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List of Symbols

ROMAN ALPHABET

$A_c$ the rate of net photosynthesis of the canopy
$c$ atmospheric CO$_2$ concentration
$c'$ fluctuation in CO$_2$ concentration
$Ca$ atmospheric CO$_2$ concentration
$Ca_{hi}$ atmospheric CO$_2$ concentration at 2 m
$Ca_{lo}$ atmospheric CO$_2$ concentration at 0.25 m
$Ci$ intercellular CO$_2$ concentration
$C_p$ the specific heat capacity of air at constant pressure
$DI$ the dryness index
$E$ the rate of evaporation
$EF$ evaporative fraction in the available energy
$ET$ evapotranspiration rate
$f$ the conversion factor for CO$_2$ from ppm to g m$^{-3}$
$F_c$ the integrated net CO$_2$ flux over the canopy
$F_{c2000}$ the integrated net CO$_2$ flux over the canopy at PPFD = 2000 µmol m$^{-2}$ s$^{-1}$
$F_s$ the vertical flux density of any scalar above the canopy
$G$ the heat flux density into and out of the soil
$g_a$ aerodynamic conductance
$g_c$ canopy surface conductance
$g_s$ stomatal conductance
$g_l$ stomatal conductance of leaf
$H$ sensible heat flux density
$h_c$ mean canopy height
$k$ von Karman's constant
$L$ the latent heat of vaporization
$LE$ latent heat flux density
$LE_{EQ}$ the equilibrium evapotranspiration rate
$LE_{IM}$ the imposed evapotranspiration rate
$P$ the energy consumption by photosynthesis
$P_n$ net photosynthesis rate
$q$ the specific humidity of air
\( q' \) fluctuation in the specific humidity
\( Q_{10} \) the temperature coefficient
\( Q_a \) available energy
\( R_d \) the hypothetical mean dark canopy respiration (soil plus plant)
\( R_D \) the canopy respiration (soil plus plant) in the daytime
\( R_N \) the canopy respiration (soil plus plant) at night
\( R_{N0} \) the canopy respiration (soil plus plant) at night for a reference temperature \( T_0 \)
\( R_n \) net radiative flux density
\( S' \) fluctuation in scalar concentration
\( T \) temperature
\( T' \) fluctuation in air temperature
\( T_0 \) a reference temperature
\( T_a \) air temperature
\( T_L \) leaf temperature
\( T_{len} \) mean time length for net carbon gain
\( T_s \) soil temperature
\( TR \) transpiration rate
\( u \) wind speed
\( u^* \) friction velocity
\( w \) vertical wind speed
\( w' \) fluctuation in vertical wind speed
\( z_{ch} \) the roughness parameter for transfer of sensible heat
\( z_{em} \) the roughness parameter for transfer of momentum

**GREEK ALPHABET**

\( \alpha \) Priestley-Taylor parameter
\( \beta \) Bowen ratio
\( \gamma \) the psychrometric constant
\( \Delta \) the slope of the saturation water vapor pressure vs. temperature curve
\( \Delta C \) the amount of \( \text{CO}_2 \) stored in the canopy
\( \Delta S \) the net physical storage of energy
\( \rho \) the air density
\( \Omega \) omega factor
# List of Abbreviations

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<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>BOREAS</td>
<td>the Boreal Ecosystem Atmosphere Study</td>
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<td>DOY</td>
<td>day of the year</td>
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<tr>
<td>EC</td>
<td>eddy correlation</td>
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<tr>
<td>BFEDA</td>
<td>the ECHIVAL Field Experiment in a Desertification-Threatened Area, the European field experiment in desertification-threatened areas</td>
</tr>
<tr>
<td>ERC</td>
<td>the Environmental Research Center</td>
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<tr>
<td>FACE</td>
<td>Free Air CO₂ Enrichment</td>
</tr>
<tr>
<td>GAME</td>
<td>the GEWEX Asian Monsoon Experiment</td>
</tr>
<tr>
<td>GAME-HUBEX</td>
<td>GAME- the HUaihe River Basin EXperiment Processes</td>
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<tr>
<td>GAME-Thailand</td>
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<td>GAME-Siberia</td>
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<td>GAME-Tibet</td>
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<tr>
<td>GEWEX</td>
<td>the Global Energy and Water Cycle Experiment</td>
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<tr>
<td>GCMS</td>
<td>General Circulation Models</td>
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<tr>
<td>HAPEX</td>
<td>the Hydrological-Atmospheric Pilot EXperiment</td>
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<td>HAPEX-MOBILHY</td>
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<td>HEIFE</td>
<td>the HEIihe River Basin Field Experiment on Land Surface Processes</td>
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<tr>
<td>HIFE</td>
<td>the ISLSCP Field Experiment</td>
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<tr>
<td>IGBP</td>
<td>the International Geosphere-Biosphere Program</td>
</tr>
<tr>
<td>ISLSCP</td>
<td>the First International Satellite Land Surface Climatology Project</td>
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<tr>
<td>IRGA</td>
<td>infra-red gas analyzer</td>
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<tr>
<td>JST</td>
<td>Japan Standard Time</td>
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<tr>
<td>LAI</td>
<td>leaf area index</td>
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<tr>
<td>LCP</td>
<td>canopy light compensation point</td>
</tr>
<tr>
<td>LCP_{am}</td>
<td>canopy light compensation point in the morning</td>
</tr>
<tr>
<td>LCP_{pm}</td>
<td>canopy light compensation point in the afternoon</td>
</tr>
<tr>
<td>MOM</td>
<td>micrometeorological observation mast</td>
</tr>
<tr>
<td>MOT</td>
<td>meteorological observation tower</td>
</tr>
<tr>
<td>NDVI</td>
<td>normalized difference vegetation index</td>
</tr>
<tr>
<td>NEE</td>
<td>net ecosystem CO₂ exchange</td>
</tr>
<tr>
<td>NEE_D</td>
<td>net ecosystem CO₂ exchange in the daytime</td>
</tr>
<tr>
<td>NEE_N</td>
<td>net ecosystem CO₂ exchange at night</td>
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<tr>
<td>NOPEX</td>
<td>the Northern Hemisphere Climate-Processes Land-Surface Experiment</td>
</tr>
<tr>
<td>Acronym</td>
<td>Description</td>
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<tr>
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<tr>
<td>OTC</td>
<td>open top chamber</td>
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<tr>
<td>PFT</td>
<td>plant functional type</td>
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<tr>
<td>PAR</td>
<td>photosynthetically active radiation</td>
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<tr>
<td>PPFD</td>
<td>photosynthetically active photon flux density</td>
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<tr>
<td>SHA</td>
<td>vertical sensible heat advection</td>
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<tr>
<td>SiB</td>
<td>the Simple Biosphere model</td>
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<tr>
<td>SPAC</td>
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<td>TDR</td>
<td>time-domain reflectometry</td>
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<tr>
<td>VPD</td>
<td>vapor pressure deficit</td>
</tr>
<tr>
<td>VPD_L</td>
<td>vapor pressure deficit at the leaf surfaces</td>
</tr>
<tr>
<td>WUE</td>
<td>water use efficiency</td>
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</tbody>
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