

# HTCondor Workflow Development for Statistical Modeling of Satellite Image Time Series with Ancillary Data

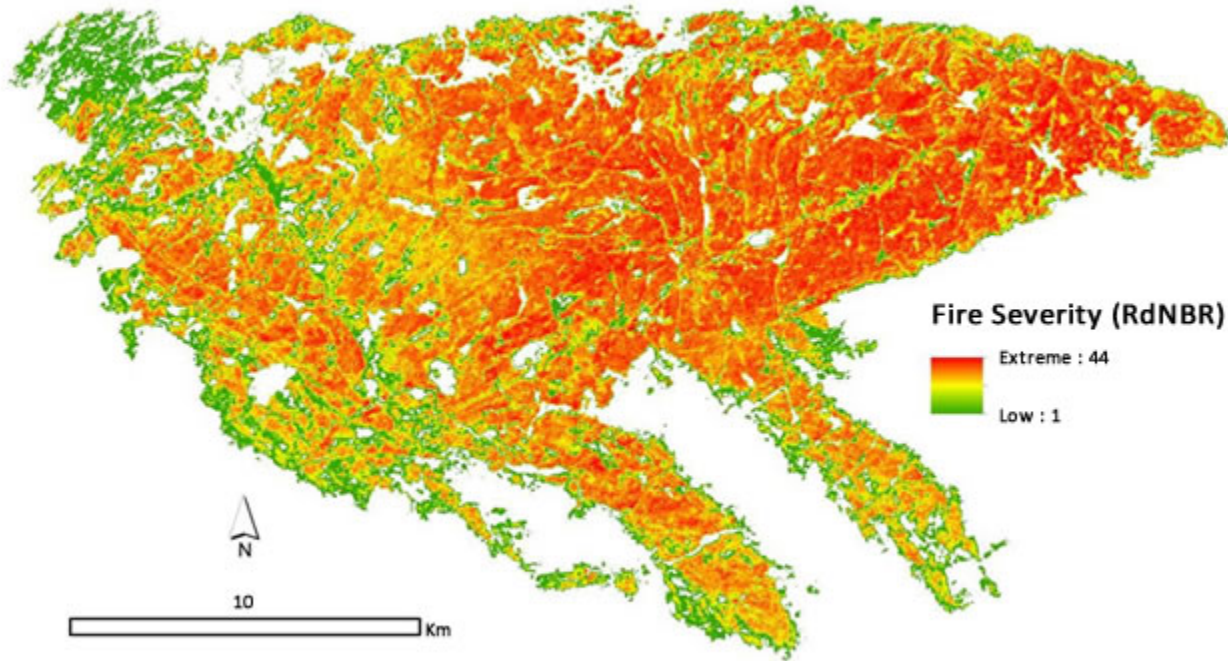
Matthew Garcia

Ph.D. Candidate, Forest Science  
University of Wisconsin–Madison  
Advised by Prof. Philip Townsend

HTCondor Week 2017

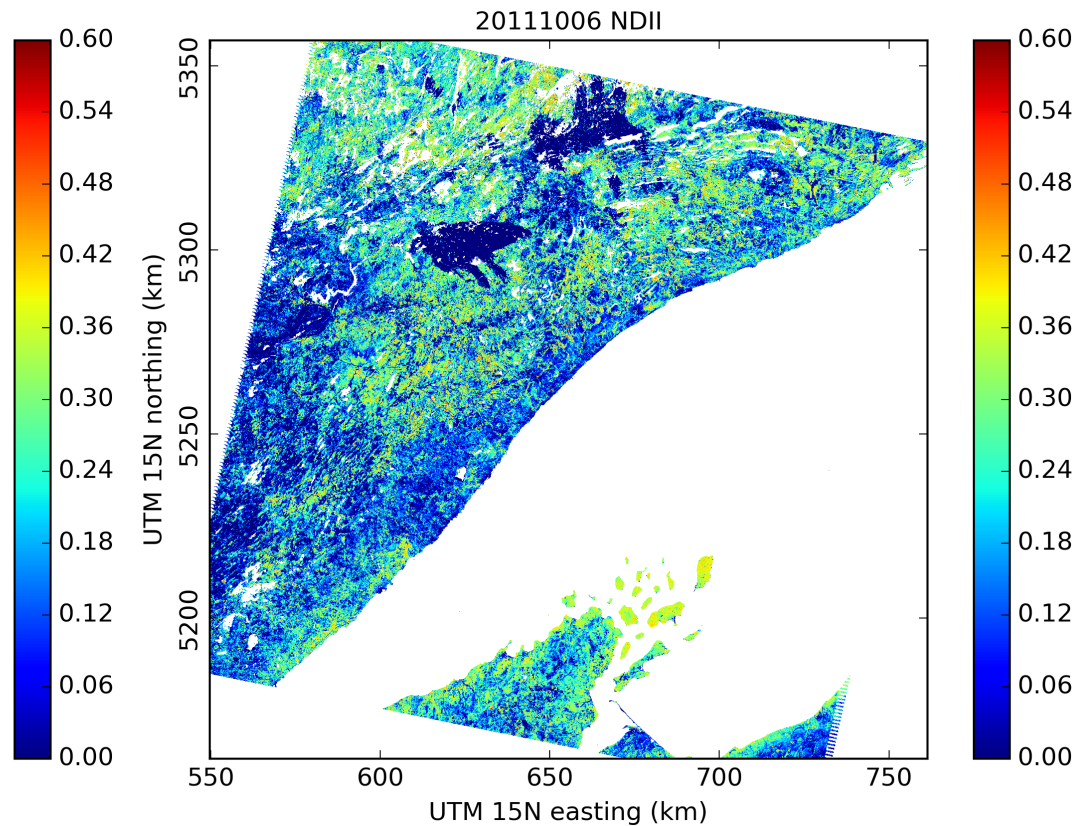
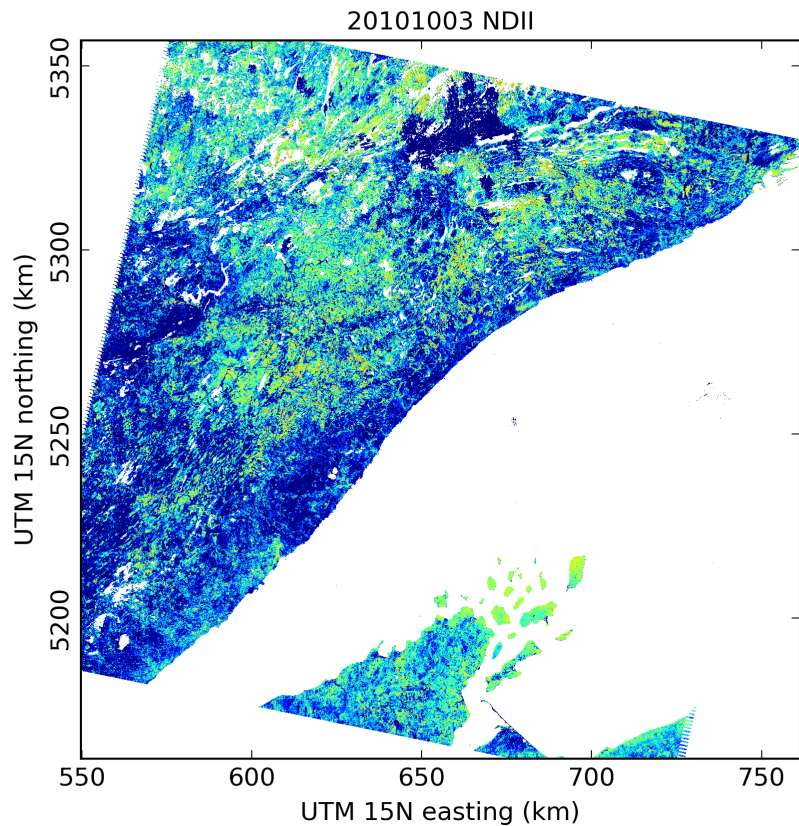
Madison, Wisconsin

5 May 2017



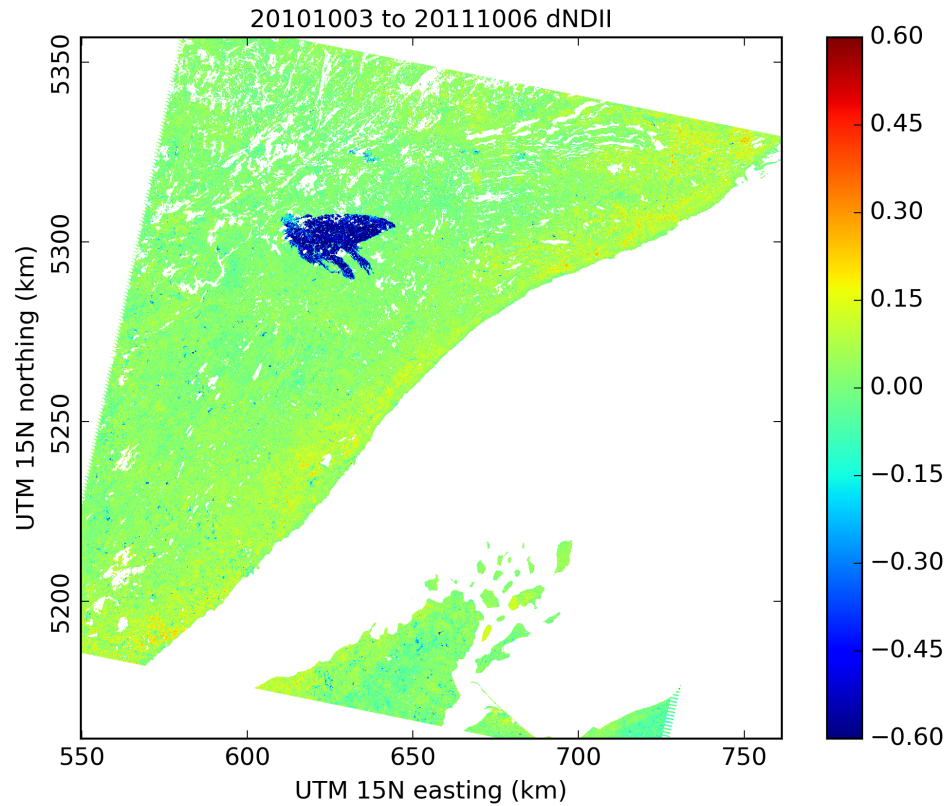
## Pagami Creek Fire, NE Minnesota, September 2011

Data provided by US Geological Survey  
Burn Severity analysis by USDA Forest Service, Northern Research Station  
<https://www.fs.fed.us/nrs/highlights/#highlight160>



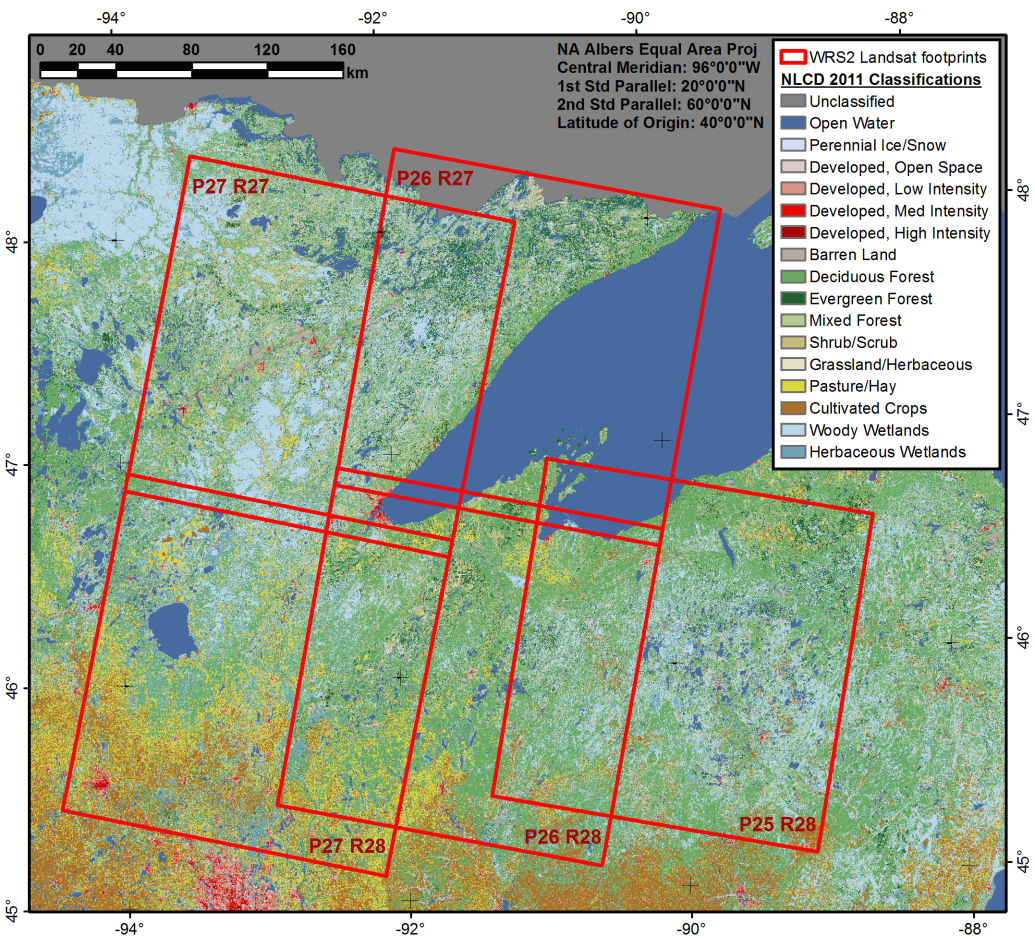
## Landsat-based Vegetation Index Temporal Difference, NE Minnesota (P26R27)

Data from US Geological Survey, my own processing and analysis in Python  
Part of an HTCondor tutorial at [https://github.com/megarcia/HTCondor\\_examples](https://github.com/megarcia/HTCondor_examples)



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## Dissertation Study Area and Data

~202,000 sq. km (U.S. only)

1984 – 2013 (30 years)

Landsat scenes from US Geological Survey

200 – 250 scenes per footprint

GHCN-D weather data from NOAA/NCEI

## Project Considerations

Python (pandas, numpy, scipy, matplotlib)

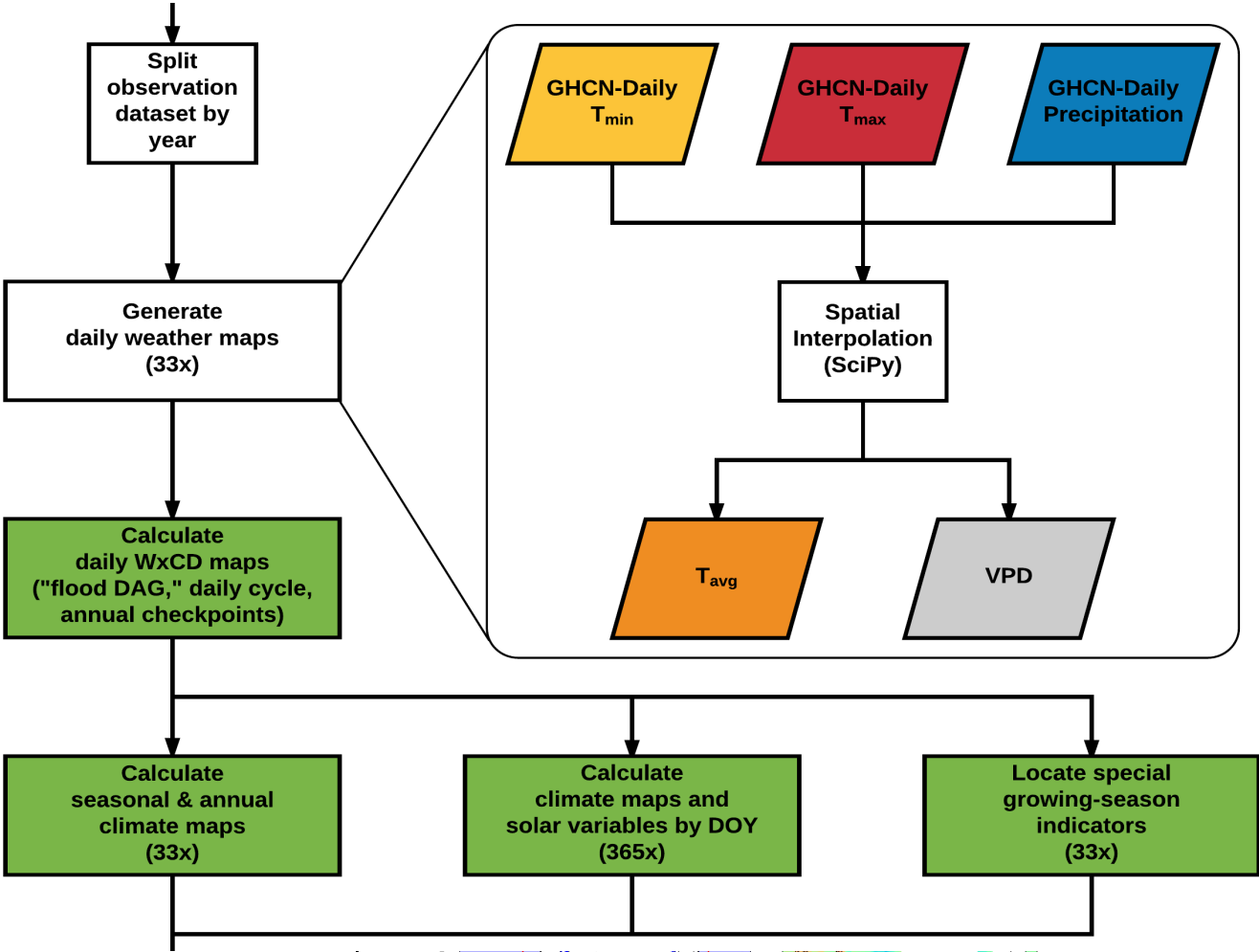
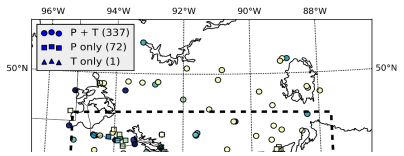
HDF5 storage with internal compression

Exploit scalability of HTCondor and OSG

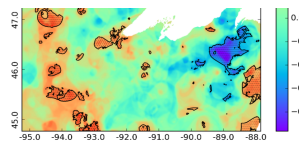
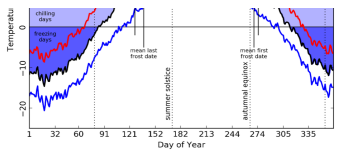
Repeatable, reproducible, transferable

Publications with open-source repos

GHCN-Daily data from NOAA NCEI



Publish with open-source repository





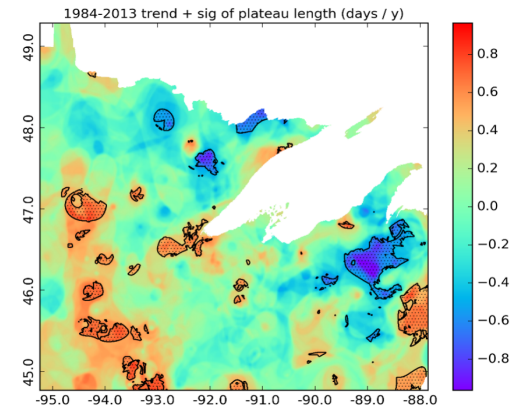
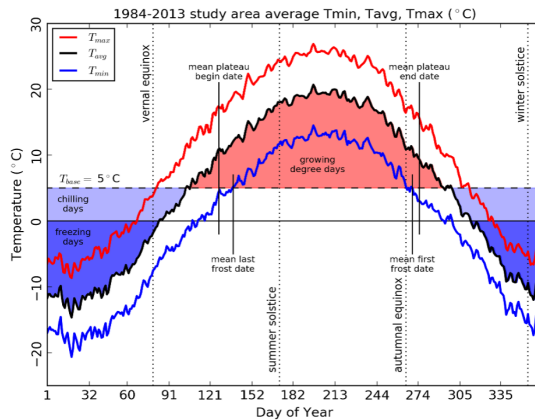
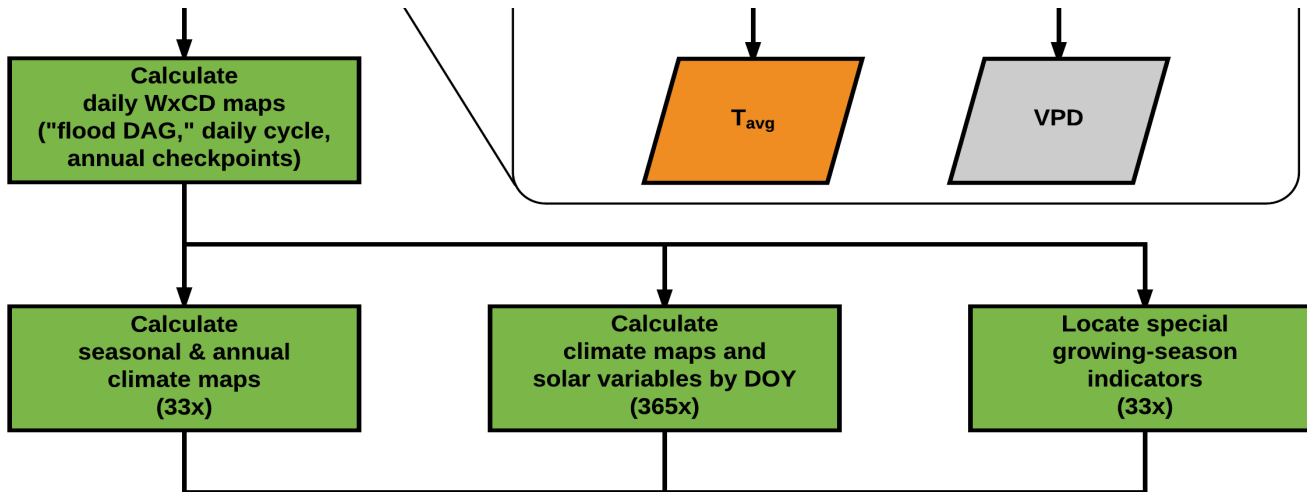
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# WxCD

Weather and Climate Derivatives  
mapped from daily surface observations

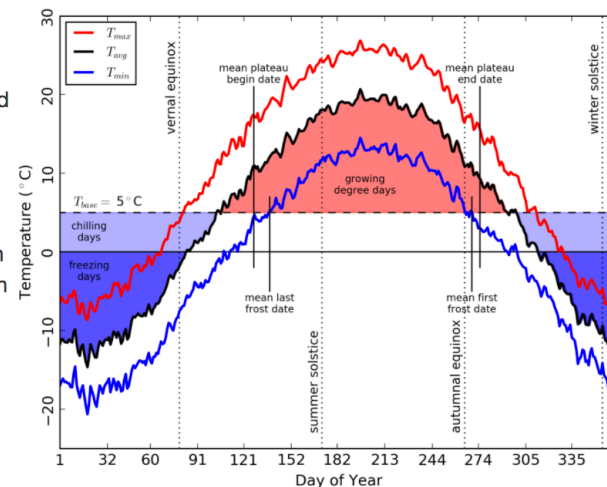
Author: Matthew Garcia  
PI: Prof. Philip A. Townsend  
Ref: [Garcia and Townsend \(2016\)](#)

## Introduction

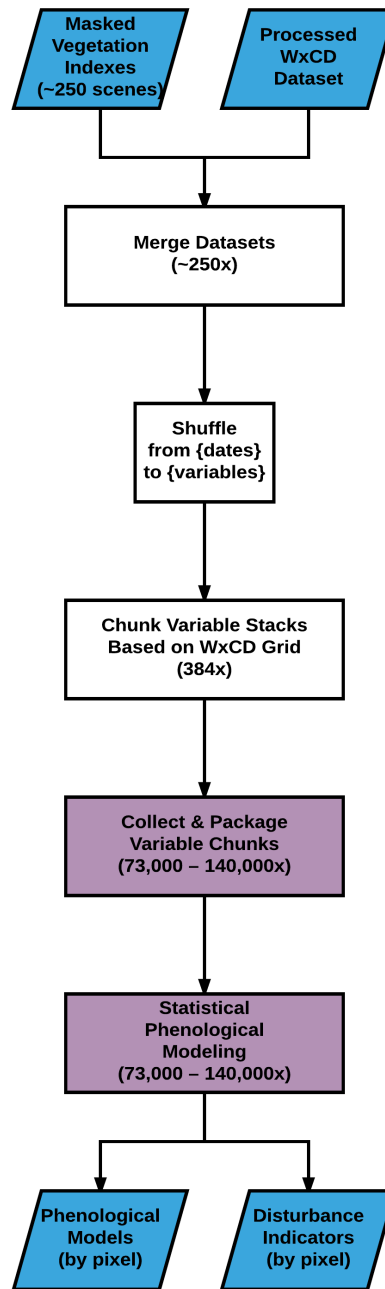
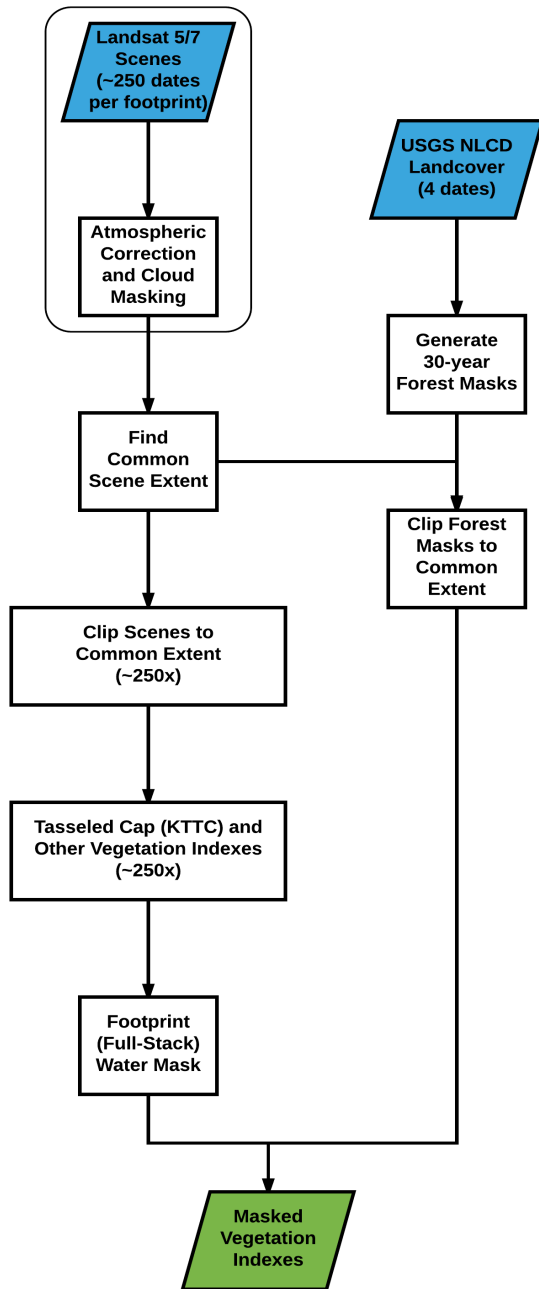
WxCD is a collection of python scripts and workflows for managing and summarizing surface weather (Wx) observations over climatological time scales, typically 30 years or more. Basic meteorological station reports of temperature and precipitation are interpolated to a user-defined grid, then used to calculate regional and climatological statistics and a number of derived climatological measures focusing on the cold and warm (growing) seasons. Results are intended for use with *in situ* and remote sensing observations of vegetation phenology. This project is part of ongoing work for the author's Ph.D. dissertation.

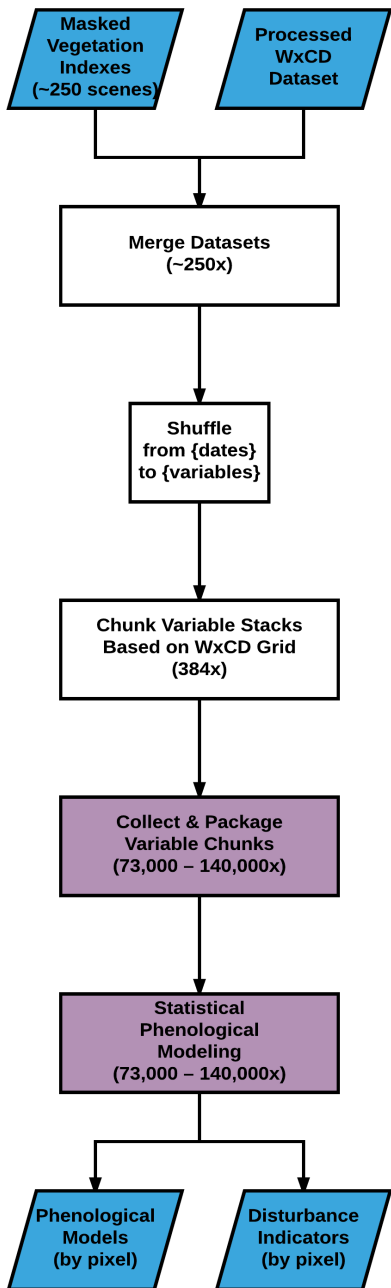
[GitHub Repository](#)

[Documentation](#)



<https://megarcia.github.io/WxCD/>





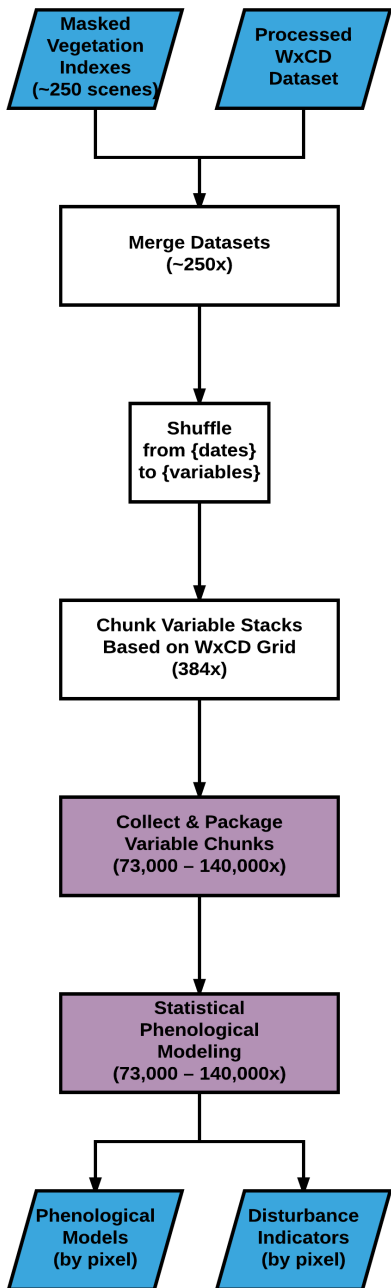
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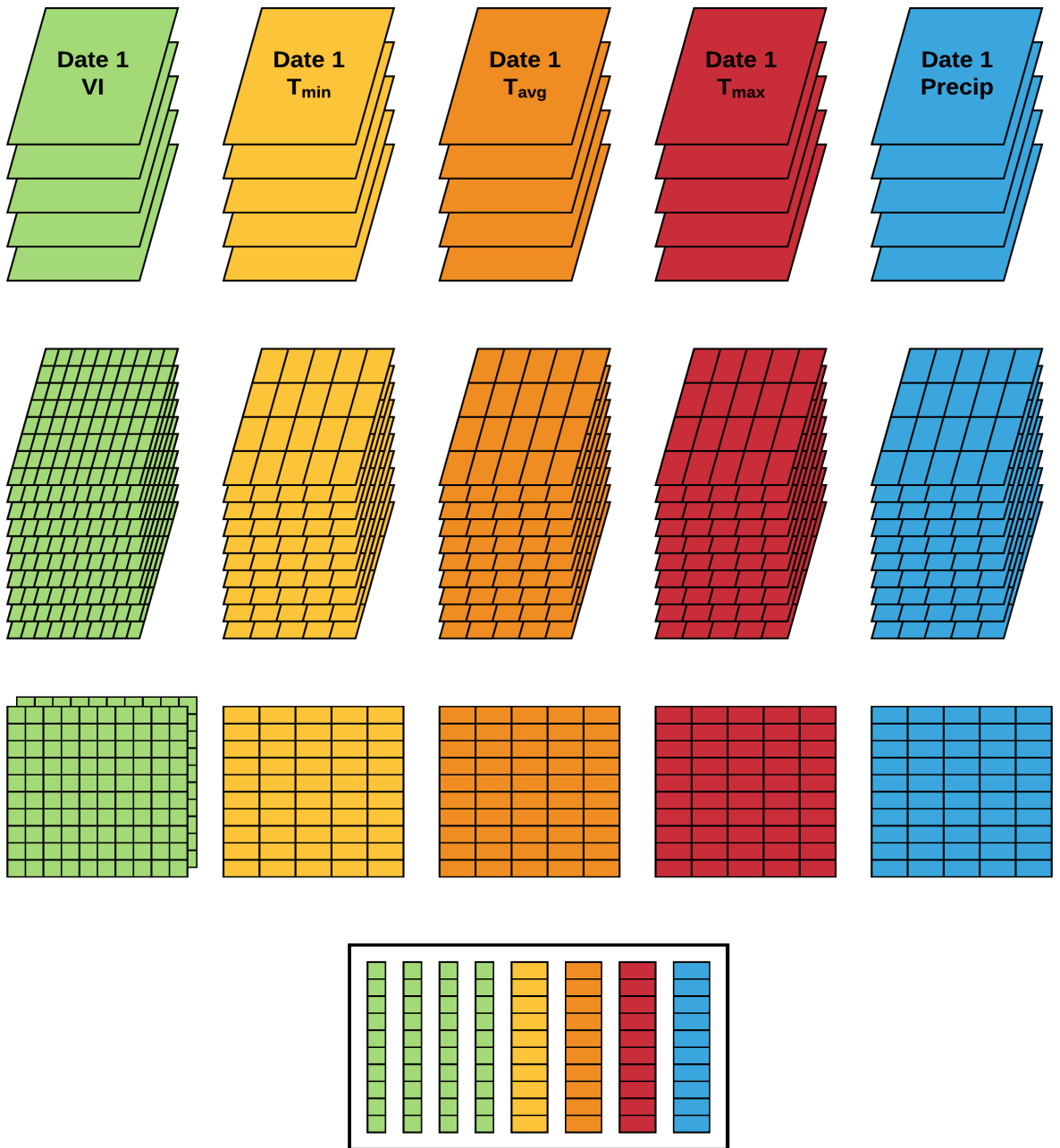
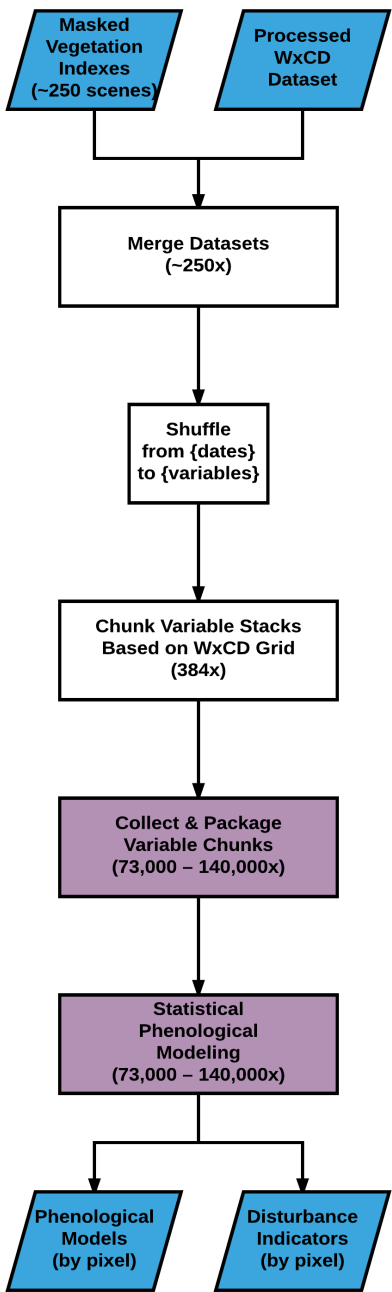
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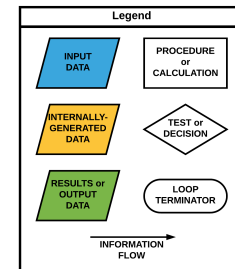
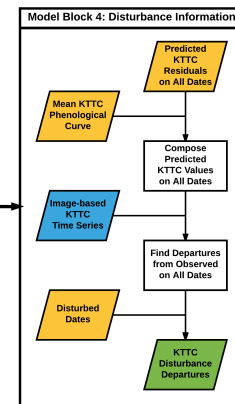
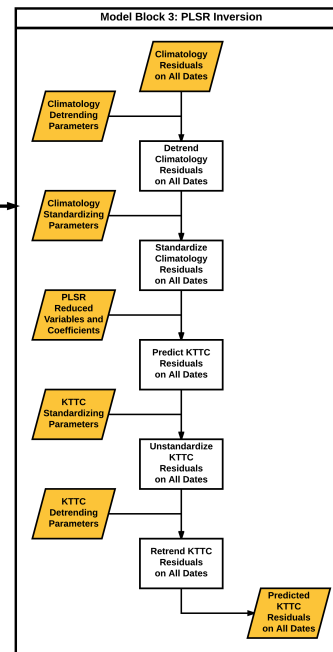
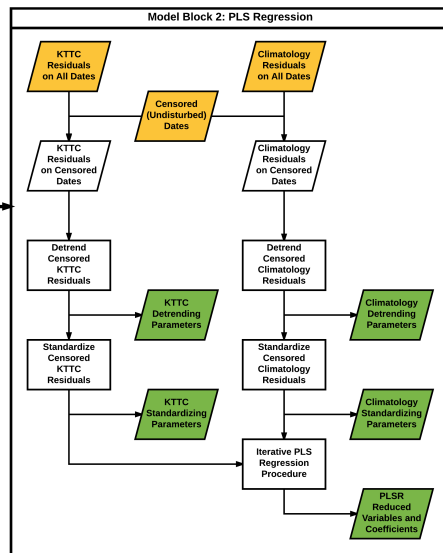
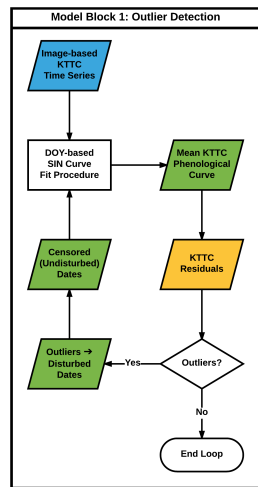
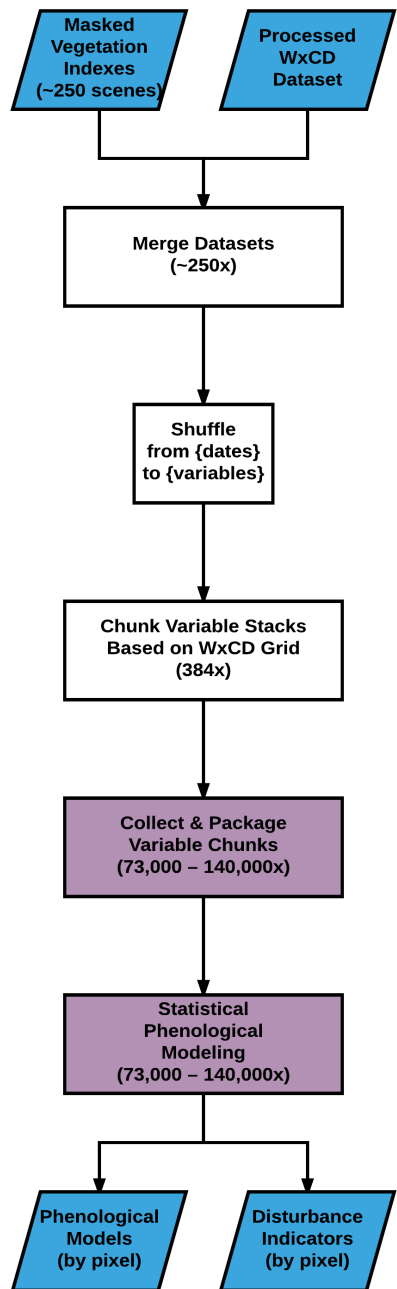
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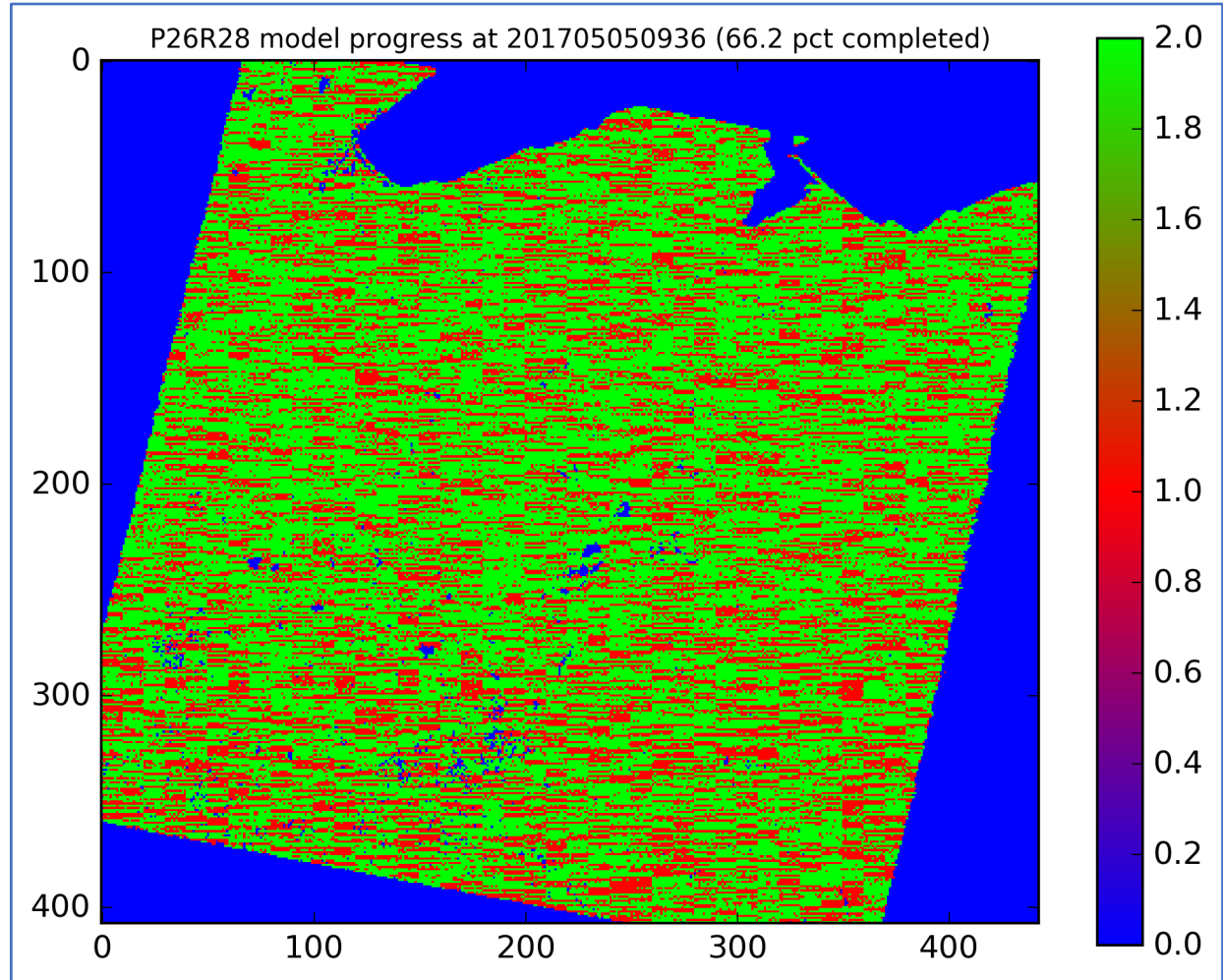
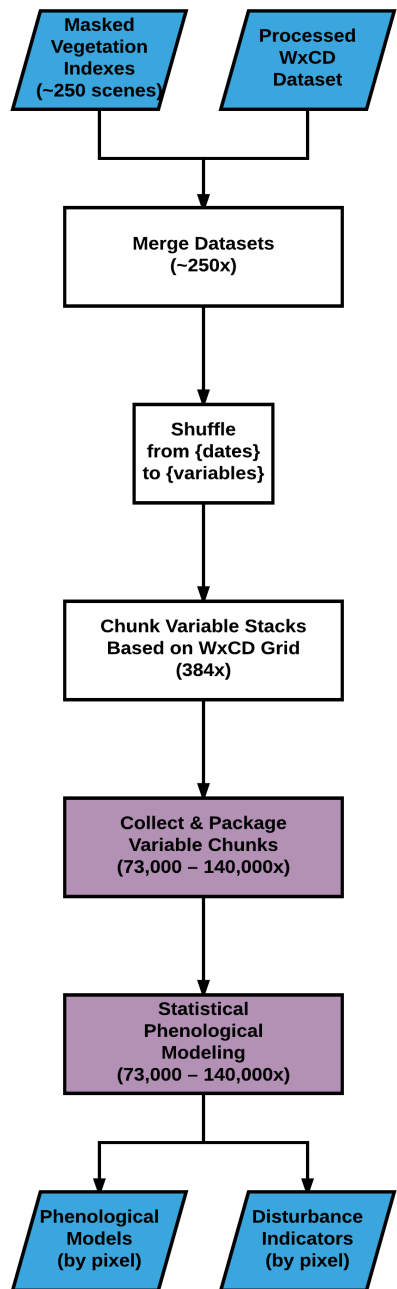
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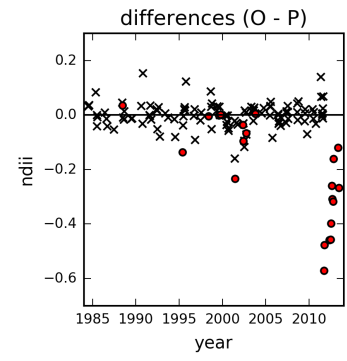
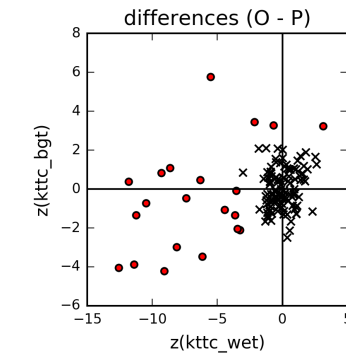
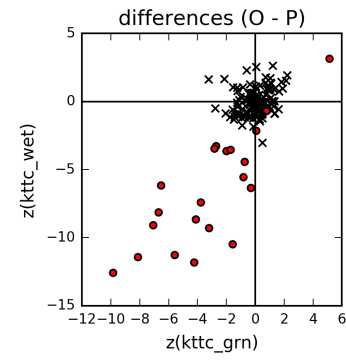
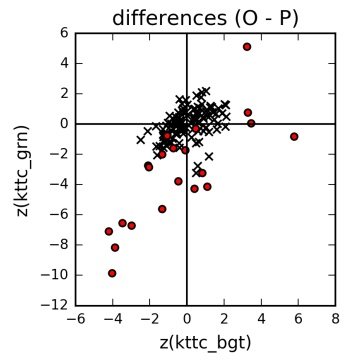
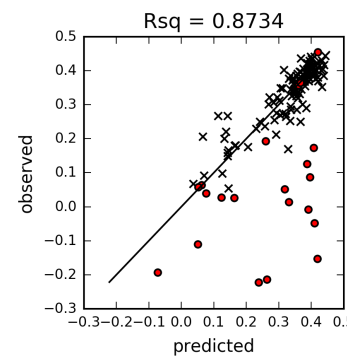
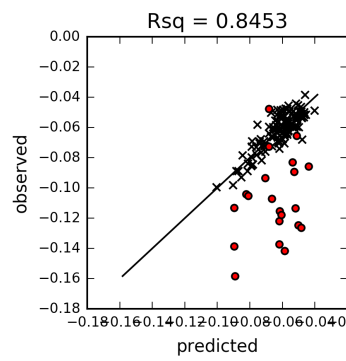
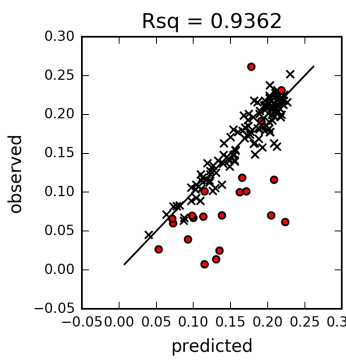
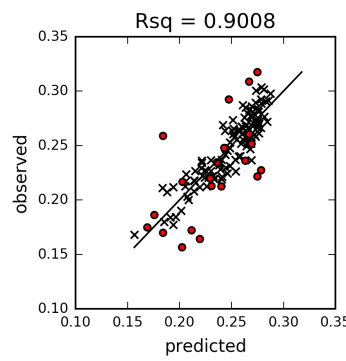
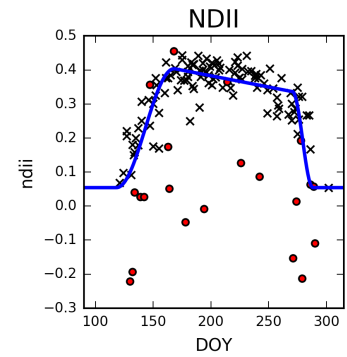
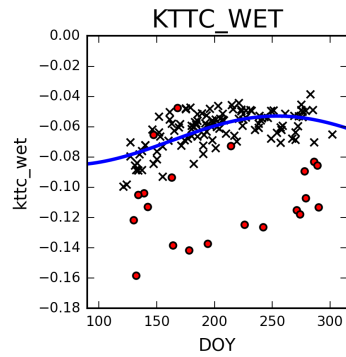
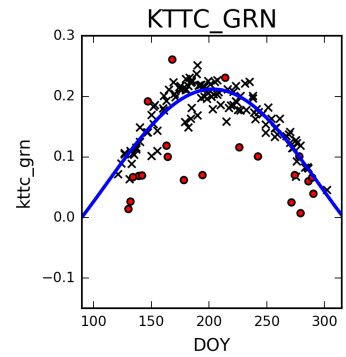
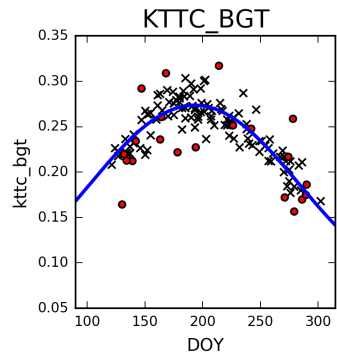
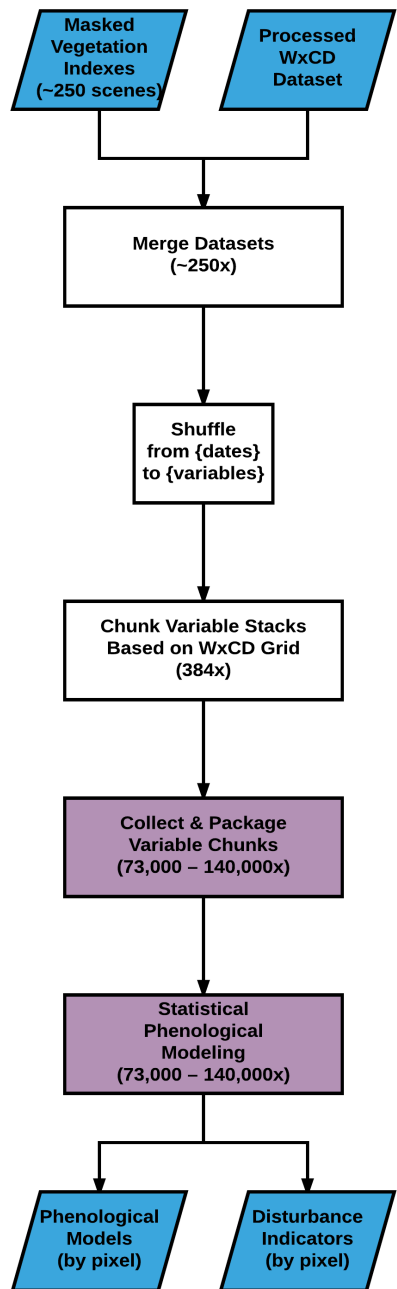
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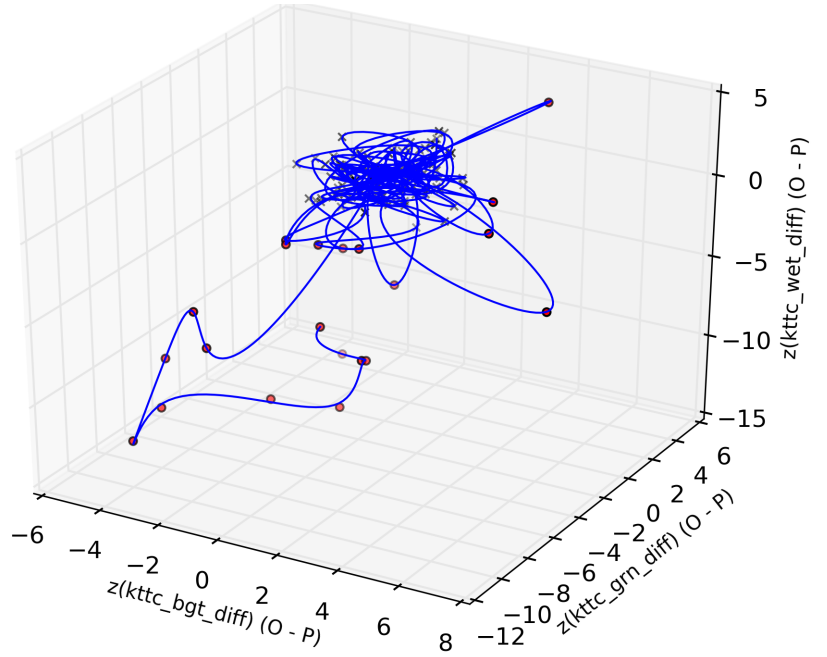
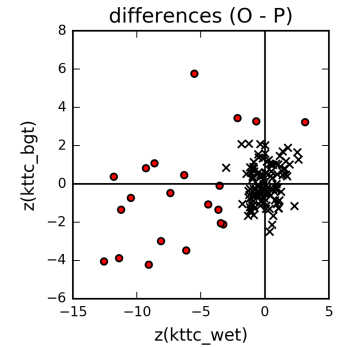
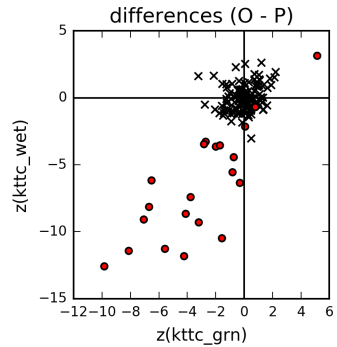
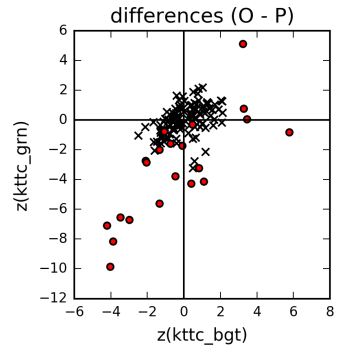
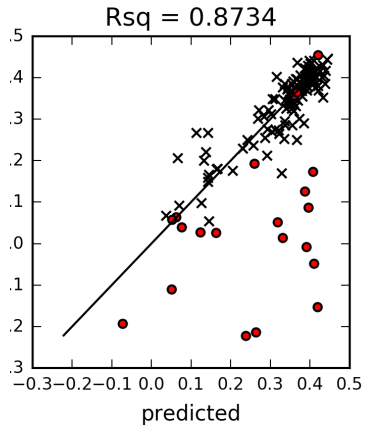
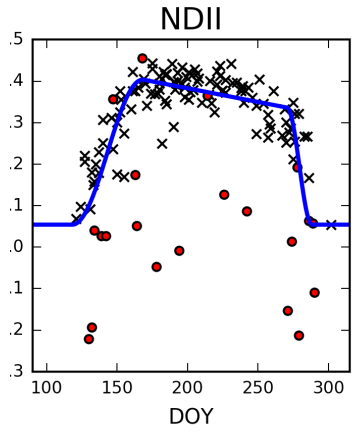
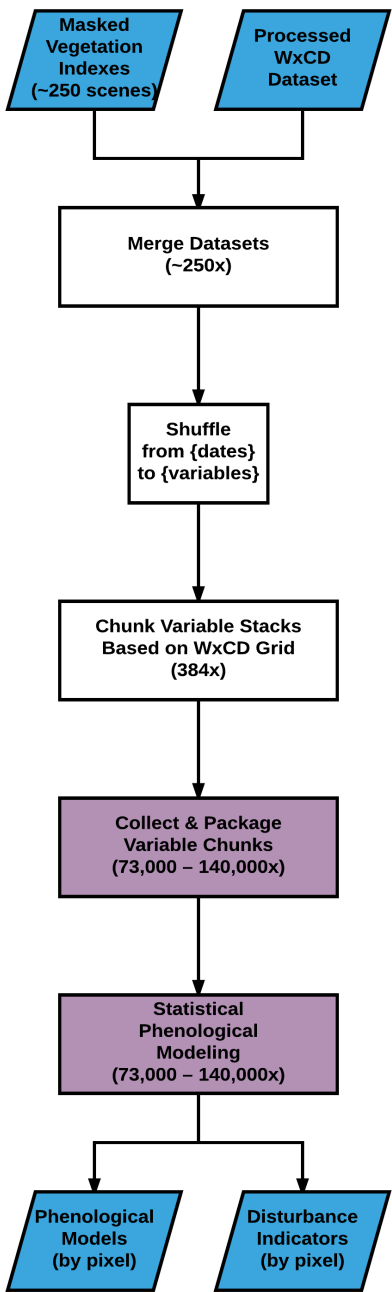


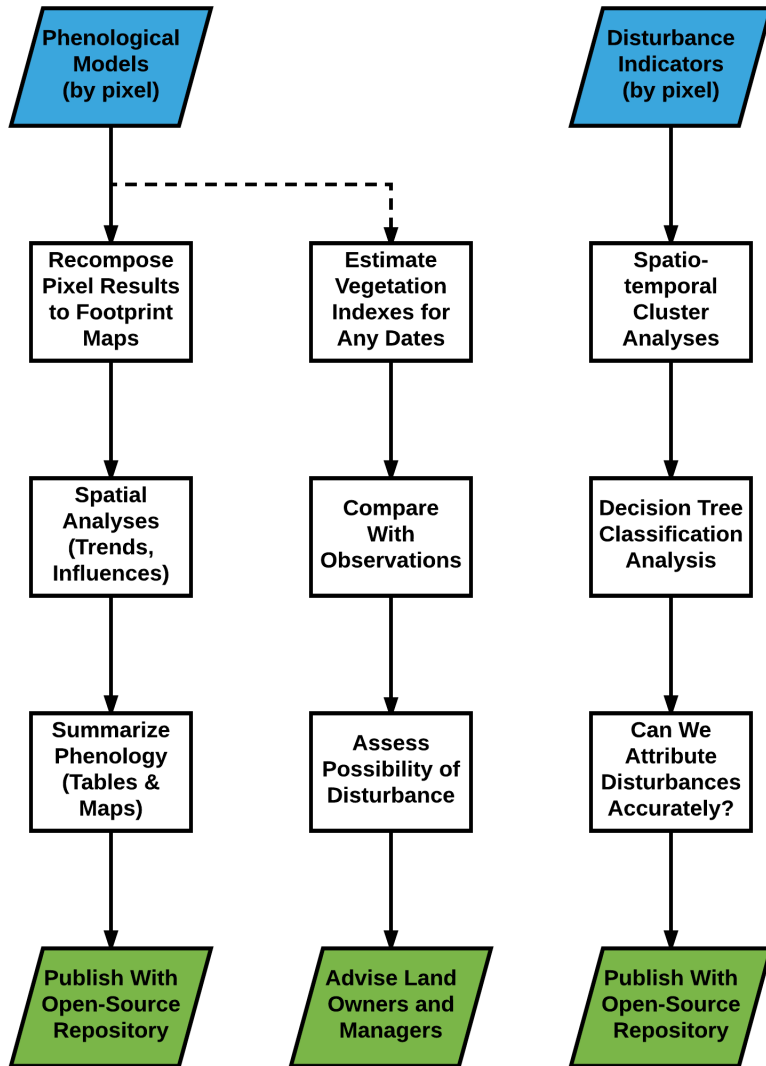












**Thank You!**

**Special thanks to:  
CHTC (esp. Lauren and Christina)  
HTCondor Team, OSG**

**Data:  
USGS, NOAA/NCEI**

**Funding:  
CALs, FWE, USDA, USFS, NASA, WSGC**

