



A 170-year spring phenology index of plants in eastern China

H. Wang, Q. Ge, and J. Dai

Institute of Geographical Sciences and Natural Resources Research, Chinese Academy of Sciences, China
(wang_huanjiong@sina.com)

Extending phenological records into the past can be conducive to delineate the plant phenology and ecology in the past, evaluate effects of climate change on ecosystems and assess long-term impacts of climate change on vegetation. A great number of historical phenological information is now available for Europe, North America and Asia. However, the long-term phenological series is relatively scarce in East Asia. In order to address this deficiency, this study firstly developed a 170-year spring phenology index (SPI) across eastern China from 1834 to 2009. The SPI represents the mean time of first flowering of *Syringa oblata* and *Cercis chinensis*, as well as 50% of full flowering of *Paeonia suffruticosa*. The SPI in the recent 30 year is 2.0-6.3 days earlier than any other consecutive 30-year period since 1834. Moving linear trend analysis shows that the advancing trend of SPI over the past three decade reaches up to -4.1 days/decade, exceeding all the previous observed trends. In addition, the SPI series correlated significantly with spring (February-April) temperature of the study area. An increase in spring temperature of 1 °C induces an earlier SPI by 3.1 days. These shifts of SPI provide important information regarding regional vegetation-climate relationship, and are helpful for monitoring the impact of climate change on biophysical system and biodiversity.

Keywords: spring phenology; index (SPI); global warming; China