

Aerodynamic canopy height: A simple metric of canopy dynamics derived from AmeriFlux tower data

Housen Chu, Department of Environmental Sciences, Policy, and Management, University of California, Berkeley, CA, USA

Dennis D Baldocchi, Department of Environmental Sciences, Policy, and Management, University of California, Berkeley, CA, USA

Cristina Poindexter, Department of Civil Engineering, California State University, Sacramento, CA, USA

Michael Abraha, Great Lakes Bioenergy Research Center, Michigan State University, MI, USA

AmeriFlux Data Contributors

AmeriFlux is a vast network of more than 250 eddy covariance flux sites dispersing across most of North America's ecoregions. The network provides valuable datasets of the direct and in situ measurements of fluxes and ancillary variables that are used across different disciplines and applications. Aerodynamic canopy height is one of the potential data products that is crucial to many modeling applications, but have not yet been standardly and extensively provided across the network. This study tests and generates the first network-wise data set of aerodynamic canopy heights from eddy covariance measurements. We adopt and improve the method proposed in previous study (Pennypacker and Baldocchi 2015; *Boundary Layer Meteorology*), and run the tests across a broad range of ecosystem types ranging from tall- to short-canopy, from closed- to open-canopy, and also from evergreen to deciduous vegetation. Our estimates are in generally good agreement with those derived from in situ measurements or LIDAR measurements. We then demonstrate and discuss the potential applications of aerodynamic canopy heights to providing the information of seasonal and interannual changes of canopy structures.