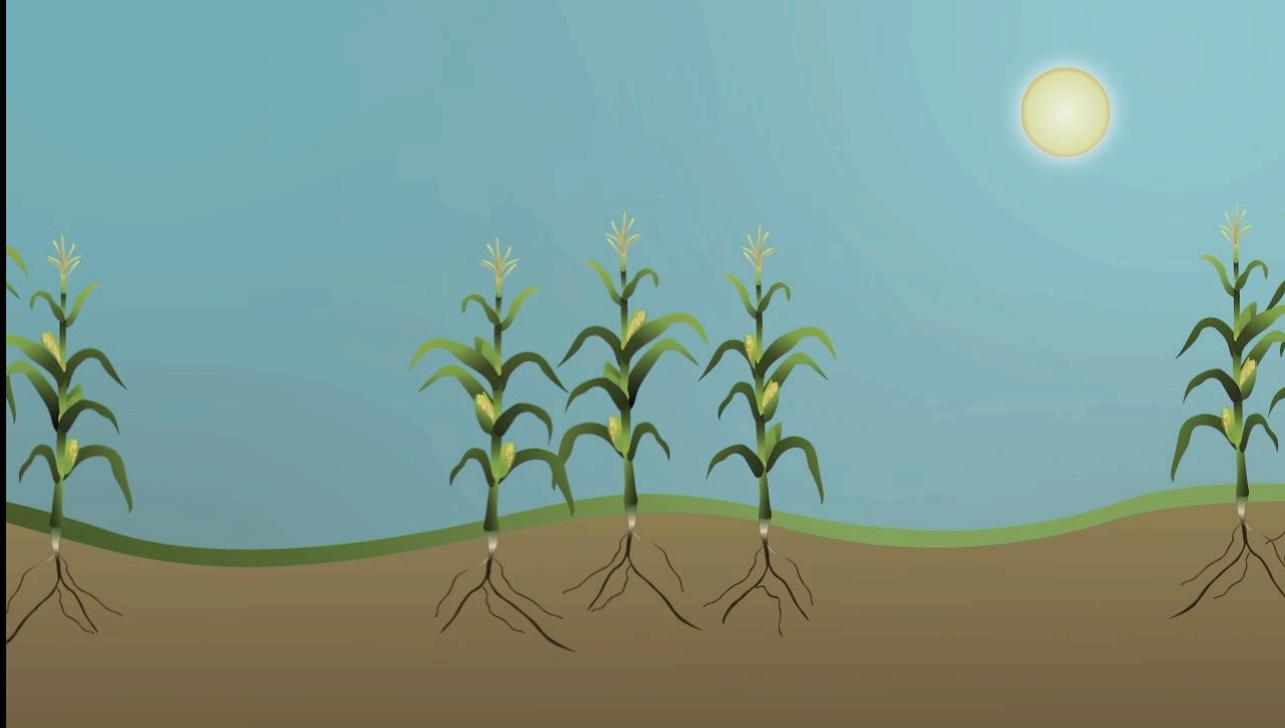


# OPENET

Evapotranspiration Data for Water Management and Precision Agriculture



# What is evapotranspiration?



Water applied to a field ultimately:

- Evaporates
- Transpires (after being used by plants to grow)
- Recharges underlying groundwater
- Runs off and returns to a local canal or river

Search

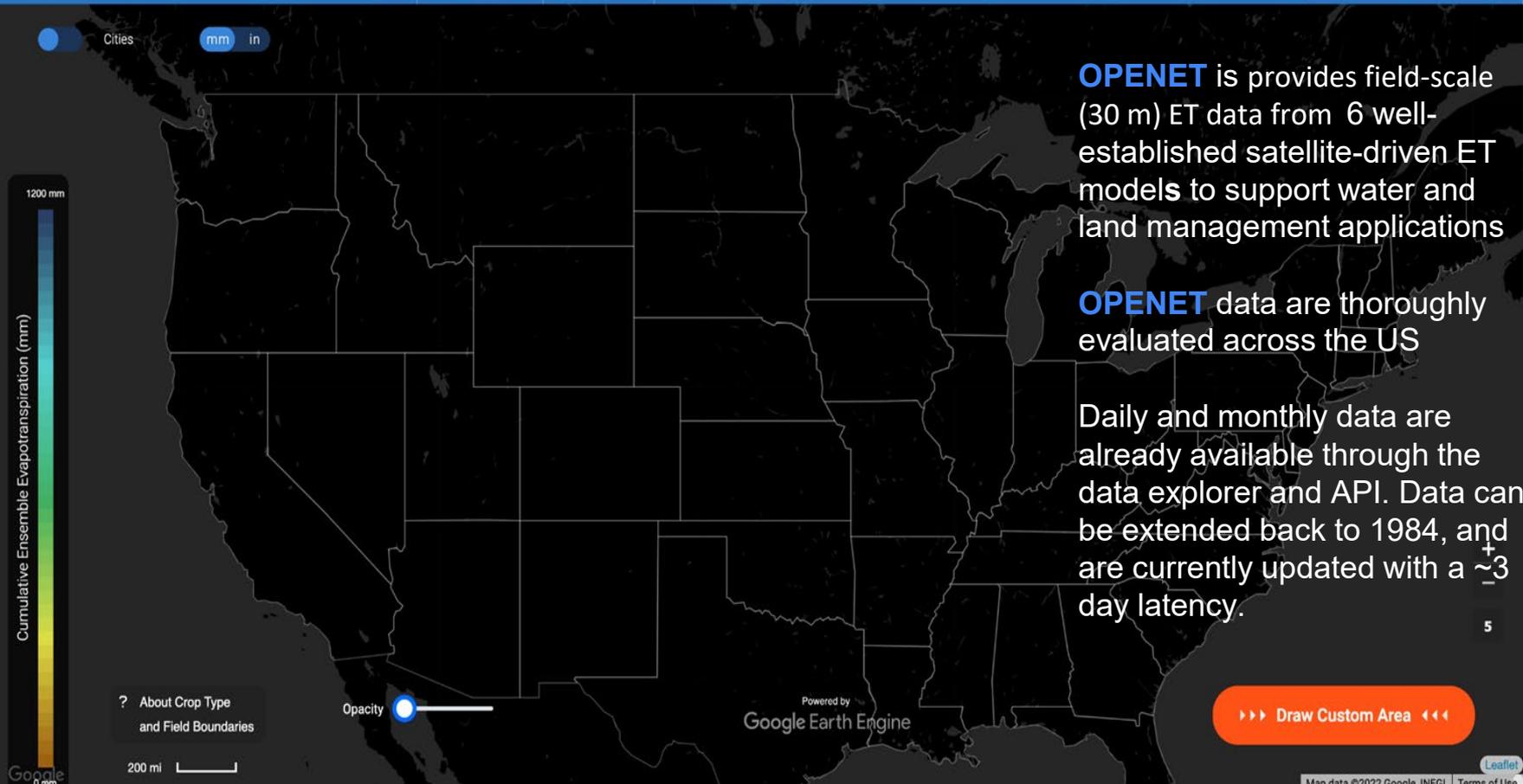


Select Year  
2021

Variable  
ET

Raster View  Field View

[New Here? Take a Tour!](#)



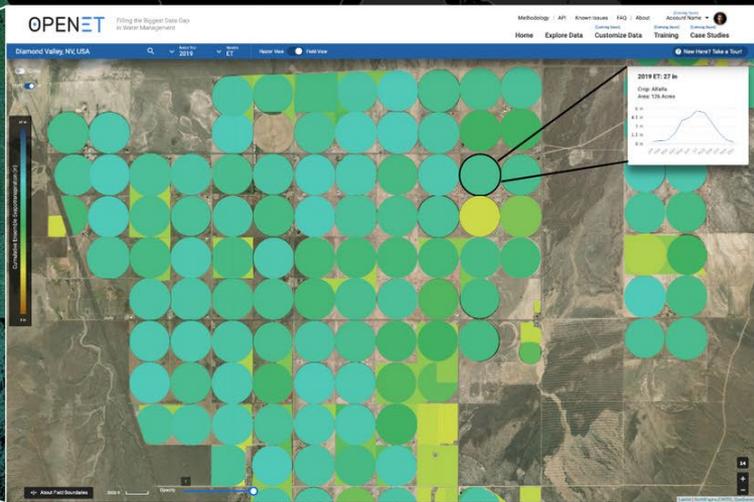
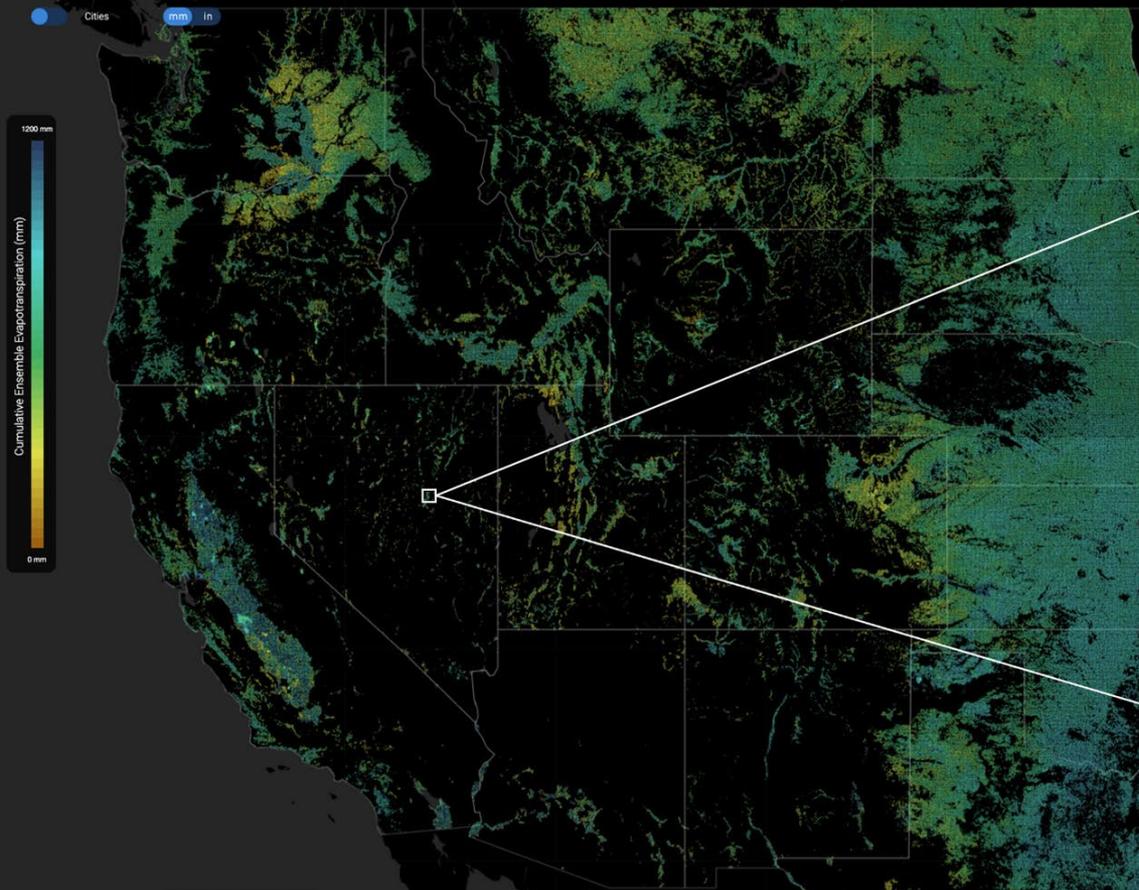
**OPENET** provides field-scale (30 m) ET data from 6 well-established satellite-driven ET models to support water and land management applications

**OPENET** data are thoroughly evaluated across the US

Daily and monthly data are already available through the data explorer and API. Data can be extended back to 1984, and are currently updated with a  $\sim 3$  day latency.

[? About Crop Type and Field Boundaries](#)

Opacity



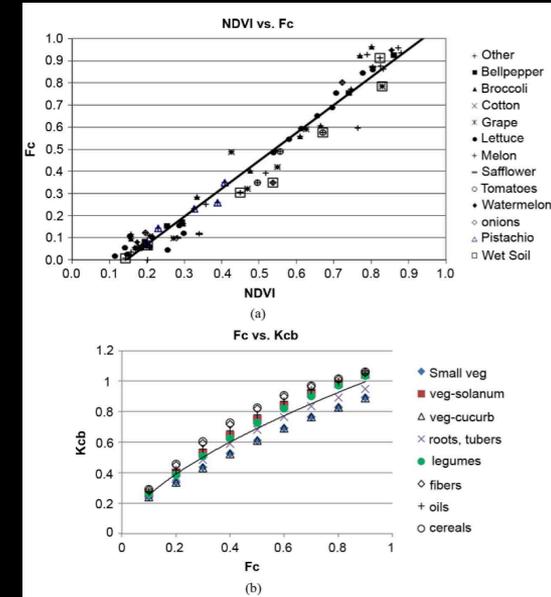
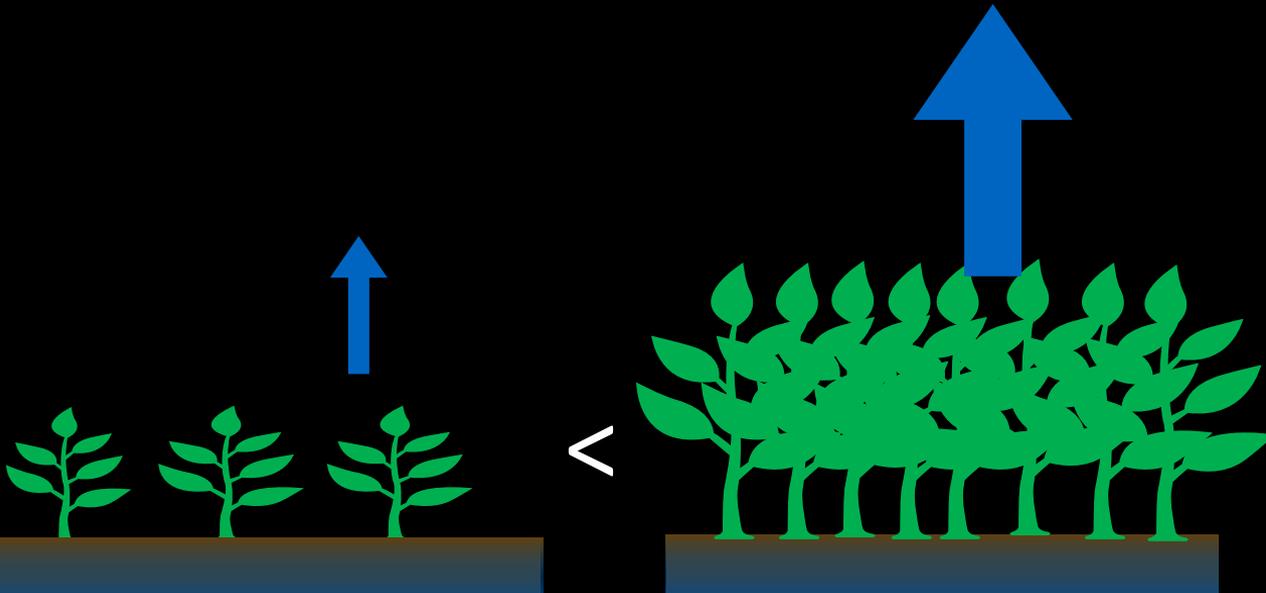
# How do we model ET?

Evapotranspiration is controlled by the amount of vegetation and the atmospheric demand for water

$$ET = K_c \times E_{To}$$

$$K_c \sim f(F_c)$$

$$F_c \sim f(\text{NDVI})$$



# How do we model ET?

Key principle: Evapotranspiration consumes energy!

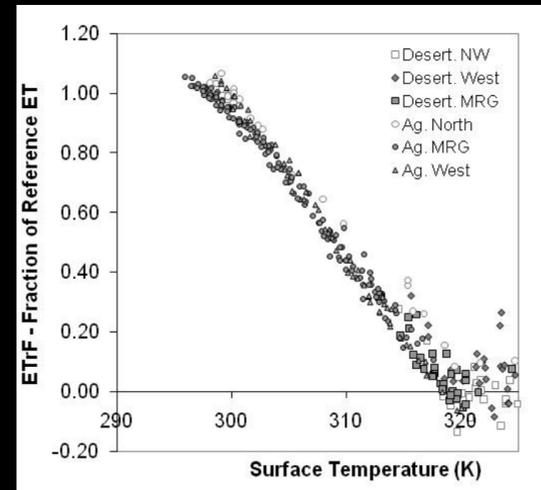
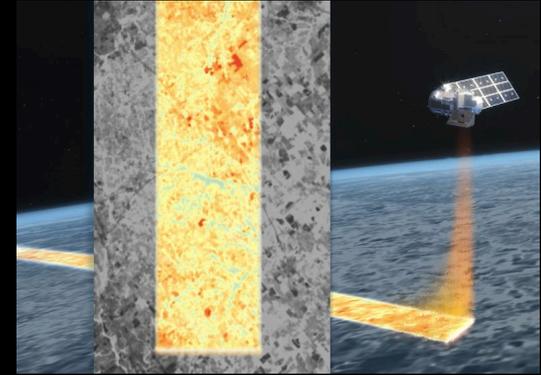
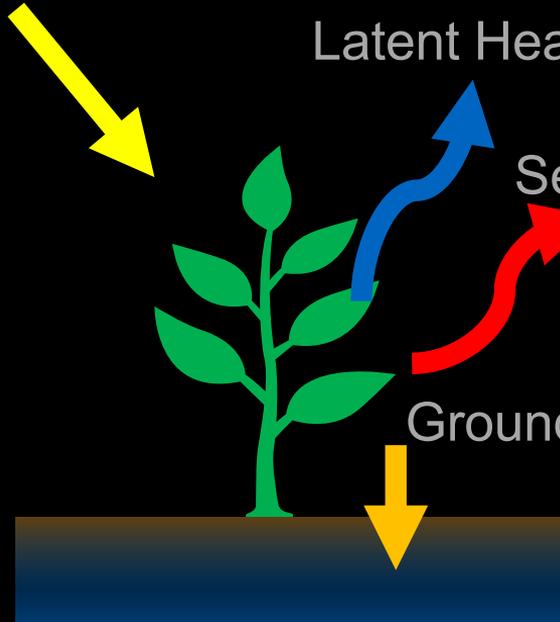
$$LE = R_n - G - H$$

Net Radiation ( $R_n$ )

Latent Heat ( $LE$ )

Sensible Heat ( $H$ )

Ground Heat Flux ( $G$ )

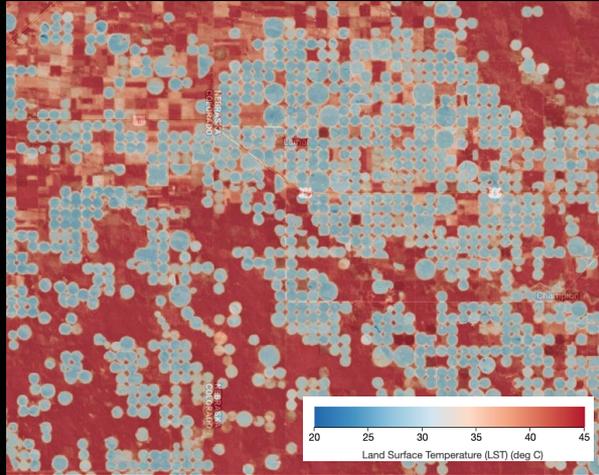


# What the satellites 'see'?

"True color"  
(red, green, blue)

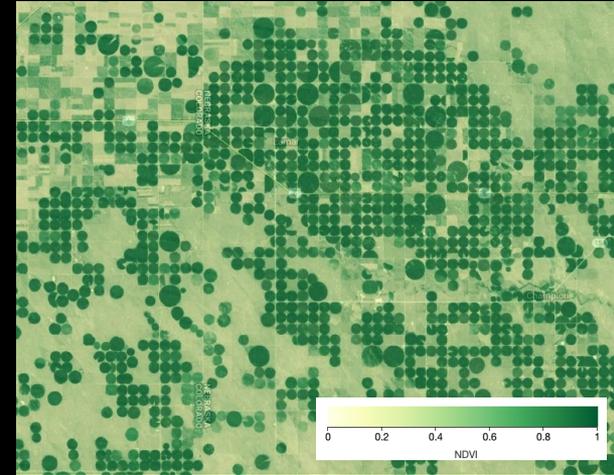


Thermal infrared emissions



Cooler = more ET  
Hotter = less ET

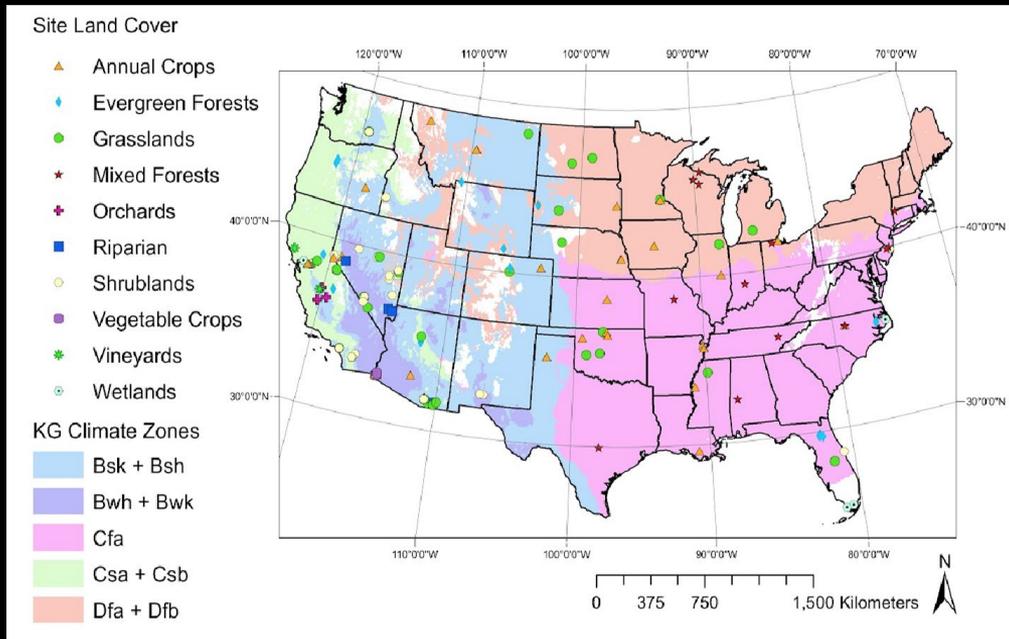
NDVI  
(Normalized Difference  
Vegetation Index)



'Greener' = more ET

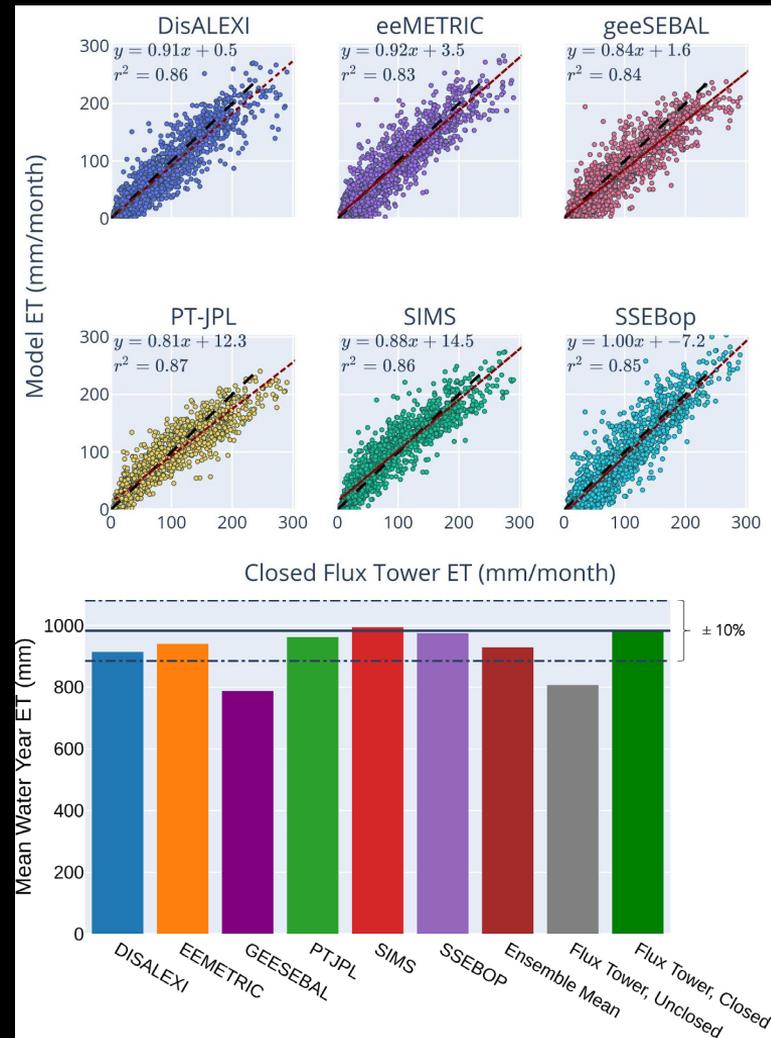
# Building trust in data

The largest ever evaluation of ET to date



~153 flux tower sites; 70 ag sites

Water Year MAE = 8.9%



# Building trust in data



Local evaluation of specialty crops supported by CSU ARI

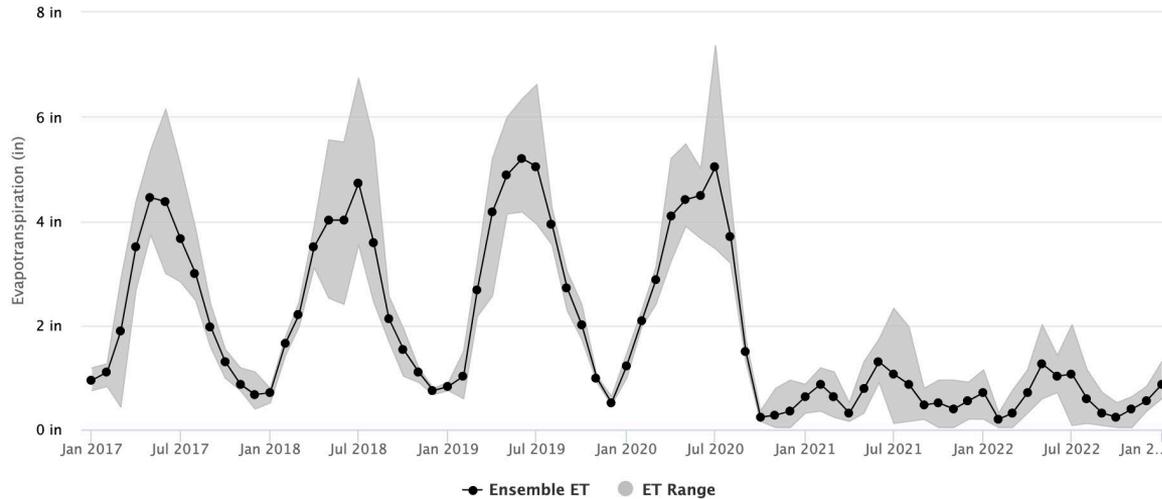
36.438720, -121.399452  
 Lat: 36.43372297895021 Lon: -121.39379136264326

New Here? Take a Tour!

Monthly 
  Cumulative 
  Daily

## Evapotranspiration (in)

Download Data



### Data Options

ET

- Ensemble
- Range
- EEMETRIC
- SSEBop
- SIMS
- PT-JPL
- DisALEXI
- geeSEBAL

ET Fraction

Additional Variables

Highcharts.com

Draw Custom Area

# OpenET can help:

- Rural communities to design locally driven water conservation and management programs.
- Water managers to develop more accurate water budgets, incentive programs and other innovative strategies.
- Policymakers to more accurately track water supplies, simplify regulatory compliance, and co-develop solutions with local communities.
- Farmers to expand use of data-driven irrigation practices to maximize “crop per drop” and reduce costs for fertilizer, water, and energy.





Google Earth Engine



UNIVERSITY of NEBRASKA-LINCOLN



California State University  
MONTEREY BAY





Questions?  
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[openetdata.org](http://openetdata.org)

