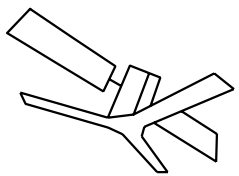
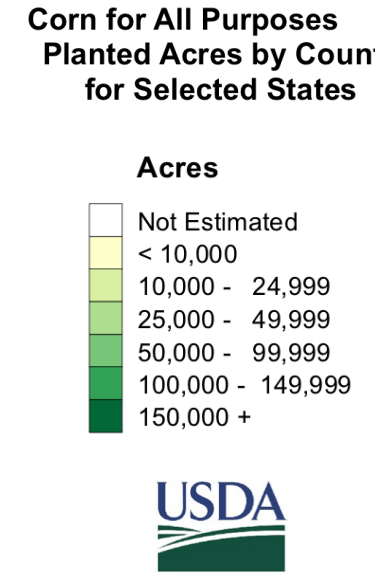
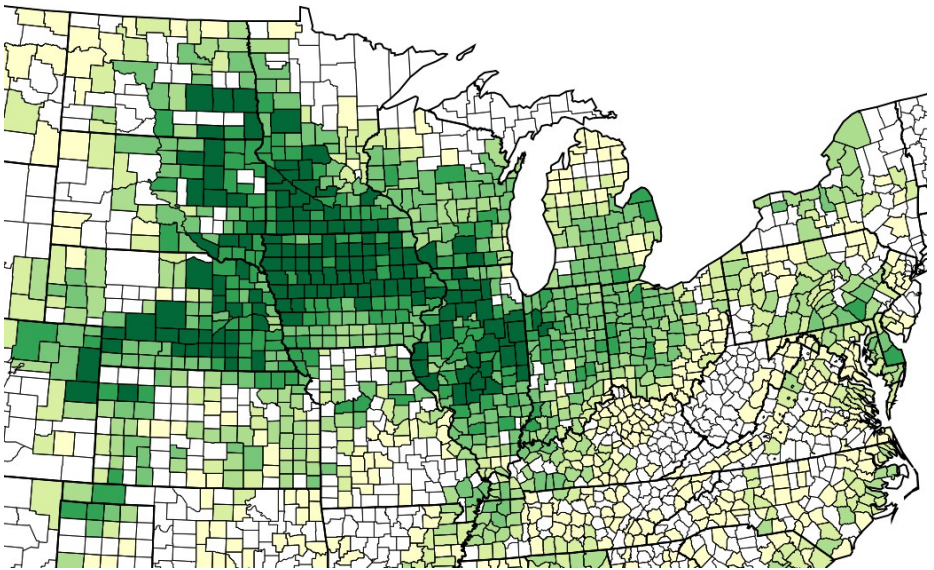
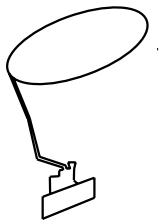
Besides Soil Moisture, What can be “Seen” with Satellite L-band Radiometry in the U.S. Corn Belt?









Brian Hornbuckle

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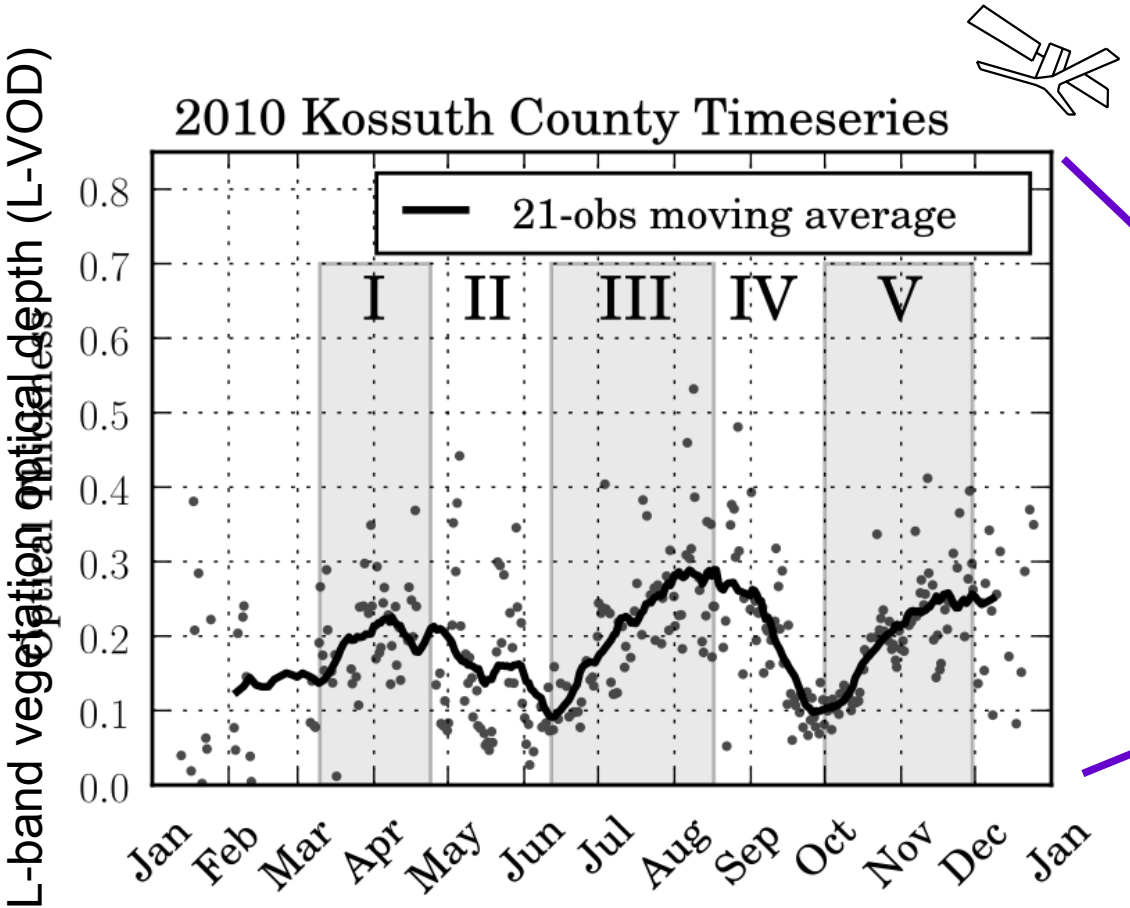
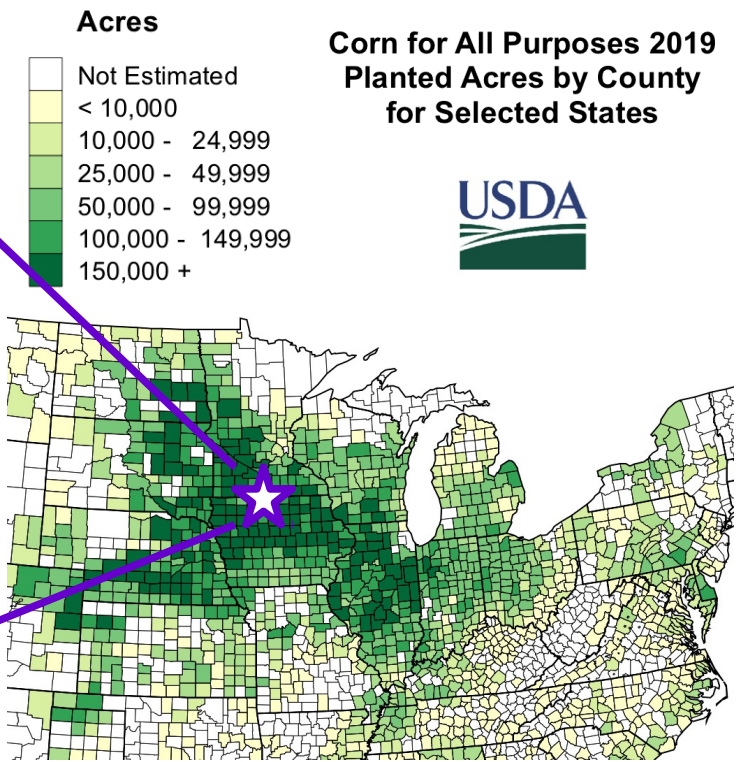
Hornbuckle: What can be "Seen" at L-band in the U.S. Corn Belt?





Patton and Hornbuckle (2012) GRSL

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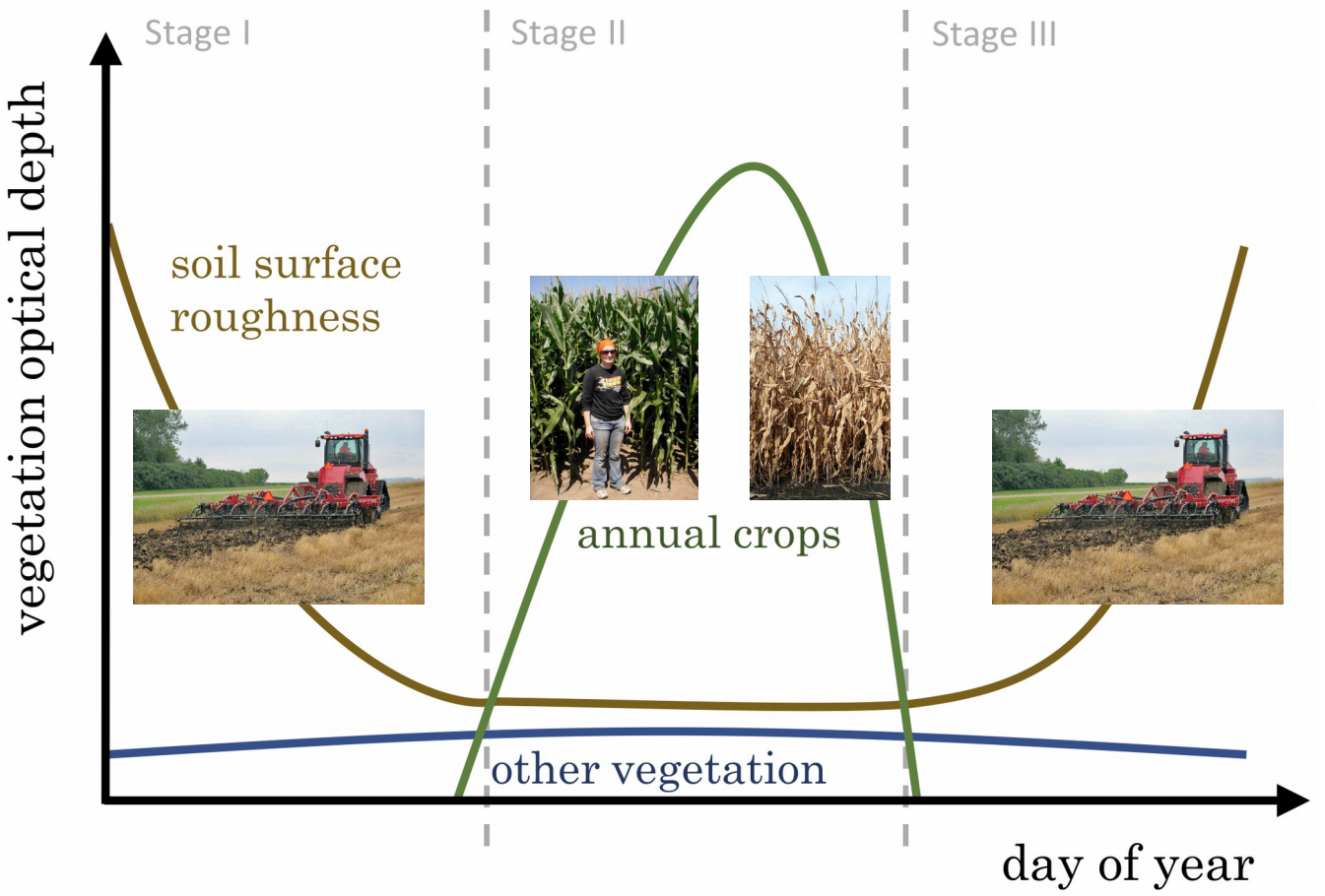
Hornbuckle: What can be "Seen" at L-band in the U.S. Corn Belt?

conceptual model of VOD in the U.S. Corn Belt



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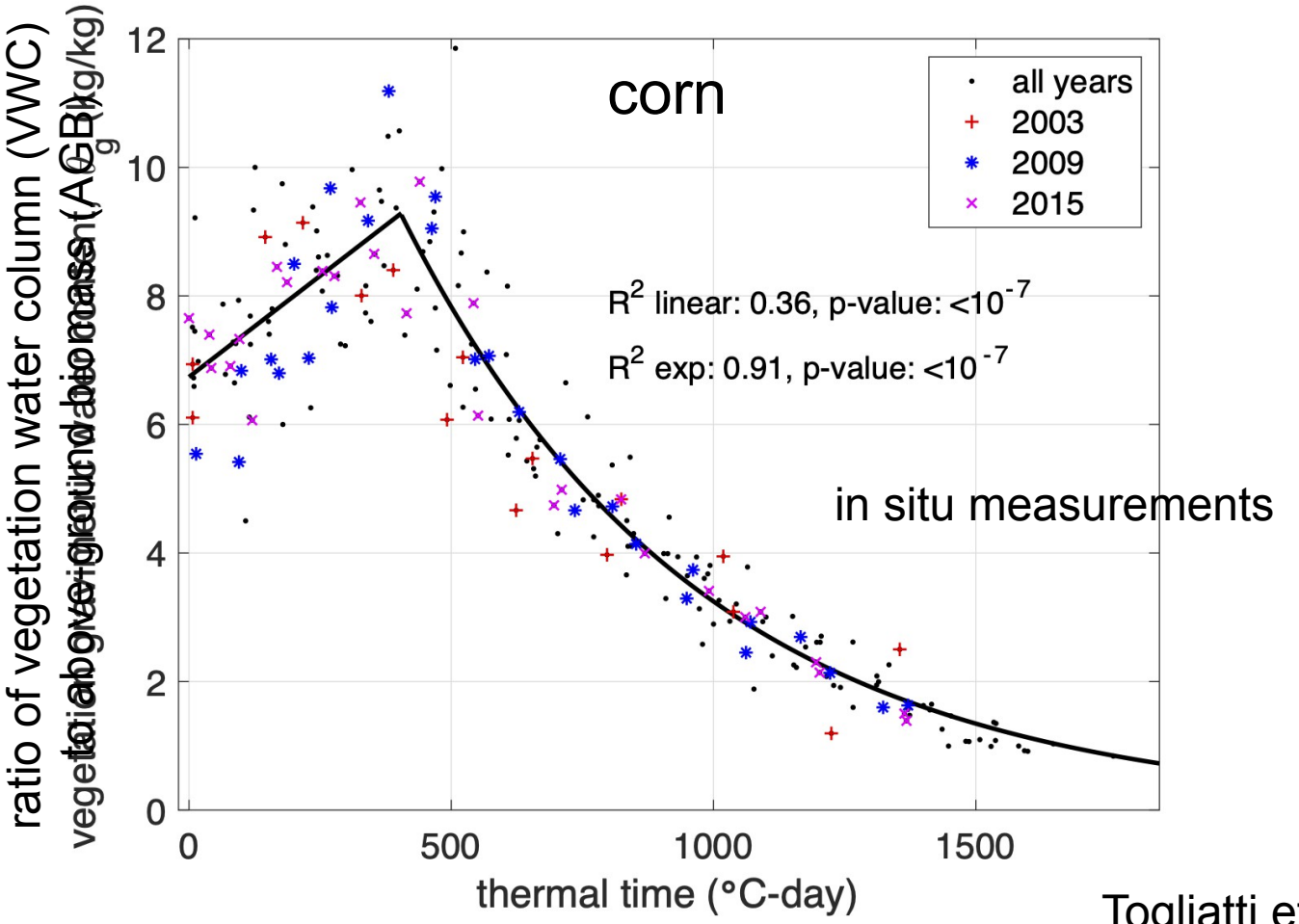

Togliatti et al. (2019) RSE

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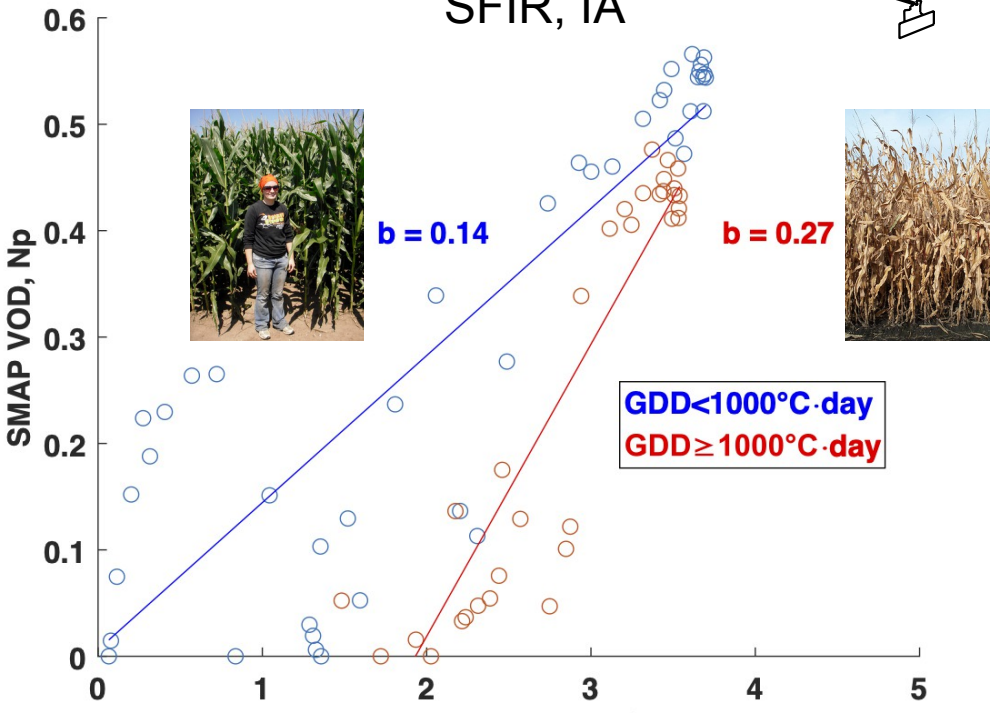

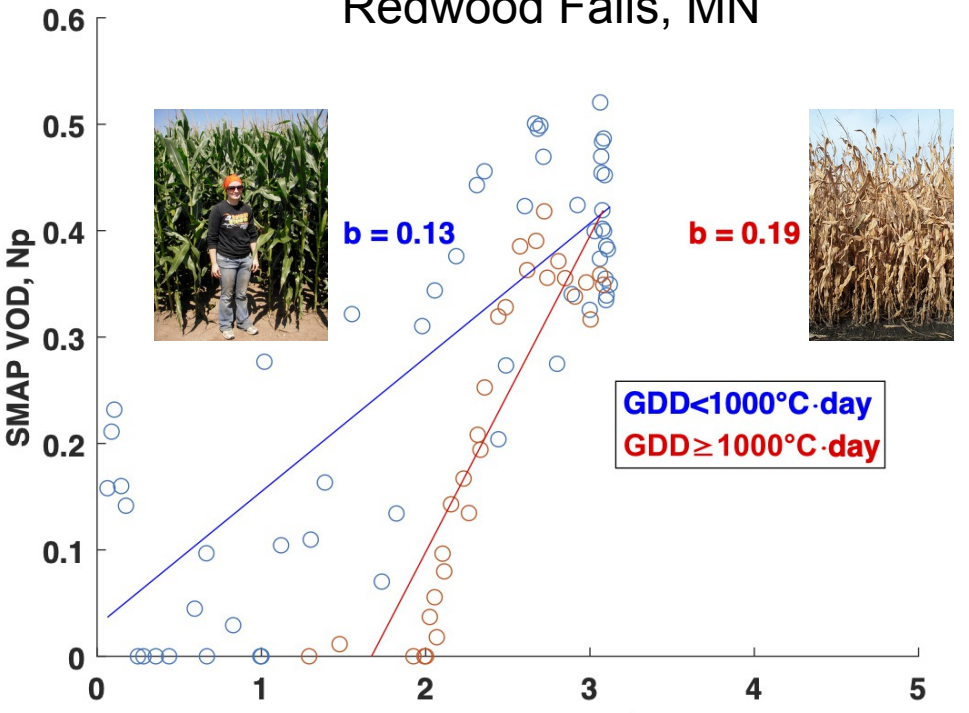

Hartman et al. (2023) RSE

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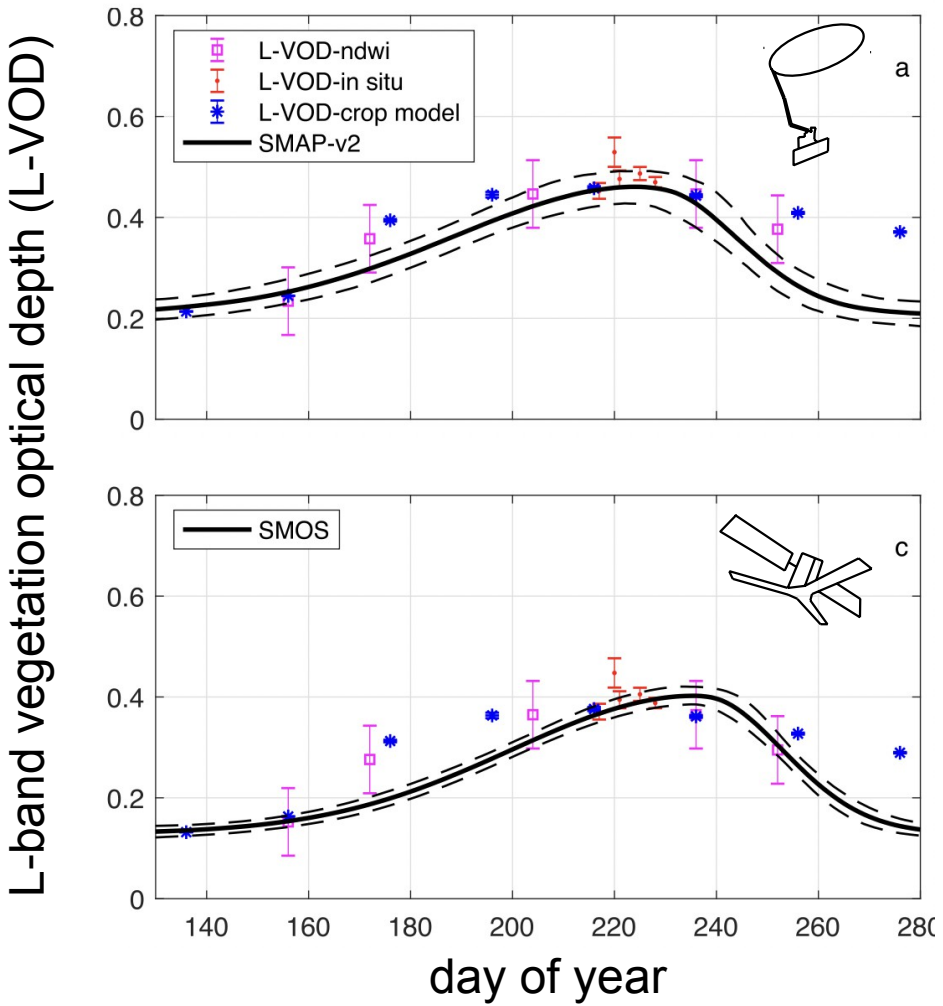

Quantitative assessment using:

NDWI;

in situ measurements;

VWC from a crop model.

Togliatti et al. (2020) GRSL

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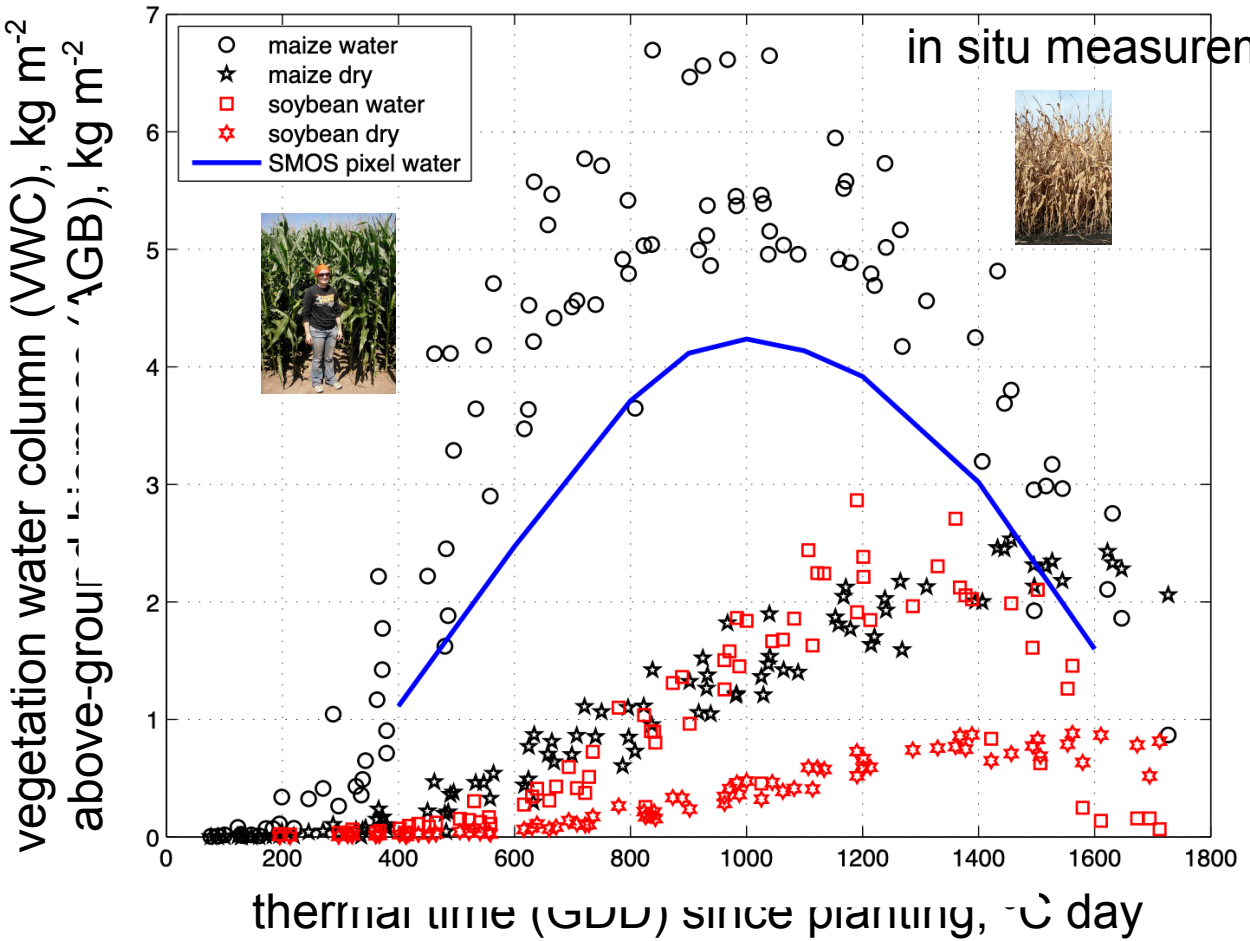

peak VWC occurs
at a specific
stage of development
(R2 = milk)
(1000 °C day for NE/IA)

Hornbuckle et al. (2016) RSE

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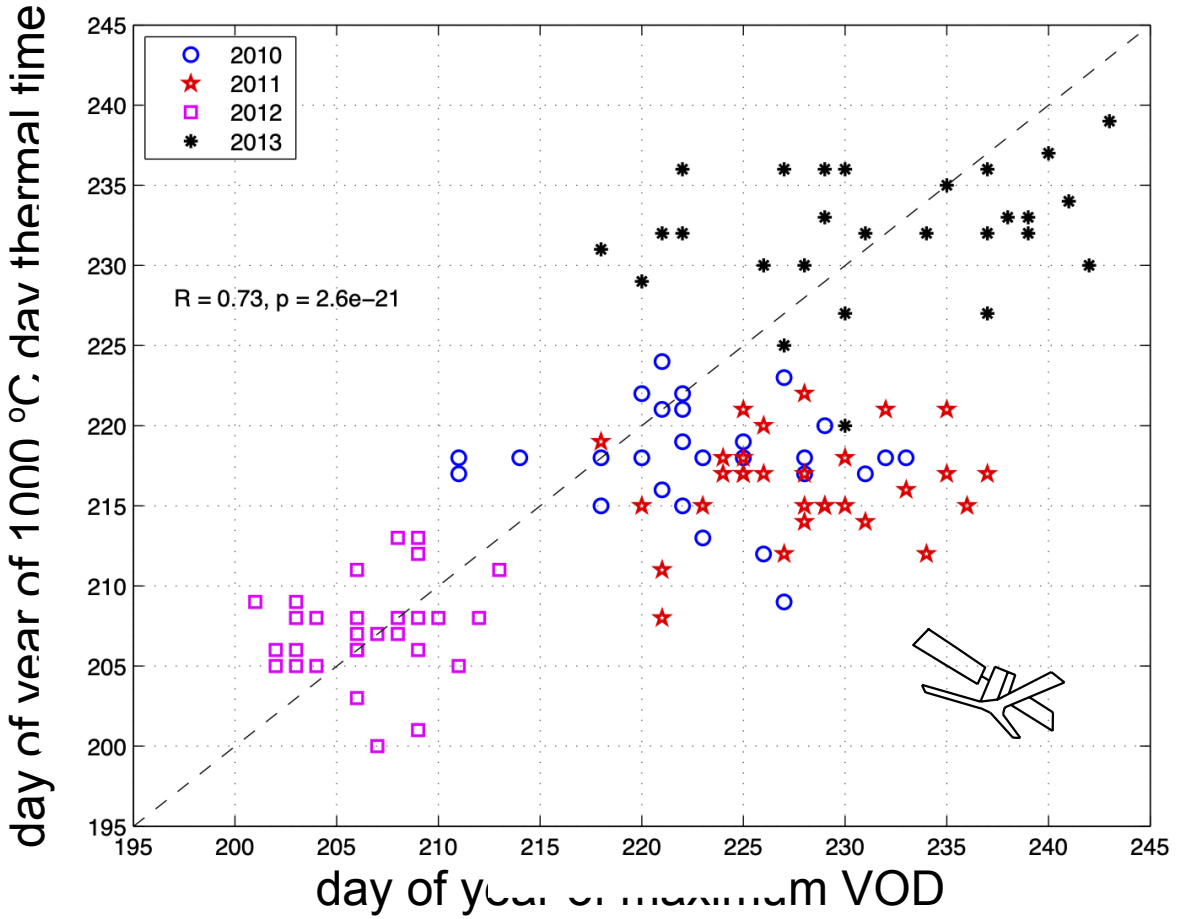
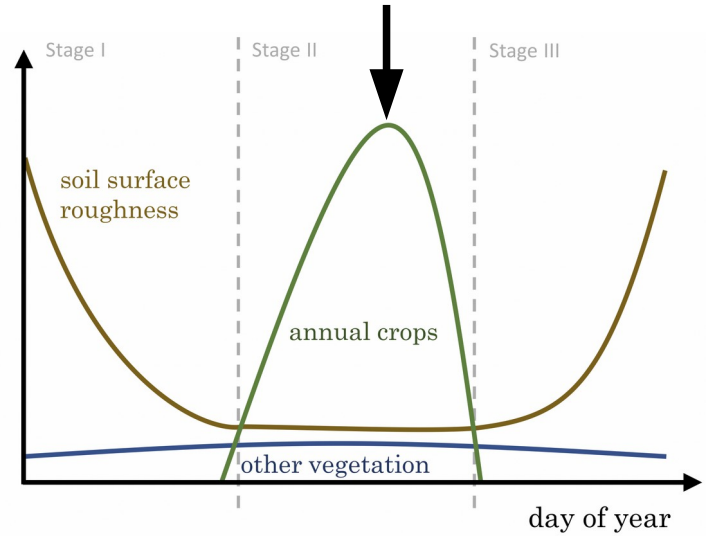


When do we reach peak VWC (phenology stage)?



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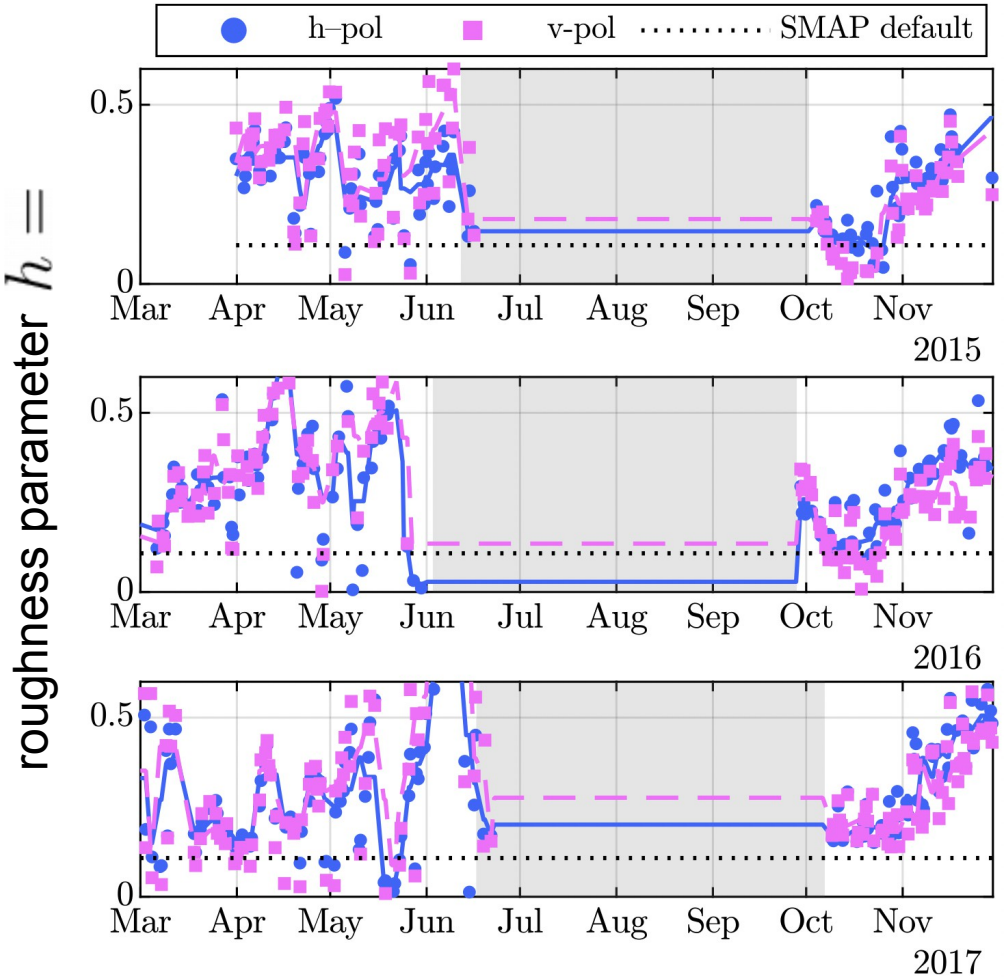

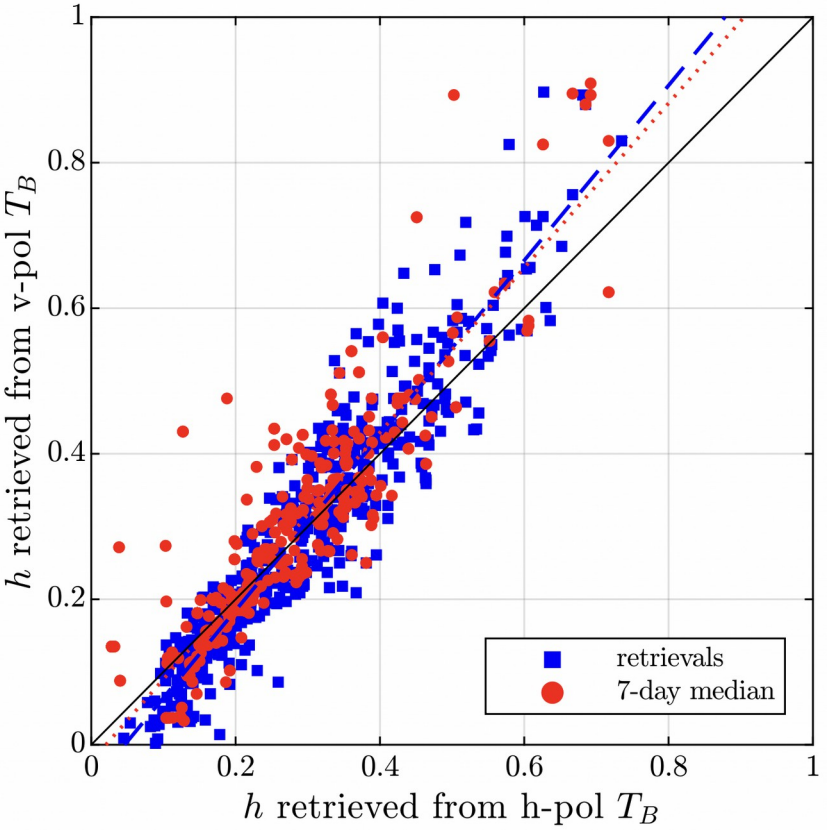

Walker et al. (2023) RSE

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33 km SMAP / 40 km SMOS pixels	10 km pixels
4000 Corn Belt fields	400 Corn Belt fields
county-sized	township-sized
much larger than growing season precipitation variability	approaching 1-to-2 km size of smallest storms during the growing-season
10-times better than USDA crop management and phenology information	100-times better than USDA crop management and phenology information

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Could enable realistic crop modeling of Corn Belt and other croplands?