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| **PhenChile: advances on the Chilean National Phenological Monitoring System** |
| Monitoring changes in leaf phenology using remote sensing is one of the simplest and most efficient way to detect and geographically assess the effects of climate change on vegetation. Global warming is altering the Earth vegetation phenological cycles, being the most evident symptom the timing shift of the onset, offset and growing season length. Regional to continental shifts in phenological timing can modify large scale biogeographical patterns affecting biodiversity, forest production, pest dynamics, agriculture and food availability. Several national and international efforts have been made to develop operational remote sensing based phenological monitoring system as well as ground observation networks of time-lapse cameras or “Phenocams”. Particularly in Chile, a 4,000 km long country, an alliance between the Pontificia Universidad Católica de Valparaíso, the National Forest Service Conaf and the Ministery of Environment have developed a land-surface-phenological monitoring and anomaly detection system. The web-platform is based on remote sensing vegetation indices and a flexible non-parametric probabilistic algorithm (the “npphen” R package) capable to reconstruct any type of annual leaf phenology using remote sensing data and to quantify its inter-annual variation by means of percentiles from the reference frequency distribution (RFD). Negative phenological anomalies with RFD > 0.95 trigger a “red alert” which is displayed on the web application as soon as the satellite data become available. Furthermore, a Phenocam network is under construction with daily RGB photos taken from ten sites (and in expansion) and transmitted via wireless to the central server. In this work, we introduce the web application http://phenchile.pucv.cl/, launched in March 2024, along with preliminary results and a discussion of future opportunities and challenges. |