Supplement of

Technical note: A stochastic framework for identification and evaluation of flash drought

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Supplementary Text

Potential evapotranspiration, $E_{\text{max}}$, is often estimated by the Penman equation

$$E_{\text{max}} = \frac{\Delta}{\rho_e \lambda_w (\Delta + \gamma)} Q + \frac{\gamma}{\rho_v (\Delta + \gamma)} \left( \frac{e}{p_0} \rho_w \text{VPD} \right),$$

(1)

where $E_e$ is equilibrium evapotranspiration, $E_v$ is the evapotranspiration due to drying power of the air, $\Delta$ is the slope of the saturation vapor pressure curve (a nonlinear function of air temperature), $\gamma$ is psychrometric constant, $\lambda_w$ is latent heat of water vaporization, $Q$ is available surface energy, $\varepsilon$ is the ratio of the gas constant for dry air to that of water vapor, $p_0$ is near-surface air pressure, $\rho$ is air density, $\rho_w$ water density, $g_a$ is aerodynamic conductance, and VPD is vapor pressure deficit. Heatwave is often accompanied with high temperature and strong solar radiation, which tend to increase $E_e$; dry or moist heatwaves may also have abnormal VPD, which may influence $E_v$. 
Fig. S1. Global distribution of the variance of the mean first passage time (VFPT) (units: day^2). The gray areas are hyper-arid regions, which are excluded from this analysis.