Geophysical Research Abstracts
Vol. 16, EGU2014-1735, 2014
EGU General Assembly 2014

30-year change in the onset date of spring vegetation green-up over the Northern Hemisphere, a Bayes-based analysis

Xuhui Wang (1,3), Shilong Piao (1), Xiangtao Xu (1), Ranga Myneni (2), and Laurent Li (3)

(1) Peking Univeristy, Beijing, China (xh.wang@pku.edu.cn), (2) Boston University, Boston, USA, (3) Laboratoire de Météorologie Dynamique, Université Pierre et Marie Curie, Paris, France

Changes in vegetation phenology are some of the most significant biological impacts of historical climate change. Satellite observations provide spatio-temporal information required for assessing changes in phenology, but the data are sensitive to uncertainties in phenology detection algorithms. Using three different satellite dataset (NOAA AVHRR, MODIS, and SPOT), in this study, we applied multiple algorithms to detect onset dates of spring vegetation green-up and their uncertainties over the Northern Hemisphere in order to accurately characterize phenological changes during the past three decades under a Bayesian framework. We found that, over 30oN – 75oN of the Northern Hemisphere, spring vegetation green-up onset date has likely (72%) experienced a significant linear advancement of -1.5±0.6 days per decade during the period 1982–2011. There is a continental difference in the rate of change: vegetation green-up onset date over Eurasia has significantly advanced by -1.8±0.6 days per decade, while that over North America does not show significant trend (-0.8±0.7 days per decade). Trend reversal and abrupt change of vegetation green-up onset date are unlikely (<30%) to have occurred at hemispheric and continental scale, but more probably occurred over some regions like western North America and eastern Siberia. The inferred spatio-temporal changes of vegetation green-up onset dates indicate that nonlinear response of vegetation phenology to climate change may have taken place due to warming induced change either in winter chilling or in the fire regime. Our results imply that, given increasing frequency and size of fires, the understudied impacts of fire regime may become more important on shaping vegetation phenology in future.