Geophysical Research Abstracts
Vol. 20, EGU2018-10315, 2018
EGU General Assembly 2018

The Flux Footprint Prediction - Online Tool

Natascha Kljun (1), Enrico Tomelleri (2), Claudio D'Onofrio (3), Tarek El-Madany (4), and Georg Wohlfahrt (5)

(1) Dept. of Geography, Swansea University, Swansea, UK (n.kljun@swansea.ac.uk), (2) Faculty of Science and Technology, Free University of Bolzano-Bozen, Bolzano-Bozen, Italy, (3) Dept. of Physical Geography and Ecosystem Science, Lund University, Lund, Sweden, (4) Dept. of Biogeochemical Integration, Max Plank Institute for Biogeochemistry, Jena, Germany, (5) Institute of Ecology, University of Innsbruck, Innsbruck, Austria

Remote sensing data from satellite, UAV, or tower-mounted sensors are increasingly being used for improved interpretation of eddy covariance (EC) flux measurements of, for example, carbon dioxide or water vapour, or for upscaling such flux measurements. The key challenge in this context is the difference between the flux footprint of EC measurements, i.e. the area from which the measured flux originates, and the field-of-view of remote sensing measurements. The footprint of EC measurements is typically a few hundreds of meters and varies in time due to changing environmental conditions, while the field-of-view of remote sensing measurements depends largely on the selected platform and sensors and is often fixed in time. In addition to the spatial allocation issue, the two sets of measurements often represent different temporal scales.

We present FFPonline, a data processing tool with the aim to support interpretation of EC measurements, combination of EC measurements with UAV-based spectral data, improved upscaling of EC data based on informed selection of remote sensing pixels, and also optimal placement of fixed spectrometers for continuous information acquisition or mobile measurements (e.g., chambers) at EC sites.

FFPonline (http://footprint.kljun.net/ffp2d.html) is based on the two-dimensional parameterisation for flux footprint prediction FFP (Kljun et al. 2015) and allows uploading a time series of environmental data. For each time step of the input data, a footprint is calculated. The footprints for the time series are then aggregated to a so-called footprint climatology that can be combined with a remote sensing product. As an example, the tool derives an unsupervised land-cover classification for the footprint area based on a RGB and a Sentinel 2 map and overlays the footprint climatology with the land-cover classification. The key output is a graphical and tabular representation of a contribution per land-cover type to the measured fluxes.

Kljun, N., P. Calanca, M.W. Rotach, H.P. Schmid, 2015: A simple two-dimensional parameterisation for Flux Footprint Prediction (FFP), Geoscientific Model Development, 8, 3695-3713. DOI 10.5194/gmd-8-3695-2015.