Applications for ECOSTRESS ET and Stress Products in Agriculture

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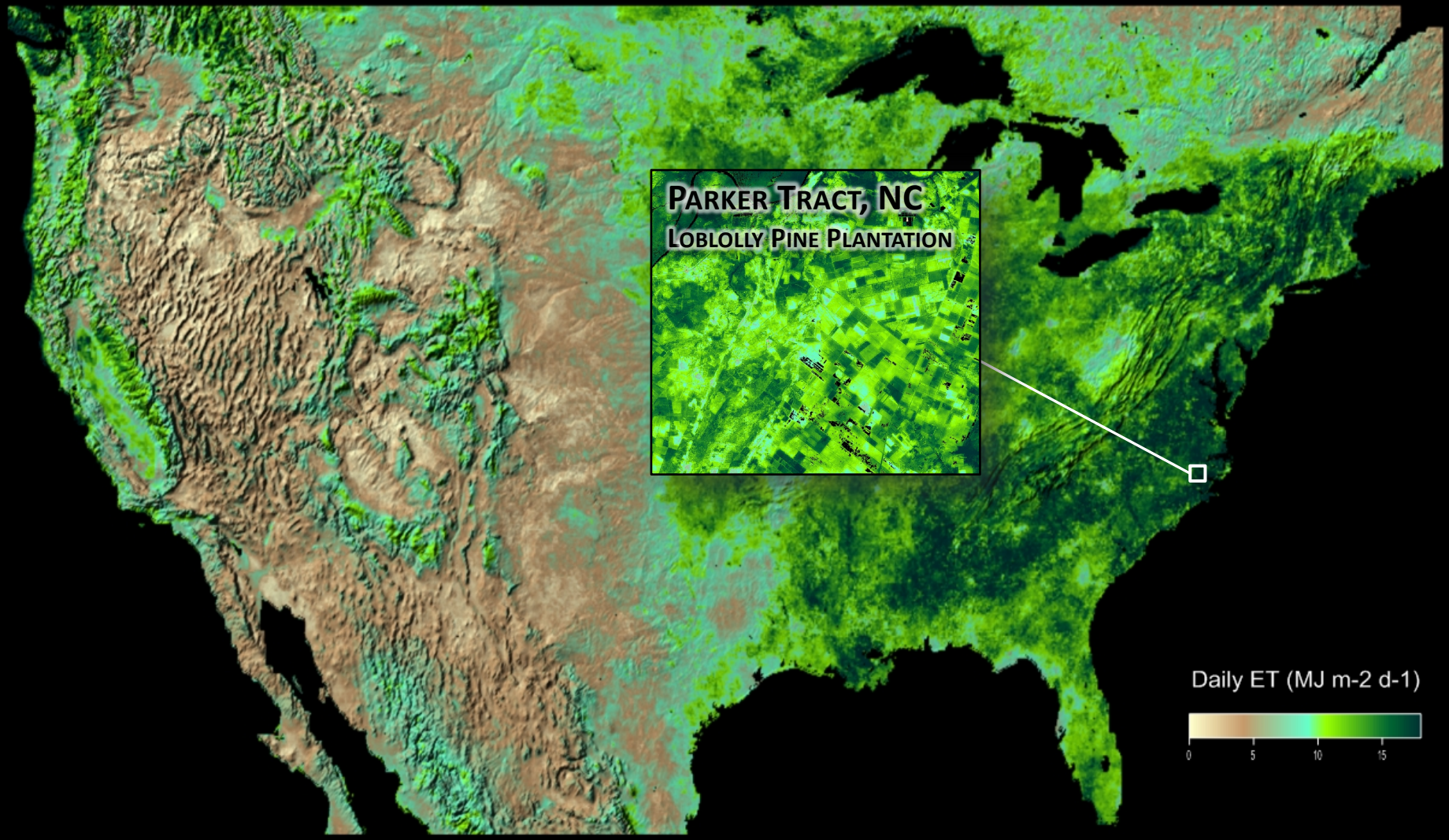
NOAA – NESDIS – STAR
GOES Evapotranspiration and Drought Product System (GET-D)

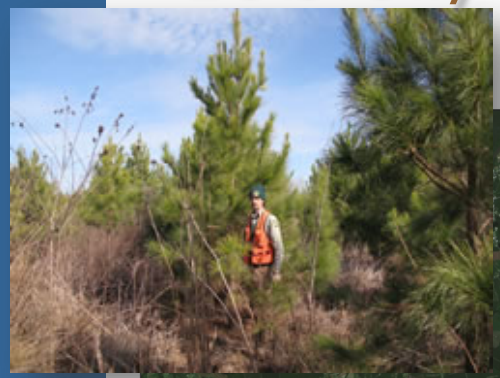


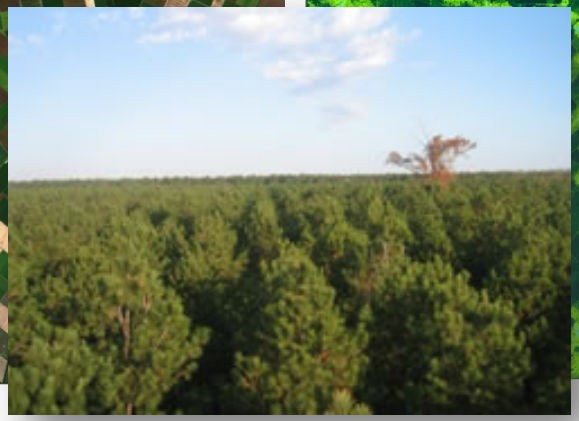
USDA-ARS Long-Term Agroecosystem Research (LTAR) Sites

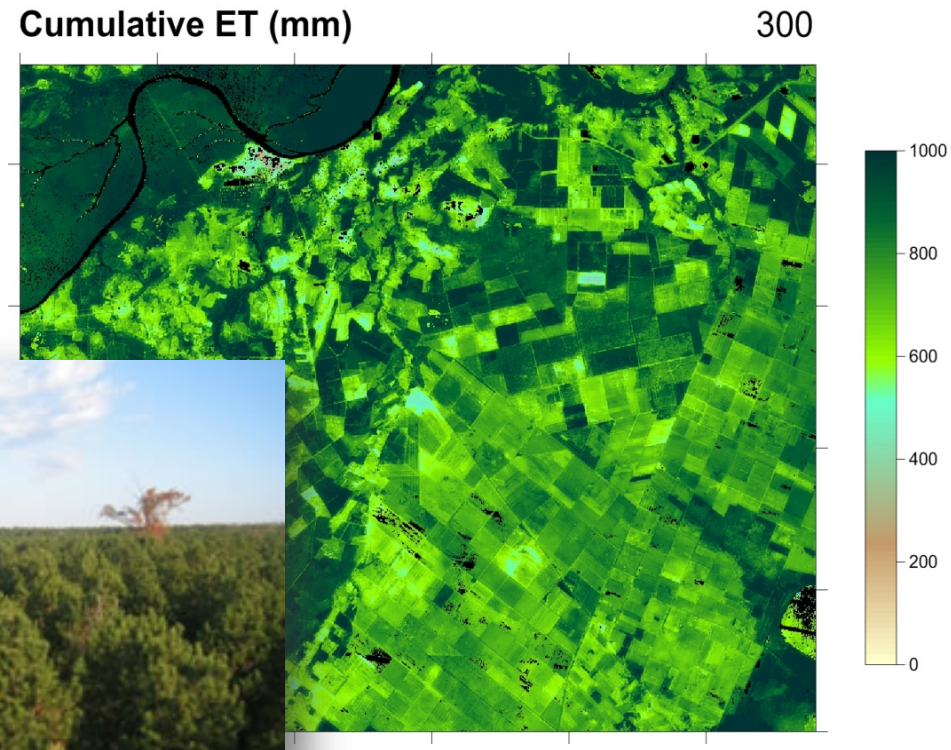
PRHP Platte River-High Plains

UMRB Upper Mississippi River Basin

Loblolly Pine Plantation, NC





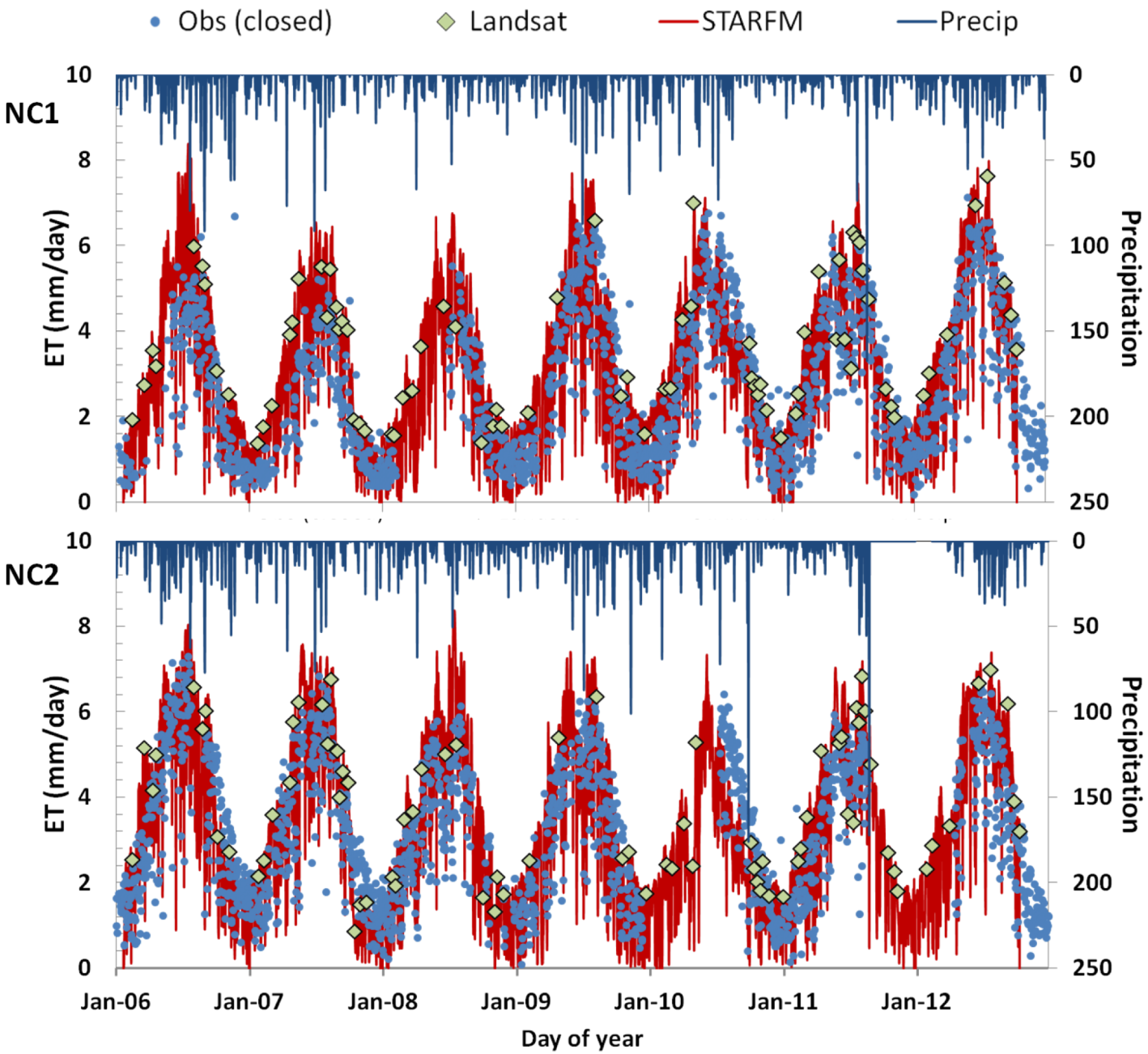


Study Area

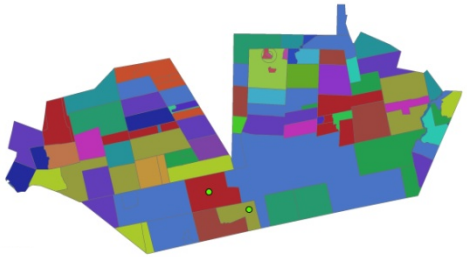
Yang, Y., et al.(2017). Daily Landsat-scale evapotranspiration estimation over a forested landscape in North Carolina, USA using multi-satellite data fusion, HESS

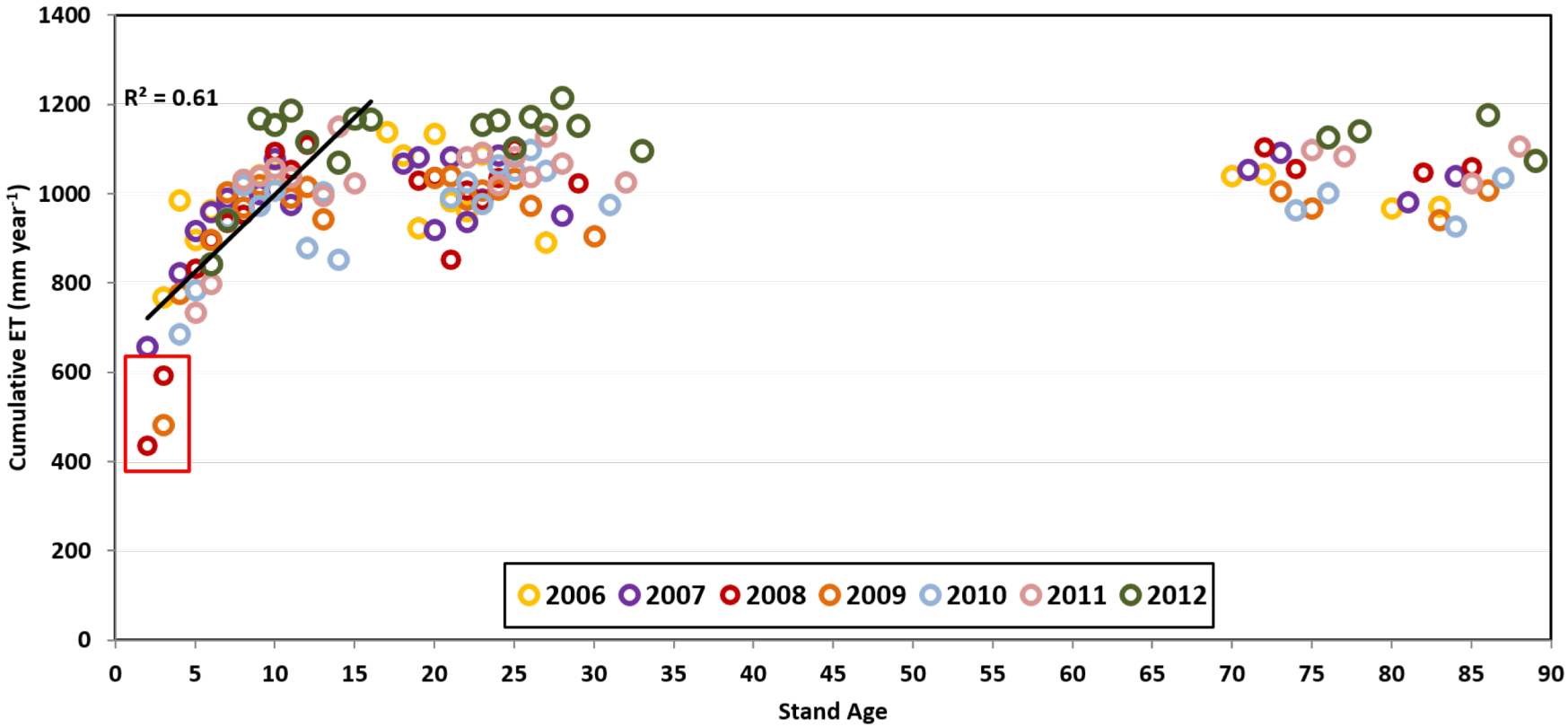
Yang, Y., et al.(2018). Investigating impacts of drought and disturbance on evapotranspiration over a forested landscape in North Carolina, USA using high spatiotemporal resolution remotely sensed data. Remote Sensing of Environment, *Under Revision*

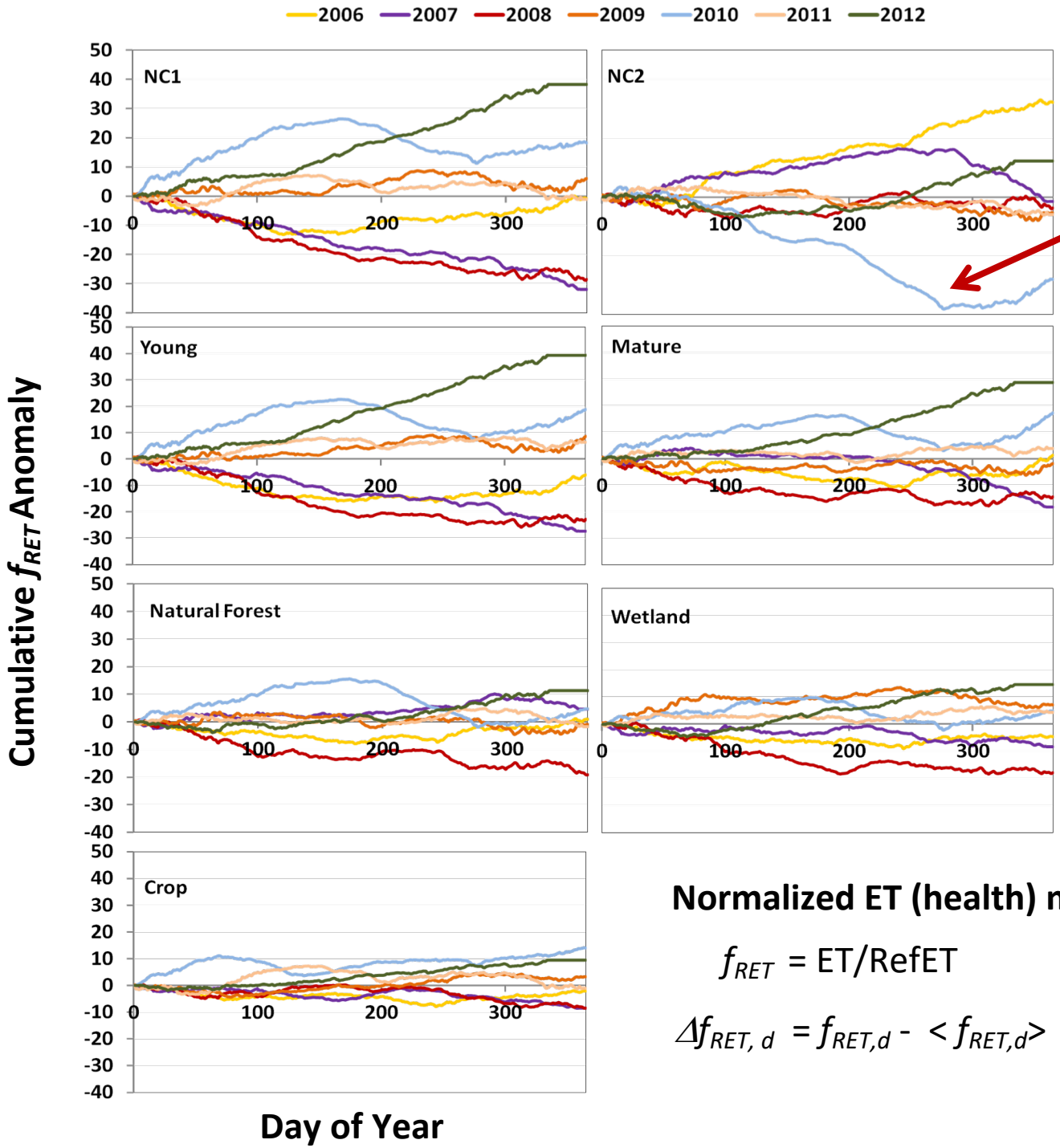
Seasonal flux evaluation



Cumulative water use by stand age







Thinning in 2010

Normalized ET (health) metric:

f_{RET} = ET/RefET

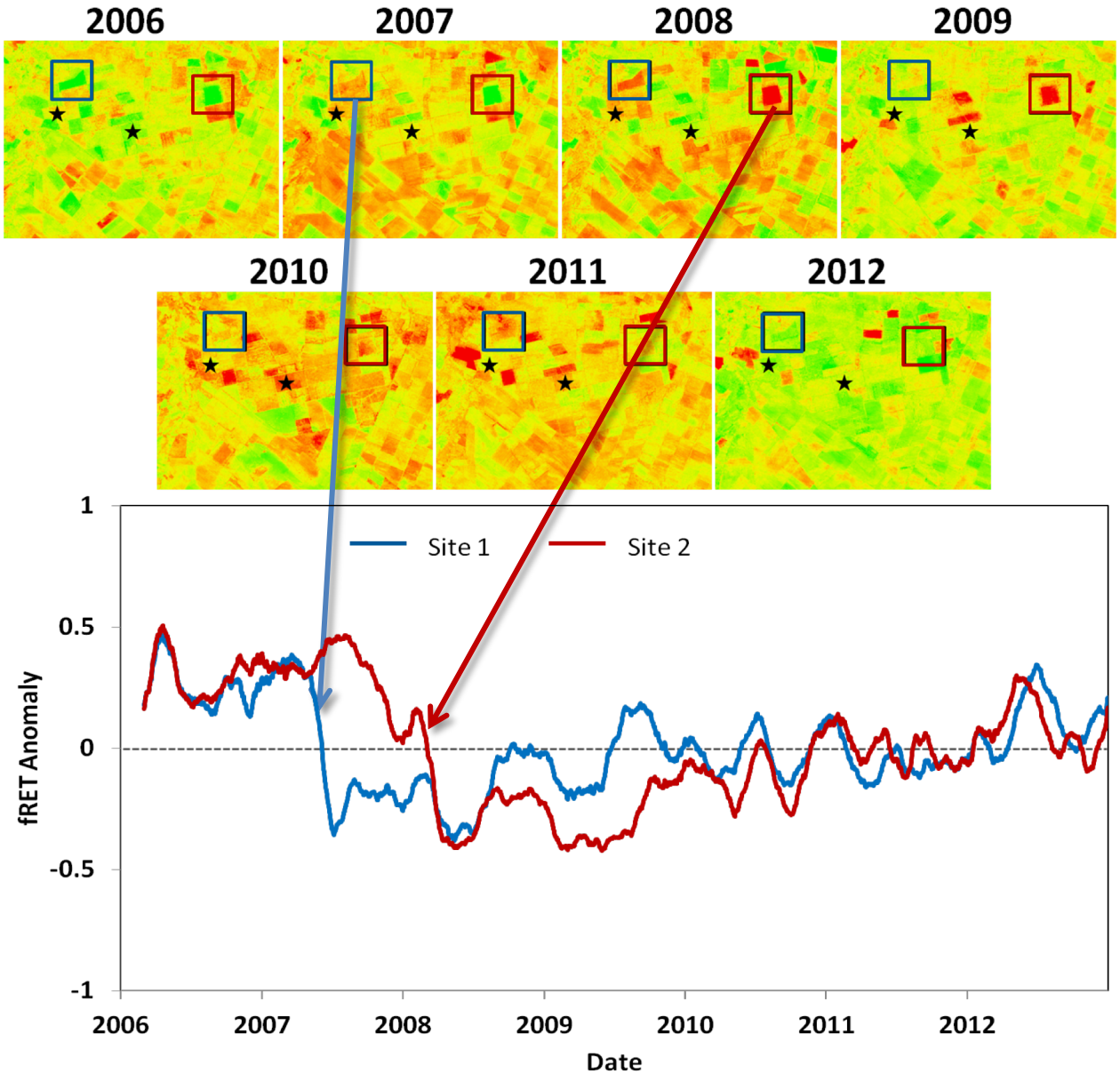
$\Delta f_{RET,\,d} = f_{RET,d} - \langle f_{RET,d} \rangle$ (anomaly)

Seasonal f_{RET} Anomalies

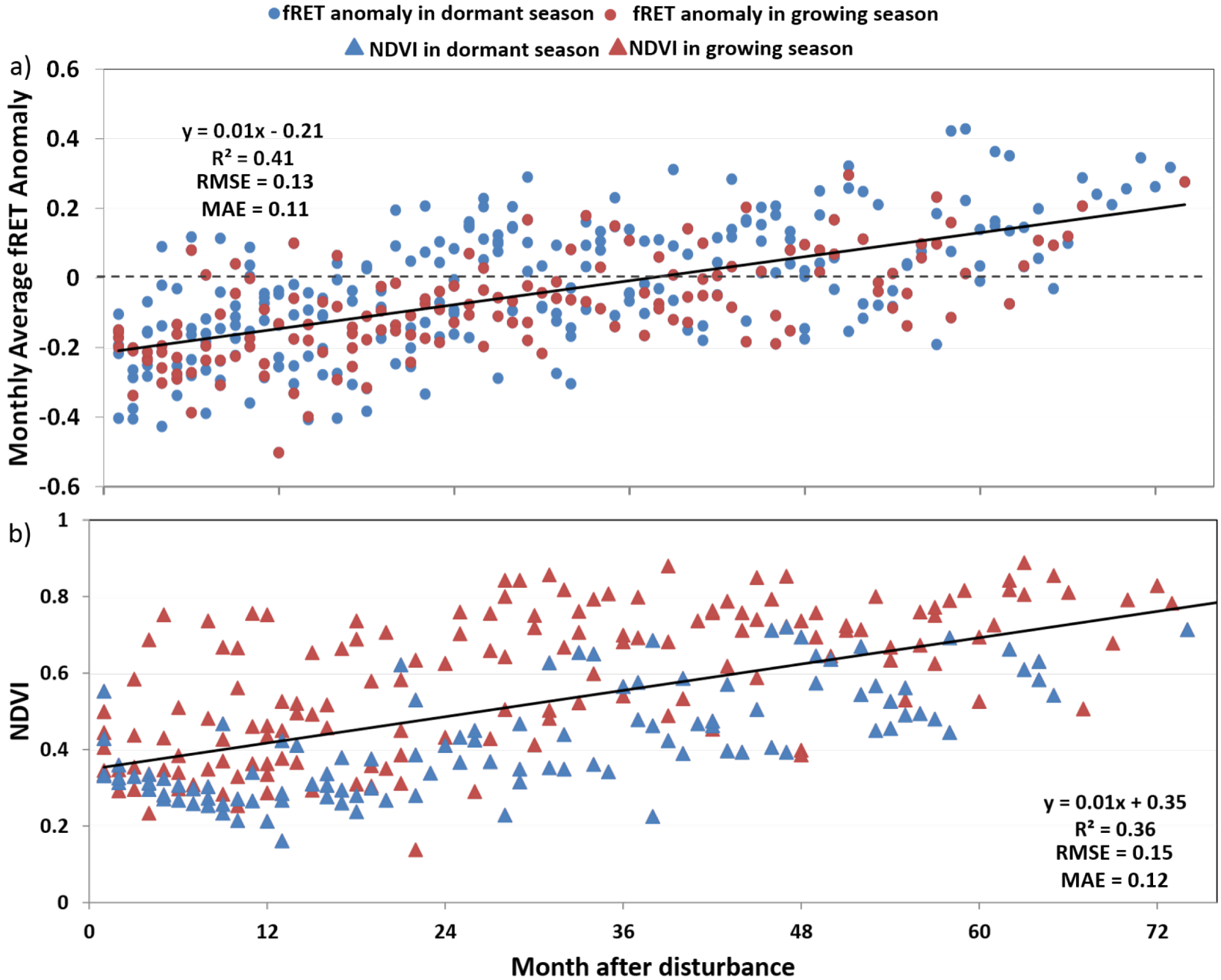
Long-term ET Study – Disturbance

Red indicates anomalously low seasonal water use (stress or disturbance)

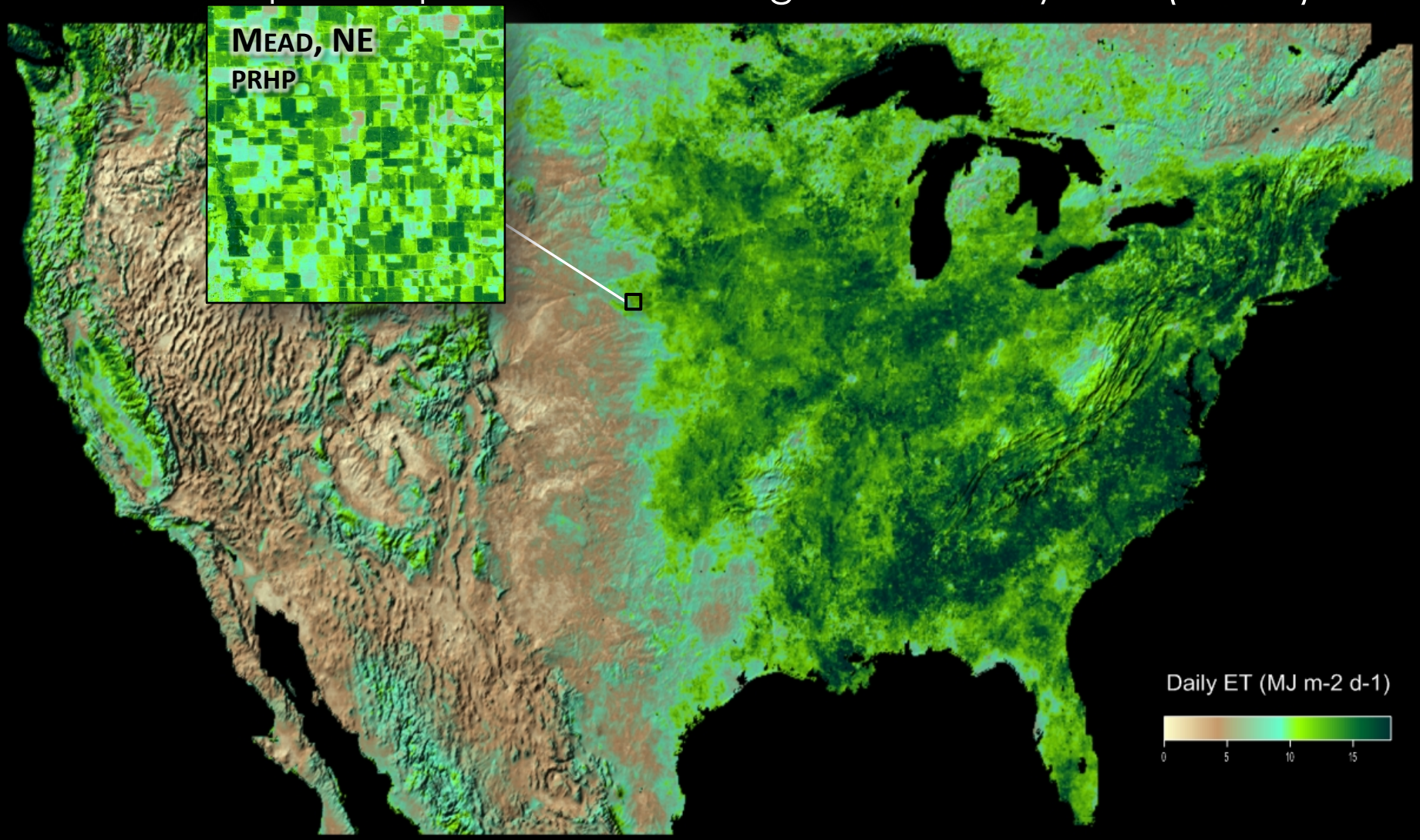
Green indicates high water use (healthy stand conditions)



Long-term ET Study – Recovery



NOAA – NESDIS – STAR
GOES Evapotranspiration and Drought Product System (GET-D)



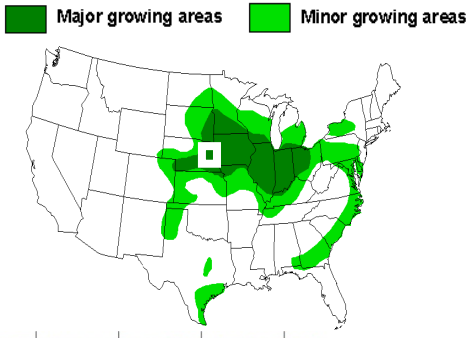
USDA-ARS Long-Term Agroecosystem Research (LTAR) Sites

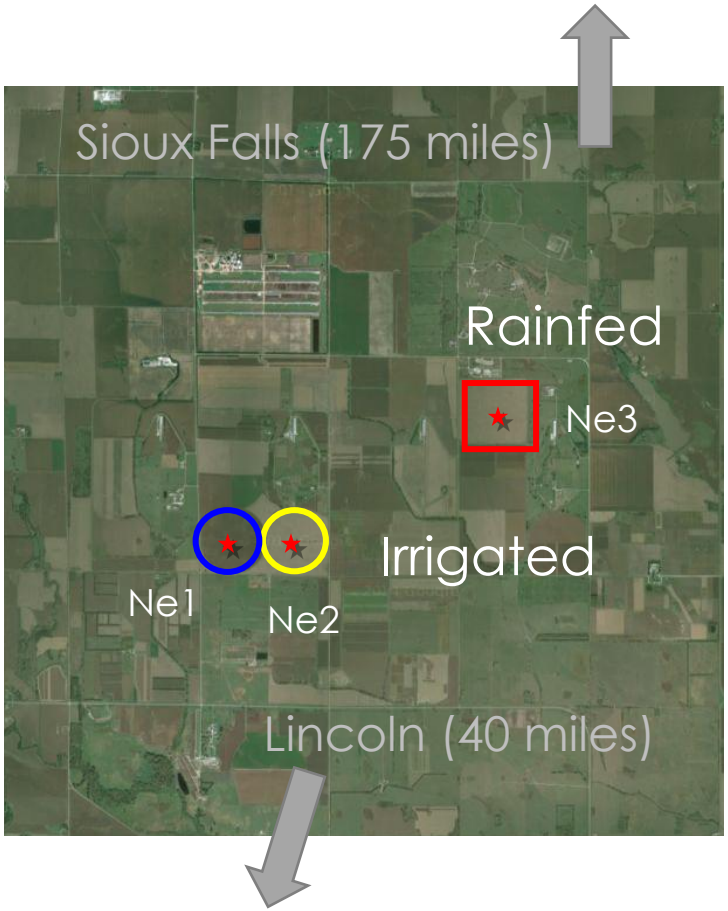
PRHP Platte River-High Plains

UMRB Upper Mississippi River Basin

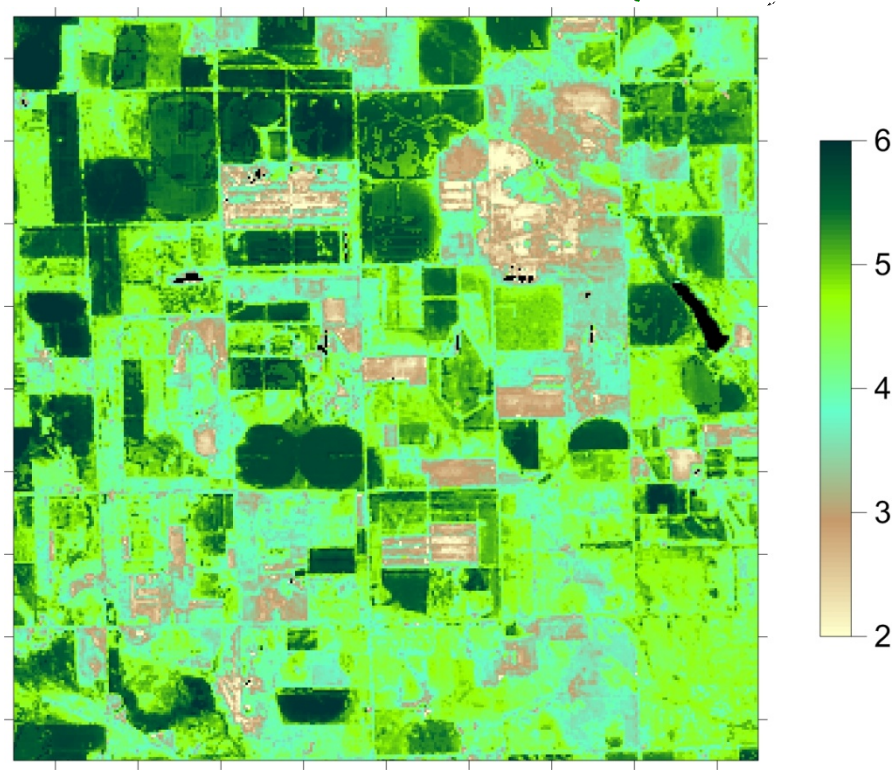
Multi-scale ET/RefET as yield indicator

Mead, NE





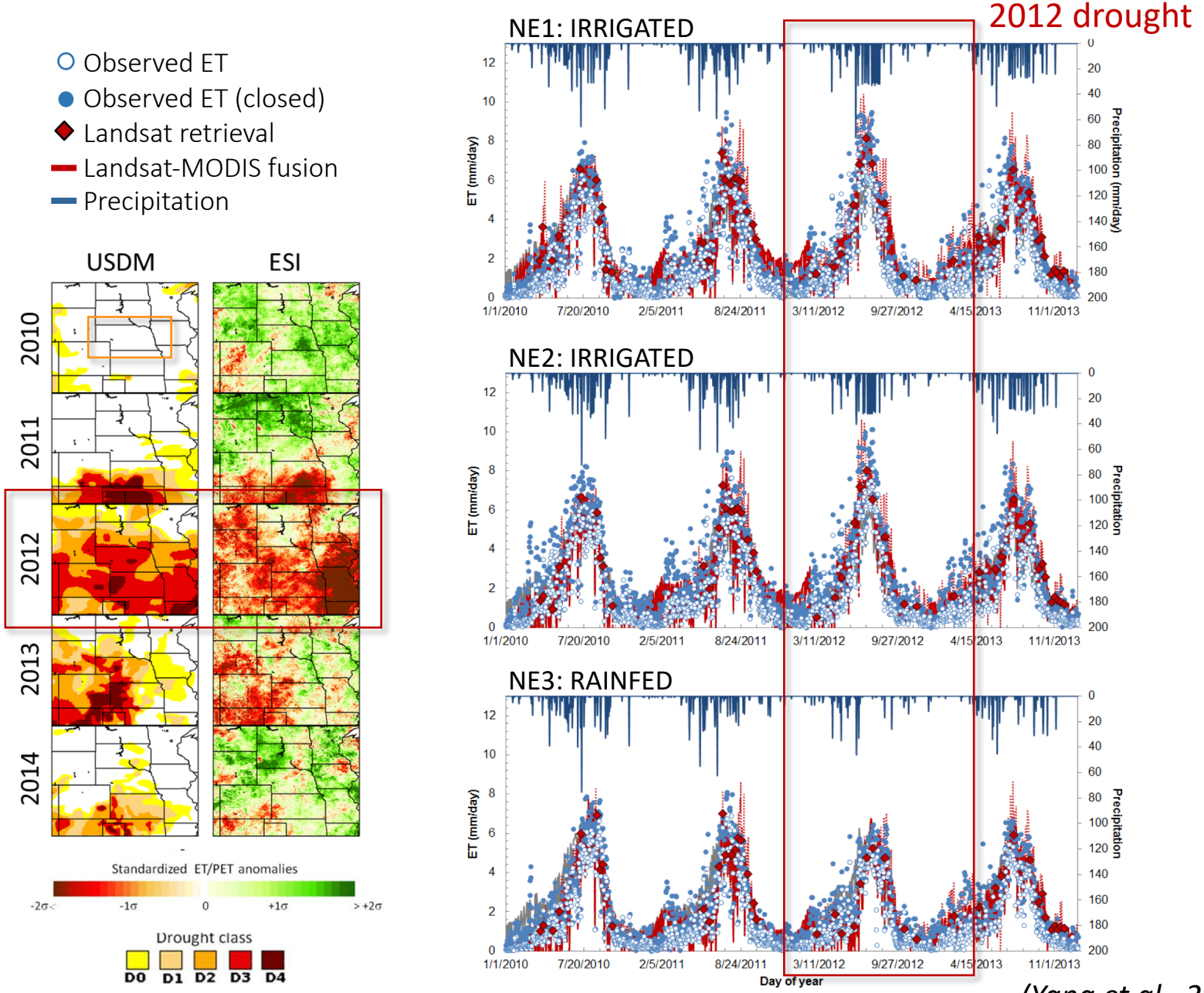
Evapotranspiration



Landsat 8 - 2013

Yang, Yang, Martha C. Anderson, Feng Gao, Brian Wardlow, Christopher R. Hain, Jason A. Otkin, Joseph Alfieri, Yun Yang, Liang Sun, and Wayne Dulaney. Field-scale mapping of evaporative stress indicators of crop yield: An application over Mead, NE, USA. Remote Sensing of Environment 210 (2018): 387-402.

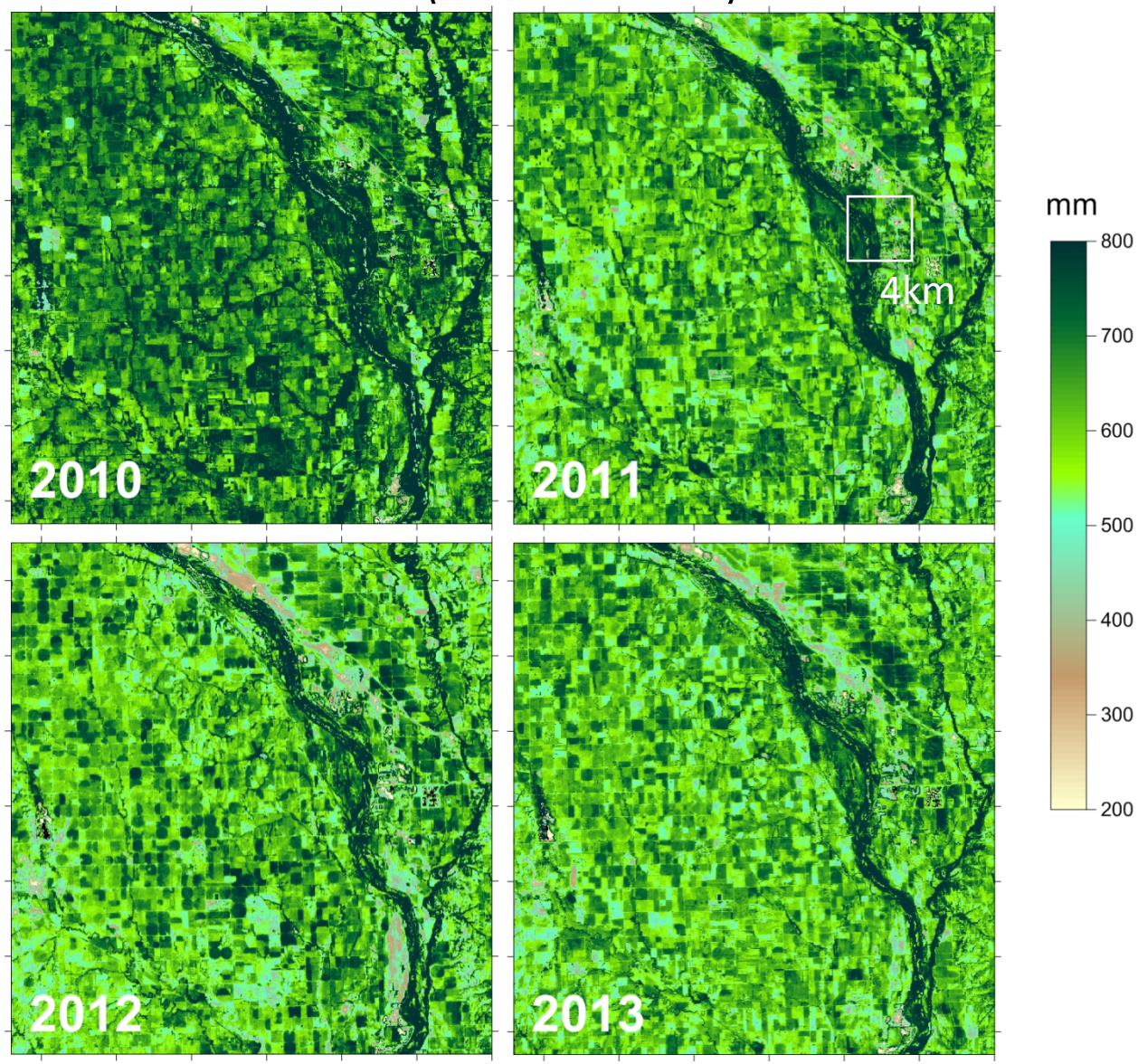
Rainfed corn and soybean in NE



(Yang et al., 2018)

Landsat/MODIS ET datacubes

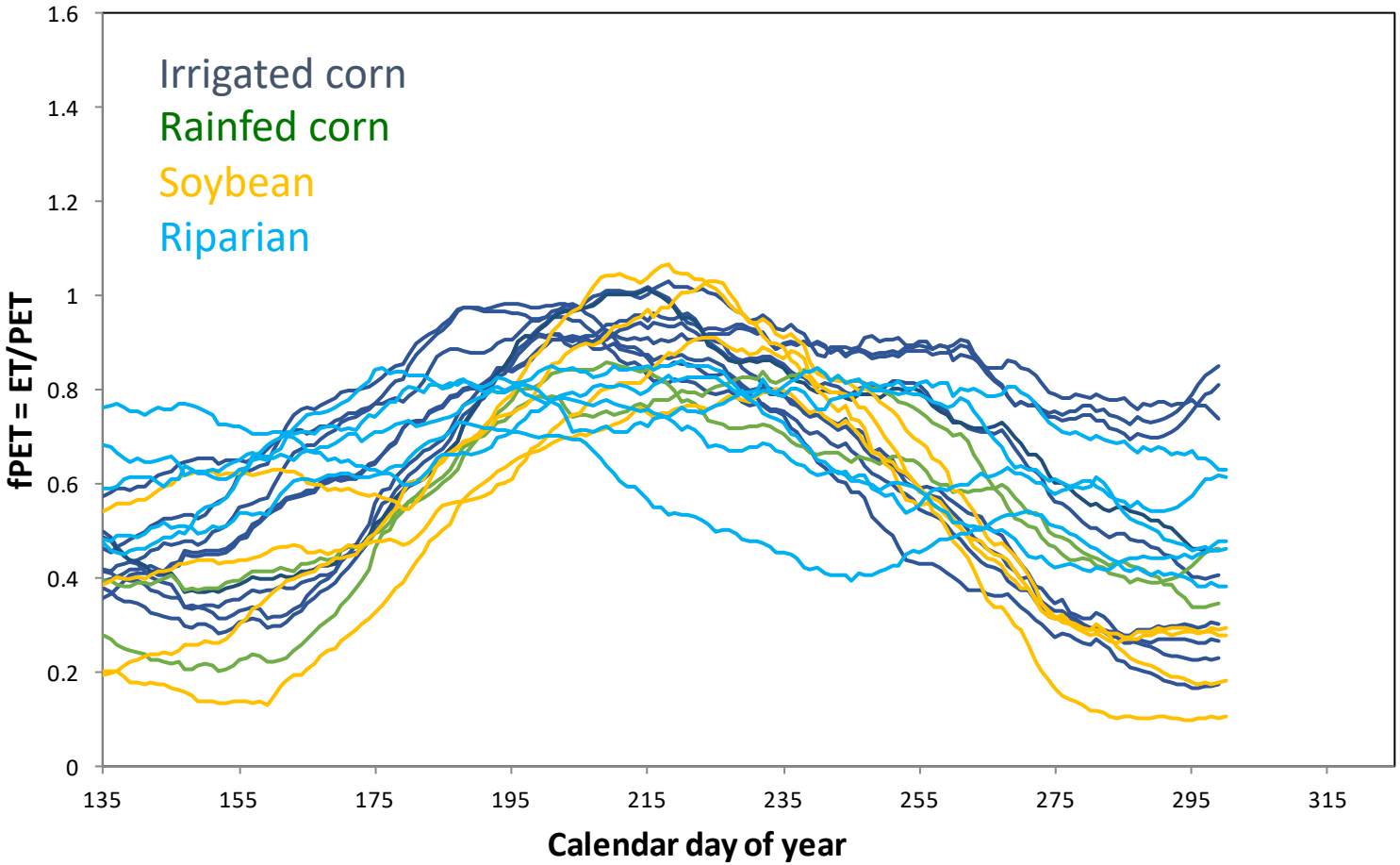
Mead, Nebraska (near Lincoln)



GROWING SEASON WATER USE

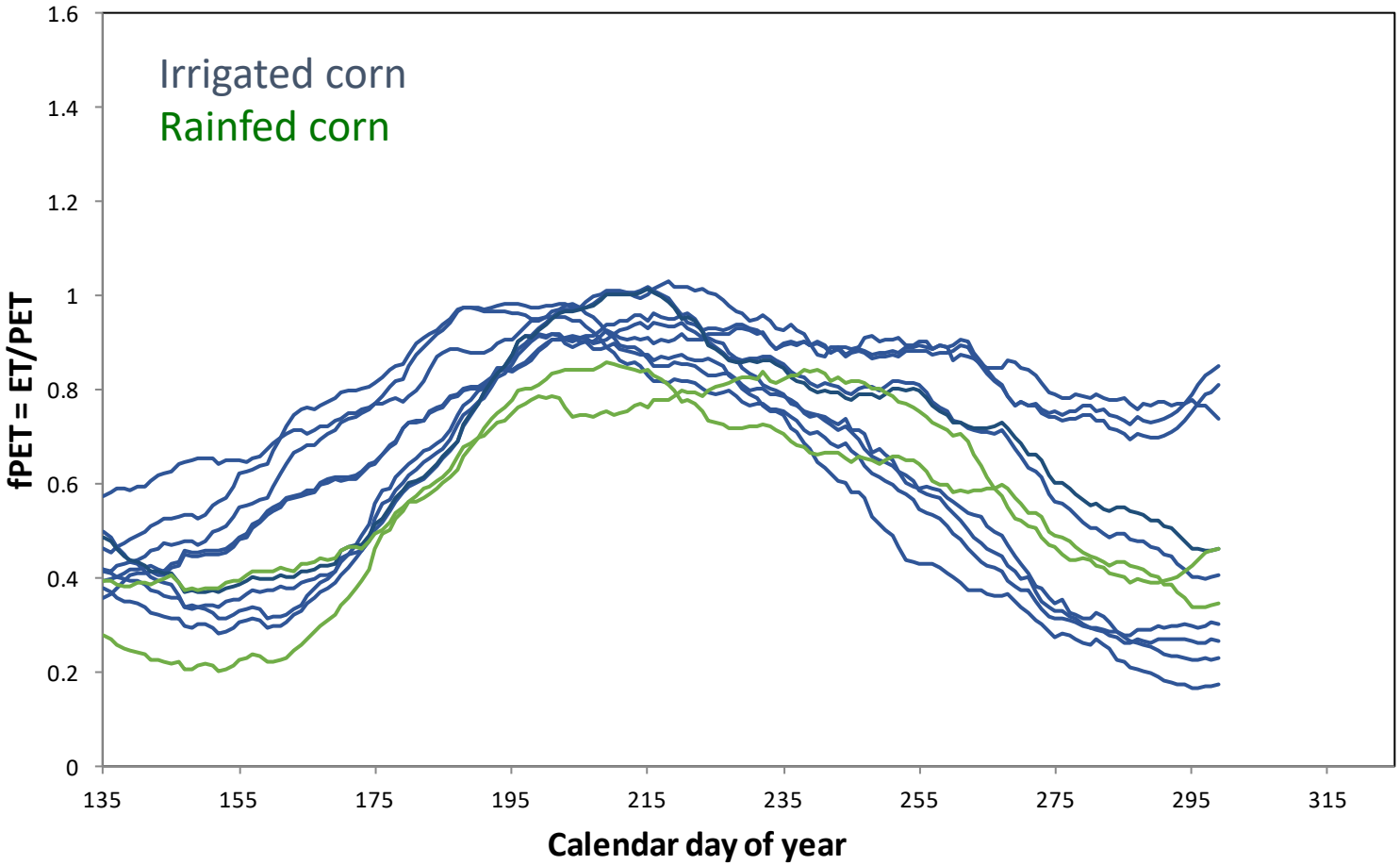
Corn fields at Mead site

Aligned on calendar date



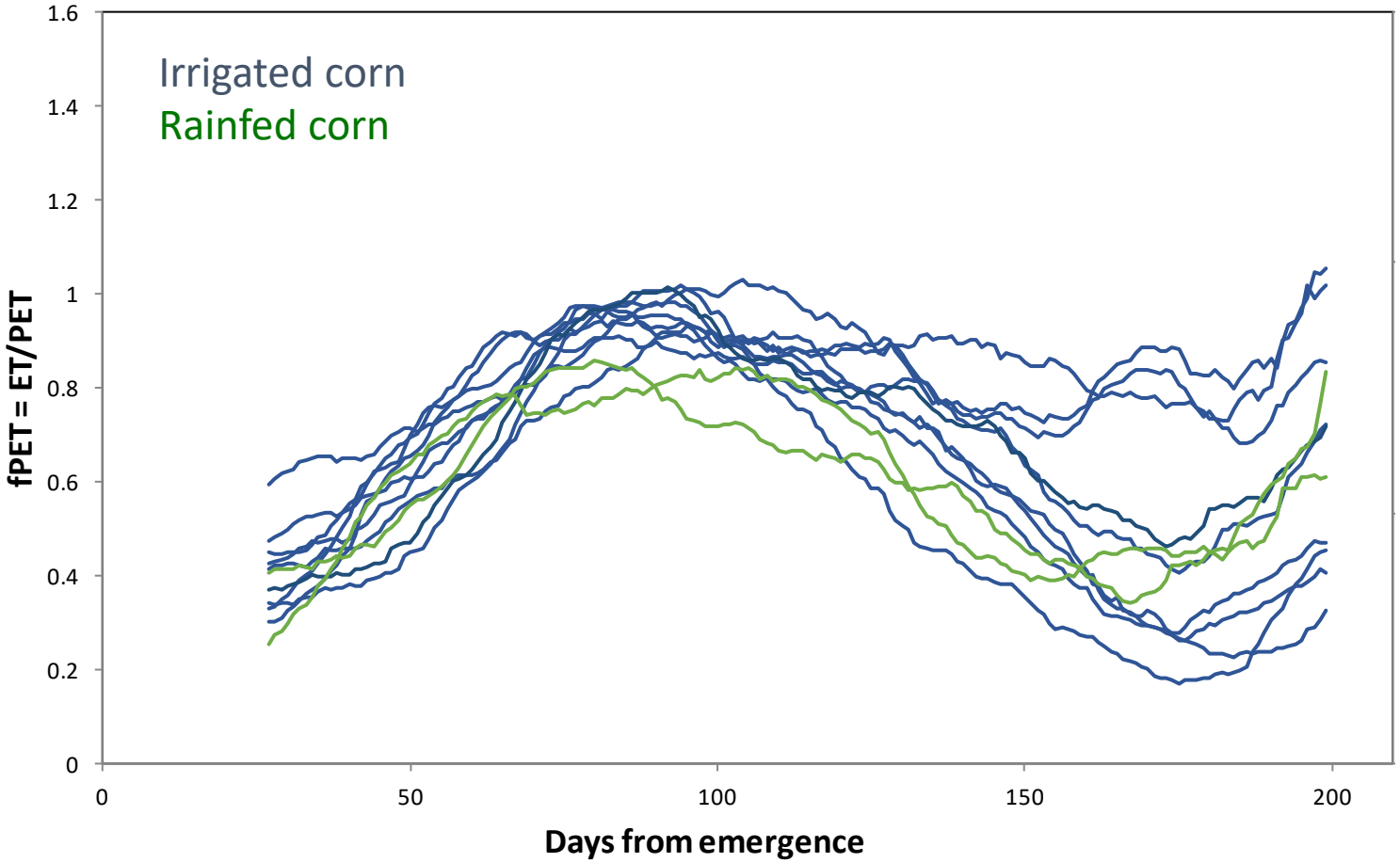
Corn fields at Mead site

Aligned on calendar date

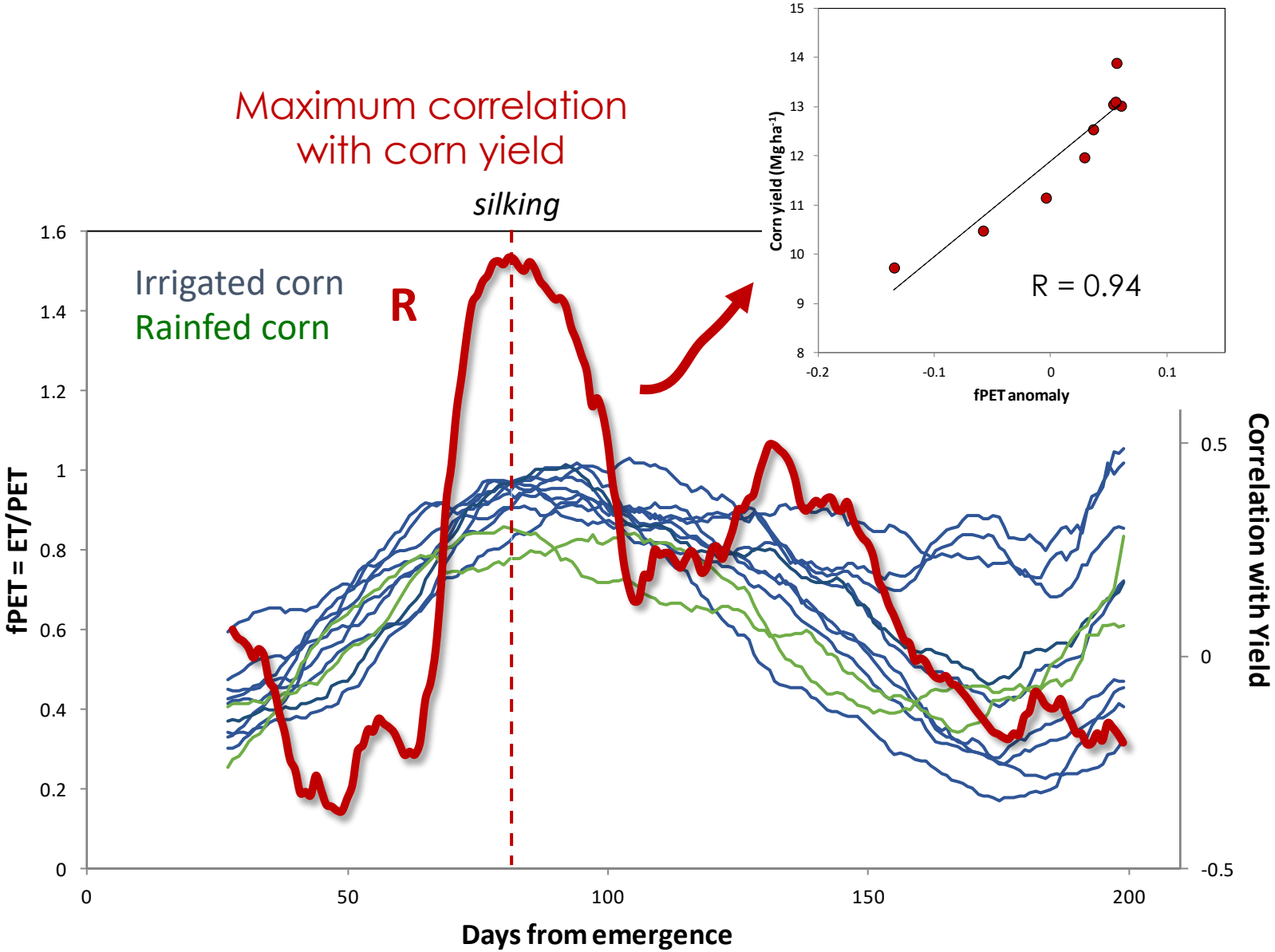


Corn fields at Mead site

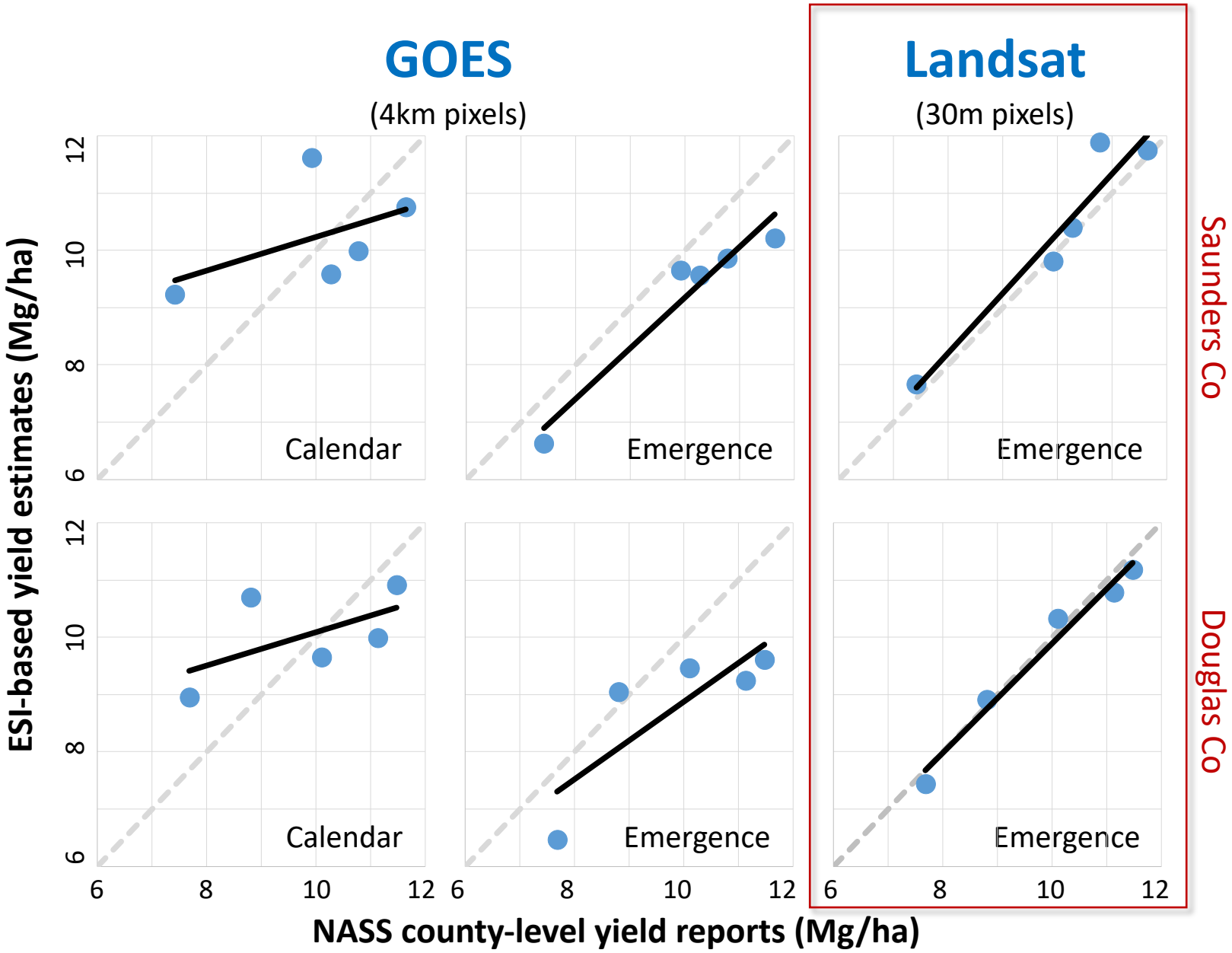
Aligned on crop- (or field-) specific emergence date



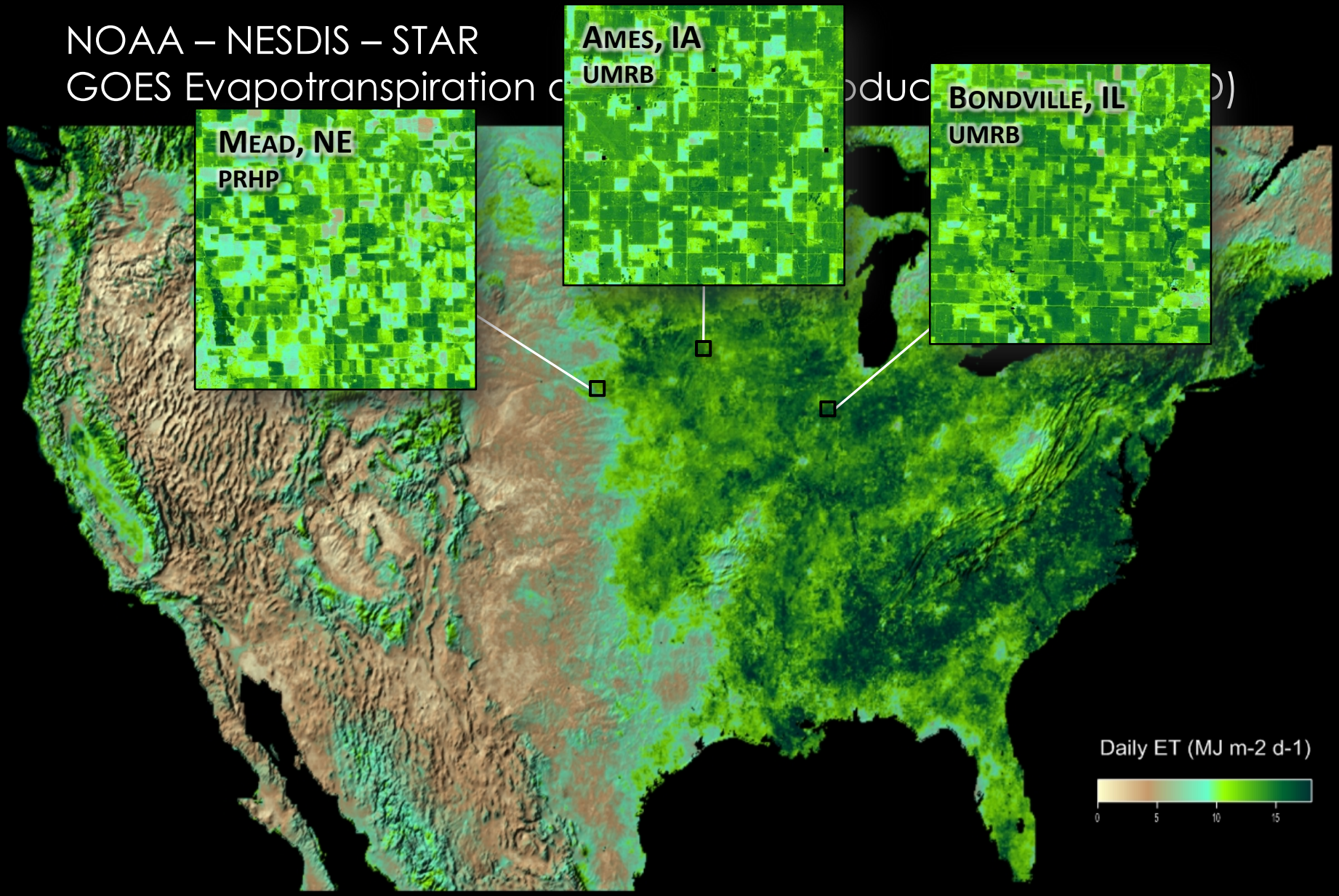
Corn fields at Mead site



Correlations with county-level yields



NOAA – NESDIS – STAR
GOES Evapotranspiration c oduc)

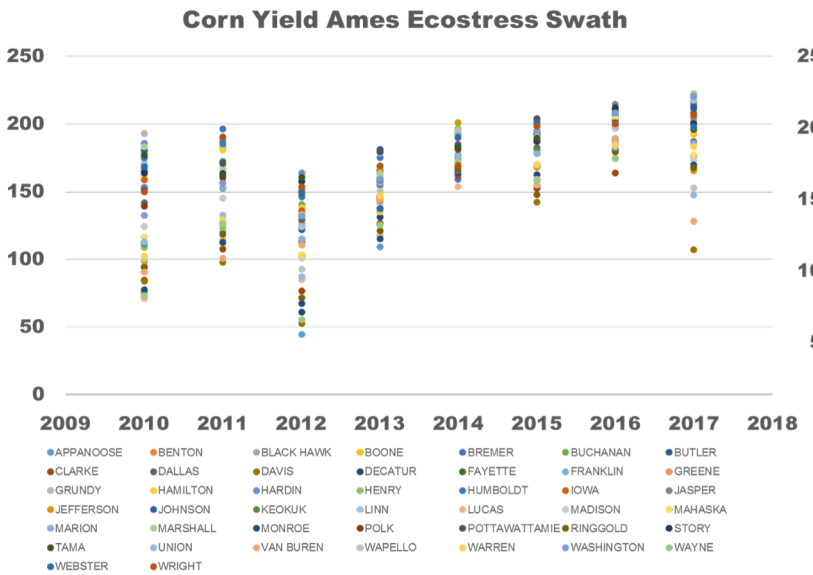


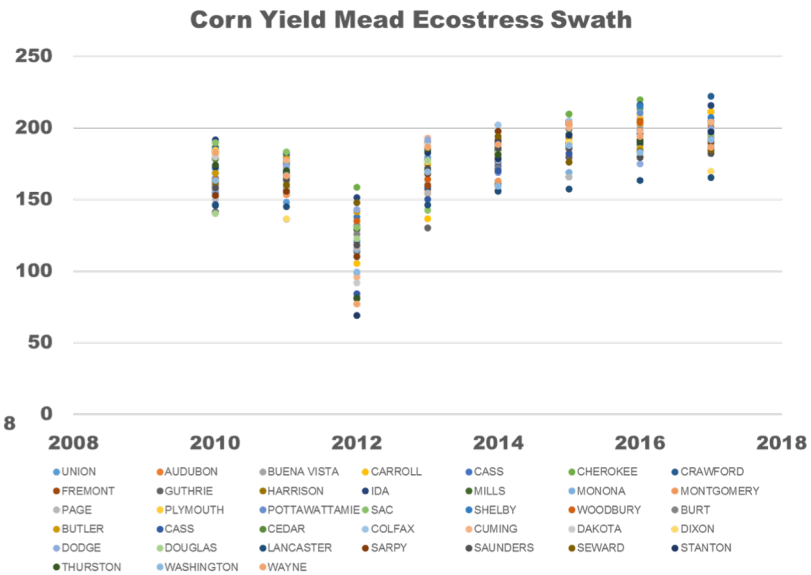
USDA-ARS Long-Term Agroecosystem Research (LTAR) Sites

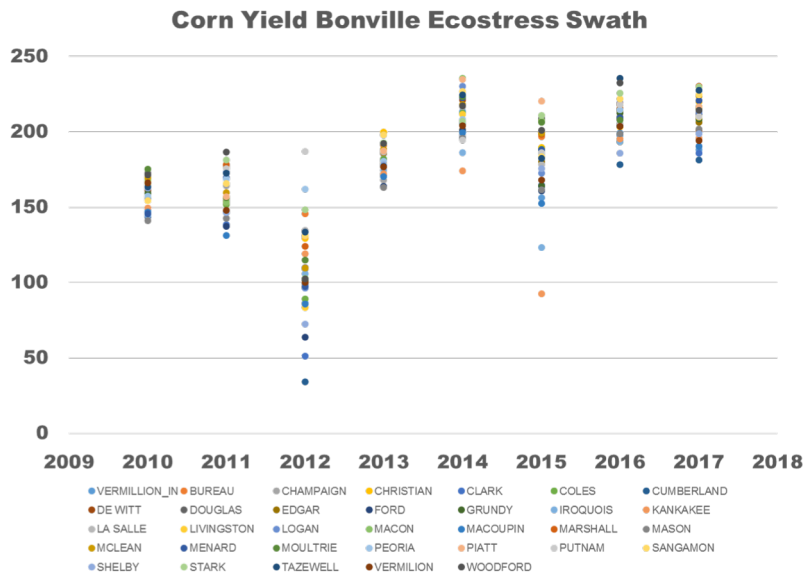
PRHP Platte River-High Plains UMRB Upper Mississippi River Basin

Variations in corn yields 2010-2017

NASS County Level Corn Yields level(BU/ACRE)







https://quickstats.nass.usda.gov/

NOAA – NESDIS – STAR
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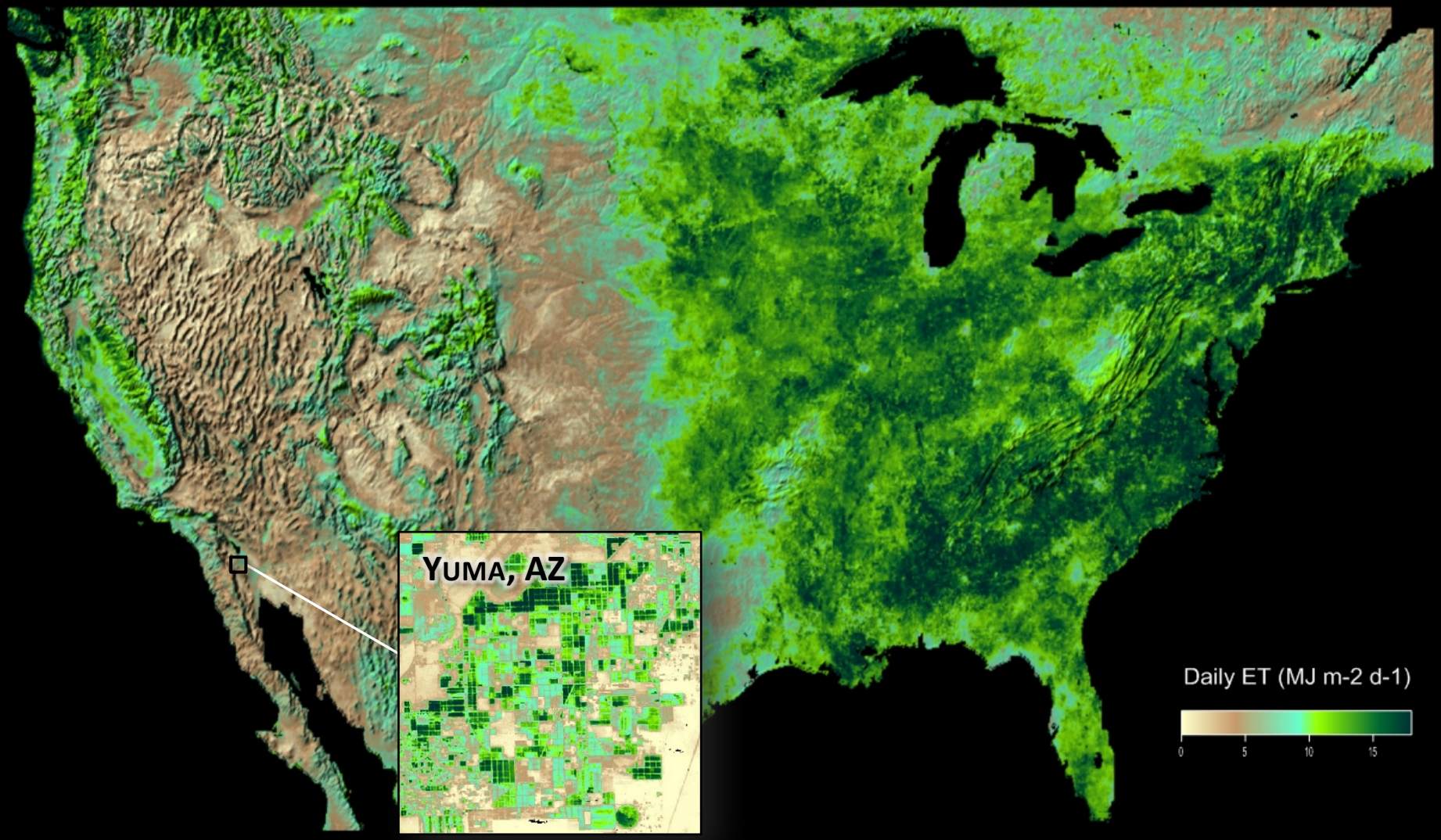
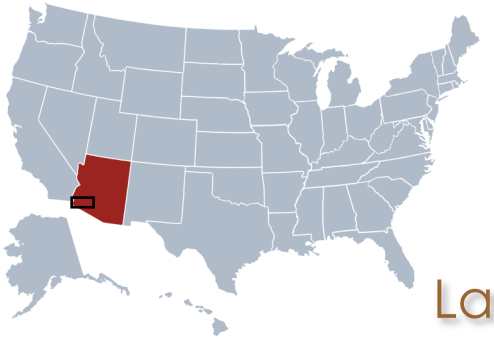
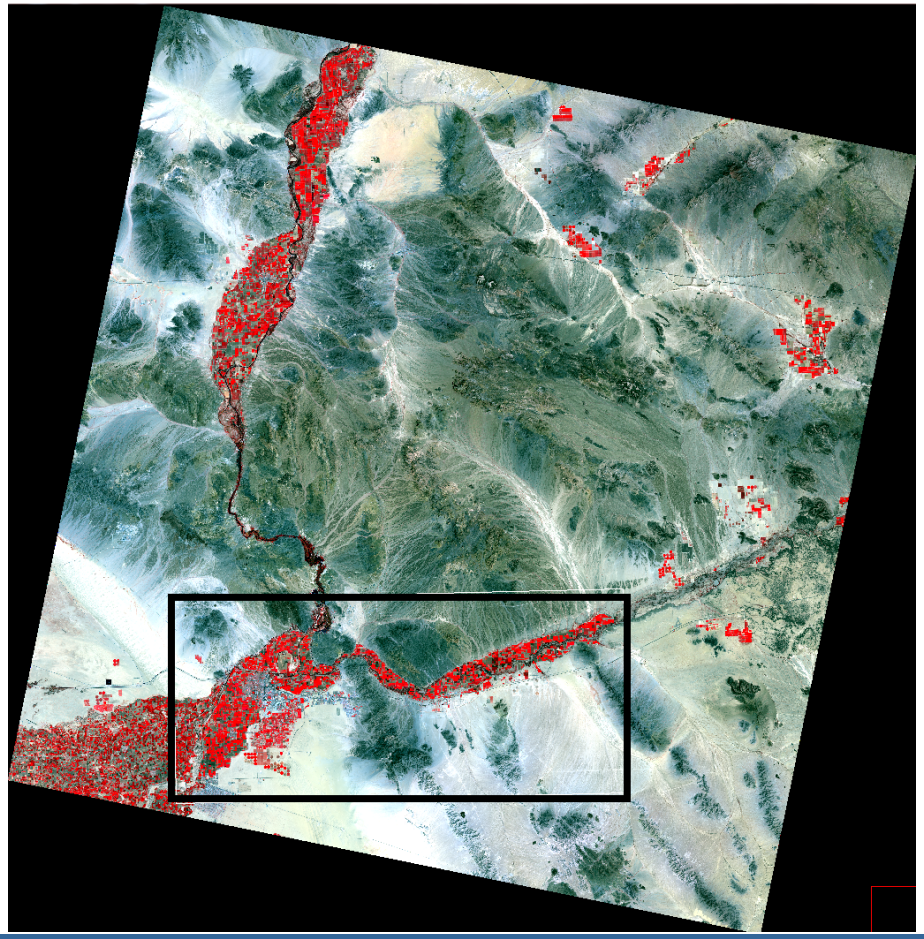


USDA-ARS Long-Term Agroecosystem Research (LTAR) Sites

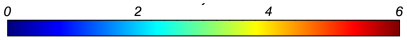
Applications: Yuma site (AZ)



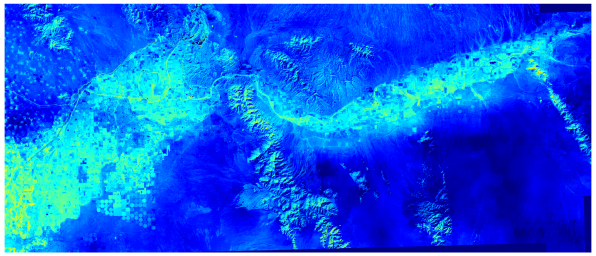
Landsat 8 - 2017



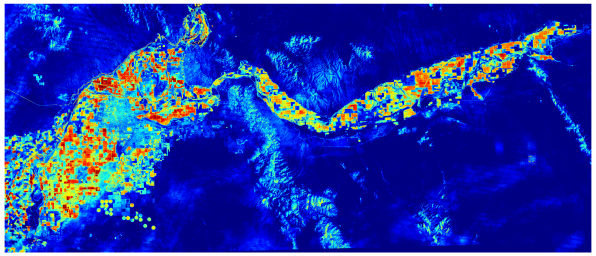
Evapotranspiration (mm/day)



2017060



2017120



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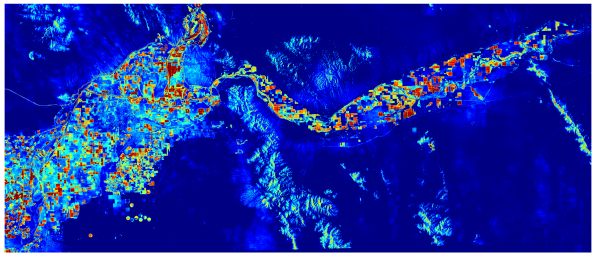
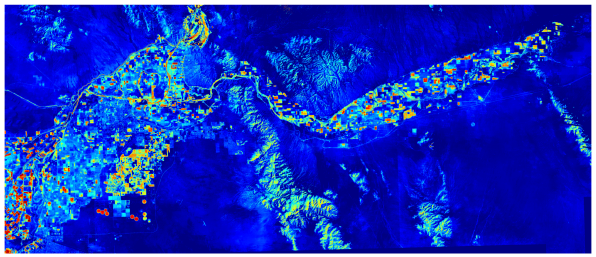
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