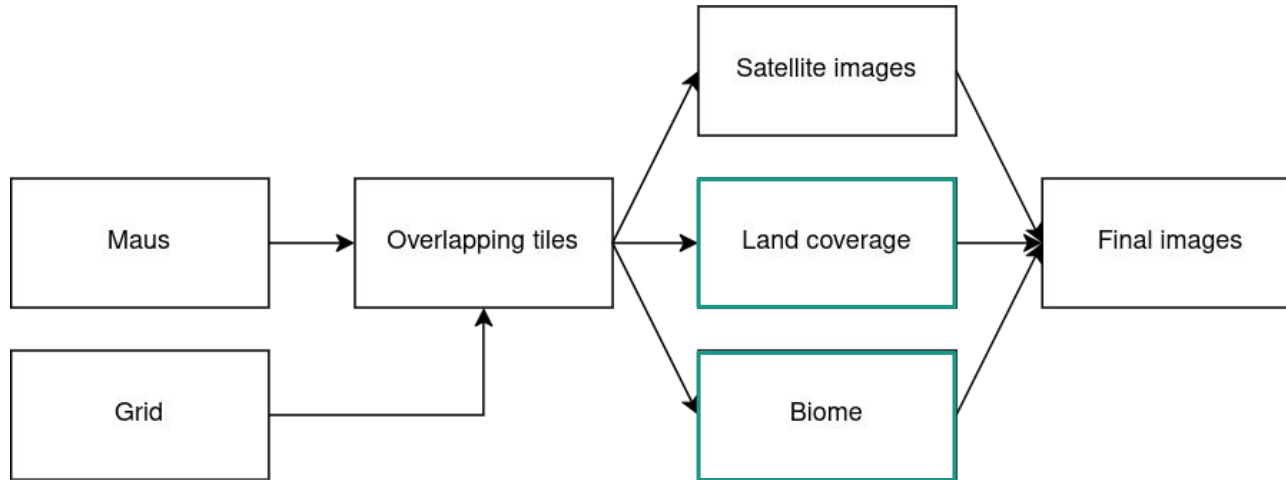




# Week 4

Mining Asset Detection (MAD)

## Experiment - Data fetching

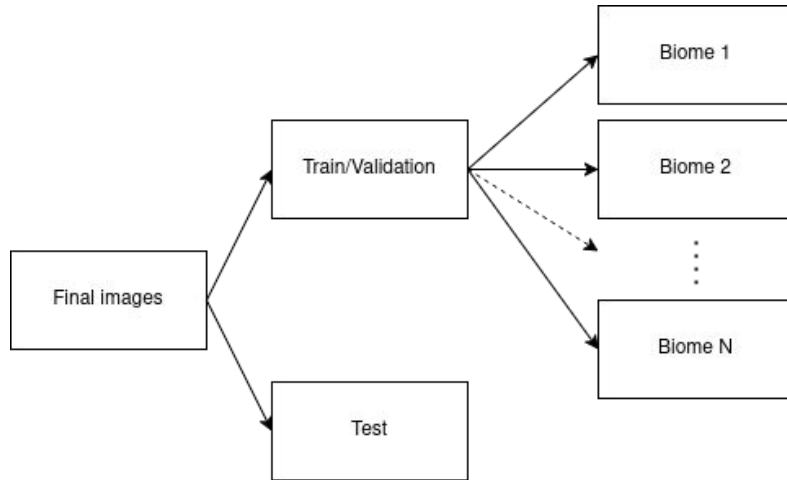




# Experiment - Data fetching

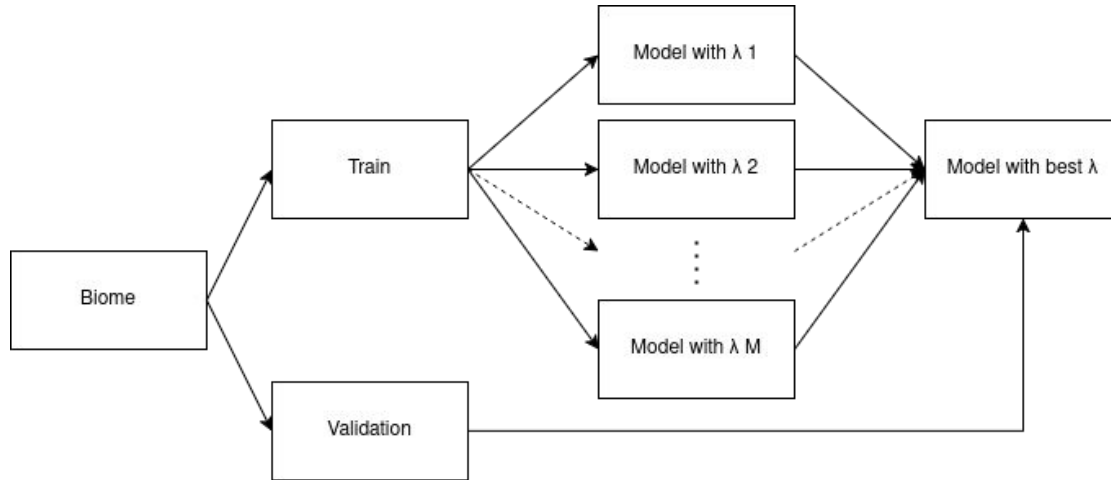
- Inclusion of land coverage: <https://esa-worldcover.org/en/data-access>
  - Only as counts of pixels per square, not as info in images
- Inclusion of biomes: <https://ecoregions.appspot.com/> e.g.
  - Deserts & Xeric Shrublands
  - Temperate Broadleaf & Mixed Forests
  - Boreal Forests/Taiga
  - etc.

# Experiment - Clustering



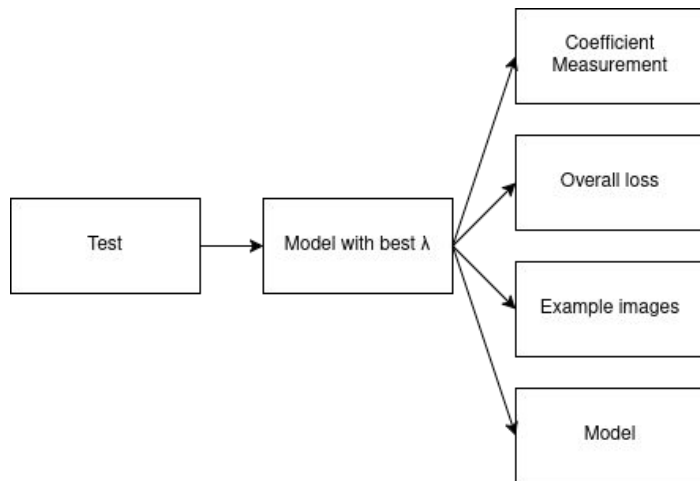
- Train test split done beforehand to determine performance of final model.

# Experiment - Model Training



- Essentially what I did in previous weeks per biome

# Experiment - Model Evaluation

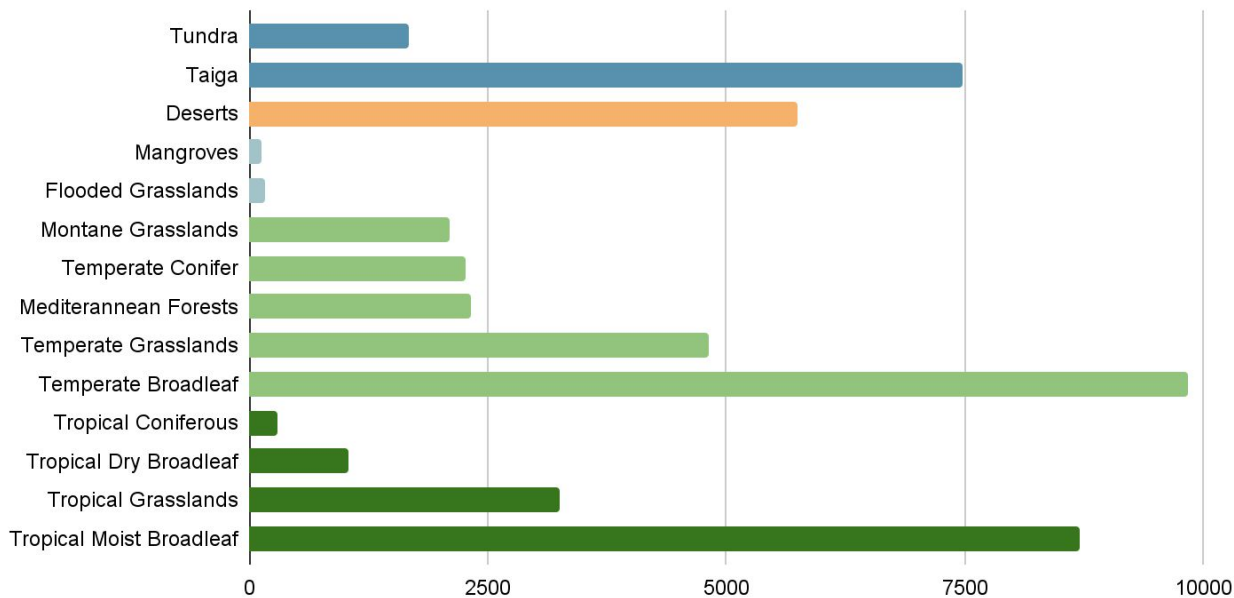


- What coefficients mattered
- How well is the final model
- What does the prediction look like
- Final model to load in again



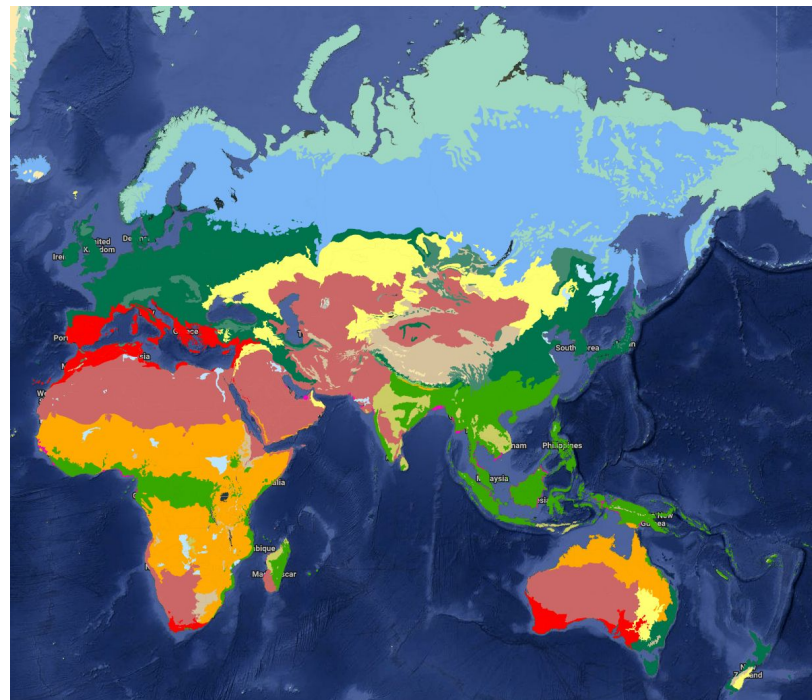
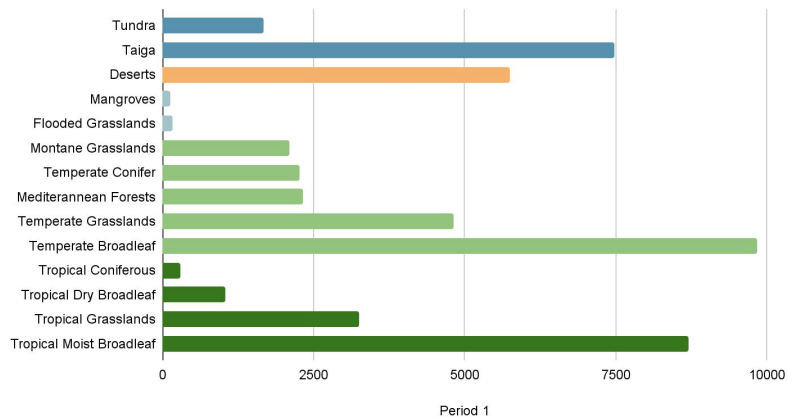
# Experiment - Data characteristics

## Biomes



# Experiment - Data characteristics

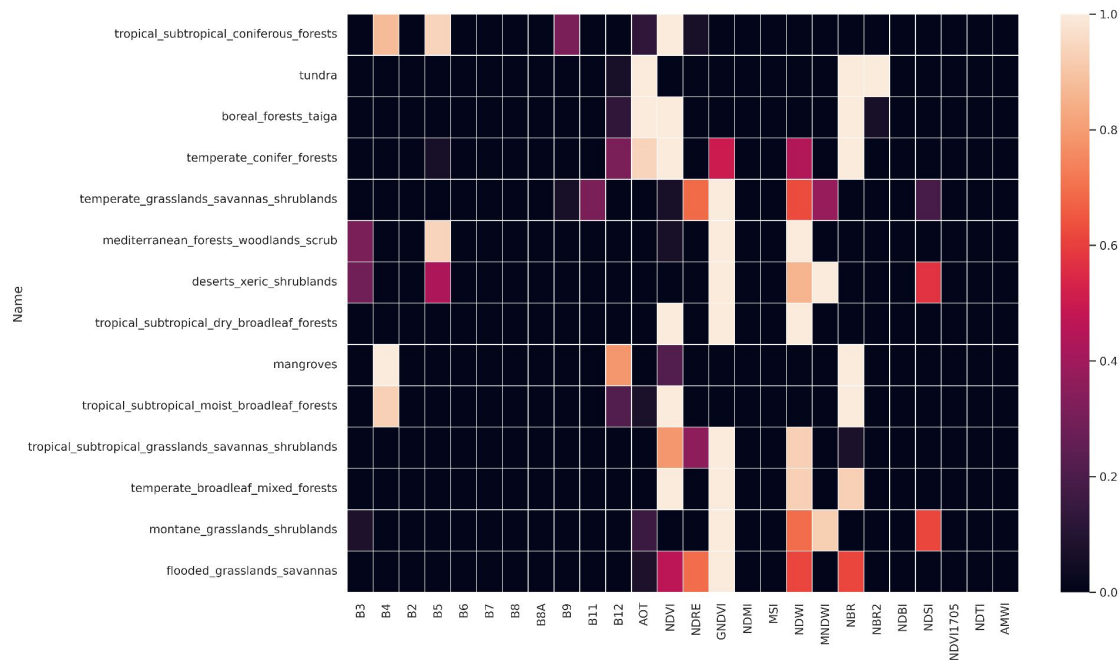
Biomes





# Experiment - Coefficient Measurements

- High preference for the non-linear features
  - Why?
- Depend a lot on B8 related bands
  - But B8 on its own never in the top bracket

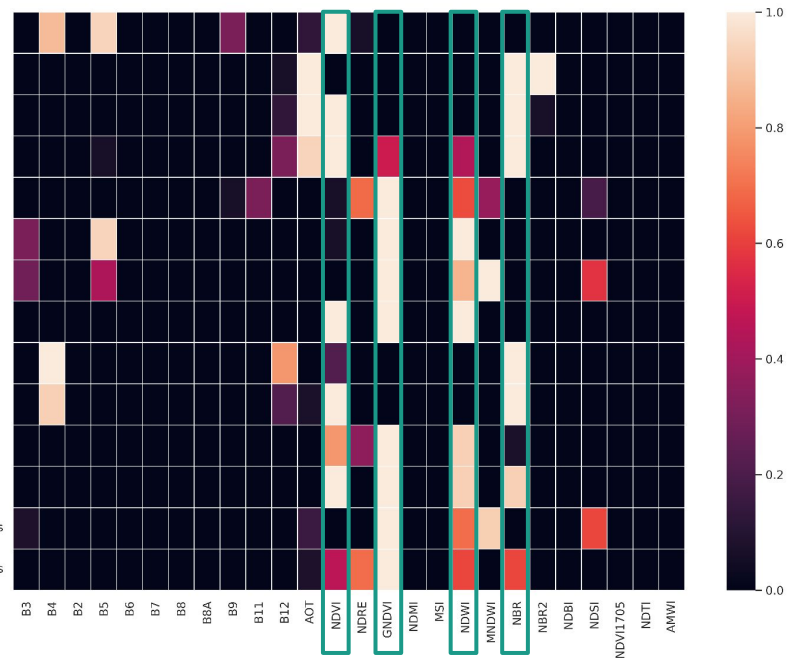


# Experiment - Coefficient Measurements

Index	Formula	Description
NDVI	$(B08 - B04) / (B08 + B04)$	Vegetation health
NDRE	$(B8A - B05) / (B8A + B05)$	Red Edge NDVI (chlorophyll)
GNDVI	$(B08 - B03) / (B08 + B03)$	Green NDVI
NDMI	$(B08 - B11) / (B08 + B11)$	Moisture Index
MSI	$(B11 - B08) / (B11 + B08)$	Moisture Stress Index
NDWI	$(B03 - B08) / (B03 + B08)$	Water presence (McFeeters)
MNDWI	$(B03 - B11) / (B03 + B11)$	Modified NDWI (better for urban areas)
NBR	$(B08 - B12) / (B08 + B12)$	Burn severity index
NBR2	$(B11 - B12) / (B11 + B12)$	Burn severity (drier/urban fires)
NDBI	$(B11 - B08) / (B11 + B08)$	Built-up index
NDSI	$(B03 - B11) / (B03 + B11)$	Snow index
NDVI705	$(B05 - B04) / (B05 + B04)$	Chlorophyll content (narrow-band NDVI)
NDTI	$(B04 - B03) / (B04 + B03)$	Turbidity, Suspended Solids
AMWI	$(B04 - B02) / (B04 + B02)$	Acid Mine Drainage

montane\_grasslands\_shrublands

flooded\_grasslands\_savannas





## Experiment - Loss Measurements

- Not a great look
  - Binary nature of the dataset
- But differences between regions again indicate that region separation seems smart

Biome	RMSE Positive
Tundra	0.45
Taiga	0.38
Deserts	0.39
Mangroves	0.34
Flooded Grasslands	0.20
Montane Grasslands	0.49
Temperate Conifer Forests	0.51
Mediterranean Forests	0.29
Temperate Grasslands	0.51
Temperate Broadleaf Forests	0.41
Tropical Coniferous Forests	0.23
Tropical Dry Broadleaf Forests	0.15
Tropical Grasslands	0.35
Tropical Moist Broadleaf Forests	0.36



# Experiment - Demo

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