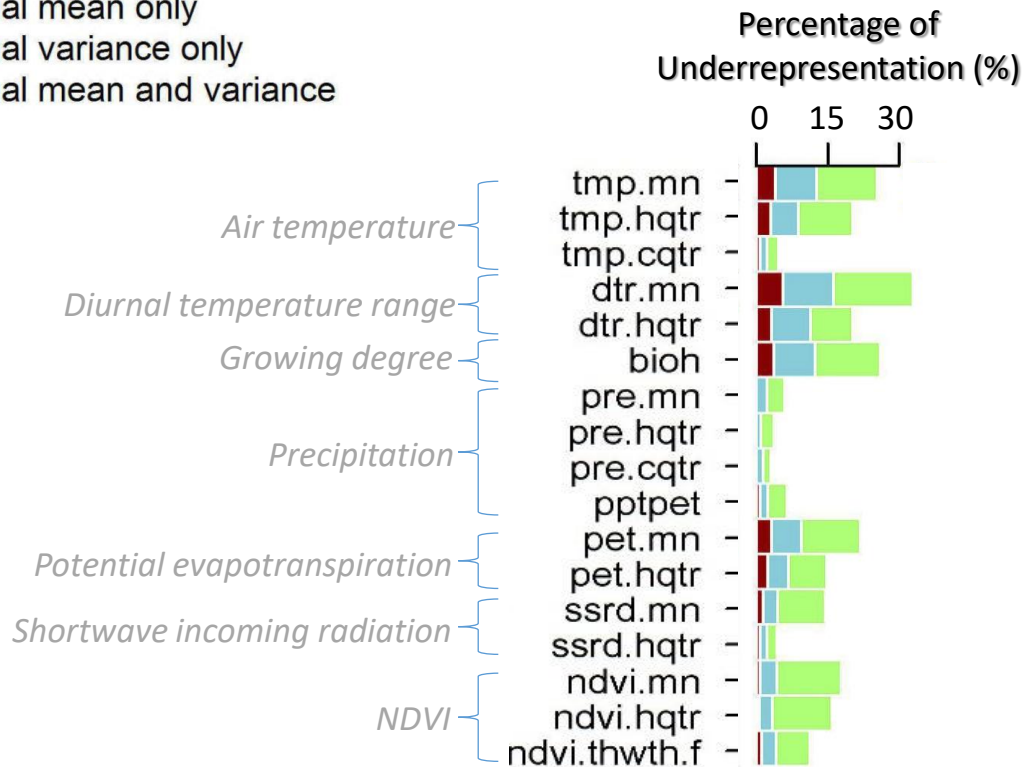
- Air temperature (tmp)
- Precipitation (pre)
- Diurnal temperature range (dtr)
- Potential evapotranspiration (pet)
- Shortwave incoming radiation (ssr)
- Normalized Difference Vegetation Index (ndvi)

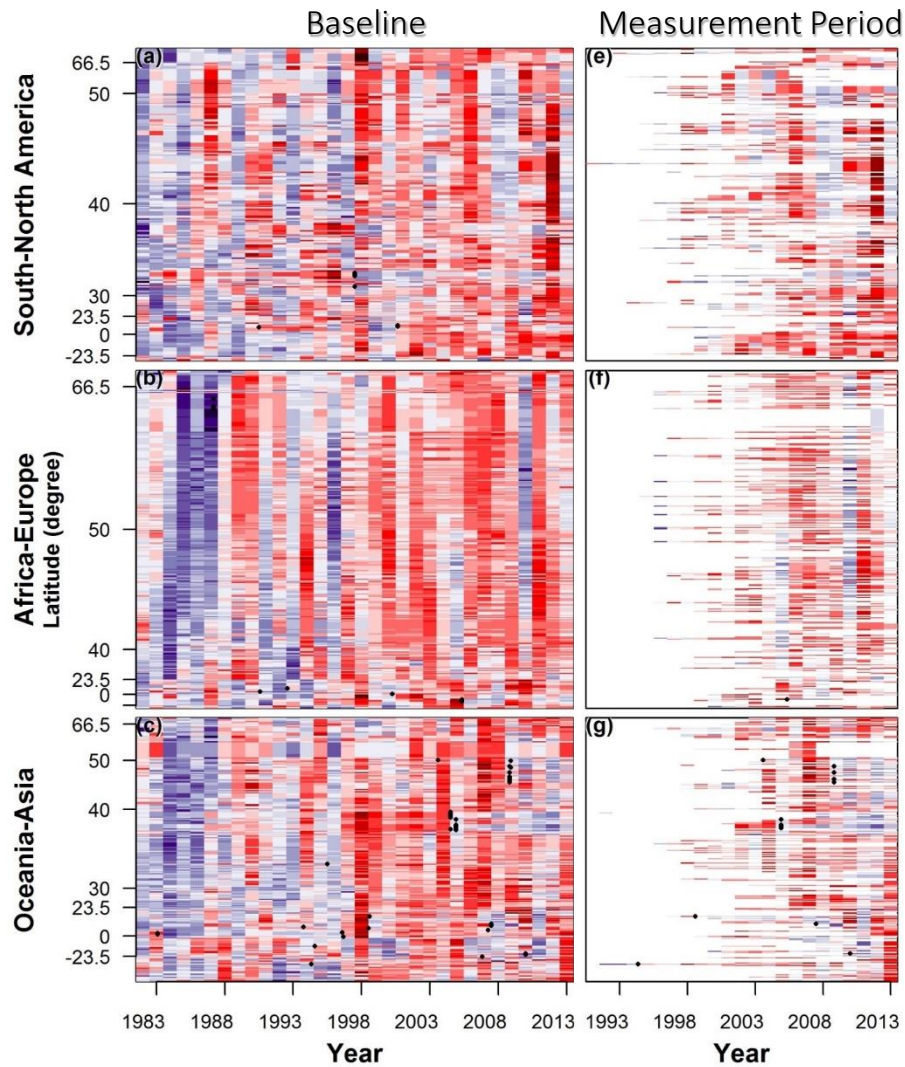


Univariate Analysis

– Equality of Means & Variance

- unequal mean only
- unequal variance only
- unequal mean and variance



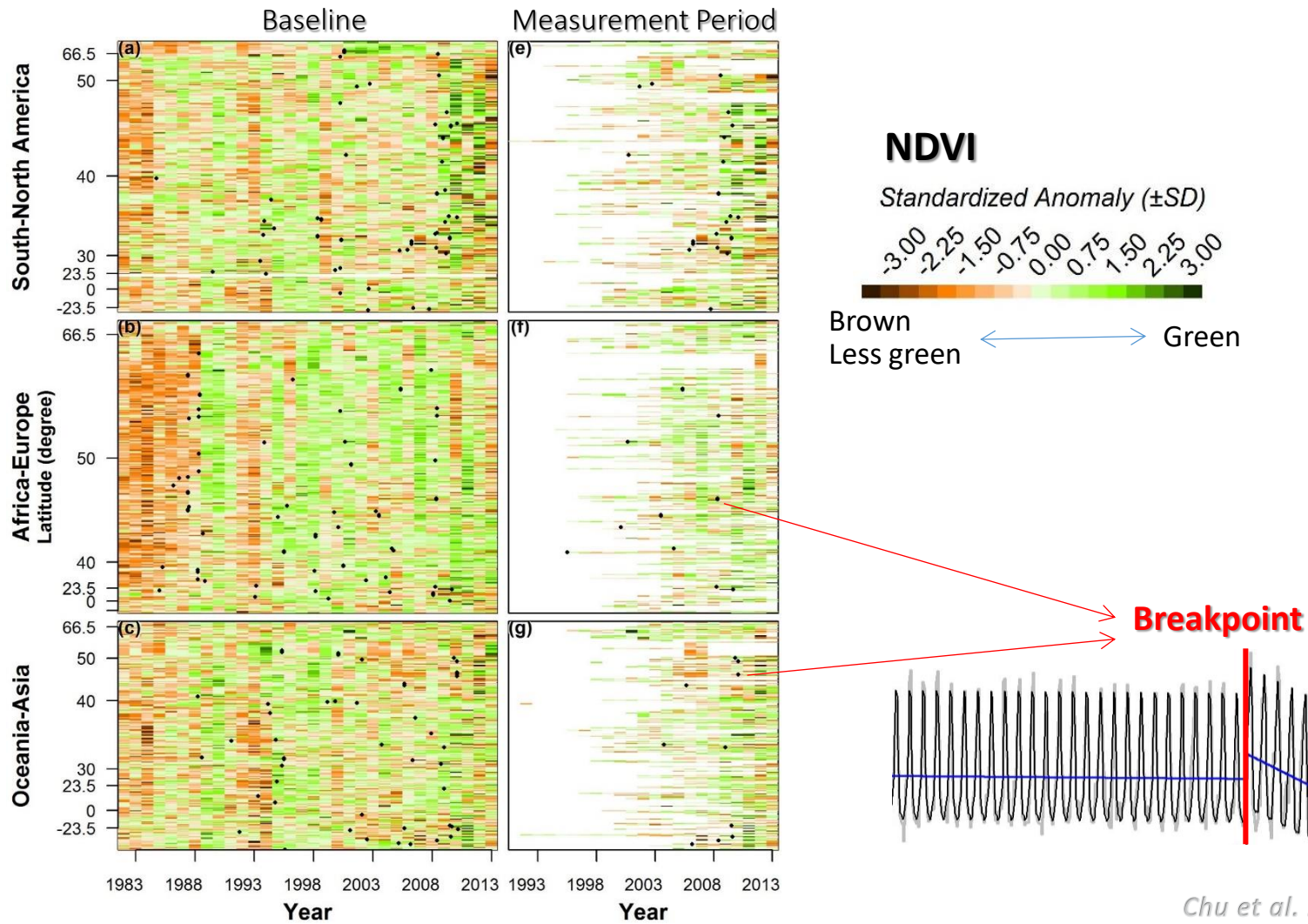


Air Temperature

Standardized Anomaly ($\pm SD$)

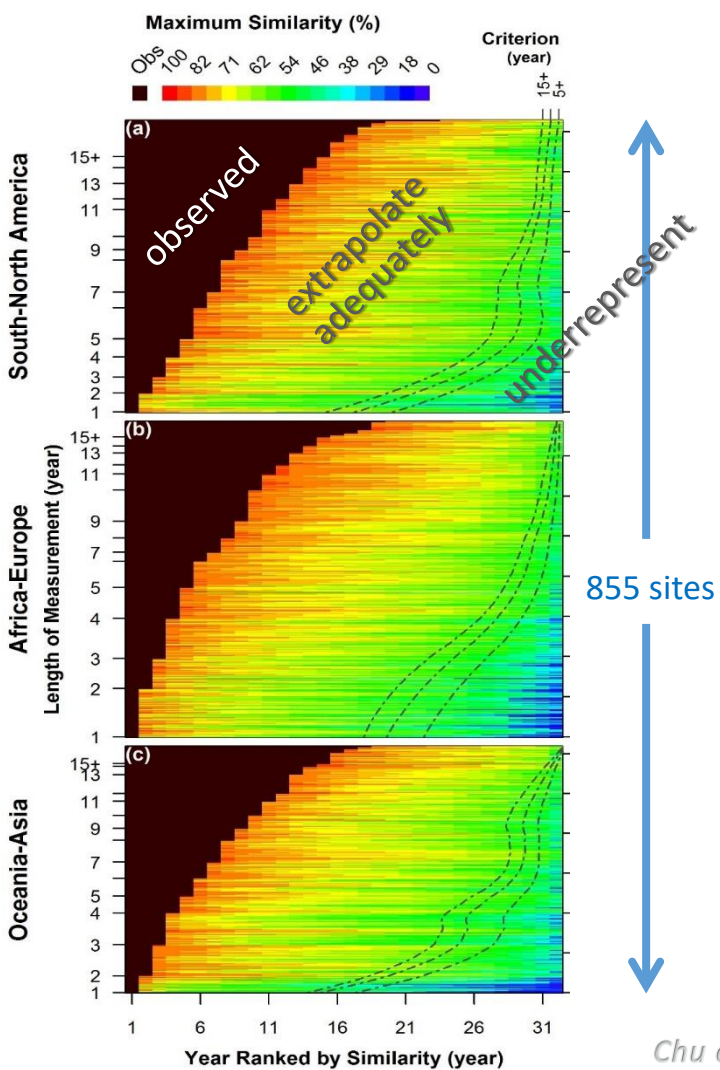
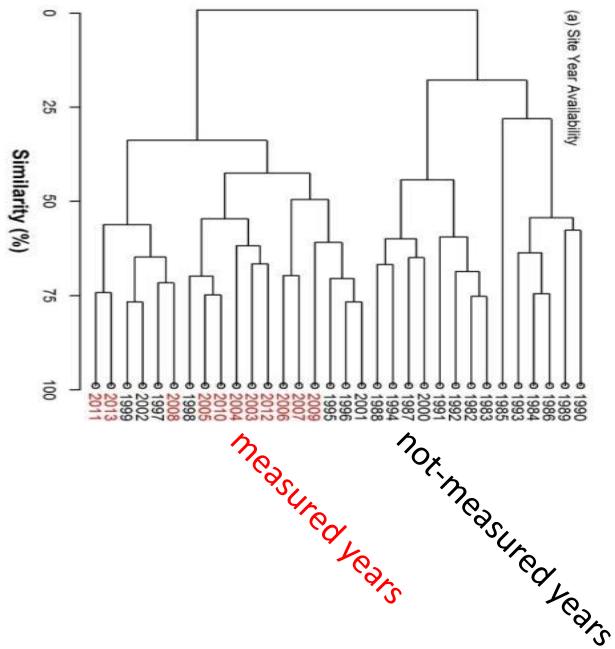


Cool \longleftrightarrow Warm

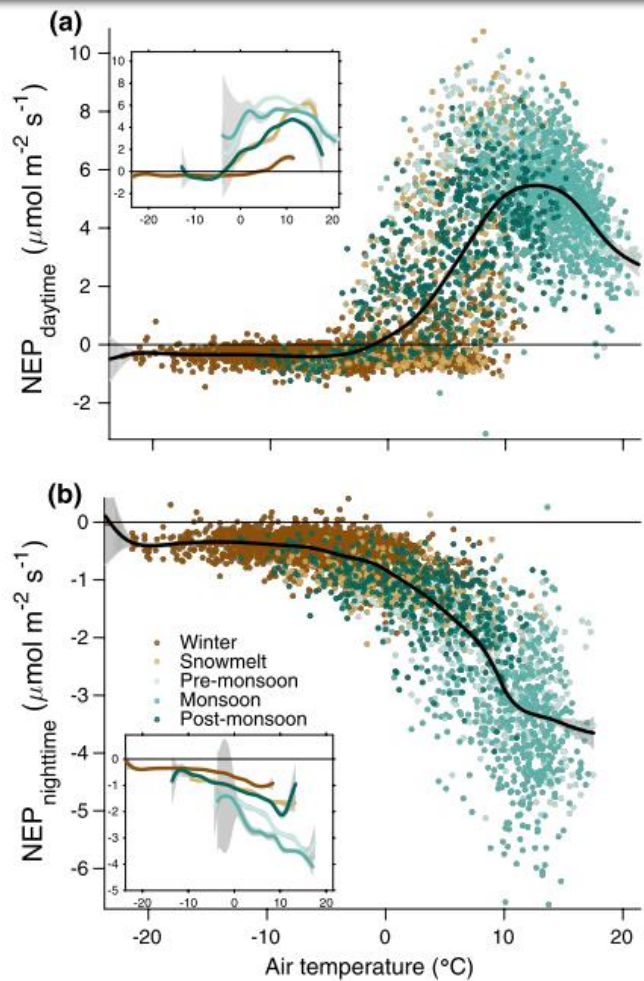
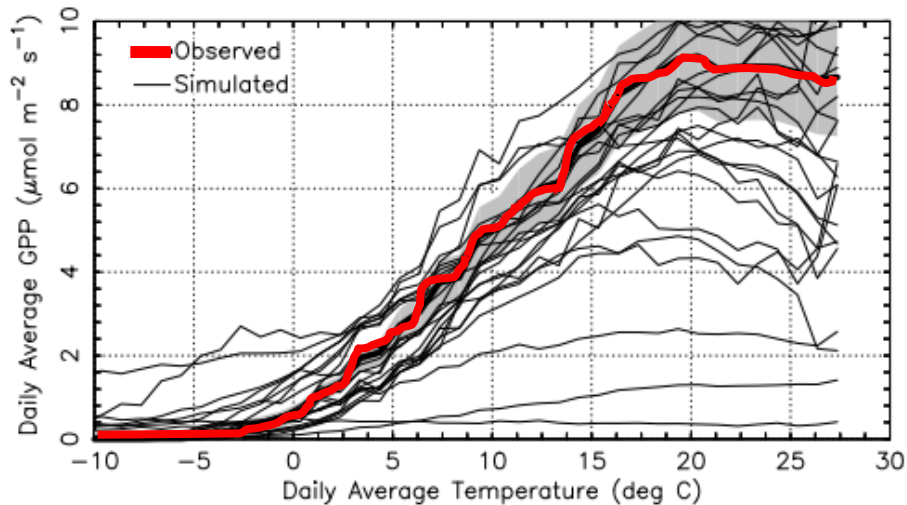


Multivariate Cluster Analysis

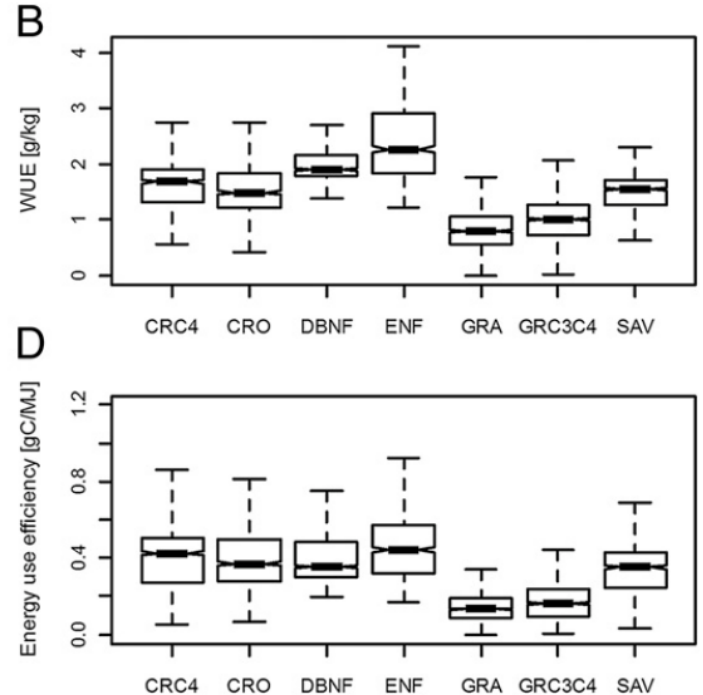
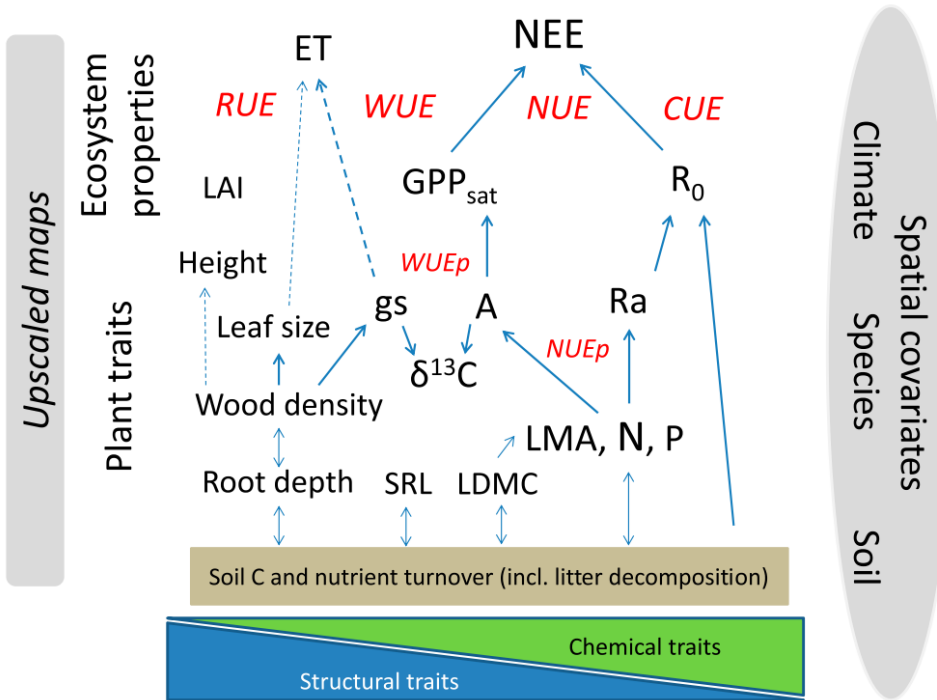
- Similarity in Multidimensional Space



Response Function



Functional Parameter

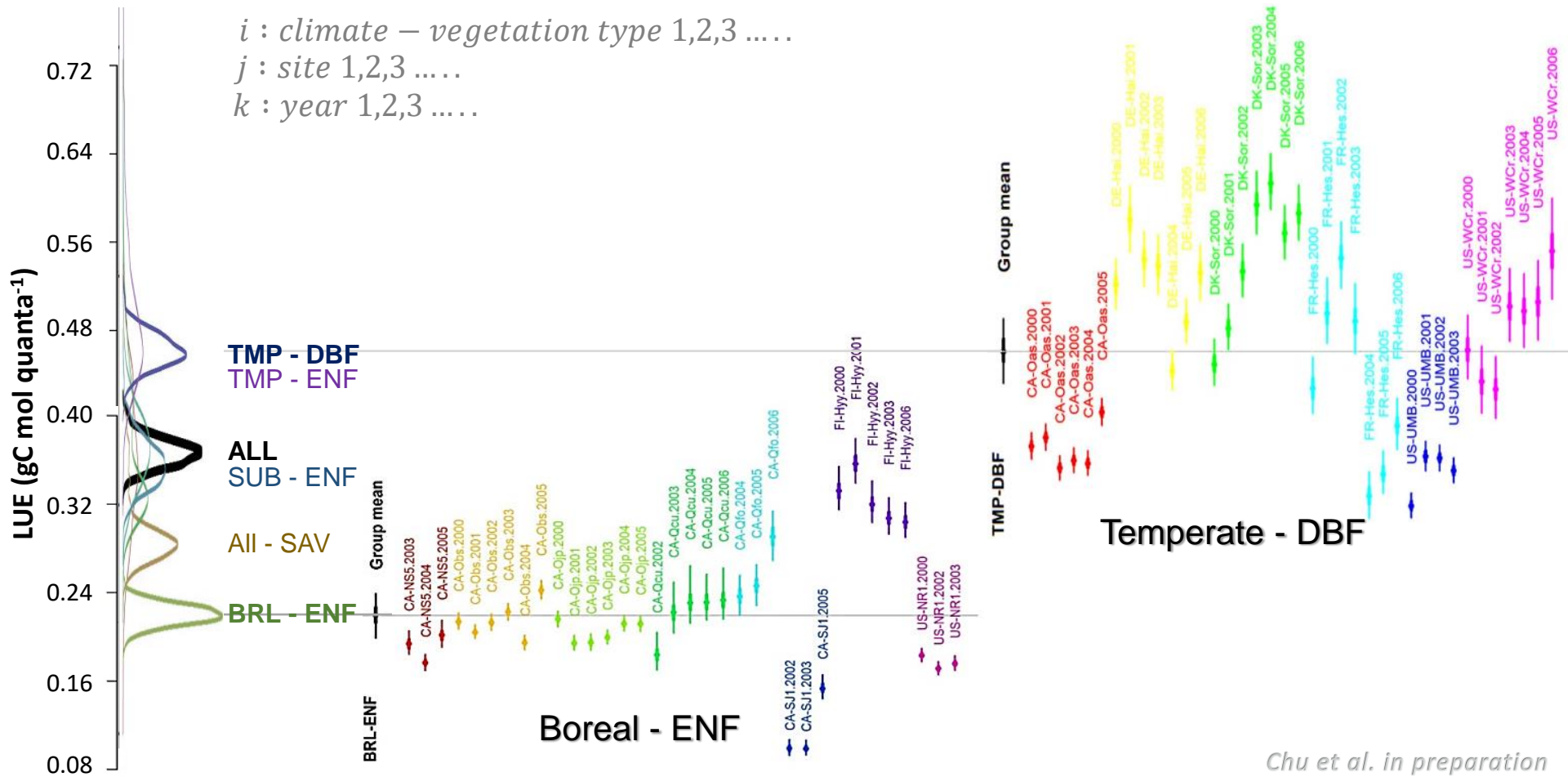


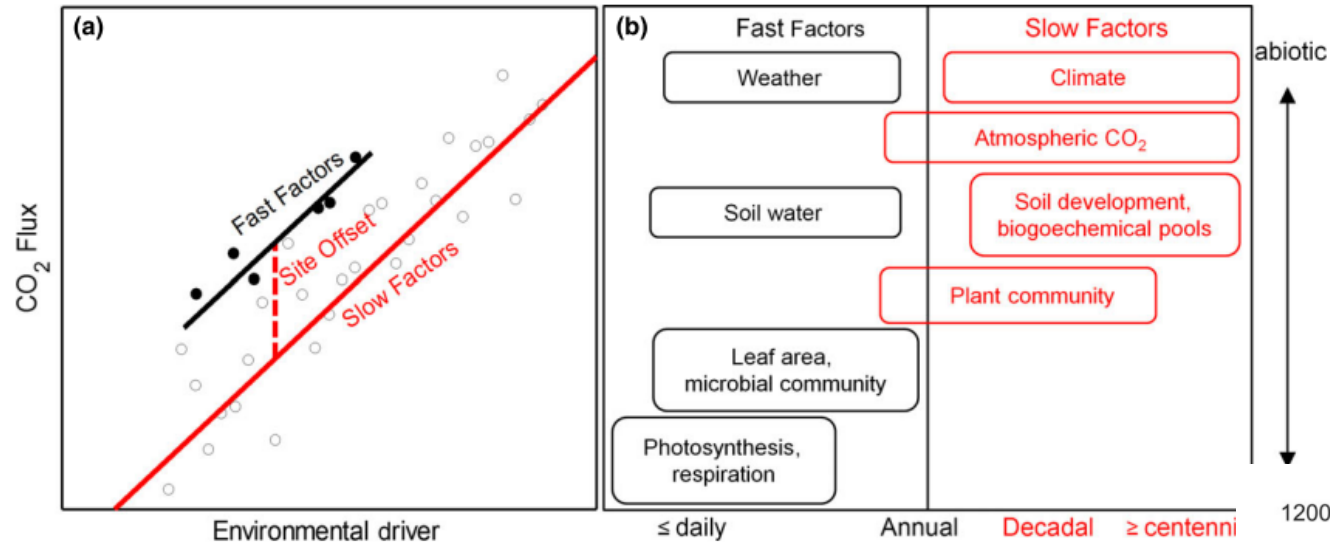
$$GPP_{ijk} = LUE_{ijk} \cdot \varphi_{ij}(T_a) \cdot \varphi_{ij}(VPD) \cdot \varphi_{ij}(T_s) \cdot f(LAI, PPFD)$$

i : climate – vegetation type 1,2,3

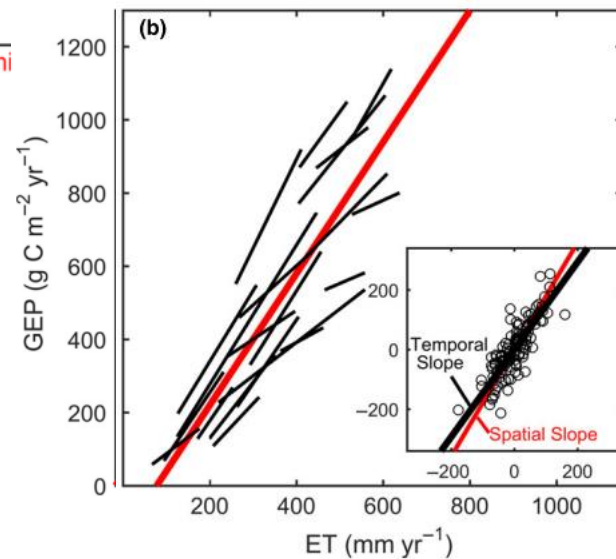
j : site 1,2,3

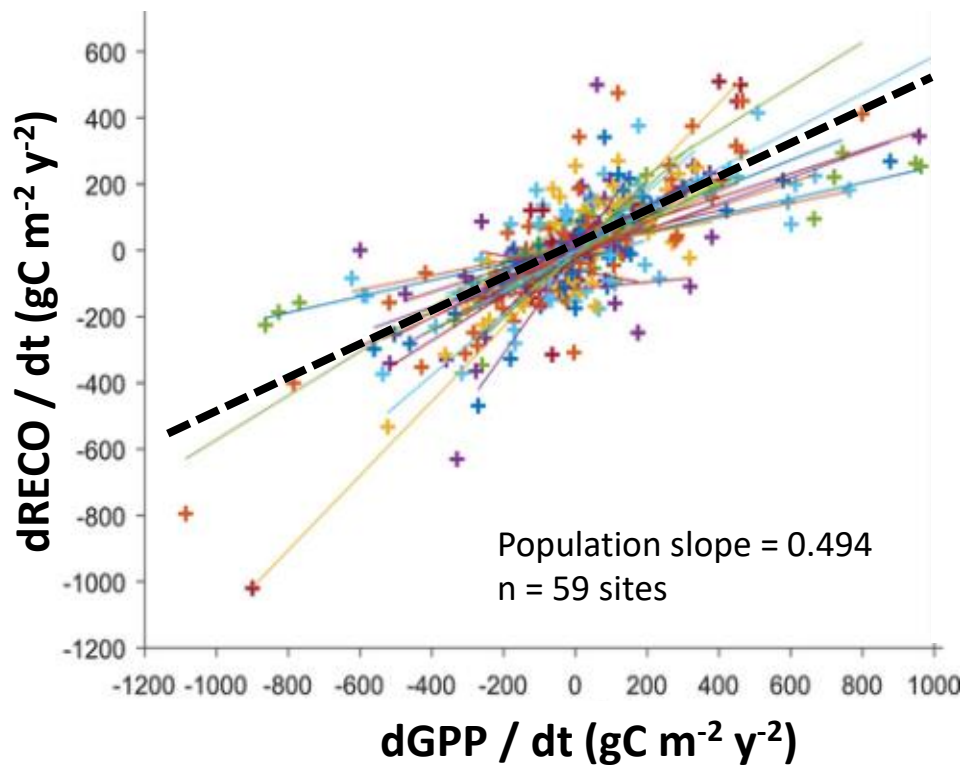
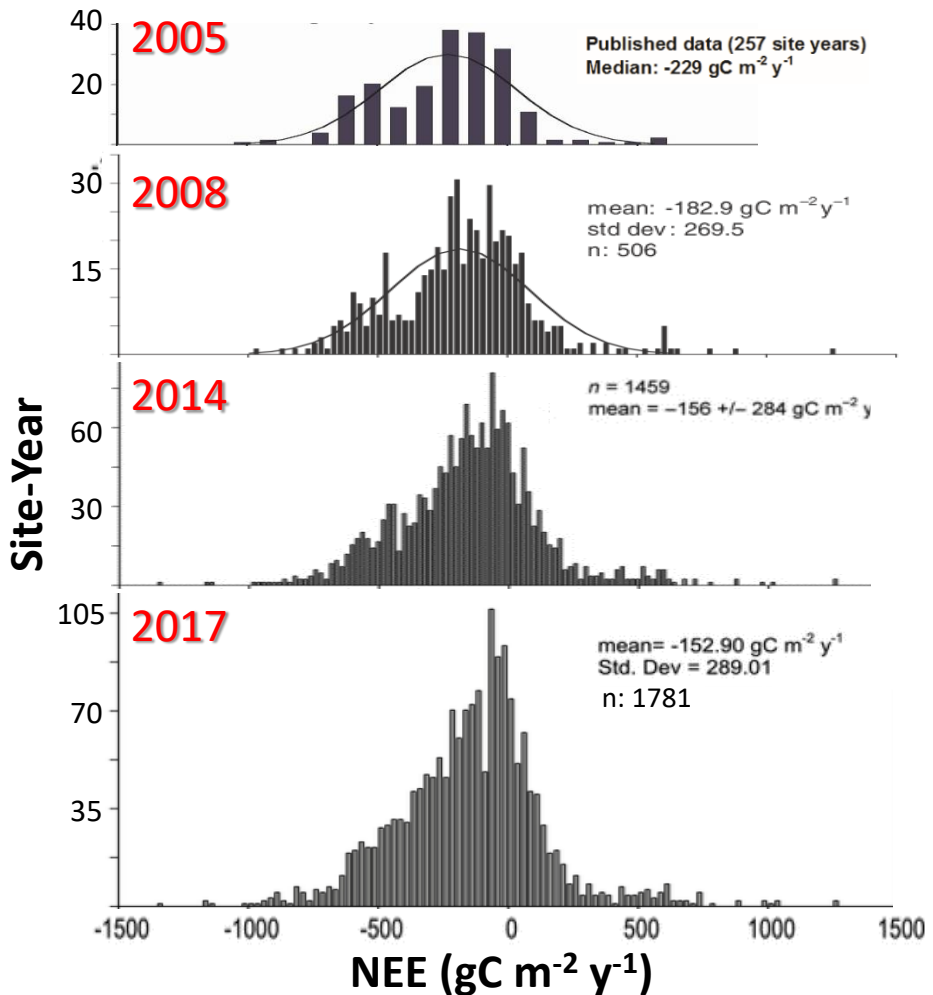
k : year 1,2,3





Space-for-Time Substitution?





Acknowledgements

Networks

AmeriFlux, ICOS, CarboEurope, Fluxnet Canada, AsiaFlux, ChinaFlux, OzFlux, MexFlux, USCCC, LBA, +++

Data Preparation/Collaboration

Gilberto Pastorello, Dario Papale, Markus Reichstein, Ranjeet, John, Sebastian Wolf, Deb Agarwal, Catharine Van Ingen, Margaret Torn, Cristina Poindexter, Marty Humphrey, Norman Beekwilder, Tom Boden, Bob Cook, Forrest Hoffman, Jitu Kumar, Carol Trotta, Eleonora Canfora, Leiming Zhang, Changliang Shao, Ke Xu, Stefan Metzger, Berkeley Biomet Lab
CRU TS3.22, University of East Anglia Climatic Research Unit
GIMMS FPAR/NDVI3g, Global Land Cover Facility (GLCF)
ERA-Interim, European Centre for Medium-Range Weather Forecasts



Agencies

DOE/TCP, NSF/RCN, ILEAPS, NASA, Microsoft, ++++



