

Predicting drought

Machine Learning for a changing climate



55 million

The amount of people affected by droughts annually

Source: World Health Organization

Droughts are linked to other disasters:

- * Water & food scarcity
- * Dangerously high temperatures
- * Damage to ecosystems
- * Wildfires
- *

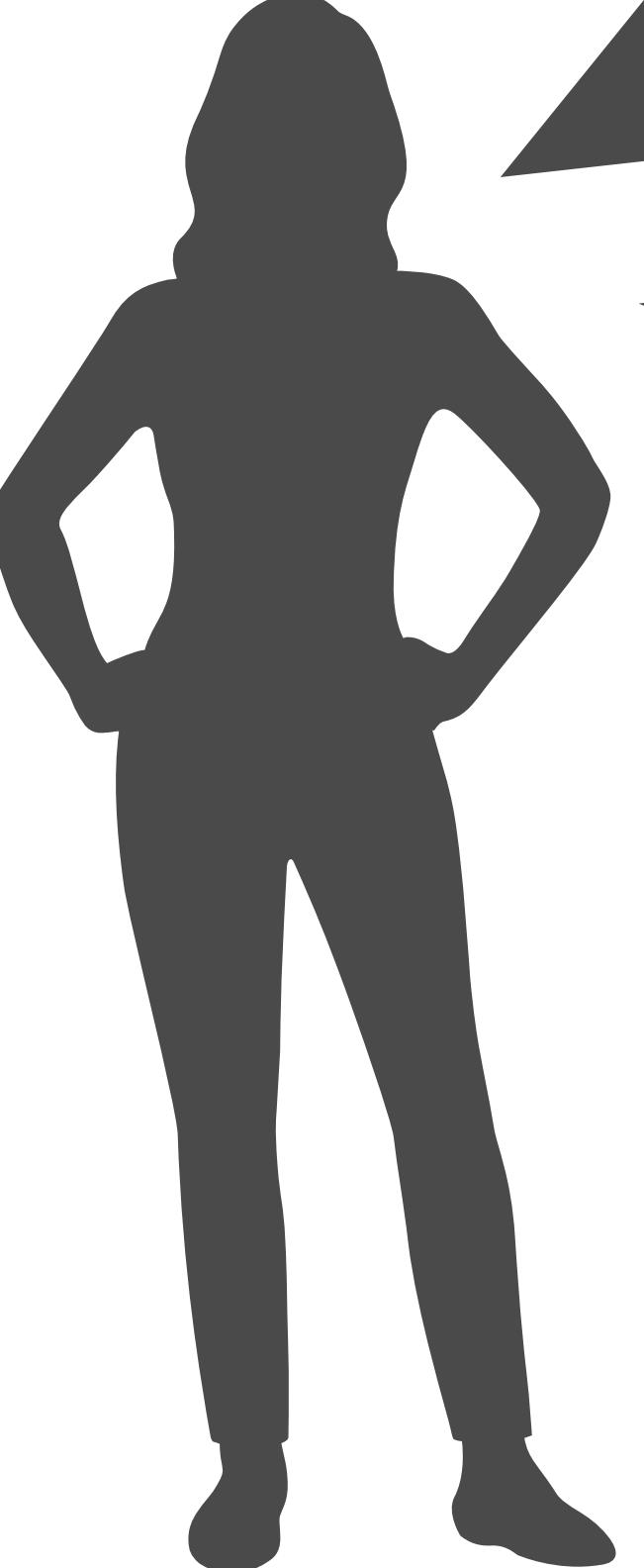
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What is a drought?

From the dictionary:

“a prolonged period of abnormally low rainfall, leading to a shortage of water.”

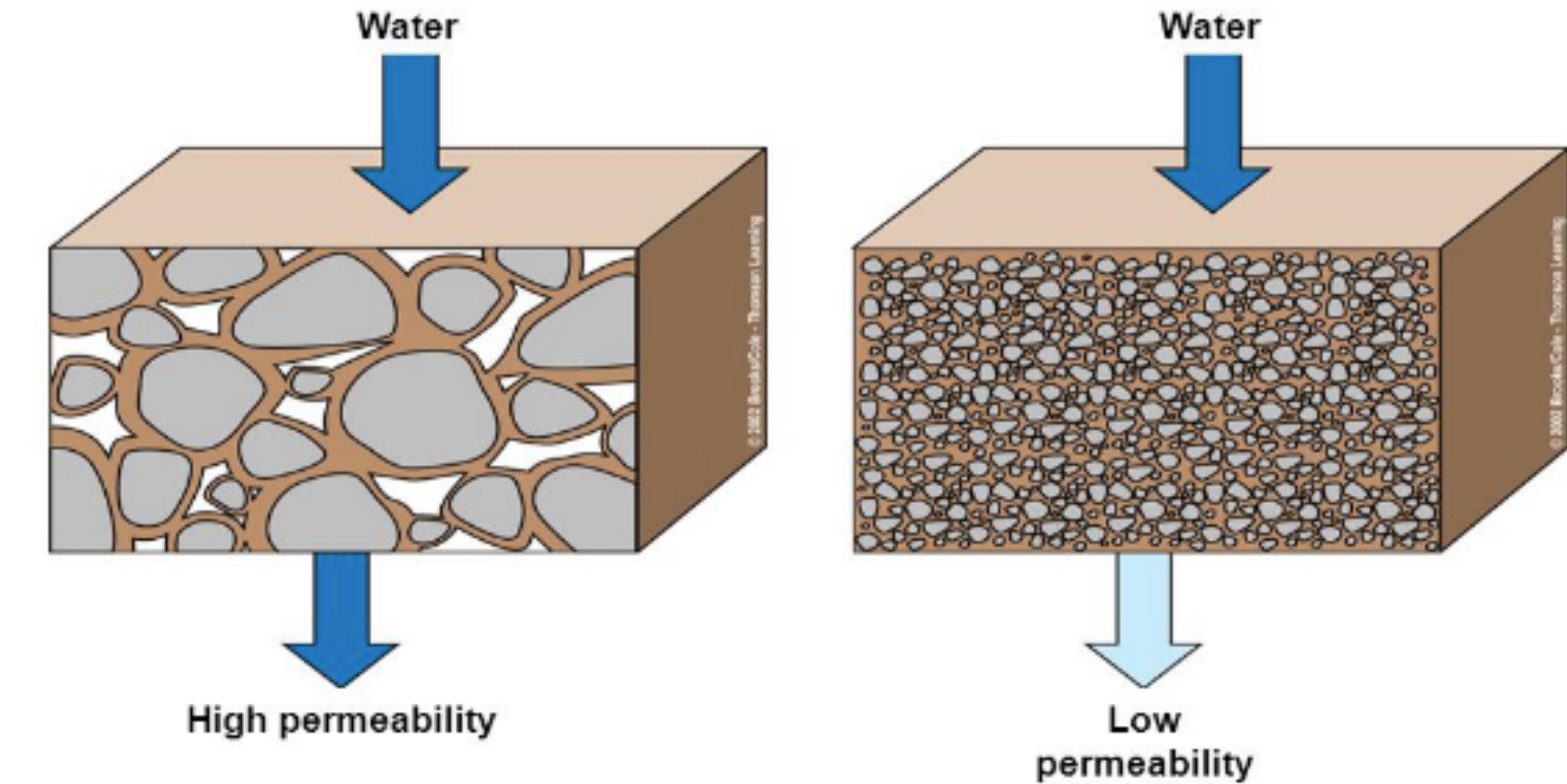


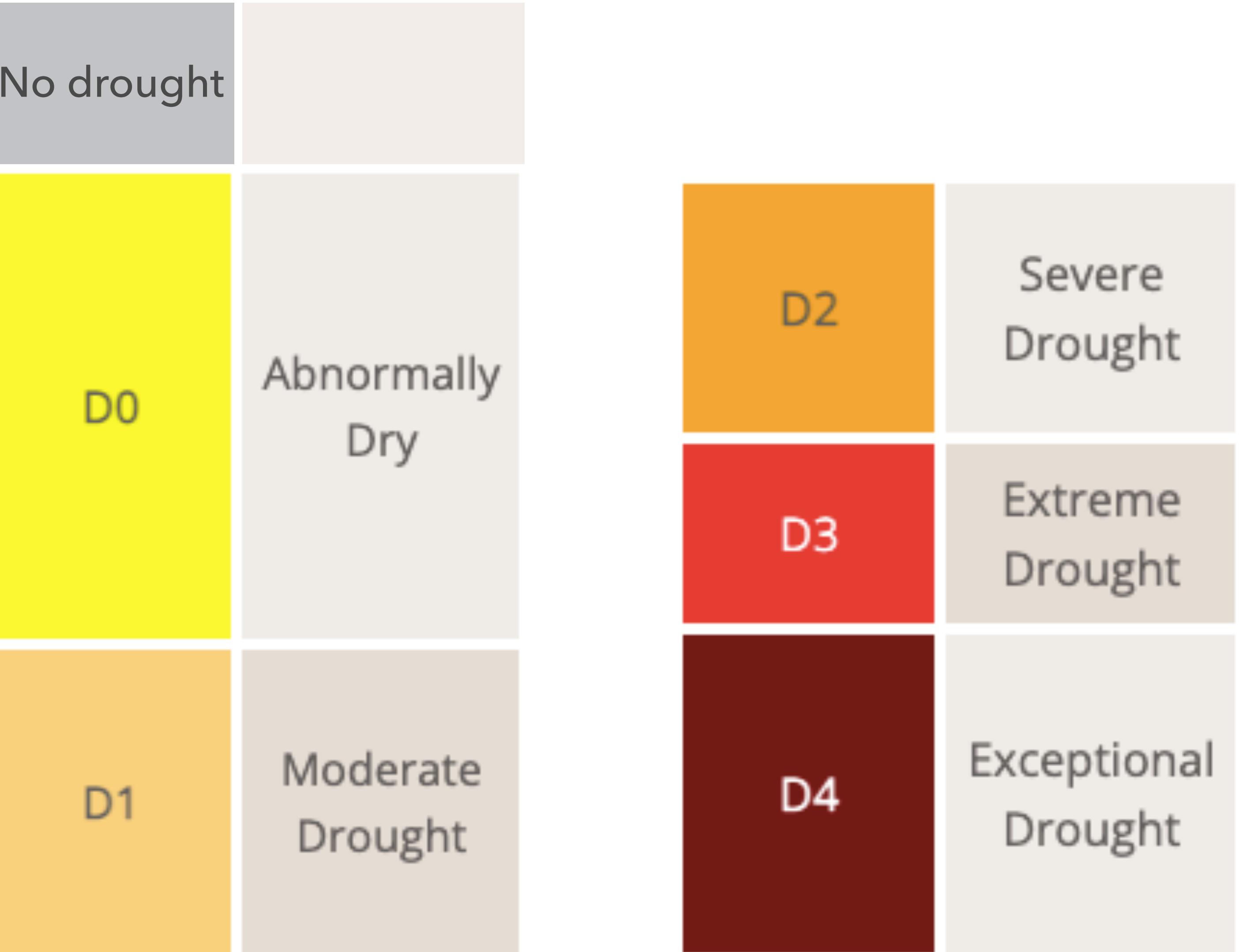
Is it possible to create a
Machine Learning model that
can predict drought?

If so, what input does it require to get the
best possible score?

Dataset info

- Two datasets
 - Weather stats: year 2000-2017, USA
 - Soil stats
- The importance of soil stats on predicting drought!
- * Drought → lack of nutrient uptake



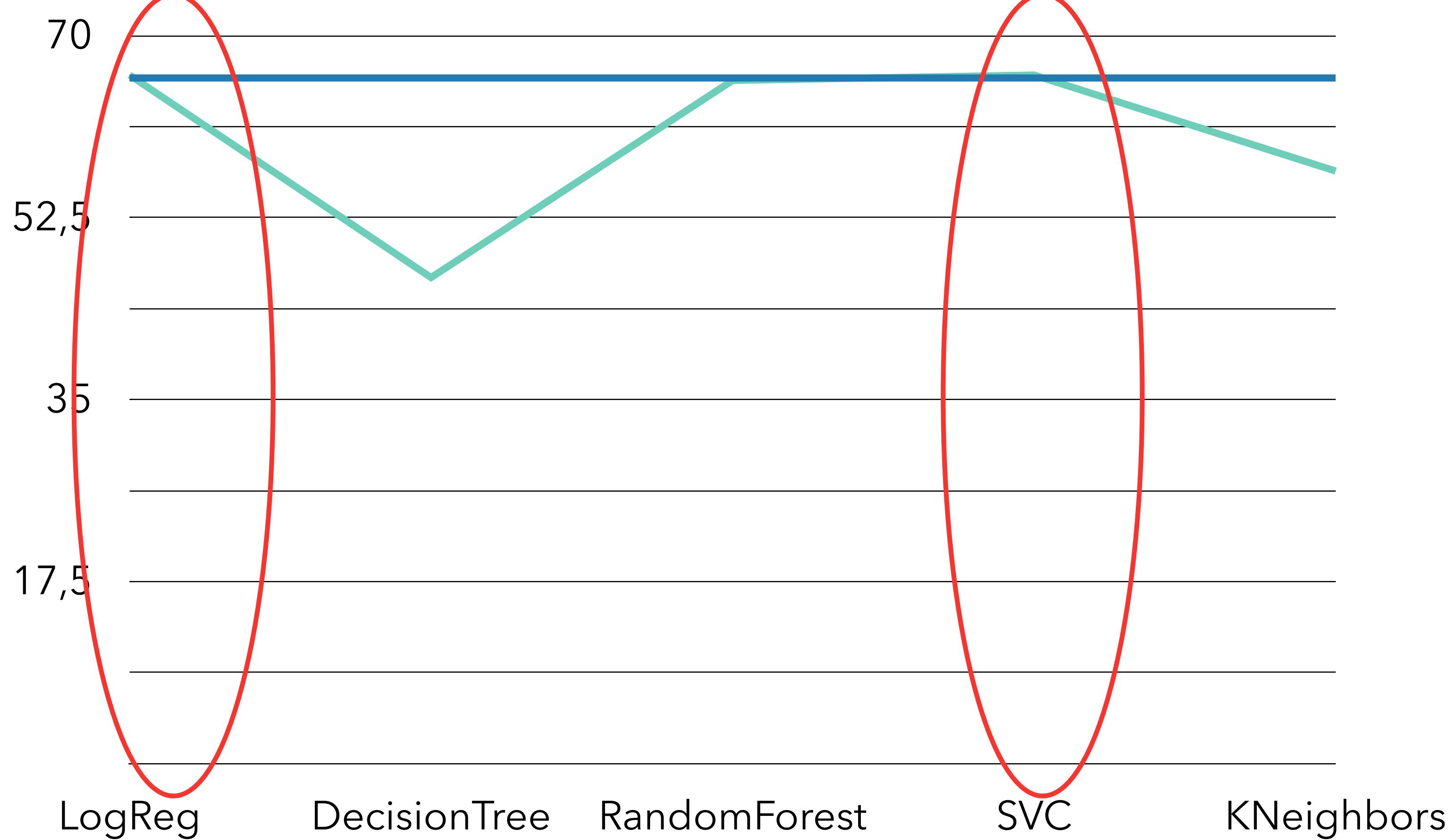


Drought classification

Model building

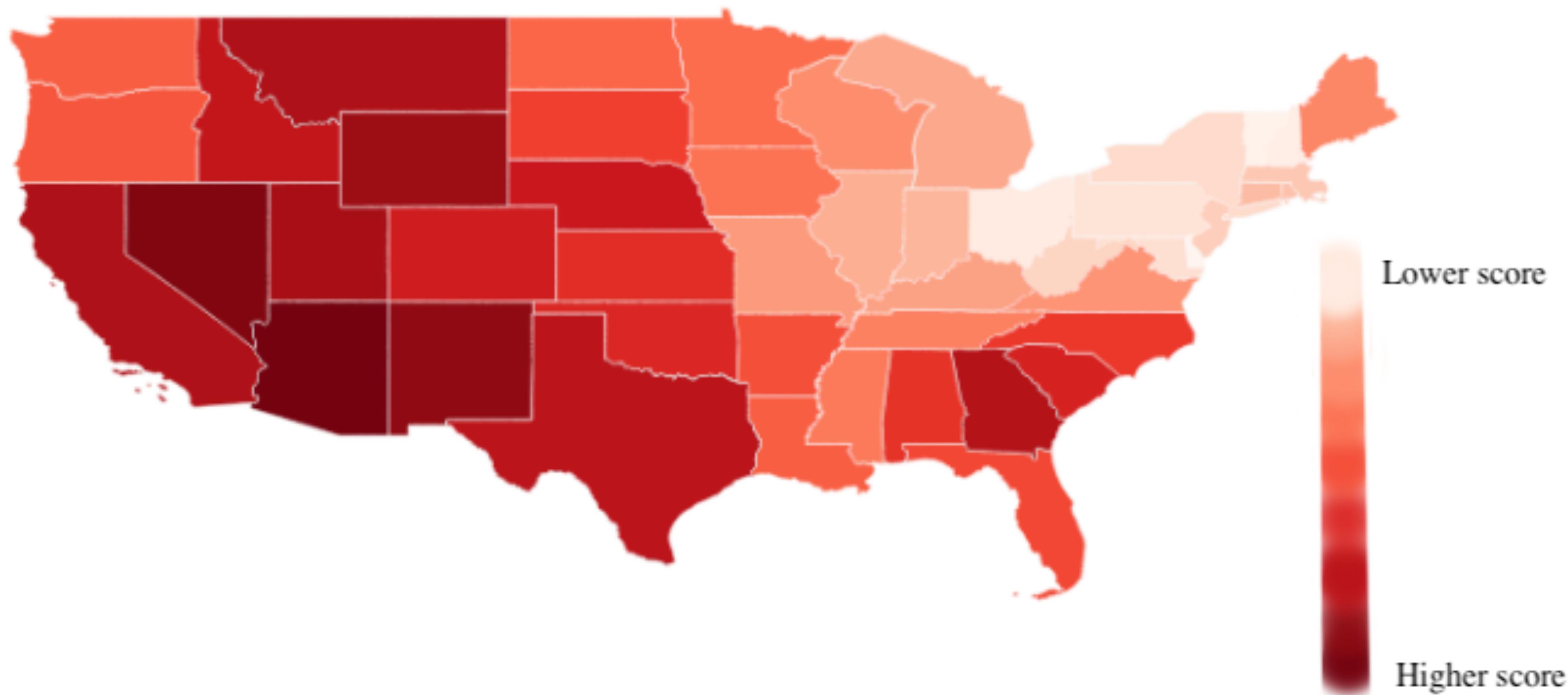
- Drawing a sample
 - Original df: ~ 20 000 000 rows
 - Sample: 100 000
- Elimination based on preexisting knowledge
 - X wind, slope, and more

Model building

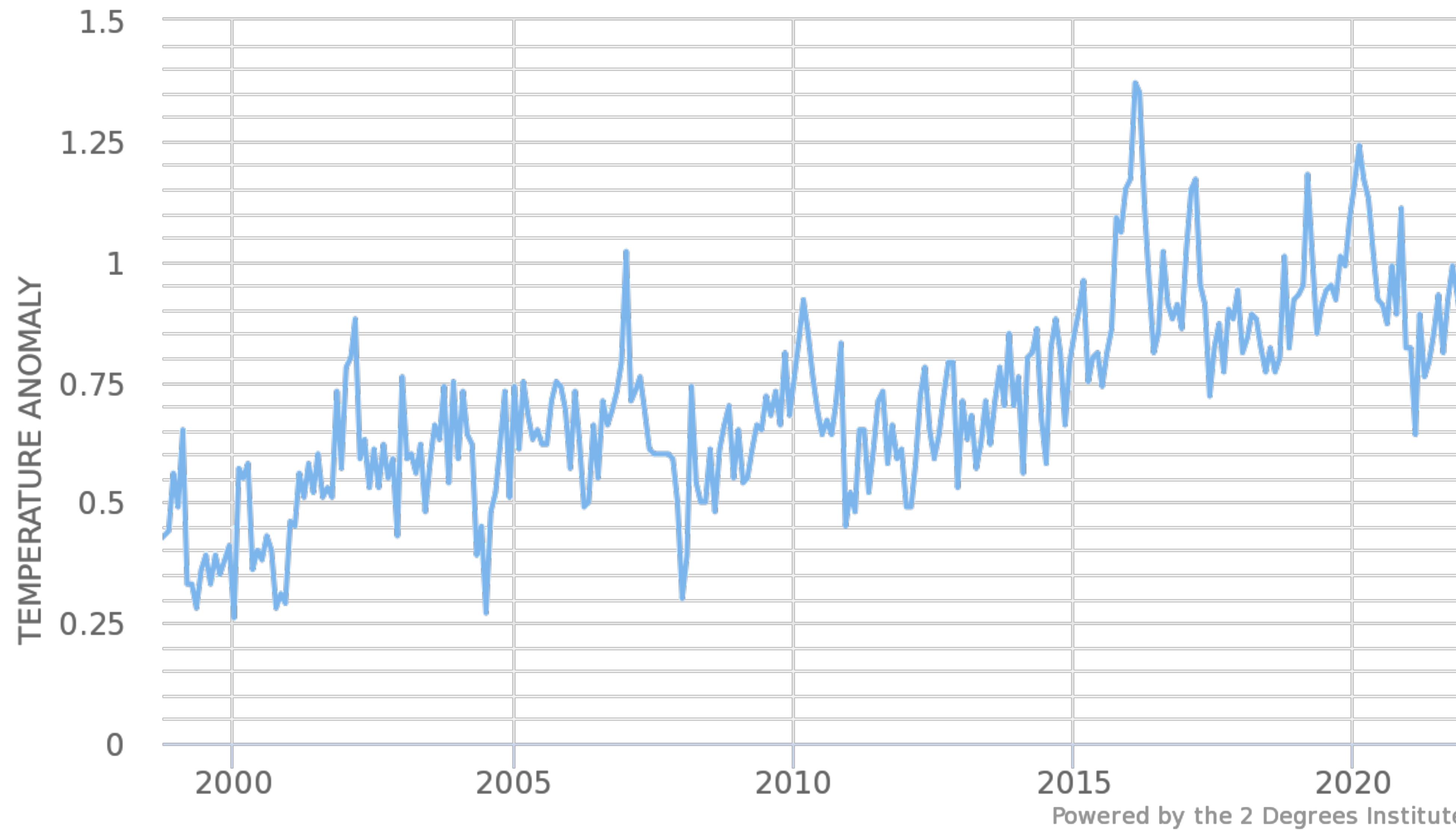


Results

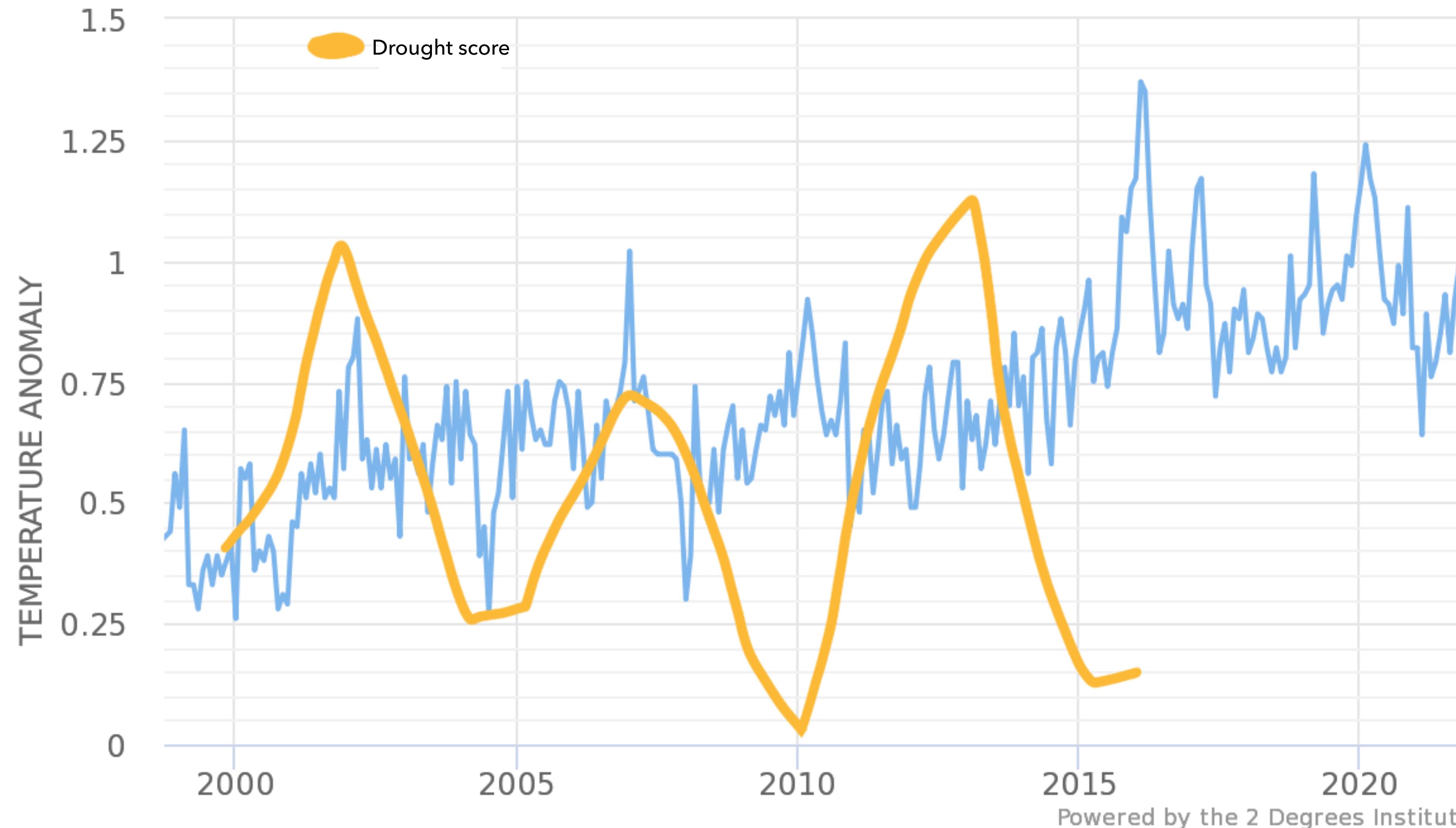
Drought score by state



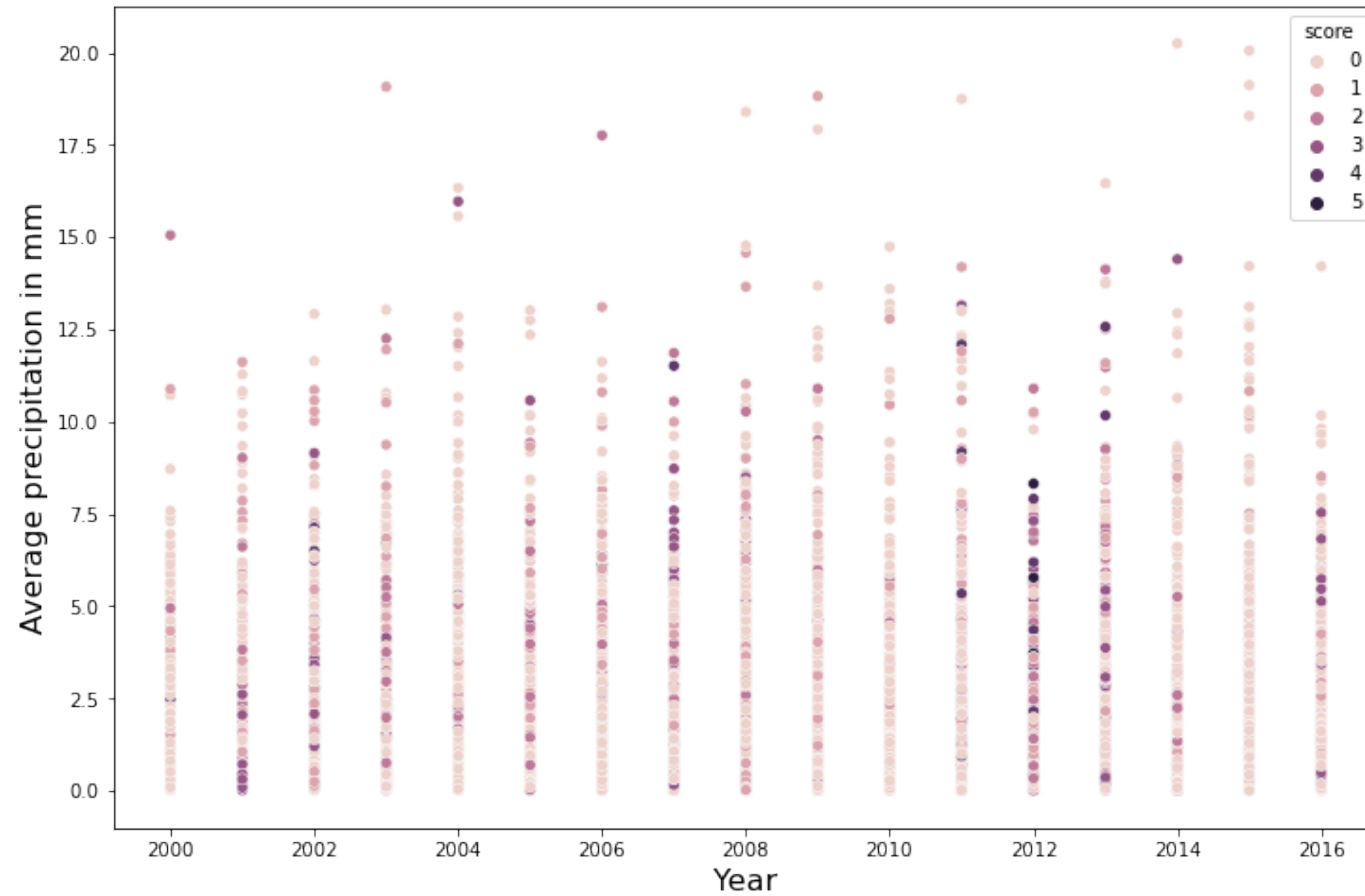
Yearly temperature change



Yearly temperature & drought score change



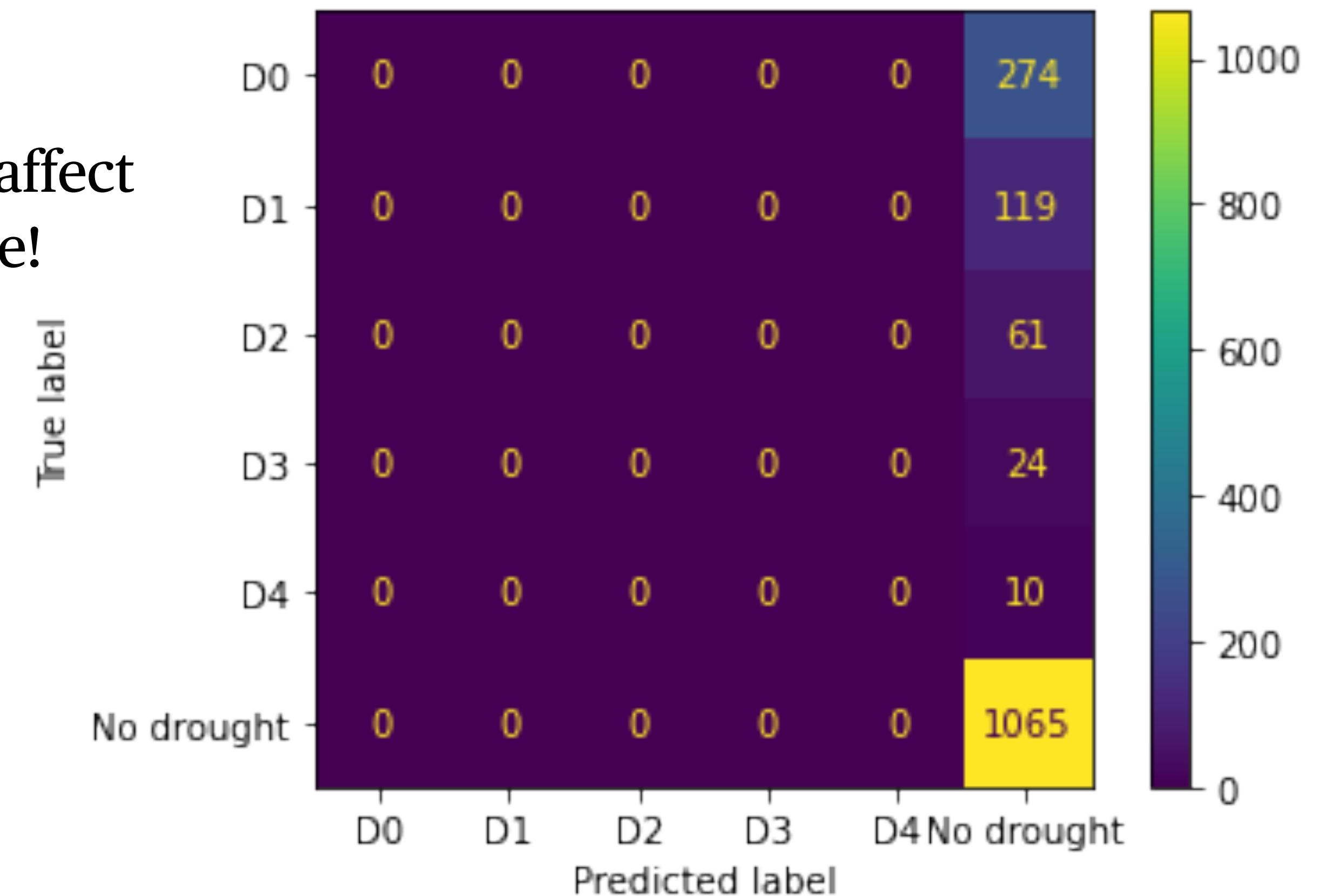
Precipitation in mm/year, by score



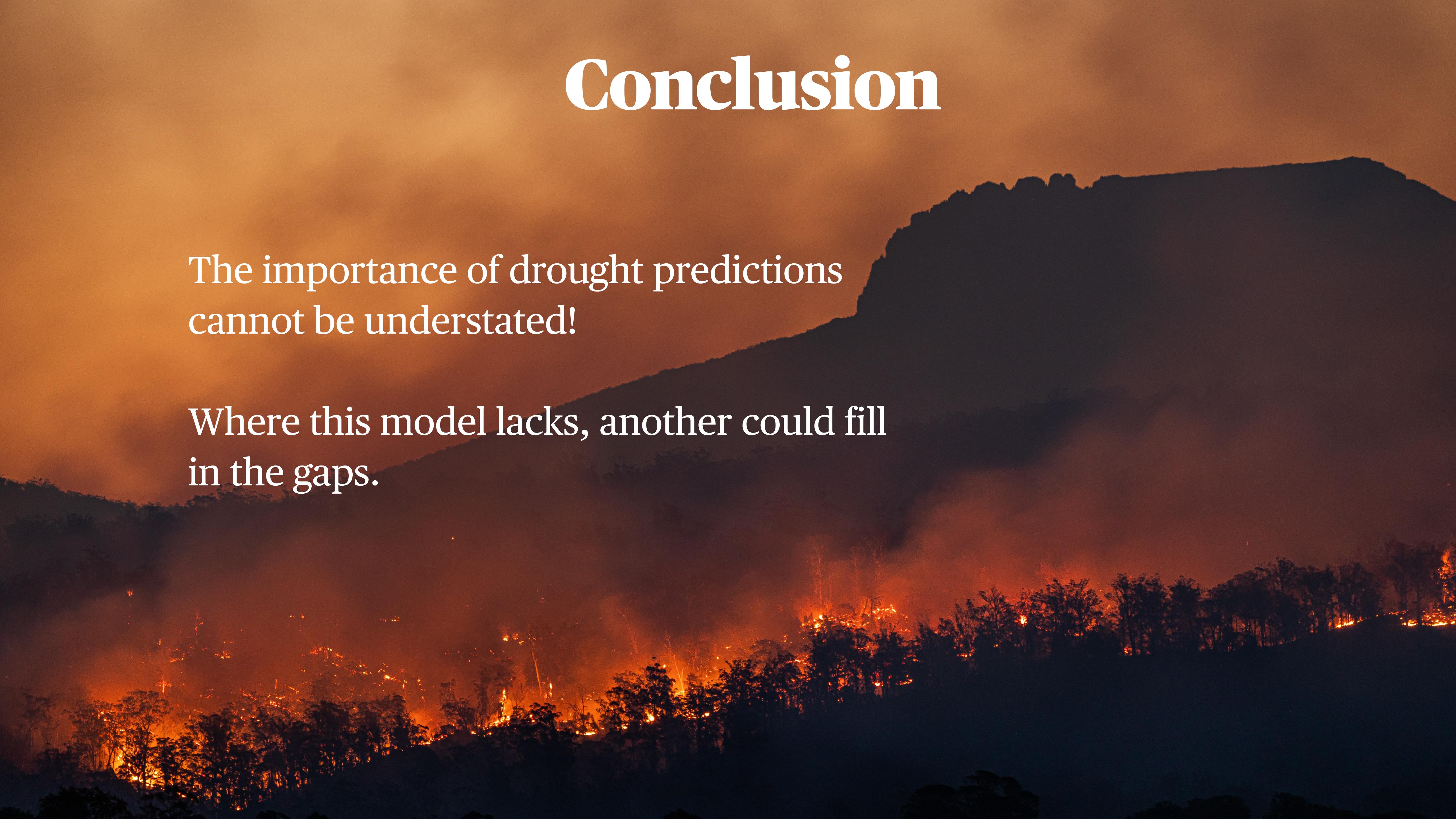
Model results

- Best accuracy score: 68.58% (on test data)
- Best training scores (accuracy, precision & recall): 0.6899
- Flaws: predicts all as No drought!

- Improvements:
 - More parameters affect drought than these!



Conclusion



The importance of drought predictions
cannot be understated!

Where this model lacks, another could fill
in the gaps.

Questions?