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DATA PAPER

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8 million phenological and sky images from 29 ecosystems from the Arctic to the tropics: the Phenological Eyes Network

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Abstract We report long-term continuous phenological and sky images taken by time-lapse cameras through the Phenological Eyes Network (http://www.pheno-eye.org. Accessed 29 May 2018) in various ecosystems from the Arctic to the tropics. Phenological images are useful in recording the year-to-year variability in the timing of flowering, leaf-flush, leaf-coloring, and leaf-fall and detecting the characteristics of phenological patterns and timing sensitivity among species and ecosystems. They can also help interpret variations in carbon, water, and heat cycling in terrestrial ecosystems, and be used to obtain ground-truth data for the validation of satellite-observed products. Sky images are useful in continu ously recording atmospheric conditions and obtaining ground-truth data for the validation of cloud contami nation and atmospheric noise present in satellite remote-sensing data. We have taken sky, forest canopy, forest floor, and shoot images of a range of tree species and landscapes, using time-lapse cameras installed on forest floors, towers, and rooftops. In total, 84 time-lapse cameras at 29 sites have taken 8 million images since 1999. Our images provide (1) long-term, continuous de tailed records of plant phenology that are more quanti

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tative than in situ visual phenological observations of index trees; (2) basic information to explain the responsiveness, vulnerability, and resilience of ecosystem canopies and their functions and services to changes in climate; and (3) ground-truthing for the validation of satellite remote-sensing observations.

Keywords Boreal forest · Decadal data set · Digital camera · Grassland · Ground-truth · Phenological Eyes Network · Plant phenology · Sky image · Temperate forest · Tropical forest

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