

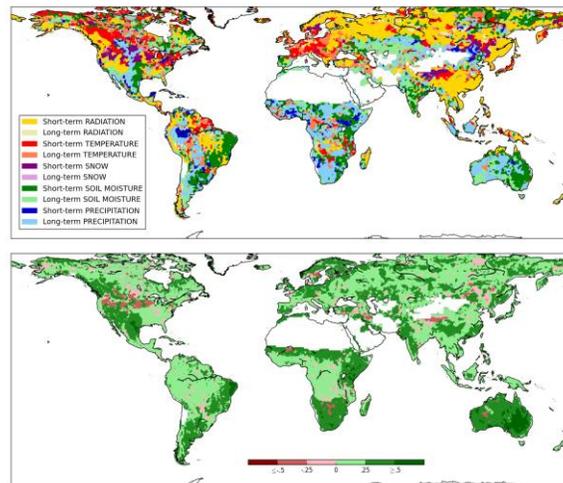


AN ANALYSIS OF THE IMPACT OF CLIMATE EXTREMES ON ECOSYSTEMS

Background

Recent advances in satellite Earth observation provide new means to collect and exploit data that are related with crucial environmental variables, called climate drivers, such as temperature, precipitation, soil moisture, etc. Fluctuations that exist in their values may reveal climate changes which have great impact on terrestrial ecosystems.

Having at our disposal a pool of climate drivers that cover a period of 30 years for each point of the Earth, now is the time to understand the causes of extreme phenomena like droughts, heatwaves and extreme rain events that took place in the past. Therefore, studying how these phenomena have changed in frequency and intensity, it would be possible to discover the impact of such factors in other variables like vegetation. Statistical methods and machine learning techniques can be applied on these data in order to help in discovering correlations and forming models that may predict future situations. An additional challenge is the efficient handling of the massive datasets that are used to study climate extremes.



Scope of the thesis

The aim of this thesis is to discover hidden correlations between the different climate drivers with vegetation indices and more specifically to reveal the causal effects that may have these drivers on vegetation. Based on machine learning techniques, like feature construction and feature selection, and taking into account past observations, we can model patterns that may exist in the data. These models can be evaluated on past records and the ultimate goal is the prediction of future values of vegetation indices globally.

SUPERVISORS

Prof. dr. Willem Waegeman
Dr. Diego Miralles

TUTOR

Christina Papagiannopoulou

MORE INFO

willem.waegeman@ugent.be

RELEVANT FOR

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