



**Jet Propulsion Laboratory**  
California Institute of Technology

# DisALEXI: Evapotranspiration disaggregation to field scales

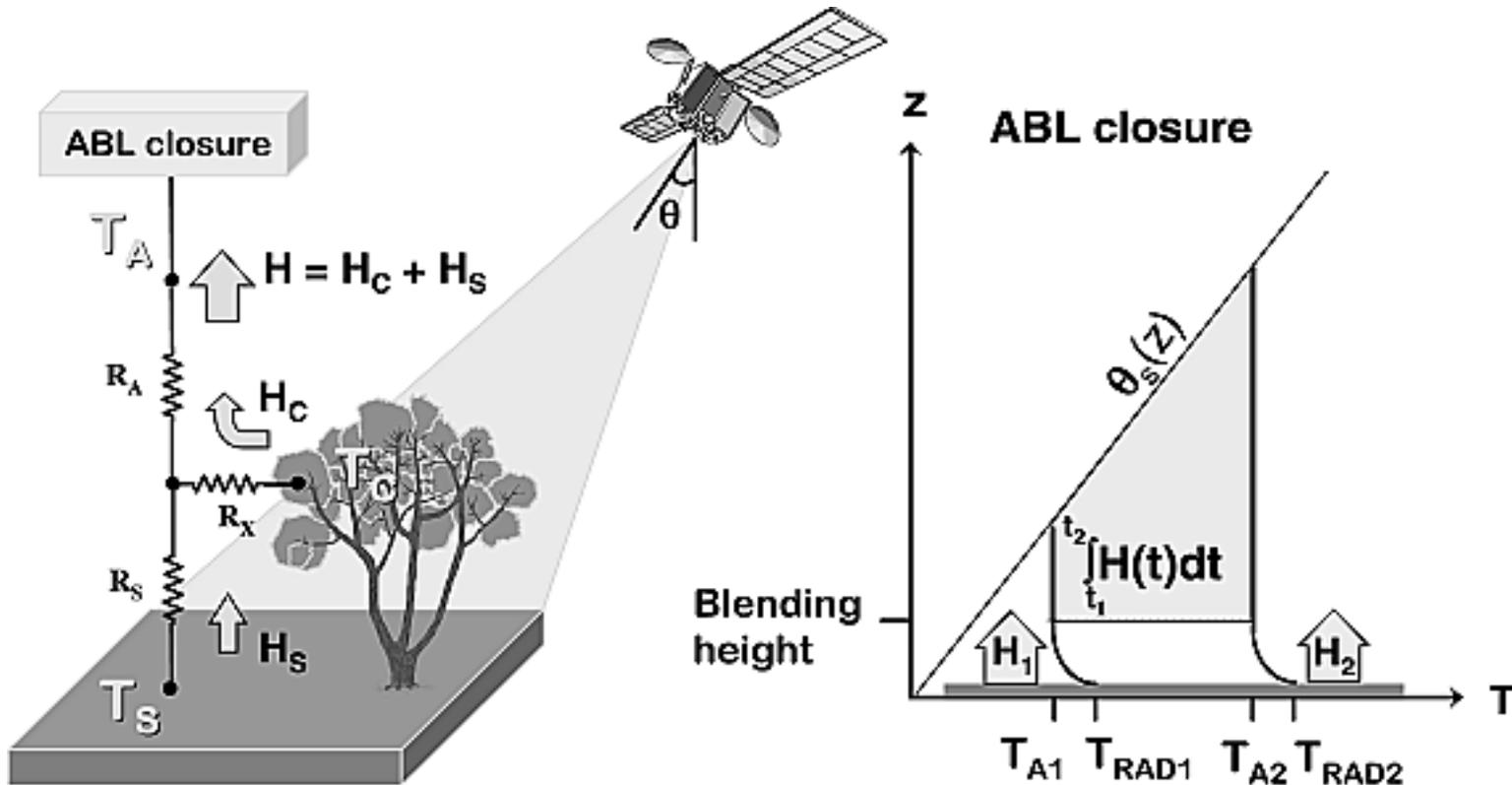
Kerry Cawse-Nicholson<sup>1</sup>, Simon Hook<sup>1</sup>, Martha Anderson<sup>2</sup>, Chris Hain<sup>3</sup>

<sup>1</sup>*Jet Propulsion Laboratory, California Institute of Technology*

<sup>2</sup>*USDA-Agricultural Research Service Hydrology and Remote Sensing Laboratory Beltsville, MD*

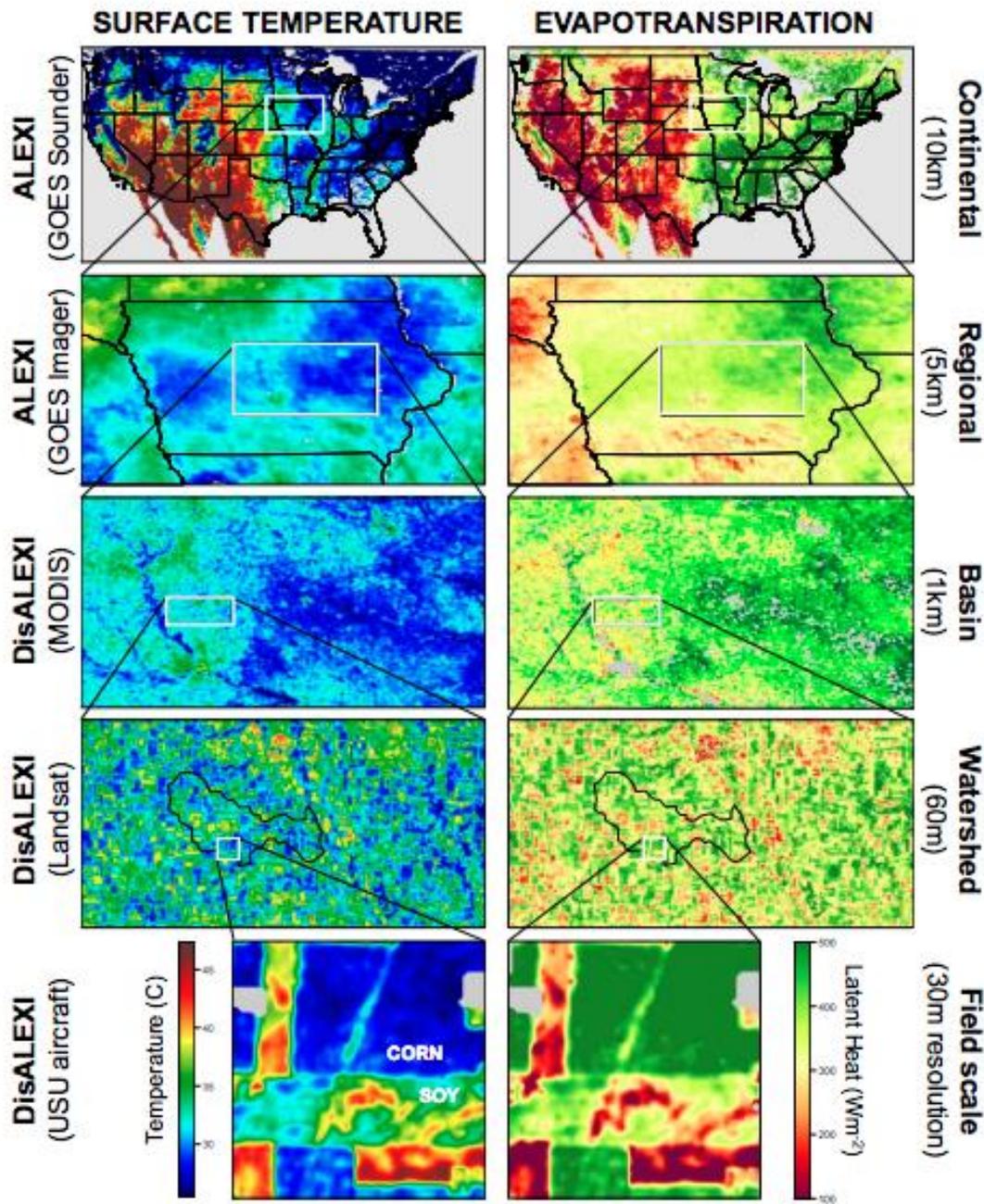
<sup>3</sup>*NASA-Marshall Space Flight Center Huntsville, AL*

# ALEXI – The Atmosphere-Land Exchange Inverse



Anderson, M. C., J. M. Norman, J. R. Mecikalski, J. A. Otkin, and W. P. Kustas (2007), A climatological study of evapotranspiration and moisture stress across the continental United States based on thermal remote sensing: 1. Model formulation, *J. Geophys. Res.*, 112, D10117.

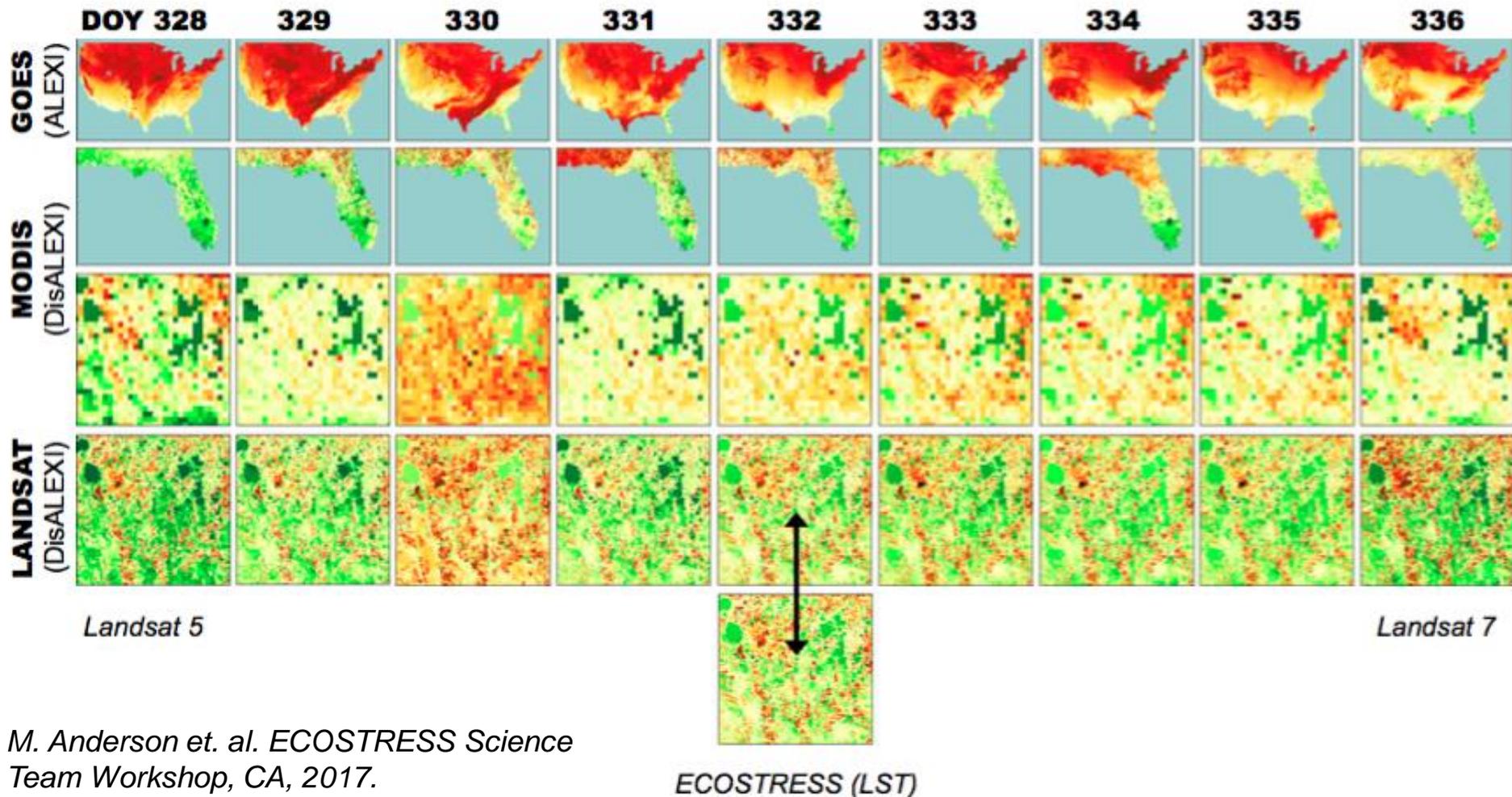
# ALEXI

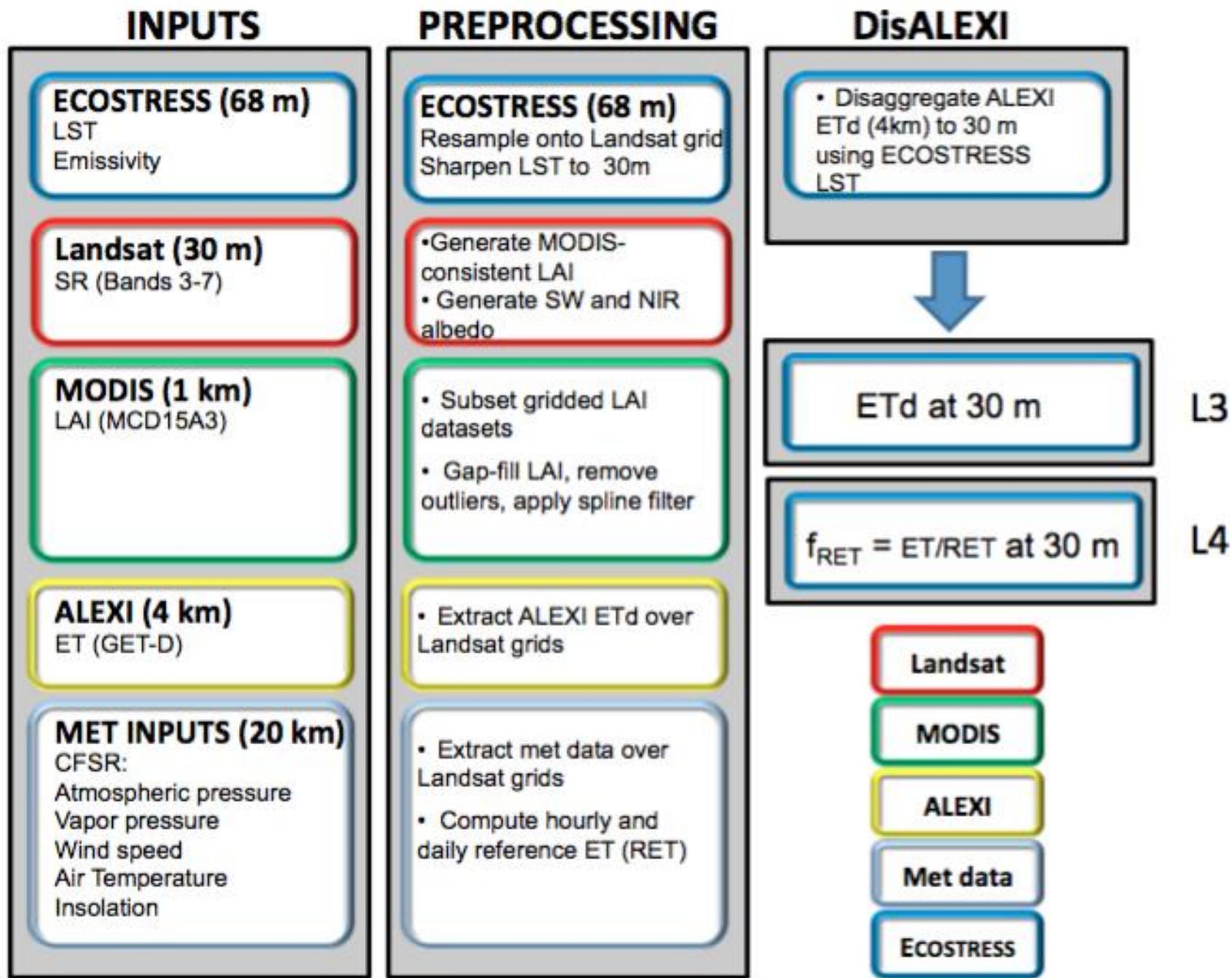


- The Atmosphere-Land Exchange Inverse is produced at different scales, using geostationary and polar orbiting satellites.
- We use the GOES-derived ALEXI produced daily over CONUS at 5km resolution.
- Using the time difference, small artefacts introduced during atmospheric correction are mitigated.
- However, these coarse resolution ET estimates can be up-sampled using higher resolution thermal measurements.

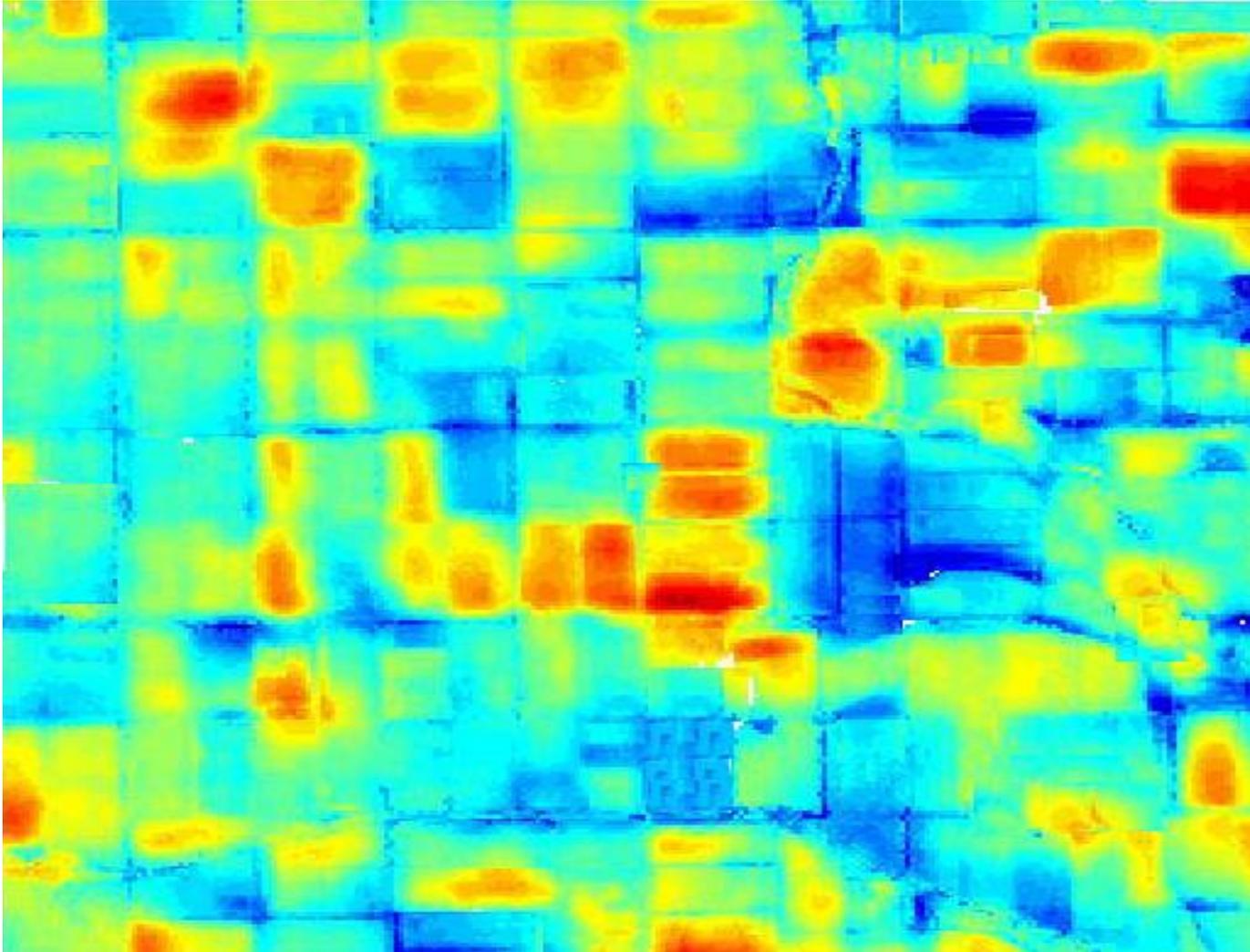
# Disaggregation using ECOSTRESS

## Daily Evapotranspiration – Orlando, FL, 2002

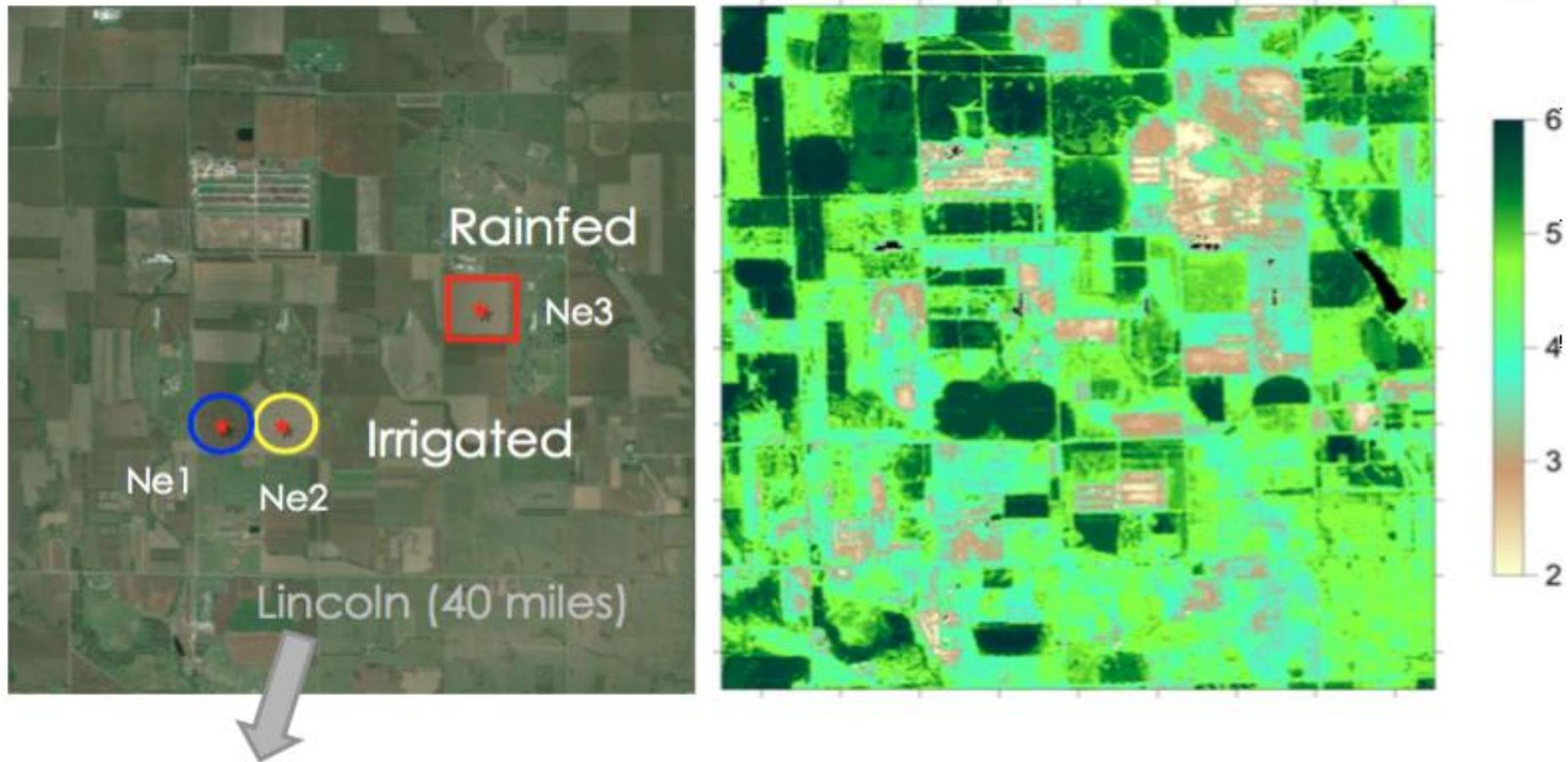




# ET at field-scale



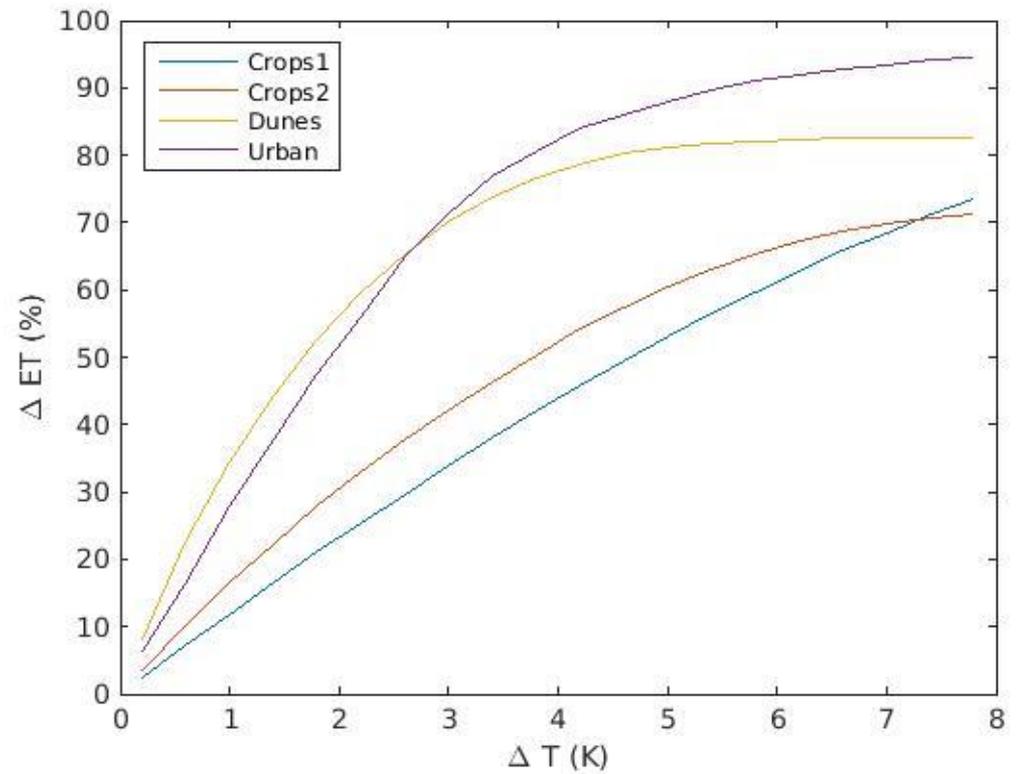
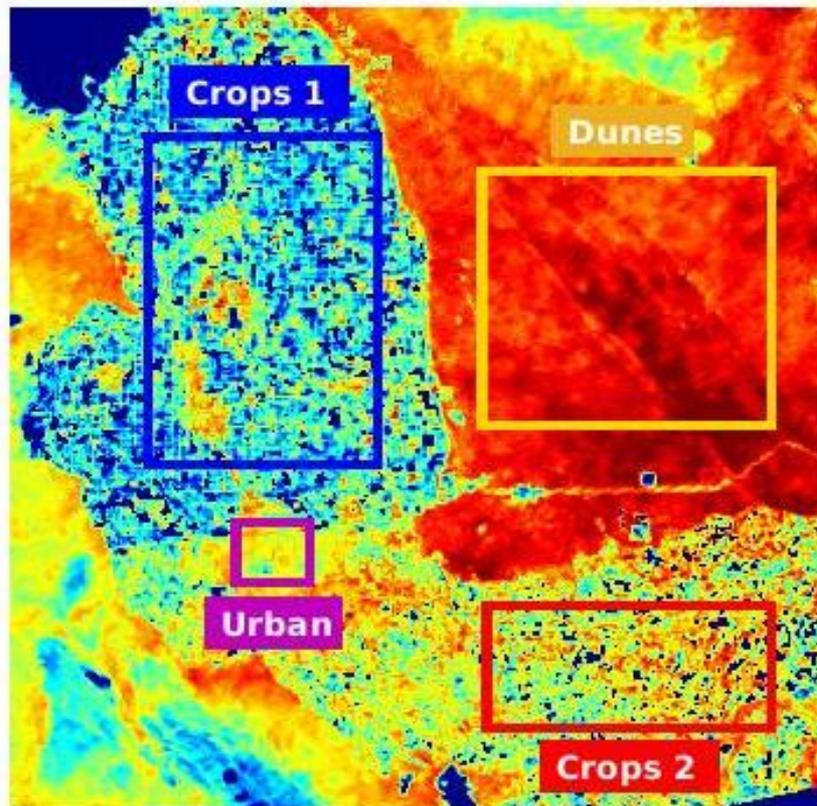
# Mead, NE



Yang, Y, et al. (2017) "Field-scale mapping of evaporative stress indicators of crop yield: an application over Mead, NE, *Remote Sensing Environ*, in preparation.

Landsat 8 - 2013

# disALEXI sensitivity



# Final remarks

- ALEXI is a coarse-resolution evapotranspiration model, that separates the contribution from canopy and soil, and takes advantage of the change in temperature as an input, in order to reduce errors.
- disALEXI is a disaggregation tool that up-samples ALEXI to the field-scale.
- disALEXI has been incorporated into the ECOSTRESS processing chain, in order to provide field-level evapotranspiration for precision agriculture and drought monitoring.



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