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Corrigendum to "Long-term relative decline in evapotranspiration with increasing runoff on fractional land surfaces" published in Hydrol. Earth Syst. Sci., 25, 3805–3818, 2021

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During the writing process, r_a was omitted from Eq. (9) in Sect. 2.5 (p. 3809). The correct formula and derivation are as follows:

$$\mathrm{EF} = \frac{L_v E}{L_v E + H} = \frac{L_v \rho \frac{e_{sat}(T_s) - e_a}{r_a + r_s}}{L_v \rho \frac{e_{sat}(T_s) - e_a}{r_a + r_s} + H}. \tag{7}$$

We used the linearized Clausius–Clapeyron relation (Eqs. 8 and 9) to simplify Eq. (7).

$$e_{sat}(T_s) = e_{sat}(T_a) + \Delta(T_s - T_a) \tag{8}$$

$$T_s - T_a = \frac{H r_a}{\rho c_p} \tag{9}$$

Here, T_a is the air temperature, $e_{sat}(T_a)$ is saturated vapor pressure of the air, and $\Delta = \frac{L_v}{R_v}\frac{e_s}{T^2}$, R_v is the gas constant for water vapor. c_p is the specific heat capacity, which is $4216\,\mathrm{J\,kg^{-1}\,K^{-1}}$ when the temperature is $0\,^\circ\mathrm{C}$.

$$\mathrm{EF} = \frac{L_v \rho \frac{e_{sat}(T_a) - e_a + \Delta(T_s - T_a)}{r_a + r_s}}{L_v \rho \frac{e_{sat}(T_a) - e_a + \Delta(T_s - T_a)}{r_a + r_s} + H} \tag{10}$$

$$= \frac{\frac{L_v \rho}{r_a + r_s}[\mathrm{VPD} + \Delta(T_s - T_a)]}{\frac{L_v \rho}{r_a + r_s}[\mathrm{VPD} + \Delta(T_s - T_a)] + H} \tag{11}$$

$$= \frac{\frac{L_v \rho}{r_a + r_s}\left(\mathrm{VPD} + \frac{\Delta H r_a}{\rho C_p}\right)}{\frac{L_v \rho}{r_a + r_s}\left(\mathrm{VPD} + \frac{\Delta H r_a}{\rho C_p}\right) + H} \tag{12}$$

$$= \frac{1}{1 + \frac{H}{\frac{L_v \rho}{r_a + r_s}\left(\mathrm{VPD} + \frac{\Delta H r_a}{\rho c_p}\right)}} \tag{13}$$

$$= \frac{1}{1 + \frac{r_a + r_s}{L_v \rho \left(\frac{\Delta r_a}{\rho c_p} + \frac{\mathrm{VPD}}{H}\right)}} \tag{14}$$

The incremental variation of $\frac{\mathrm{VPD}}{H}$ is small because both variations of VPD and H are proportional to the temperature variation. EF can be expressed as follows:

$$\frac{1}{\mathrm{EF}} = 1 + \frac{r_\mathrm{a} + r_\mathrm{s}}{\frac{L_\mathrm{v}}{c_\mathrm{p}} \Delta r_\mathrm{a}}. \tag{15}$$

Hence, r_s is a function of EF.

$$r_\mathrm{s} = r_\mathrm{a} \frac{L_\mathrm{v}}{C_\mathrm{p}} \Delta \left(\frac{1}{\mathrm{EF}} - 1 \right) - r_\mathrm{a} \tag{16}$$

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