Supplement of
Estimating water flux and evaporation losses using stable isotopes of soil water from irrigated agricultural crops in tropical humid regions

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Additional equations used for calculation of the fraction of evaporation loss (\(F_E\)) from Benettin et al., (2018):

\[
10^3\ln[\alpha^+(2H)] = 1158.8(T^3/10^9) - 1620.1(T^2/10^6) + 794.84(T/10^3) - 161.04 + 2.9992(10^9/T^3)
\]  

\(1\)

\[
10^3\ln[\alpha^+(18O)] = -7.685 + 6.7123(10^3/T) - 1.6664(10^6/T^2) + 0.3504(10^9/T^3)
\]  

\(2\)

\[
\varepsilon_k = \theta n(1 - RH)(1 - D_i/D)10^3
\]  

\(3\)

\[
\delta_A = (\delta_p - \varepsilon^+) / \alpha^+
\]  

\(4\)

where,

\(\alpha^* \text{ [-]} \) and \(\varepsilon^* \text{ [%]}\) are equilibrium fractionation factors,

\(T\) is air temperature [K],

\(RH\) is relative humidity,

\(\delta_A\) is the isotopic composition of atmospheric vapor [%],

\(\alpha\) is the kinetic fractionation factor [%],

\(n\) is the aerodynamic diffusion parameter [-],

\(\theta\) is the weighting term [-] (the possible influence of the evaporation flux on the ambient moisture and assumed as 1 (Gat, 1996)),

\(D/D\) is the ratio between the diffusivities [-] (\(D/D=0.9755\) (for \(2H\)) and \(D/D=0.9723\) (for \(18O\)) (Merlivat, 1978).

References


Figure S1. Desiccation cracks developed in the maize fields (deeper (~0.2 m) and narrower (~0.02 m)).