Geophysical Research Abstracts
Vol. 20, EGU2018-1001, 2018
EGU General Assembly 2018

Variability of growing season onset/offset in satellite-observation and in Community Land Model version 4.5.

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Vegetation phenology and its intra-annual variability have a large influence on land-atmosphere feedbacks. For this reason, global land surface models are routinely evaluated in order to assess their ability in reproducing the observed phenological variability. To do so, many state-of-the-art global land surface models simulate explicitly carbon-nitrogen biogeochemical cycles and dynamical vegetation evolution.
Since changes in vegetation growing season are indicators of climate change impacts on ecosystems, we aim at analyzing the observed variability in vegetation growing season onset and offset and the ability of a state-of-the-art land surface model to capture this variability at global scale.
To do so, we apply an updated version of the method presented in Murray-Tortarolo et al. (2013) intended to represent the three main types of observed growing season behavior: (1) single growing season with a normal distribution shape; (2) summer dormancy; (3) double growing season (i.e. secondary peak after summer drought). This analysis uses Leaf Area Index (LAI) seasonal amplitude variations as proxy for the vegetation phenology variability. We apply our method both to satellite-observations and to the Community Land Model version 4.5 (CLM4.5) simulations.
The comparison of observations and simulations provides an insight on the ability of the CLM4.5 in capturing the observed growing season features. Moreover, an analysis at Plant Functional Type (PFT) level is performed in order to produce further information on the sensitivity of each PFT to the ongoing climate change.
In general, our method expands the area of study going from high-latitude northern hemisphere regions to global, giving the possibility to understand the vegetation response to the ongoing climate change in a larger variety of ecosystems.