

Methodological Steps

Flux data processing

$[m, V_{cmax}^{25}]$ optimization
@monthly

Feature selection, Training
& Cross-validation

$[m, V_{cmax}^{25}]$ prediction
@monthly @0.25°

BEPS-DP simulation
@hourly @0.25°

BEPS-DP Ensembles of Global Two-leaf Hourly Carbon and Water Fluxes

Flux tower meteorological data
SW, TA, RH, P, WS

RS-based products
LAI

Eddy covariance flux tower data
GPP, LE

Bayesian Parameter Optimization
with carbon-water coupling cost function

ERA5 Meteorological Reanalysis
SW, TA, RH, P, WS

Optimized site-level
 $[m, V_{cmax}^{25}]$

RS-based products
LAI, LCC

Global $[m, V_{cmax}^{25}]$ datasets
Random Forest Regressor

Carbon fluxes: sunlit GPP, shaded GPP
Water fluxes: sunlit T, shaded T, E
@hourly @0.25°