EGU General Assembly 2022

The influence of climatic variables on vegetation response during the growing season – Using Decision Trees (CART) and Multiple Linear Regression (MLR) to define how precipitation, temperature, and solar radiation shape vegetation response globally.

1 – Where around the globe do droughts have a bigger influence on vegetation?

2 – Classify which climatic factors influence vegetation response globally

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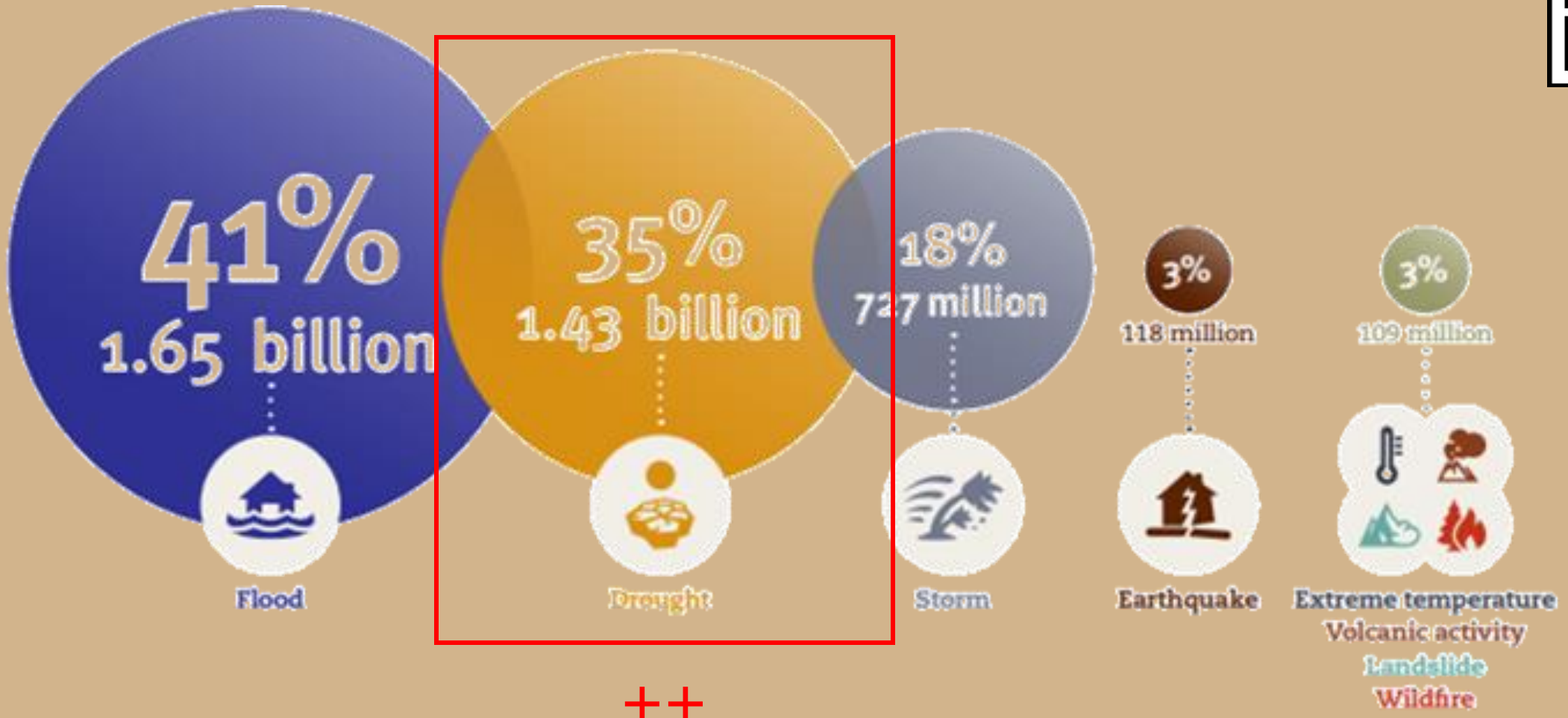
Reason for this study



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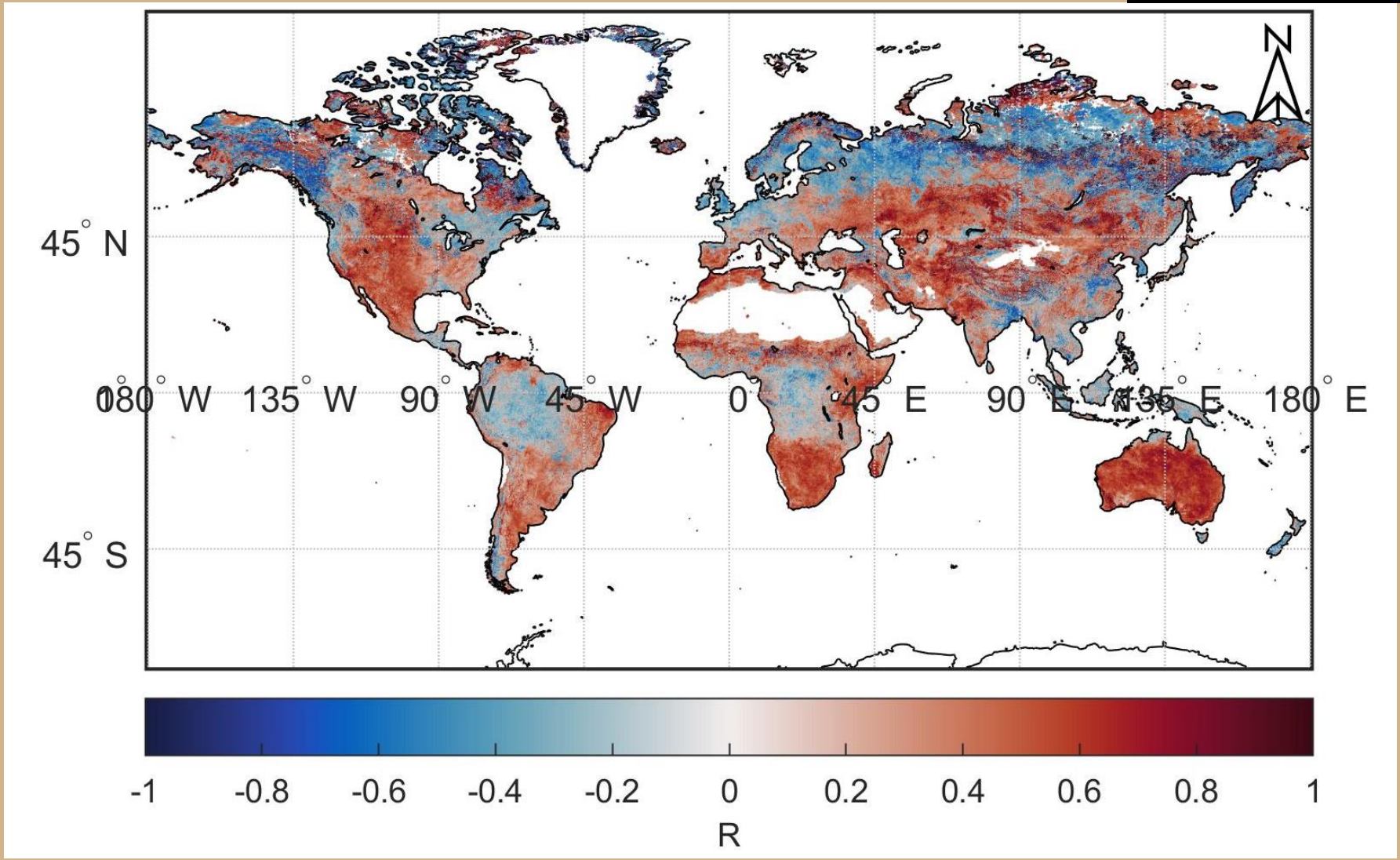
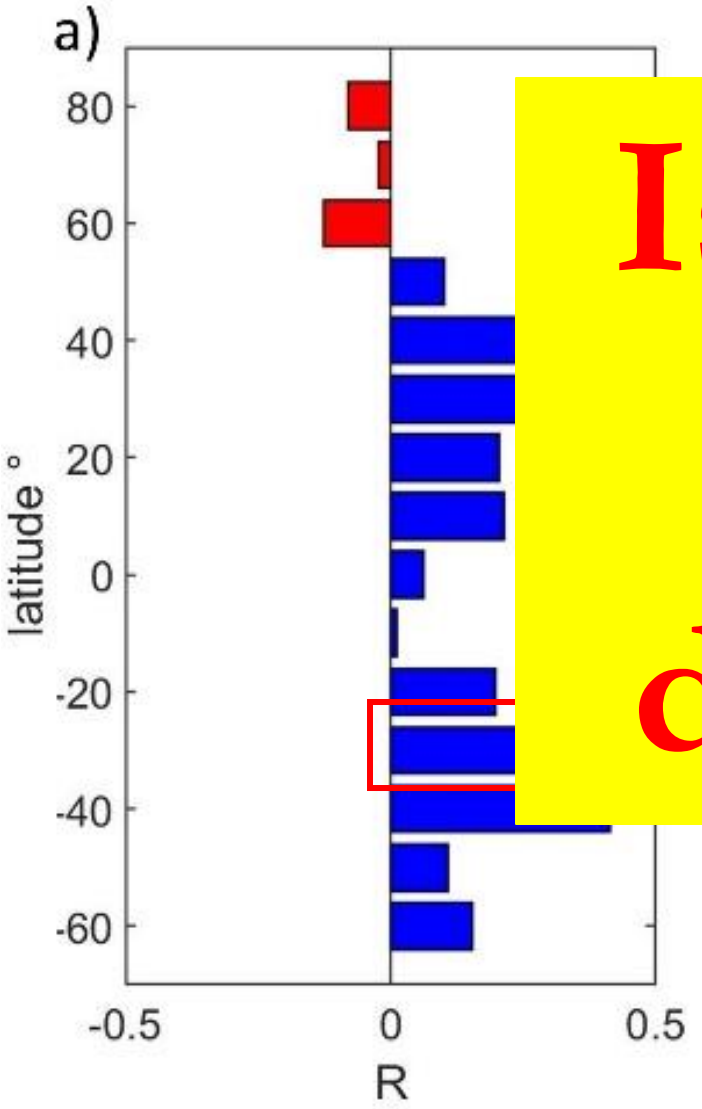
Climate Change

Optimal SPEIxNDVI correlation

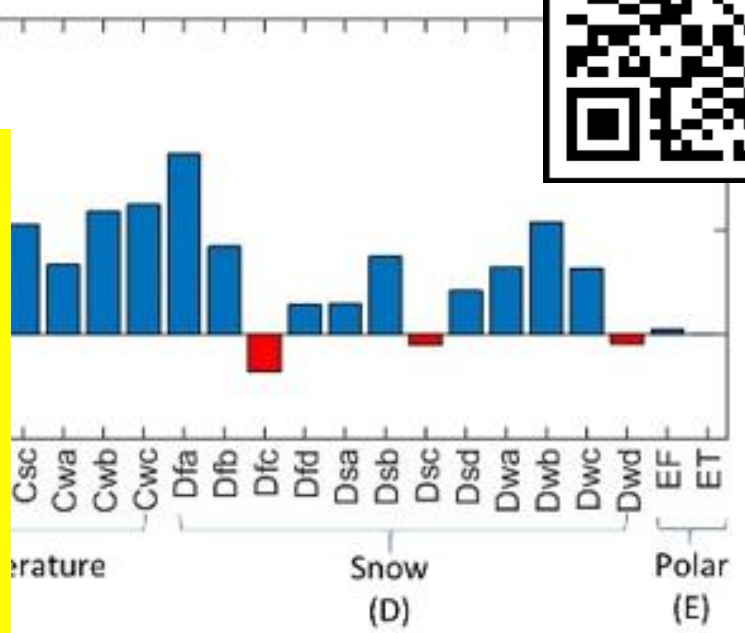
Are there any patterns on the negative and positive correlations?



Latitude?



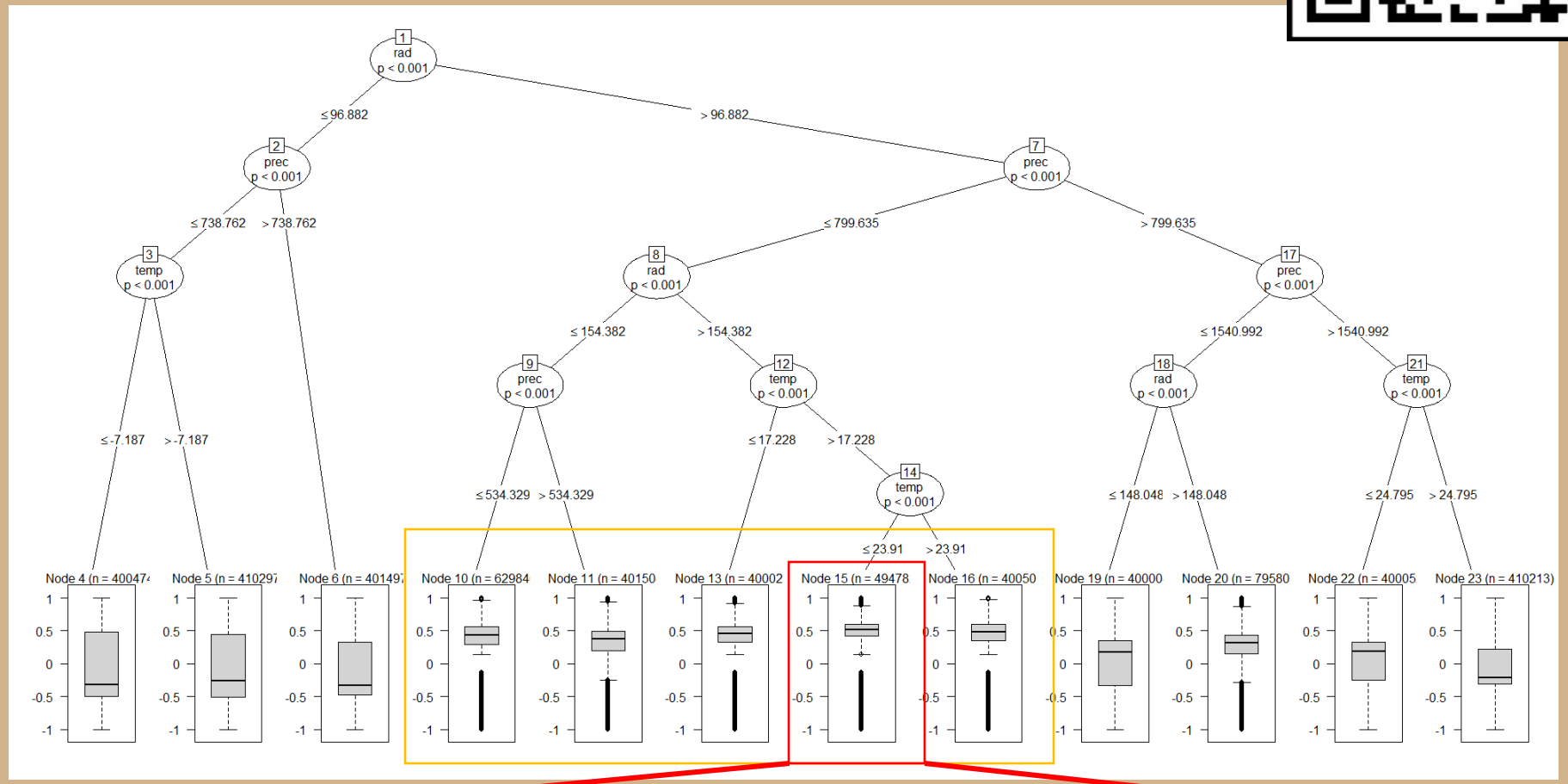
Climate?



Is there a better division?

Tree classification

- Bottom leaf limit: at least 400k pixels = 10 million km^2 =size of the US
- Independent variables: Mean Temperature, Radiation and Precipitation
- The **correlation between droughts and vegetation is higher in locations of high temperature, low precipitation and high solar radiation**



17°C<T<24°C,
P<800mm/year,
R>155

R =0.52

What factors influence vegetation response around the globe?

For every pixel

Optimal SPEI time scale

How many months do climatic variables influence vegetation?

Optimal NDVI timescale

How many months vegetation is influenced by climate?

MLR

Independent

$$\sum_{n_{months}} Temperature$$

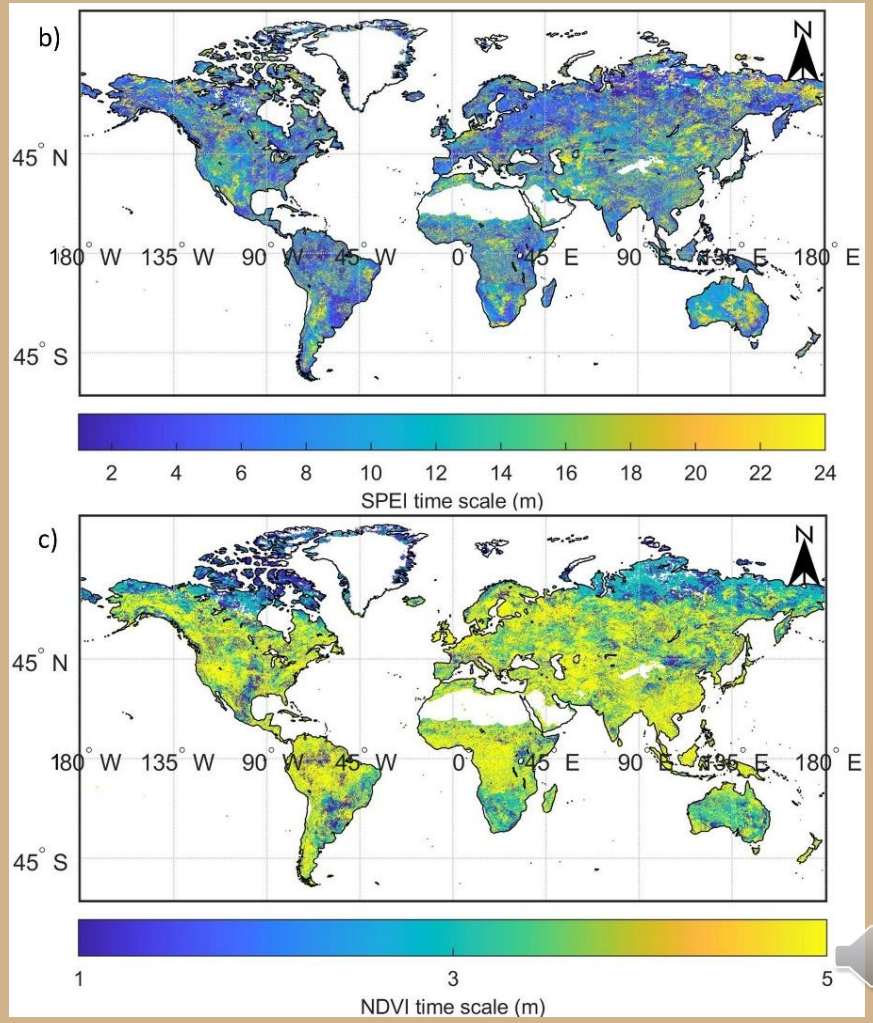
$$\sum_{n_{months}} Precipitation$$

$$\sum_{n_{months}} Radiation$$

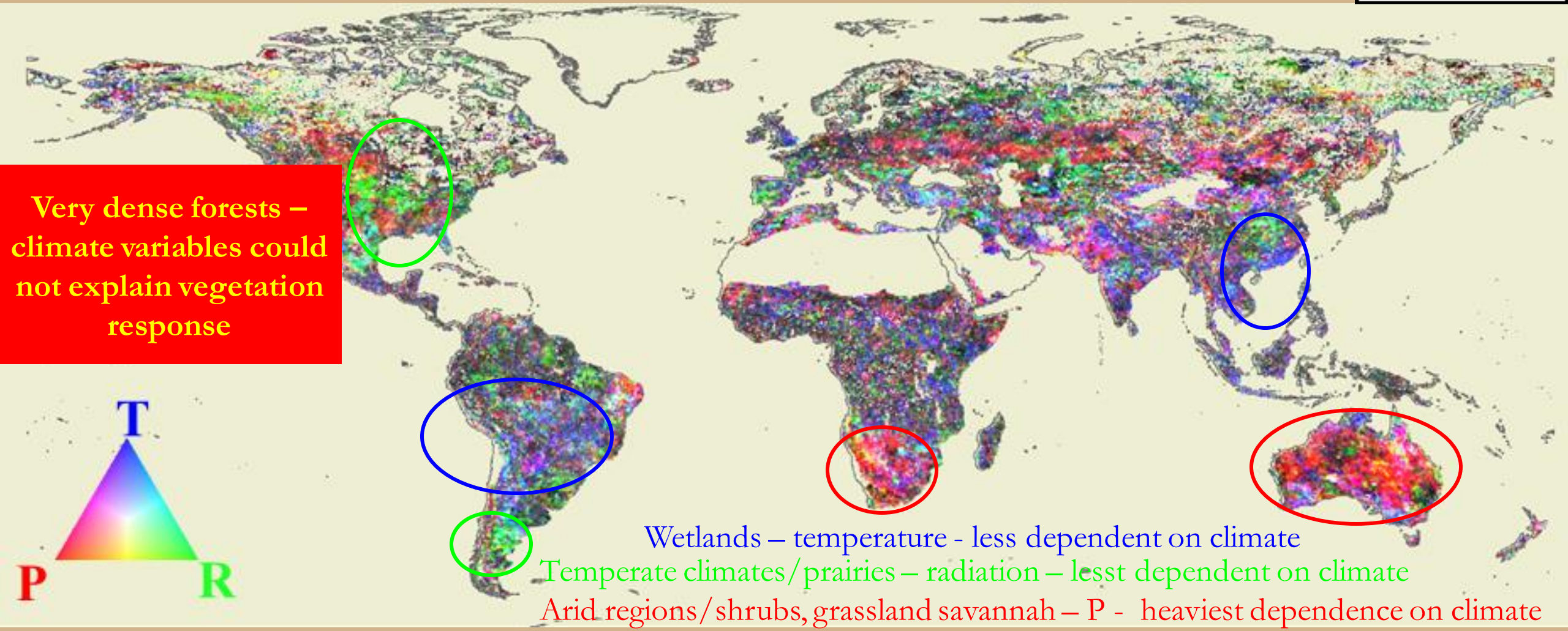
Dependent

$$\sum_{m_{months}} NDVI$$

Where n and m are the number of months in which the correlation is stronger



What factors influence vegetation response around the globe?



Conclusions

- Vegetation is the most sensible to climate variations in locations that have precipitation as limiting growth factor

- Although lower, vegetation is still sensible to droughts in locations where radiation and temperature are limiting factors

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