

Long-term in-situ dataset by Phenological Eyes Network for ecological remote sensing

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It is possible to acquire the terrestrial ecosystem information on the global scale by satellites. Besides, it is important to verify satellite data affected by clouds, aerosol, etc. on ground truth. Phenological Eyes Network (PEN) is founded so as to verify satellite data on the ground observation in 2003. We get the spectrum radiation data, the automatic digital fish-eye photograph and so on at 26 PEN sites.

The spectrum radiation is measured upward and downward not only upper canopy but also under canopy for more approximate verification on the ground. The spectrum radiation data as well as satellite data can derive vegetation indices (VI), and the automatic photographs provides background information useful for interpretation of the changes of the VI from the ecological standpoint. Moreover, the photographs can detect important phenological events such as the leaf flush, autumn color, leaf fall, and snow coverage. The sky photographs can detect the cloud coverage, which is critical in the quality assessment of satellite data. Additionally, the time series analysis using digital RGB number of the photographs as well as spectrum radiation or satellite data can automatically and quantitatively detect the phenology and the other ecological events on the resolution finer than satellites.

We hope these in-situ monitoring network will contribute to establishing more accurate and comprehensive frameworks of modelling and satellite remote sensing of terrestrial ecosystem.

Keywords: terrestrial ecosystem, phenology, spectrum radiation data, ground observation, long-term, ground verification