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Spatio-temporal Correlation between Gross Primary Production and spring onset

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Phenology studies the cycle of biological events in space and time. Several remote sensing products provide phenological information and allow analyzing climate change effects. Nowadays, new vegetation phenology products based on weather data are available, which provide reliable information at plant level. Studying the relationship between remote sensing and plant level products helps us (to) understand the variations produced by the impacts of climate change onto the vegetation over time.

This work studies the spatial-temporal correlation between Gross Primary Production (GPP) and a spring onset index. The analysis is done at 1 km spatial resolution, in the contiguous US, and for the period 2000 to 2015. We used the MODIS derived annual sum of GPP and the leaf and bloom indices derived from the extended spring indices (SI-x) models. The Leaf and Bloom indices were obtained using Daily Surface minimum and maximum temperature data (Daymet).

Preliminary results confirm the anti-corelation between the GPP and SI-x products in both the Western and Eastern coasts of the USA, whereas the central region is mainly positively correlated. In addition, the Leaf index presents lower correlations than the Bloom index, indicating that larger periods are needed to see significant direct effects. The found correlations help to develop links among the greenwave components for monitoring climatic variability.

Further work includes the analysis of the partial correlation taking into account the day of Last Freeze or advanced drought metrics as well as identifying spatial-temporal patterns between both phenological products.