

Statistical Analysis of Plant Phenology in South Korea Using ASOS and MODIS Data

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Extended Abstract

In this study, we aimed to examine the flowering dates of cherry blossom and the peak dates of maple leaves in South Korea, by the combination of temperature observation data from ASOS (Automated Surface Observing System) and NDVI (Normalized Difference Vegetation Index) from MODIS (Moderate Resolution Imaging Spectroradiometer). The more recent years, the faster the flowering dates and the slower the peak dates. This is because of the impacts of climate change with the increase of air temperature caused by global warming in South Korea. By reflecting the climate change, our statistical models could reasonably predict the plant phenology with the CC (Correlation Coefficient) of 0.870 and the MAE (Mean Absolute Error) of 3.3 days for the flowering dates of cherry blossom, and the CC of 0.805 and the MAE of 3.8 for the peak dates of maple leaves. We could suppose a linear relationship between the plant phenology DOY (day of year) and the environmental factors like temperature and NDVI, which should be inspected in more detail. We found that the flowering date of cherry blossom was closely related to the monthly mean temperature of February and March, and the peak date of maple leaves was much associated with the accumulated temperature. A more sophisticated future work will be required to examine the plant phenology using higher-resolution satellite images and additional meteorological variables like the diurnal temperature range sensitive to plant phenology. Using meteorological grid can help produce the spatially continuous raster maps for plant phenology

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