

Term Project Presentation
Ilia Notin

Mystery at the Wildlife Preserve: Multispectral Imagery

Problem

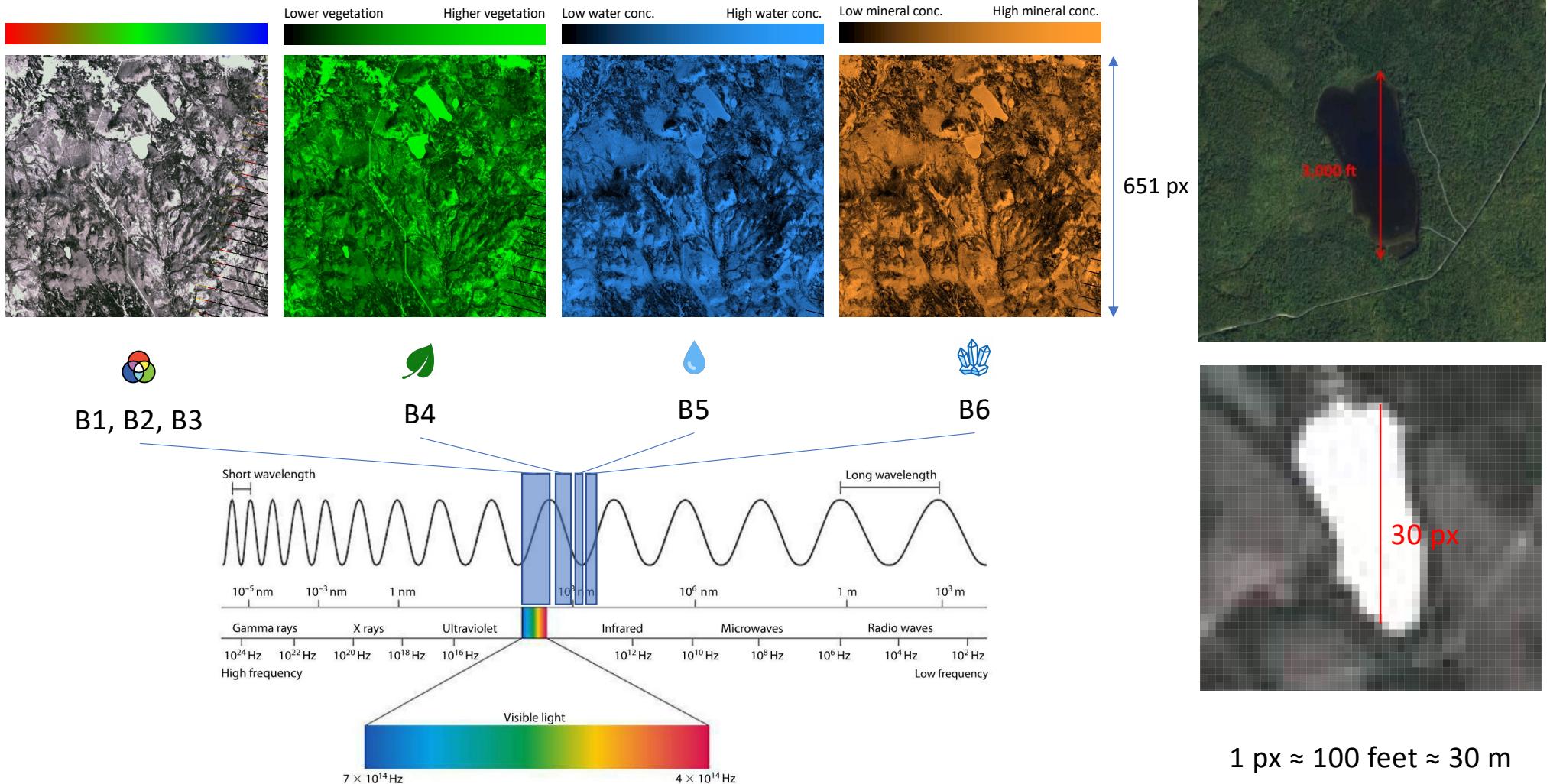


The number of nesting pairs of pipits is decreasing

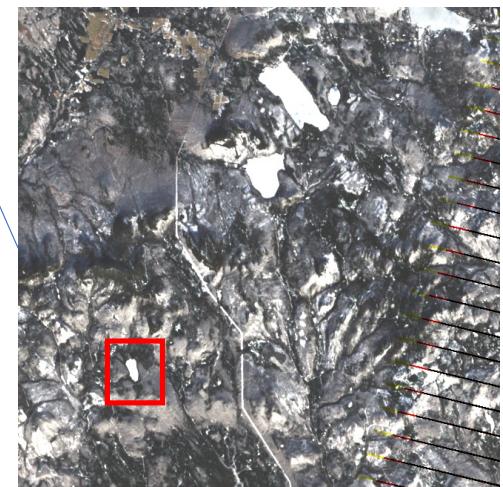
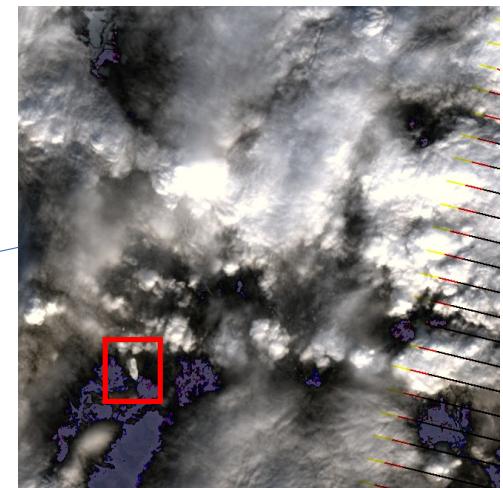
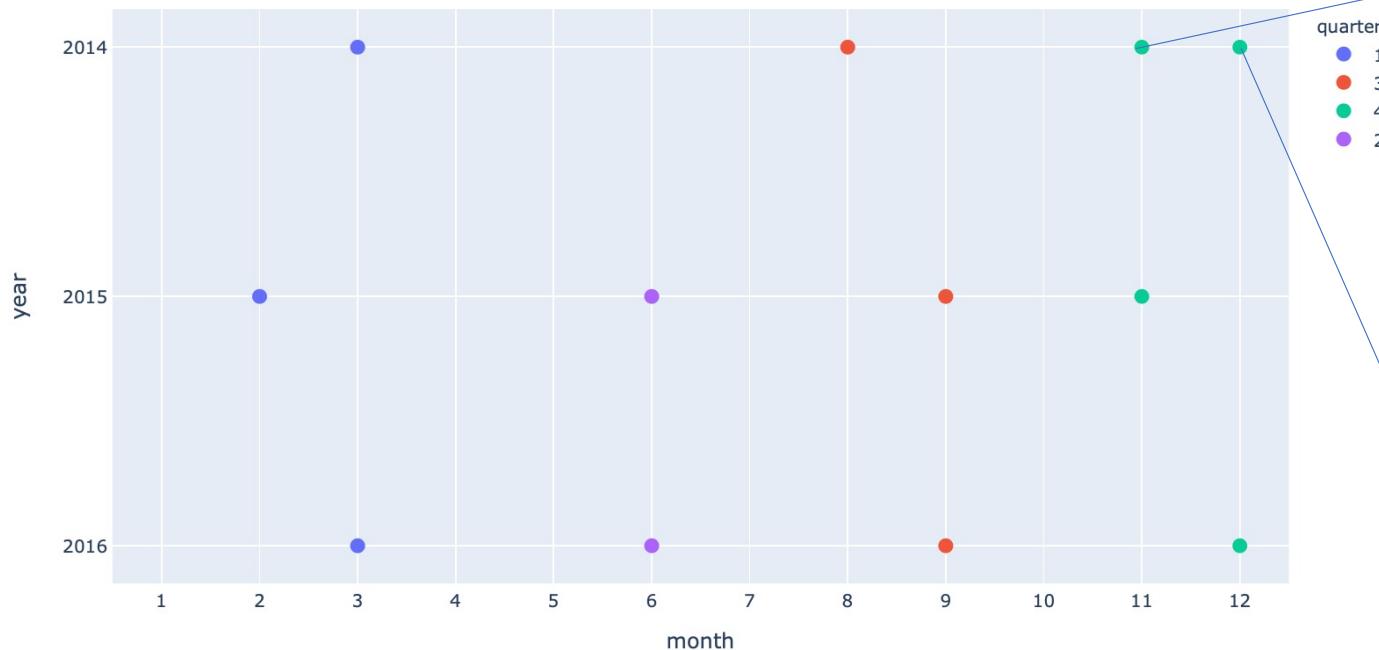
Find the reason given 12 multispectral satellite images of the habitat



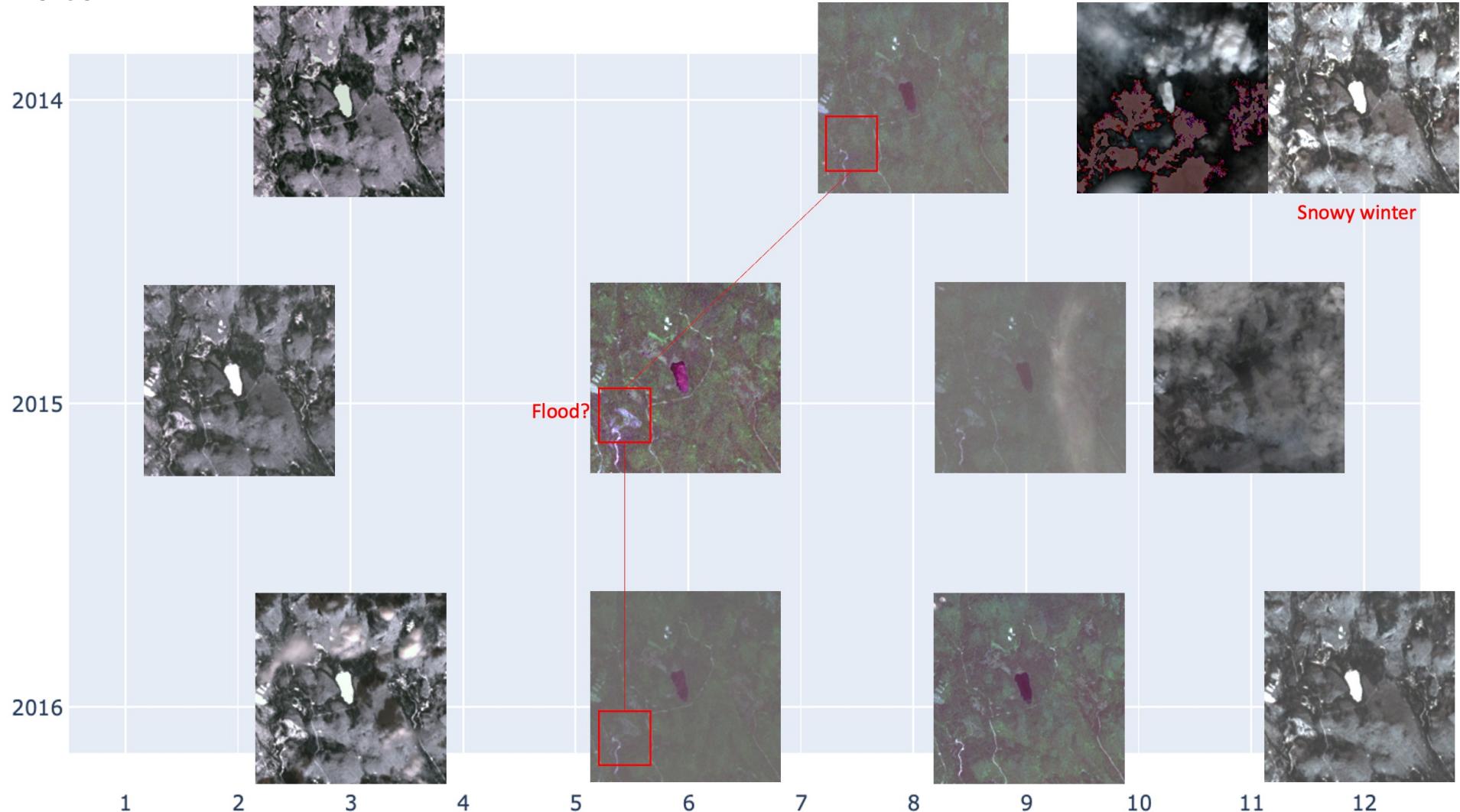
Data



Data



Data



Choosing an approach

Idea #1

Detect objects for each image

Define the dynamics in object quantity/area and/or position

Tools

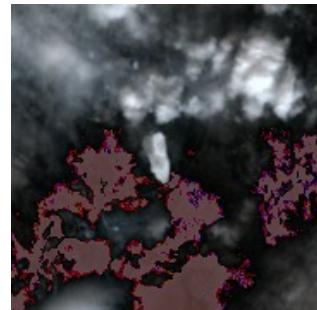
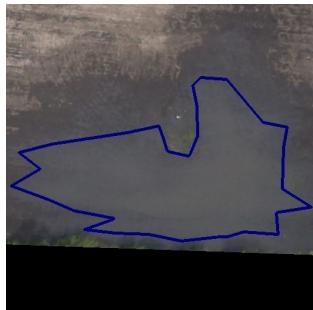
A model for object detection

Requirements

Ready-to-use pretrained model or labeled dataset

(appropriate one not found)

Train custom model (only 12 images)



Idea #2

Quantify data for each channel

Define the dynamics of changes

Define the key factors based on the observed dynamics

Tools

Image processing

Statistics

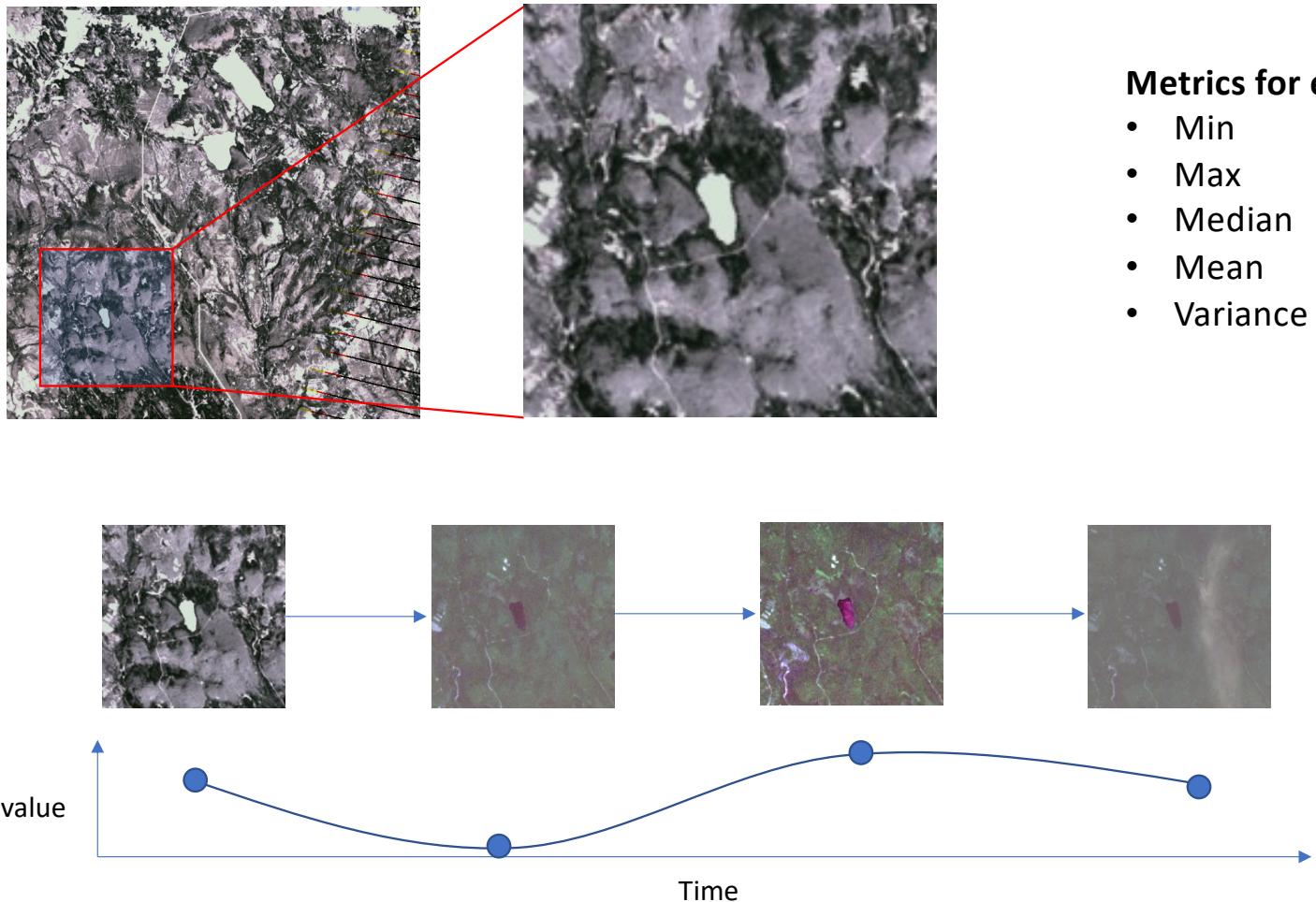
Requirements

Multispectral images in matrix form (available)

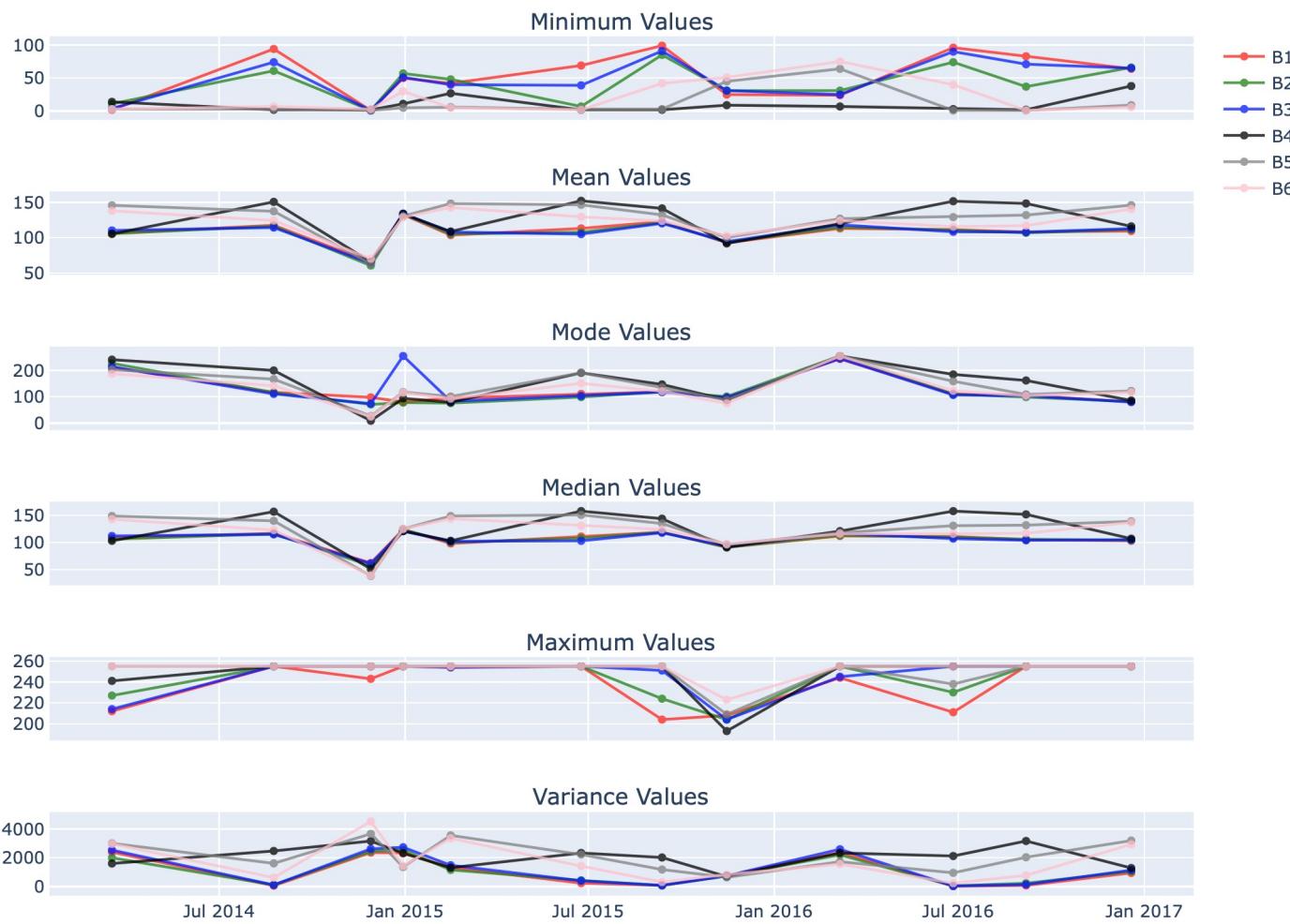


<https://github.com/chrieke/awesome-satellite-imagery-datasets>

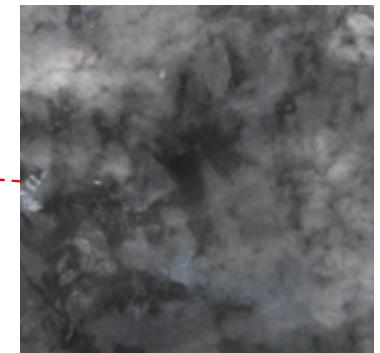
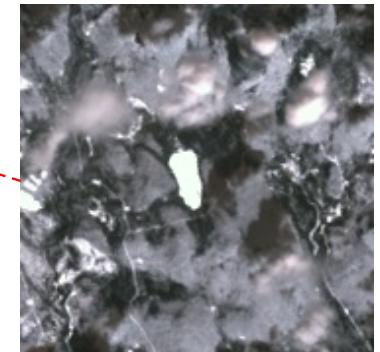
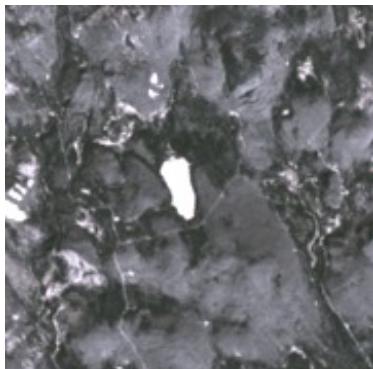
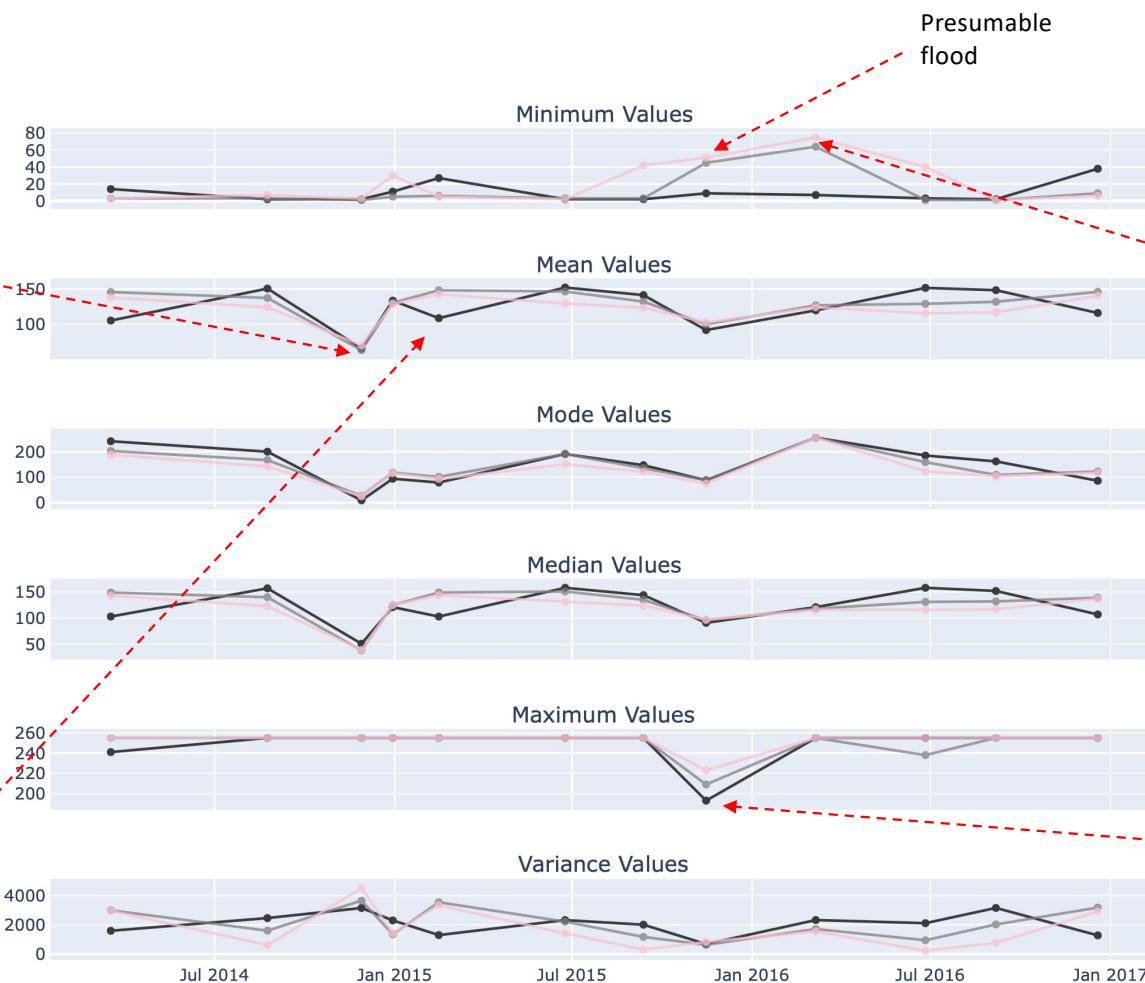
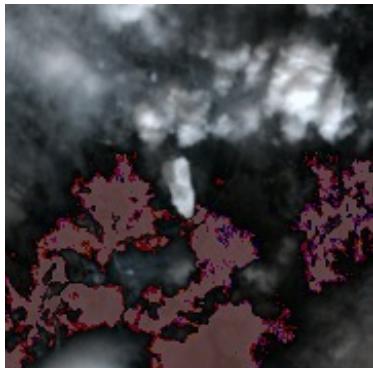
Approach



Results



Results



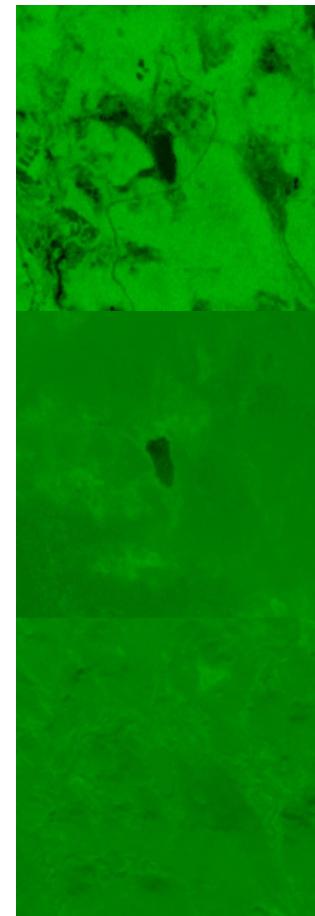
—●— B4
—○— B5
—●— B6

Conclusion

- The possible reason for pipit population reduction is a snowy winter which lead to floods in the region
- Next steps:
 - Get data on population dynamics
 - Try to gain more images
 - Analyze weather data for the region (compare amount of precipitation, temperatures, wind data to satellite images and population)
 - Analyze news data for the region (define the most frequent ones using NLP)

Normalized Difference Vegetation Index

$$\text{NDVI} = (\text{B4} - \text{B3}) / (\text{B4} + \text{B3})$$



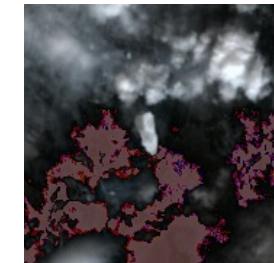
Summer

Summer
(flood)

Winter

Questions to be addressed to the source

Are the images post-processed?



Are the images obtained with the same settings of sensors?

