Deterministic time variation of drought

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ABSTRACT. The water balance equation, viz.,

\[ P + I_w = \Delta (S_{M}) + E_T + I + R_o \]

(where, \( P \) = Precipitation rate, \( I_w \) = Irrigation water rate, \( \Delta \) = Change of the respective parameter, \( E_T \) = Evapotranspiration rate, \( I \) = Infiltration rate and \( R_o \) = Run-off rate) has been used for the evaluation of drought condition determinedly. In this study drought has been considered to commence as soon as water balance during its time variation reduced to zero and consequently evaporation ceases. The water balance equation has been computed on a (i) daily, (ii) weekly and (iii) monthly basis for the precise determination of drought condition in various forms for the application of day to day operational agricultural works. The difference between the potential evapotranspiration and the available soil moisture (\( S_{M} \)) has been taken as the deficit on a drought condition and the magnitude of the severity depends on this deficit amount. Therefore, the sum of the actual evapotranspiration and the deficit must be equal to potential evapotranspiration, i.e., \( P_{ET} = AET + D \).

Again, the sum of actual evapotranspiration and the surplus is the precipitation, i.e., \( P = AET + S \).

The crude book-keeping method for the evaluation of drought condition has been also discussed for the sake of comparison only.