

Differences in inter-annual variation in flowering and budding dates at two different climatological sites in Japan

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To investigate the relationship between the inter-annual variability of the flowering and budding phenology and their geographical characteristics in Japan, we analysed the first flowering and budding dates of various plant species during winter and spring (Japanese camellia, persimmon, ginkgo, mulberry, narcissus, cherry, Japanese apricot, rhododendron, dandelion, Japanese wisteria, and Japanese lawn grass) from 1953 to 2011 at two different climatological study sites (Takayama, a northern colder site; Gifu, a southern warmer site). We found that (1) fewer than half of the species showed a trend of earlier phenology at both sites, (2) mean phenological dates at Gifu were distributed at wider range (DOY [day of year] 21.9 to 145.2) than those at Takayama (DOY 95.5 to 165.5), and (3) the species with earlier flowering or budding at Gifu showed higher variability and advanced phenology compared with plants that had later flowering and budding. These findings (a) suggest the possibility that flowering and budding phenology in central Japan has a localized response to increasing air temperature and (b) suggest the importance of the long-term and continuous observation of flowering and budding phenology for a range of plant species at multiple sites (Inoue and Nagai, *under review*).

Keywords: phenological observation, flowering date, budding date