



Remote sensing of cultivated areas and their productivity in the MENA region

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May 29, 2013



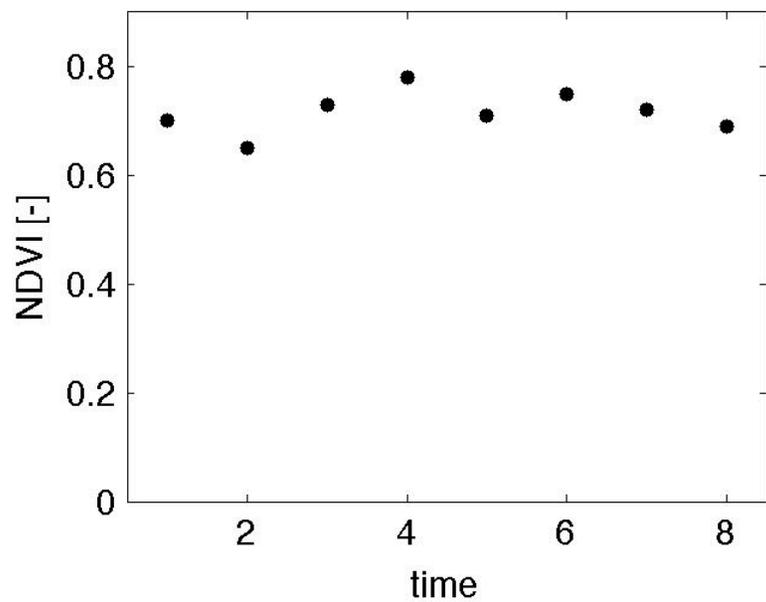
What do we observe with remote sensing in cultivated areas?

- Operational status of satellites
- Objective assessment of fields
- Identify crop types and locations
- Estimate crop area
- Estimate productivity (yield)
- Estimate crop irrigation status
- Environmental assessment

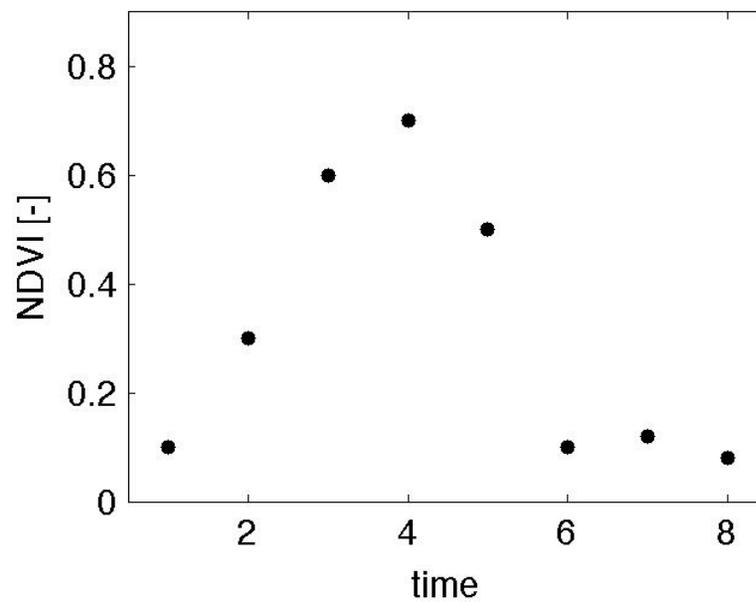
What are the tools and datasets?

- Medium-spatial resolution datasets for operational monitoring (Landsat, SPOT)
- Tools include vegetation indices, classification, change detection
- Rely on multi-temporal dynamics of vegetation
- Extract crop-specific information

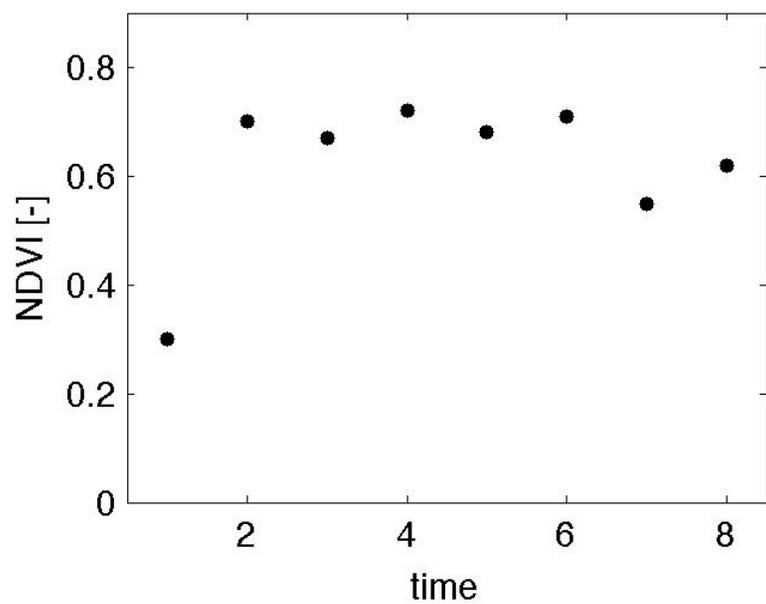
permanent vegetation



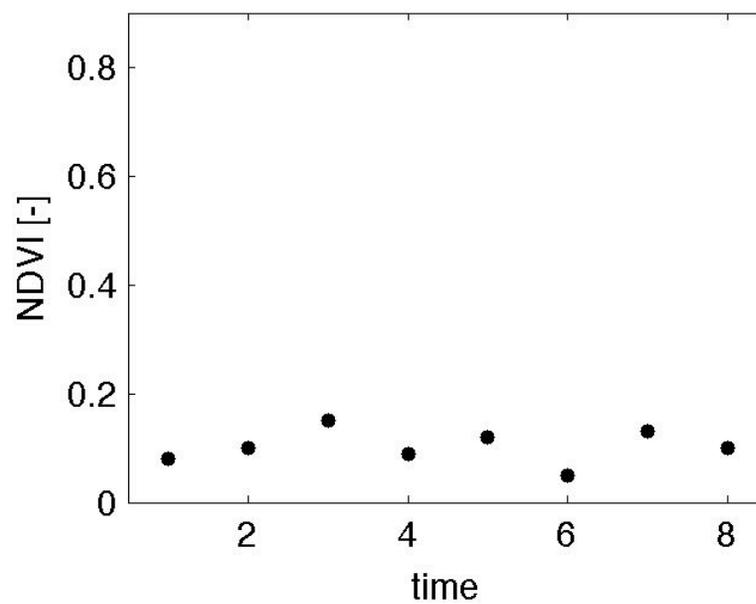
agriculture



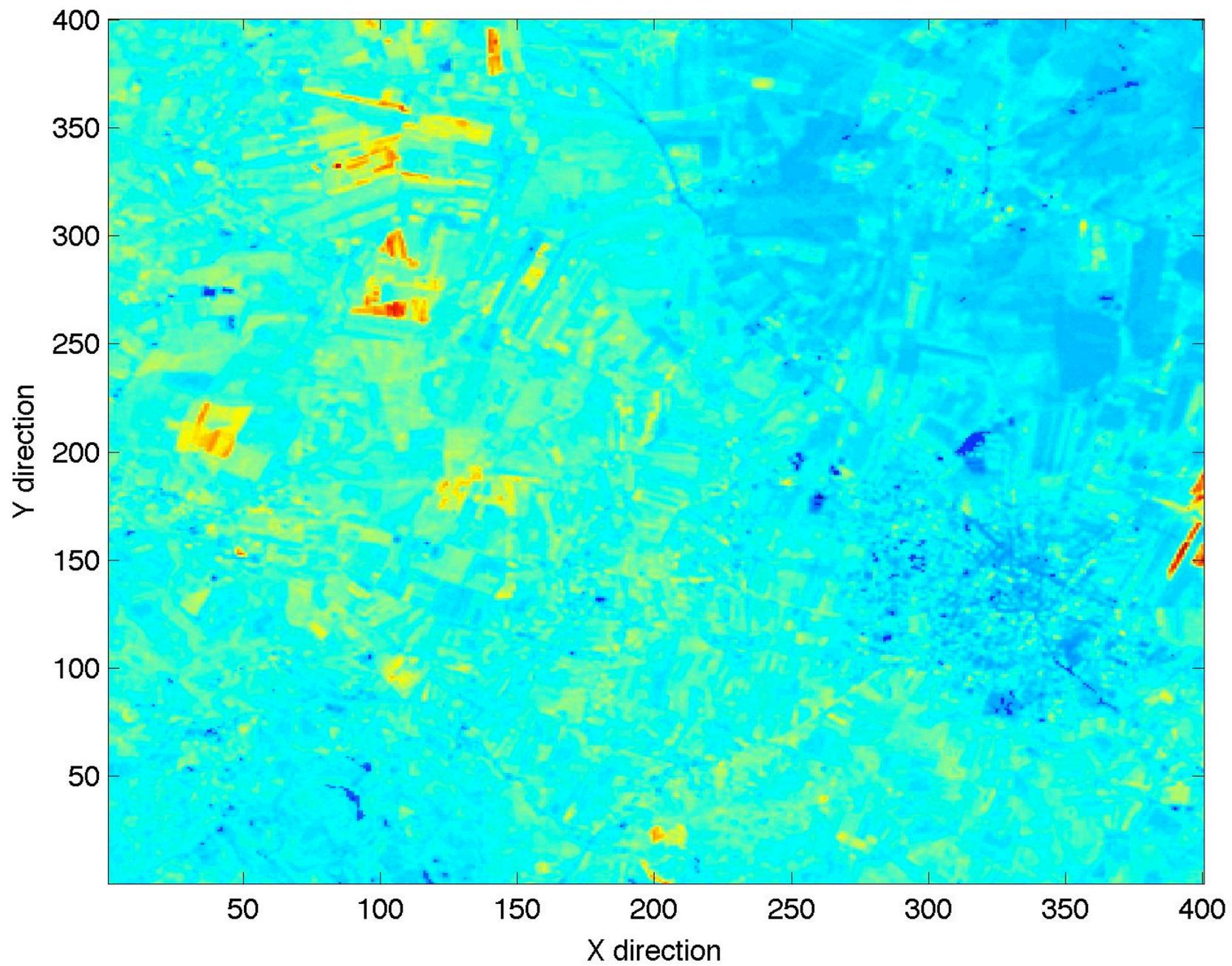
orchards



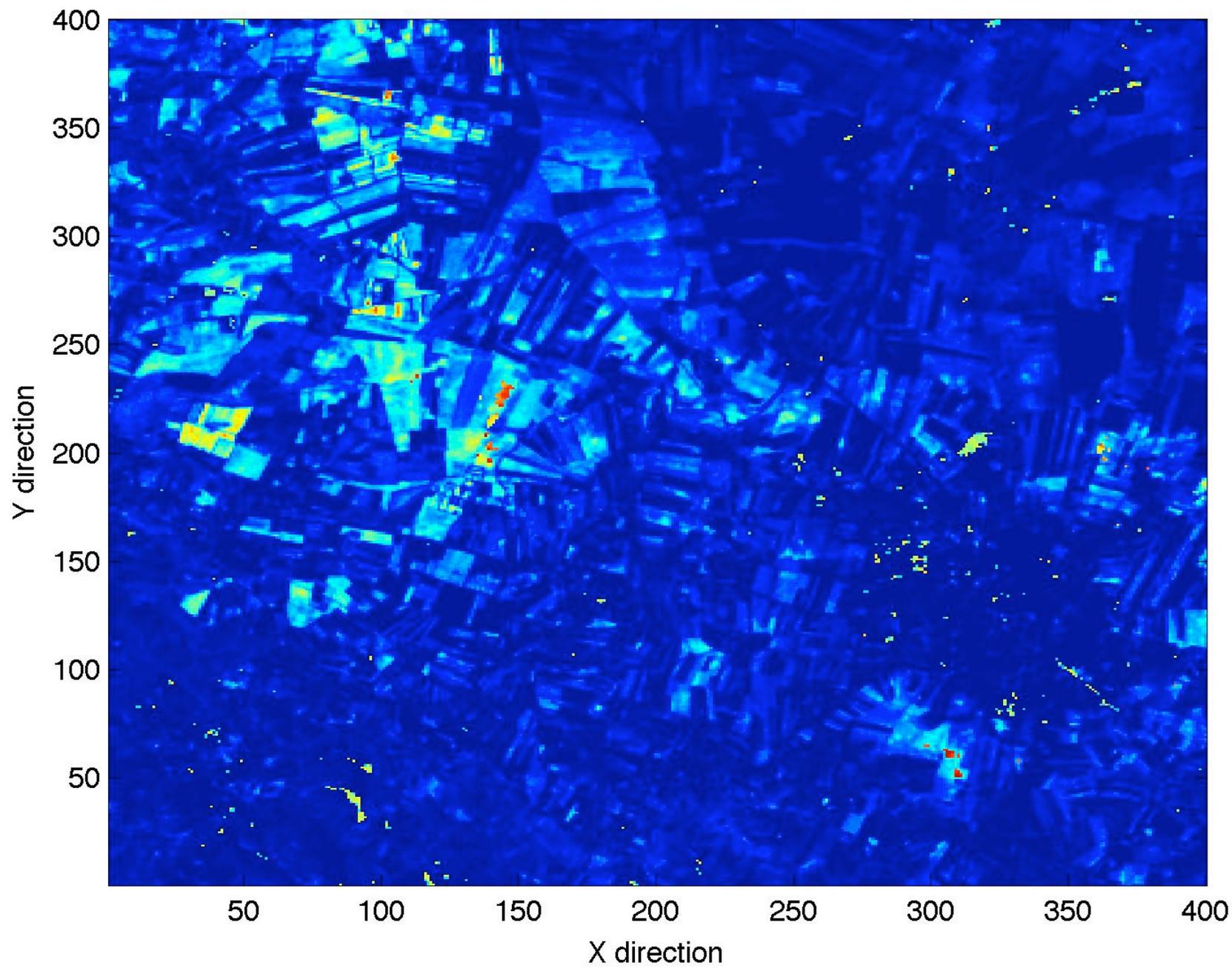
barren



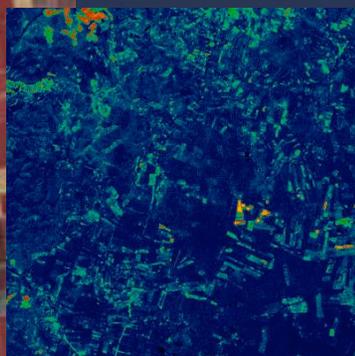
mean



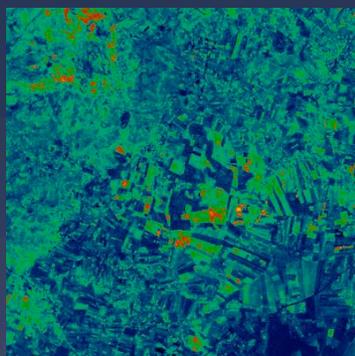
variance



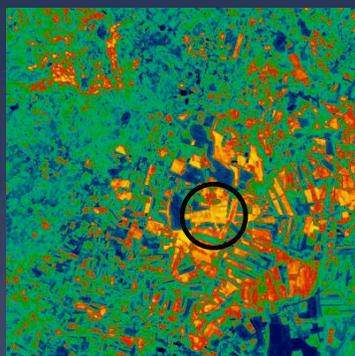
Winter crops (wheat)



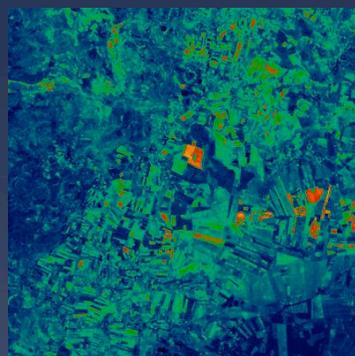
January 14, 2010



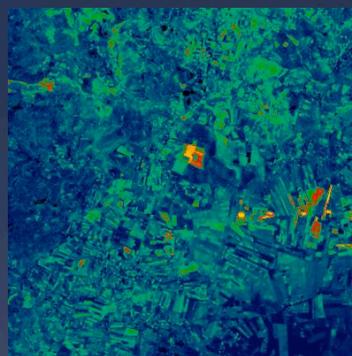
March 10, 2010



April 3, 2010



May 13, 2010

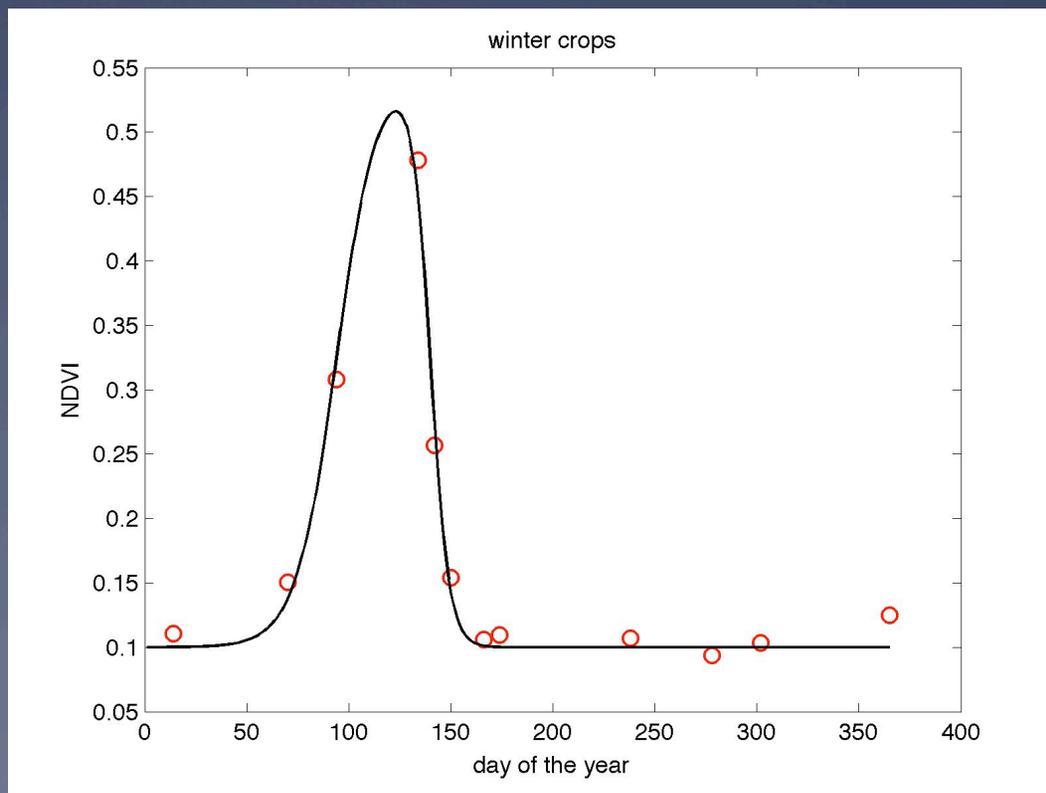


June 14, 2010

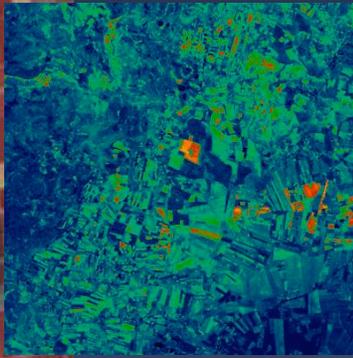


By assembling a time series of vegetation index data, we have the ability to map crop types and their irrigation status

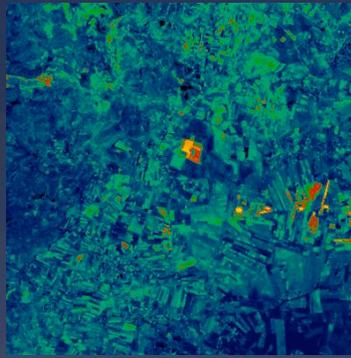
In this case, the winter crops (winter wheat) are visible by their early green-up time period



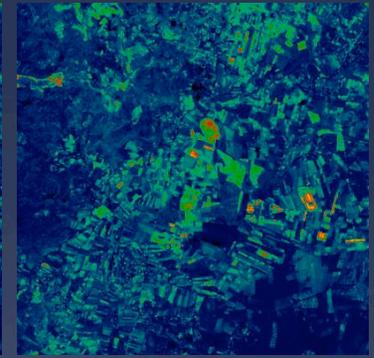
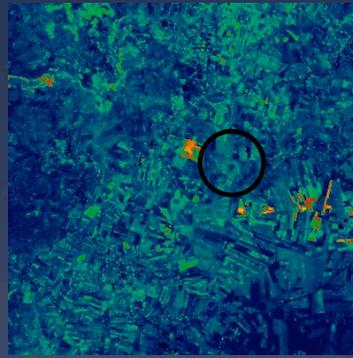
Summer crops (maize)



May 13, 2010

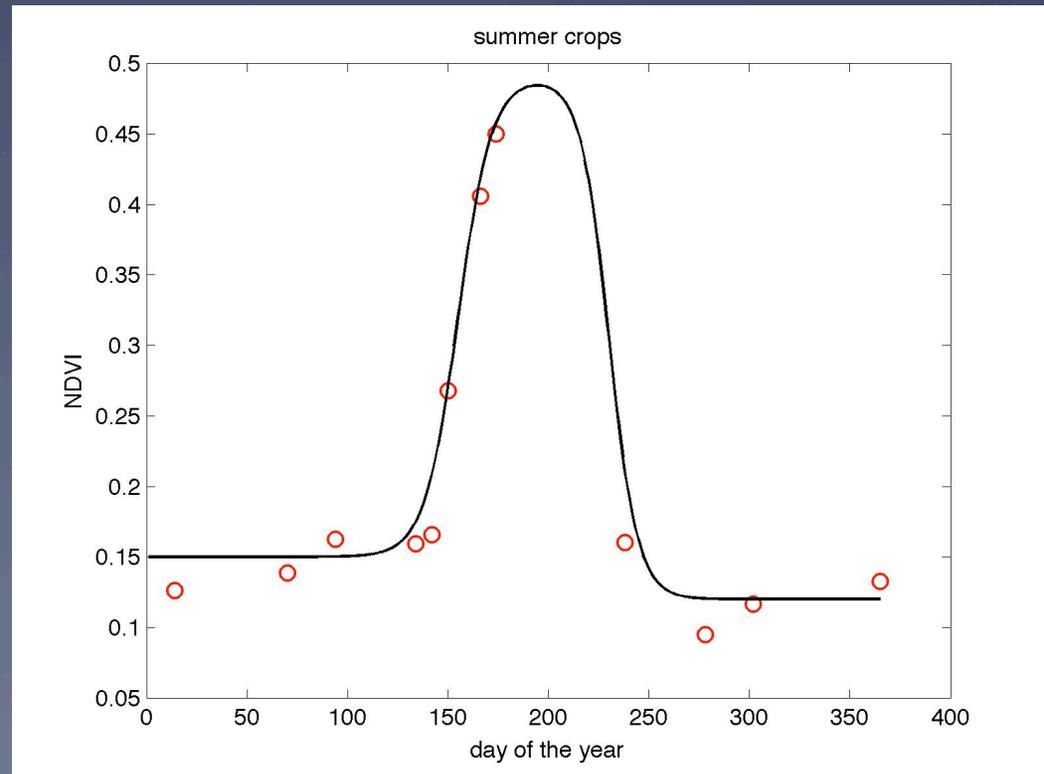


June 14, 2010

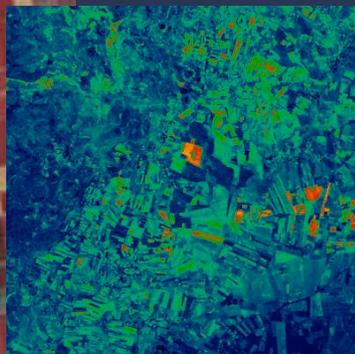


By assembling a time series of vegetation index data, we have the ability to map crop types and their irrigation status

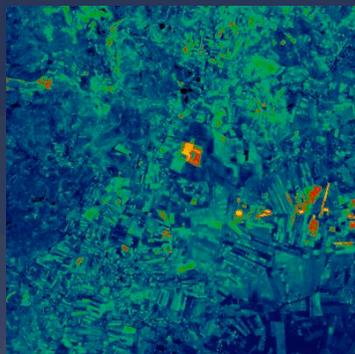
In this case, the summer crops (maize?) are visible by their late green-up time period



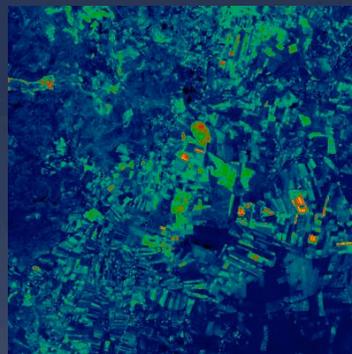
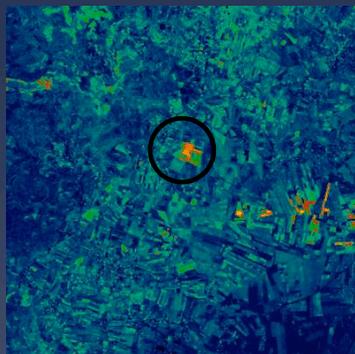
Double cropping



May 13, 2010

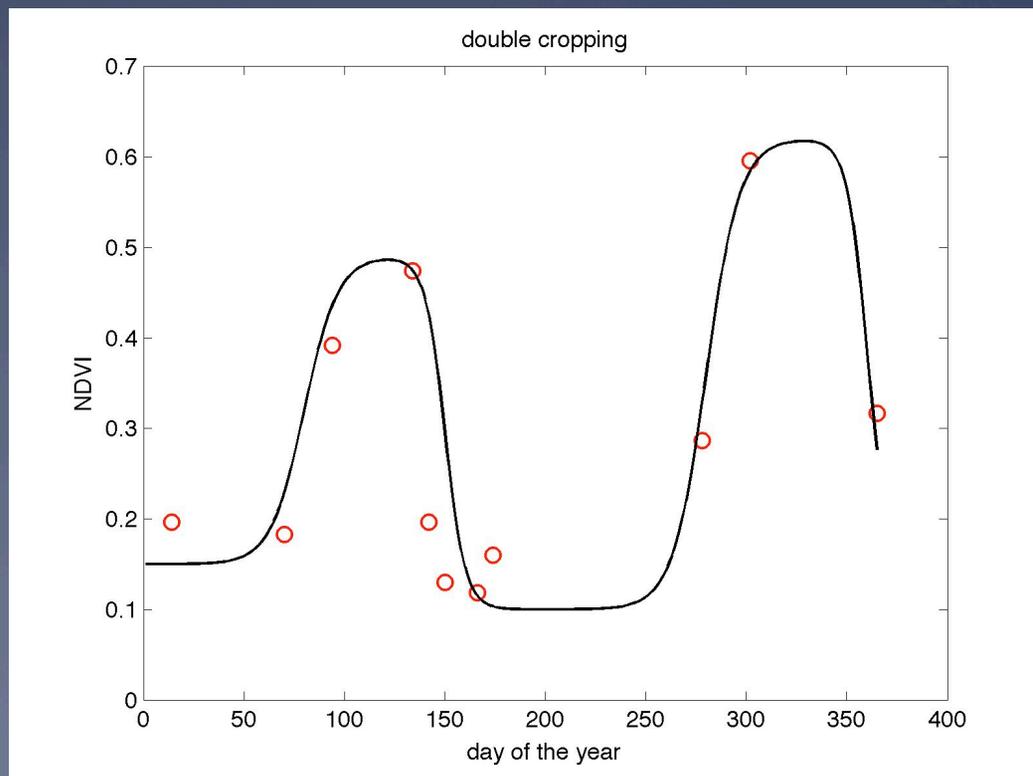


June 14, 2010

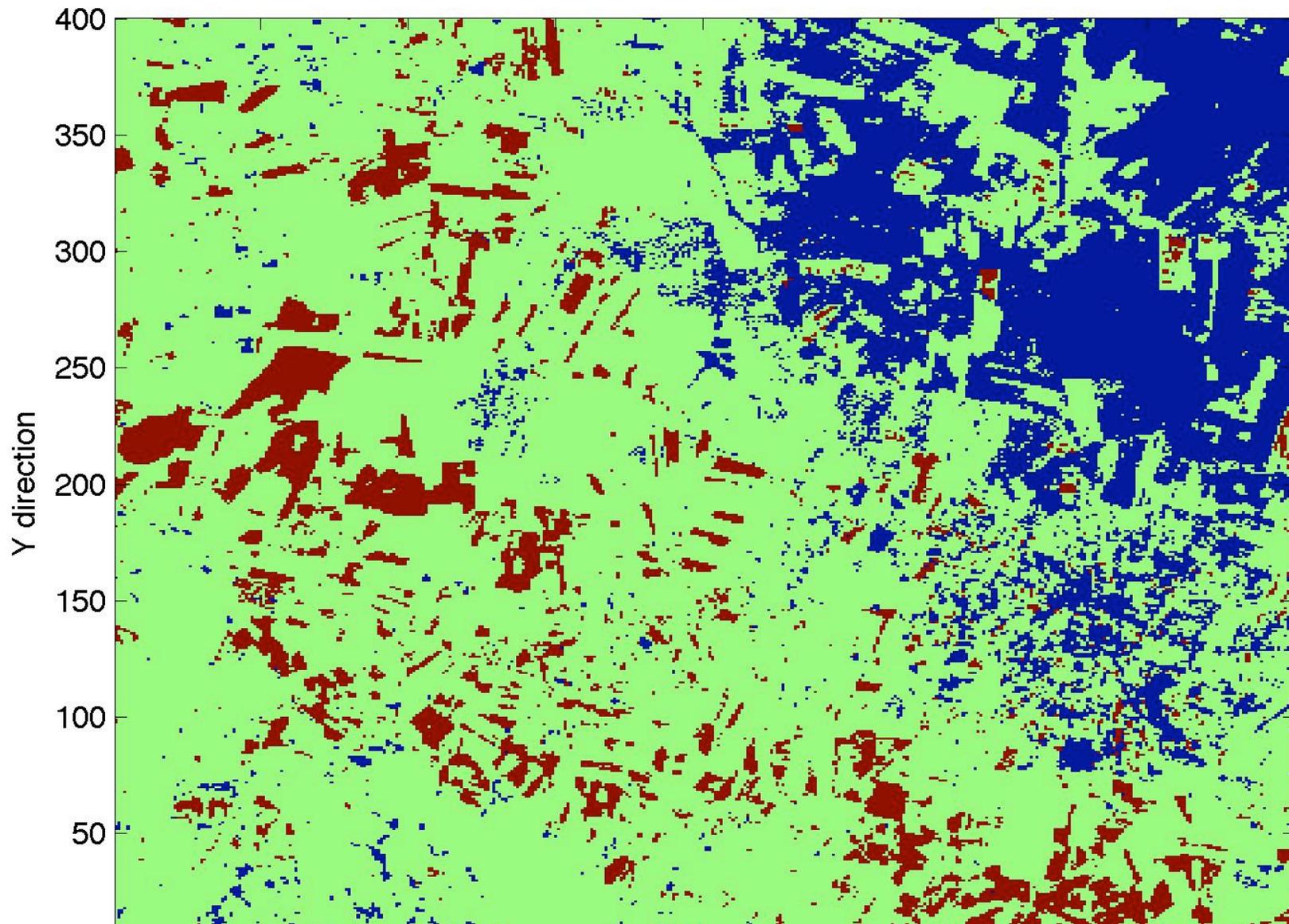


By assembling a time series of vegetation index data, we have the ability to map crop types and their irrigation status

In this case, the double cropping is visible by distinct two growing cycles



crop type map

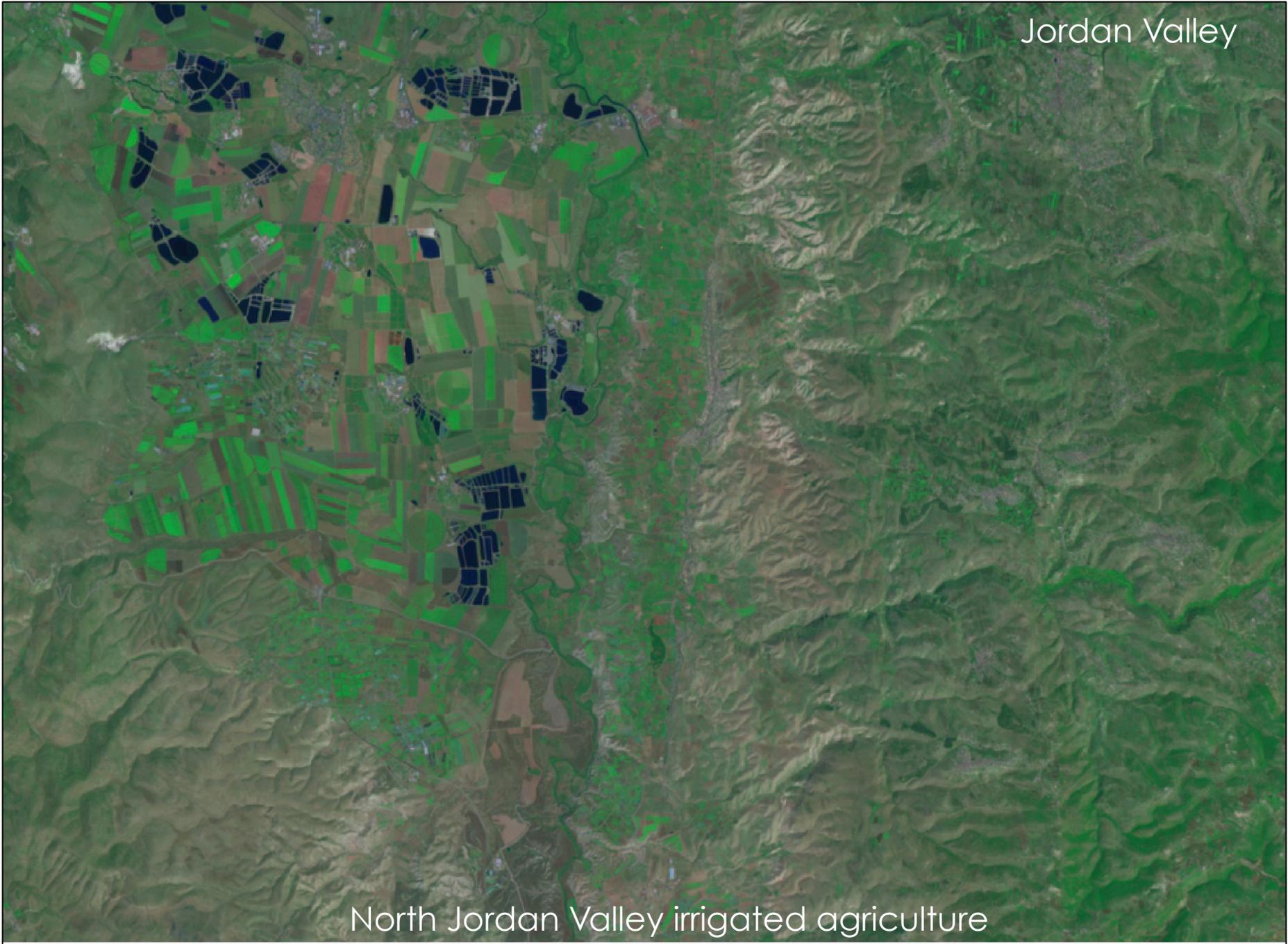


Winter
crops

Summer
crops

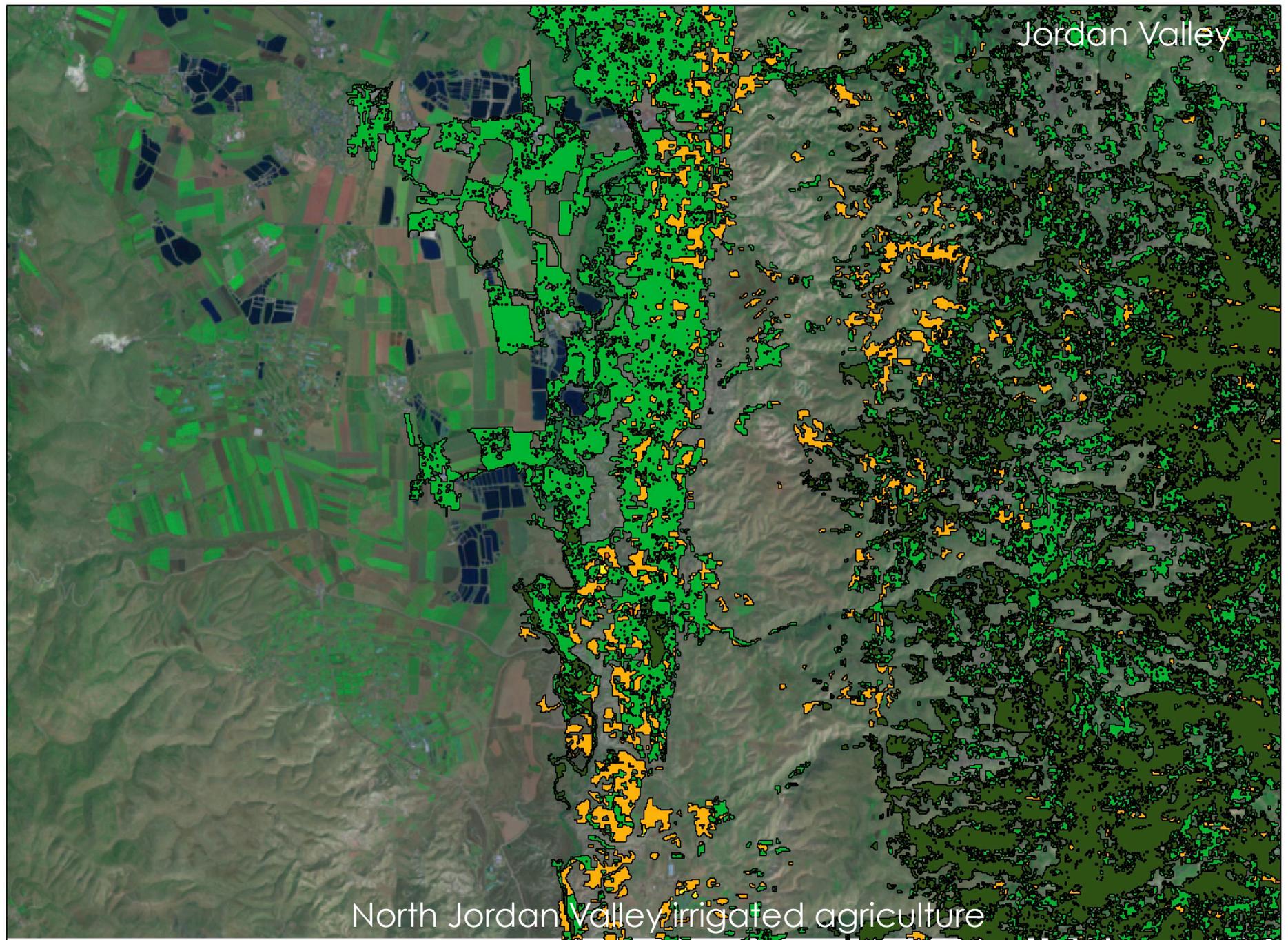
Non-cropped

Jordan Valley



North Jordan Valley irrigated agriculture

Jordan Valley

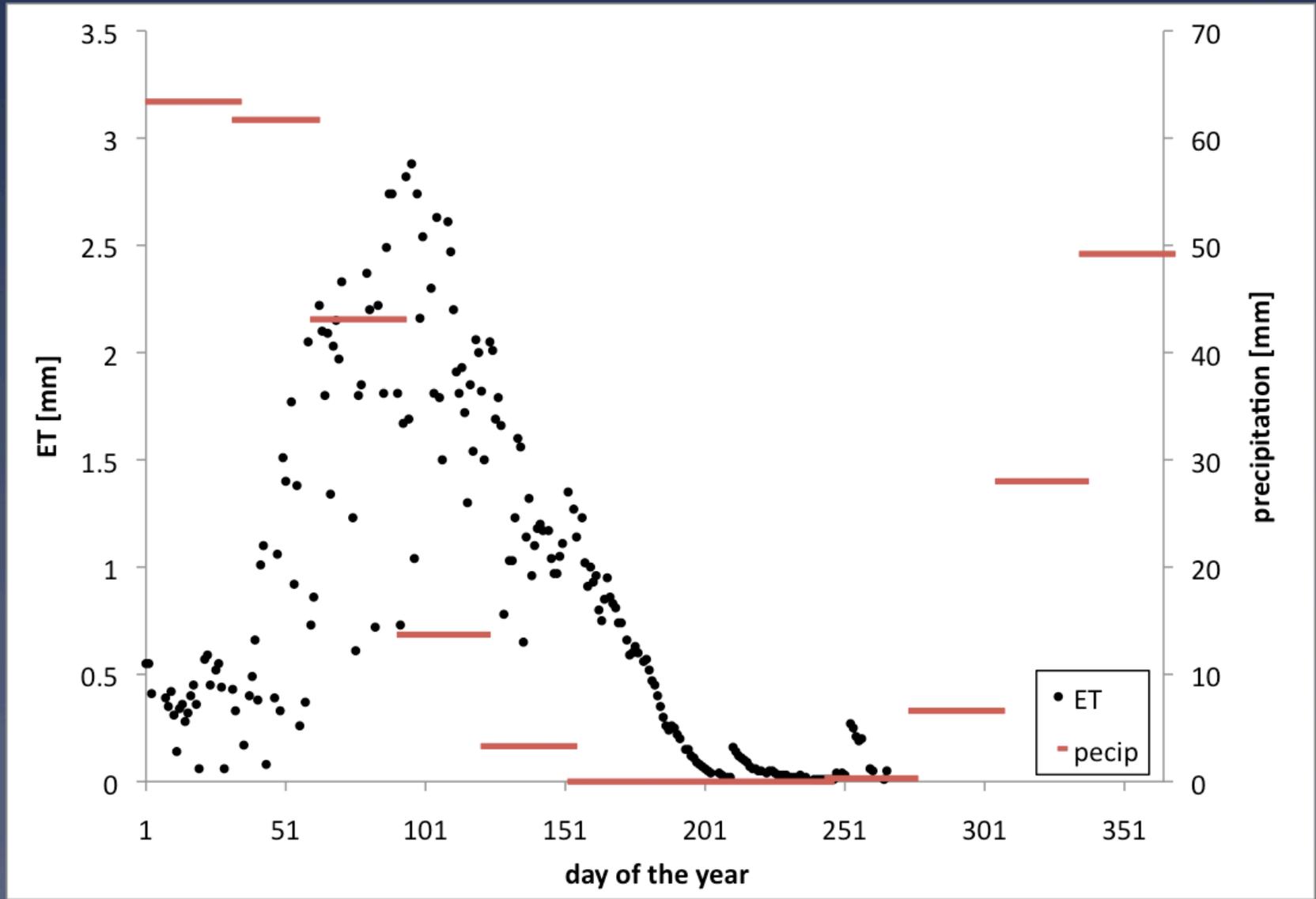


North Jordan Valley irrigated agriculture

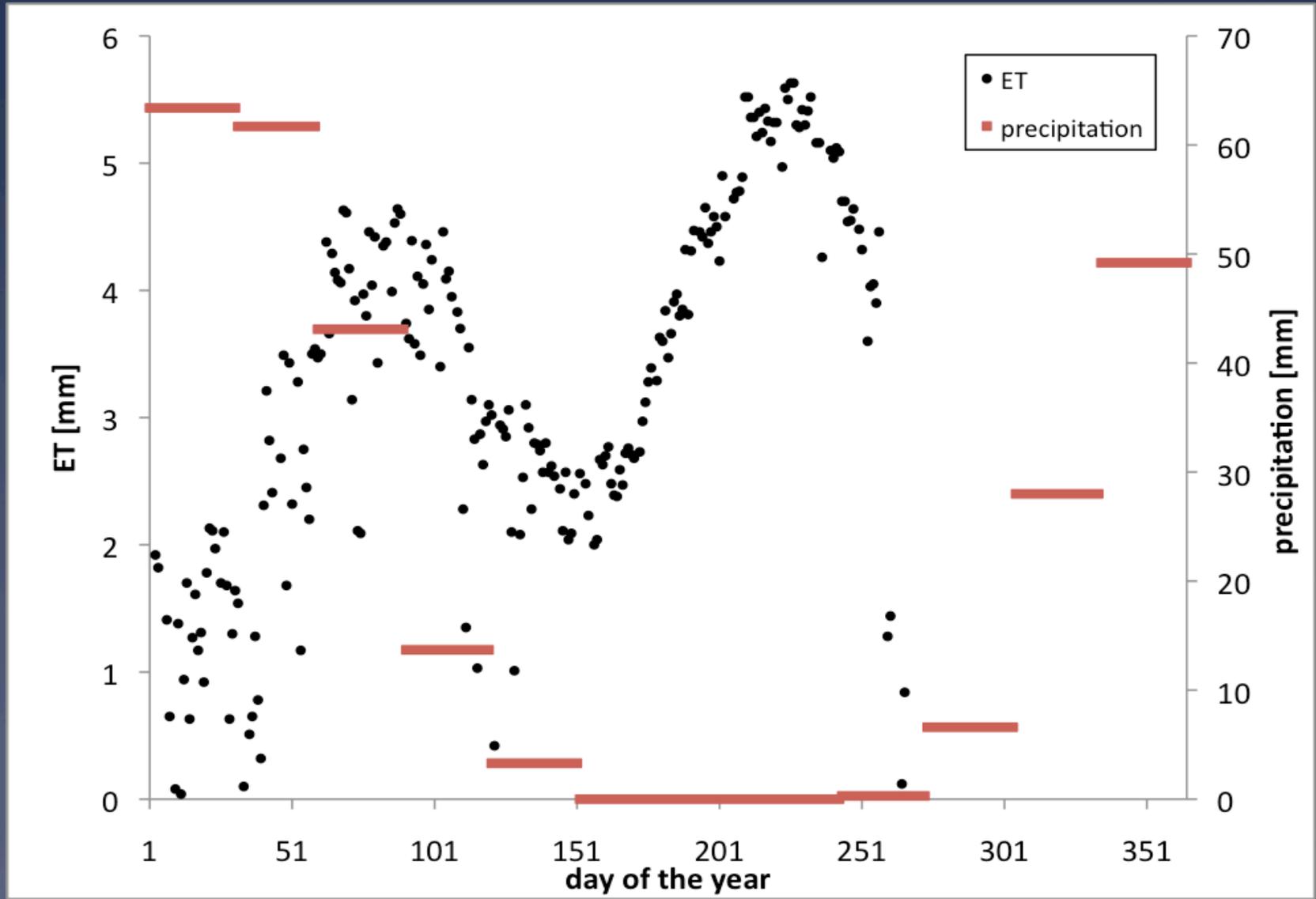
An aerial photograph showing a grid of agricultural fields in various colors, including red, yellow, and green, located on the left side of the slide.

What about water use?

Non-crop water use

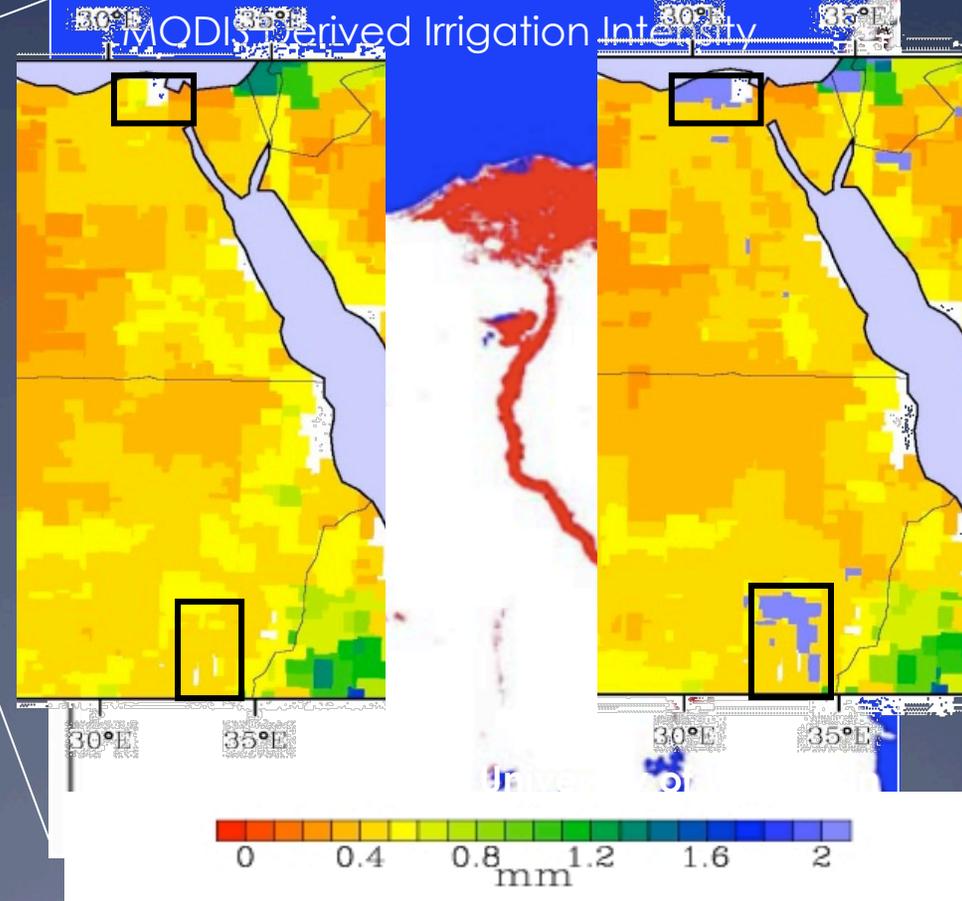
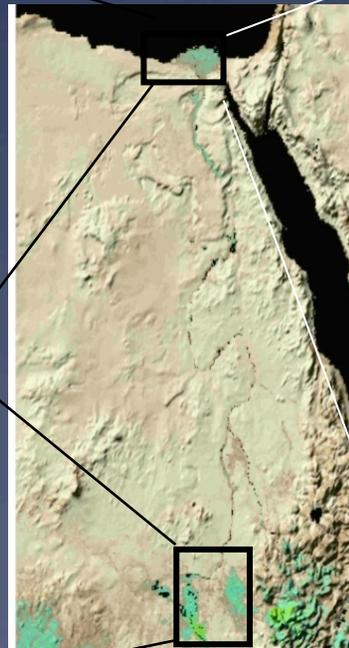


Irrigated water use



Mapping of Irrigation Intensity Improves Modeled Evapotranspiration Over Irrigated Areas

Without Modeled Irrigation With Modeled Irrigation



Summary

- Regional scale irrigation mapping completed and being used for hydrological modeling
- Local scale mapping is in progress but this will require local inputs from the users
- Crop type mapping is country specific – two crops are doable, more crops are work in progress
- Having a crop type map allows crop-specific water loss assessment which is a key input for agricultural water management