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Impacts of climate change on spring flower tourism in Beijing, China

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The beauty of blooming flowers causes spring to be one of the most picturesque and pleasant seasons in which to travel. However, the blooming time of plant species are very sensitive to small changes in climate. Therefore, recent climate change may shift flowering time and, as a result, may affect timing of spring tourism for tourists. In order to prove this assumption, we gathered data of first flowering date and end of flowering date (1963-2014) for 49 common ornamental plants in Beijing, China. In addition, we used the number of messages (2010-2014) posted on Sina Weibo (one of the most popular microblogs sites in China, in use by well over 30% of internet users, with a market penetration similar to the United States' Twitter) to indicate the tourist numbers of five scenic spots in Beijing. These spots are most famous places for seeing spring flowers, including the Summer Palace, Yuyuantan Park, Beijing Botanical Garden, Jingshan Park, Dadu City Wall Relics Park. The results showed that the number of species in flower starts to increase in early spring and peaks in middle spring, and then begins to decrease from late spring. The date when the number of species in flower peaks can be defined as best date of spring flower tourism, because on this day people can see blooming flowers of most plant species. The best date of spring flower tourism varied from March 31 to May 1 among years with a mean of April 20. At above scenic spots characterized by the beauty of blooming flowers, tourist numbers also had a peak value during spring. Furthermore, peak time of tourist numbers derived from Weibo varied among different years and was related to best date of spring flower tour derived from phenological data. This suggests that the time of spring outing for tourists is remarkably attracted by flowering phenology. From 1963 to 2014, the best date of spring flower tour became earlier at a rate of 1.6 days decade-1, but the duration for spring flower tour (defined as width at midpoint of frequency distribution curve) kept stable. The best date of spring flower tourism was significantly correlated with spring temperature ($R=-0.66$, $P<0.01$), with an increase in spring temperature of 1 °C causing the best date earlier by 4.0 days. In the context of future global warming, it is crucial to enhance the ability to predict flowering time, so as to provide reference for tourism administrators and the tourists to make better tourism arrangements.