

## Nomenclature

| Symbol            | Unit                               | Meaning   |
|-------------------|------------------------------------|---|
| $a$               | 1                                  | Regression parameter  |
| $a_q$             | 1                                  | Regression parameter  |
| $A_E$             | m <sup>2</sup>                     | Evaporation surface area  |
| $b$               | 1                                  | Regression parameter  |
| $b_q$             | 1                                  | Regression parameter  |
| $b_{\text{corr}}$ | m s <sup>-1</sup>                  | Regression parameter  |
| $c_q$             | 1                                  | Regression parameter  |
| $c_p$             | J kg <sup>-1</sup> K <sup>-1</sup> | Specific heat capacity of humid air                               |
| $C_q$             | 1                                  | Bulk-transfer coefficient for moisture (Dalton number)            |
| $C_q^N$           | 1                                  | Bulk-transfer coefficient for moisture for neutral stratification |
| $C_T$             | 1                                  | Bulk-transfer coefficient for temperature (Stanton number)        |
| $C_U$             | 1                                  | Bulk-transfer coefficient for momentum (drag coefficient)         |
| $C_U^N$           | 1                                  | Bulk-transfer coefficient for momentum for neutral stratification |
| $D_e$             | m <sup>2</sup> s kg <sup>-1</sup>  | Vapor-pressure based mass-transfer coefficient                    |
| $D_q$             | m s <sup>-1</sup>                  | Specific-humidity based mass-transfer coefficient                 |
| $e$               | Pa                                 | Actual water-vapor pressure                                       |
| $e_{eq}$          | Pa                                 | Equilibrium water-vapor pressure                                  |
| $E$               | m s <sup>-1</sup>                  | Evaporation velocity (evaporation rate)                           |
| $f_U$             | m <sup>2</sup> s kg <sup>-1</sup>  | Wind function   |
| $F_E$             | kg s <sup>-1</sup>                 | Water-vapor mass flux (evaporation mass flux)                     |
| $F_q$             | 1                                  | Stability correction function for moisture                        |
| $g$               | m s <sup>-2</sup>                  | Gravitational constant  |
| $H$               | m                                  | Height of the atmospheric surface layer                           |
| $J_q$             | W m <sup>-2</sup>                  | Turbulent flux of latent heat                                     |
| $J_T$             | W m <sup>-2</sup>                  | Turbulent flux of sensible heat                                   |
| $J_U$             | N m <sup>-2</sup>                  | Turbulent flux of momentum  |
| $J_E$             | kg m <sup>-2</sup> s <sup>-1</sup> | Water-vapor mass flux density                                     |
| $K$               | Pa <sup>-1</sup>                   | Pressure coefficient  |
| $K_m$             | m <sup>2</sup> s <sup>-1</sup>     | Molecular exchange coefficient                                    |
| $K_{m,U}$         | m <sup>2</sup> s <sup>-1</sup>     | Molecular exchange coefficient for momentum                       |
| $L$               | m                                  | Monin-Obukhov length  |
| $L_V$             | J kg <sup>-1</sup>                 | Specific heat of evaporation                                      |
| $n$               | 1                                  | Parameter of the Skeib-similarity function                        |
| $n_{\text{turb}}$ | 1                                  | Metric for the degree of turbulence                               |
| $p_q$             | 1                                  | Regression parameter  |
| $\text{Pr}_m$     | 1                                  | Molecular Prandtl number  |
| $q$               | kg kg <sup>-1</sup>                | Specific humidity   |
| $q_{10}$          | kg kg <sup>-1</sup>                | Specific humidity at 10 m height                                  |
| $q_{eq}$          | kg kg <sup>-1</sup>                | Equilibrium specific humidity                                     |
| $q_*$             | kg kg <sup>-1</sup>                | Kinematic scaling specific humidity                               |
| $\text{Ri}_0$     | 1                                  | Bulk Richardson number between the surface and first model layer  |
| $S$               | K (m/s) <sup>-2</sup>              | Stability parameter   |
| $S_R$             | K (m/s) <sup>-2</sup>              | Reference stability parameter                                     |
| $\hat{S}$         | 1                                  | Dimensionless stability parameter                                 |
| $S_A$             | kg kg <sup>-1</sup>                | Salinity (mass fraction of sea salt in seawater)                  |

| Symbol           | Unit                              | Meaning  |
|------------------|-----------------------------------|--|
| $T$              | K                                 | Temperature  |
| $T_A$            | K                                 | Air temperature  |
| $T_{SST}$        | K                                 | Sea-surface temperature  |
| $T_*$            | K                                 | Kinematic scaling temperature  |
| $u$              | $\text{m s}^{-1}$                 | x-component of wind vector   |
| $u_*$            | $\text{m s}^{-1}$                 | Friction velocity  |
| $U$              | $\text{m s}^{-1}$                 | Wind speed   |
| $U_R$            | $\text{m s}^{-1}$                 | Reference wind speed   |
| $U_1$            | $\text{m s}^{-1}$                 | Wind speed at the first model level  |
| $U_{10}$         | $\text{m s}^{-1}$                 | Wind speed at 10 m height  |
| $\hat{U}$        | 1                                 | Dimensionless wind speed   |
| $v$              | $\text{m s}^{-1}$                 | y-component of wind vector   |
| $w$              | $\text{m s}^{-1}$                 | z-component of wind vector   |
| $x$              | m                                 | Auxiliary function   |
| $z$              | m                                 | Height   |
| $z_0$            | m                                 | Aerodynamic roughness length   |
| $z_{0,q}$        | m                                 | Surface-roughness length for specific humidity                             |
| $z_{0,T}$        | m                                 | Surface-roughness length for temperature                                   |
| $z_1$            | m                                 | Height of the first model level above the surface                          |
| $\alpha$         | 1                                 | Relative change of momentum flux in the atmospheric surface layer          |
| $\alpha_m$       | $\text{m}^2 \text{s}^{-1}$        | Thermal diffusivity of air   |
| $\beta$          | 1                                 | Parameter  |
| $\beta_B$        | $\text{m s}^{-2} \text{K}^{-1}$   | Buoyancy parameter   |
| $\gamma$         | 1                                 | Parameter  |
| $\delta_m$       | m                                 | Thickness of the molecular diffusion layer                                 |
| $\delta_{m,q}$   | m                                 | Thickness of the molecular boundary layer for water vapor                  |
| $\hat{\delta}_q$ | 1                                 | Dimensionless thickness of the molecular boundary layer<br>for water vapor |
| $\Delta T$       | K                                 | Temperature difference   |
| $\varepsilon$    | 1                                 | Turbulence parameter   |
| $\zeta$          | 1                                 | Stability parameter at $z$   |
| $\zeta_0$        | 1                                 | Stability parameter at $z = z_0$   |
| $\zeta_c$        | 1                                 | Critical stability parameter of the Skeib-similarity function              |
| $\eta$           | $\text{m s}^{-1} \text{K}^{-1/3}$ | Physical parameter   |
| $\kappa$         | 1                                 | von-Kármán constant  |
| $\nu$            | $\text{m}^2 \text{s}^{-1}$        | Kinematic viscosity of air   |
| $\xi$            | 1                                 | Dimensionless wind function  |
| $\varrho_{AV}$   | $\text{kg m}^{-3}$                | Mass density of humid air  |
| $\varrho_W$      | $\text{kg m}^{-3}$                | Mass density of water  |
| $\vartheta$      | $^{\circ}\text{C}$                | Celsius temperature  |