**Role of Deep Layer Terrestrial Memory in Hydrologic Predictability**
PIs: Praveen Kumar & Xin-Zhong Liang
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**Figures:**

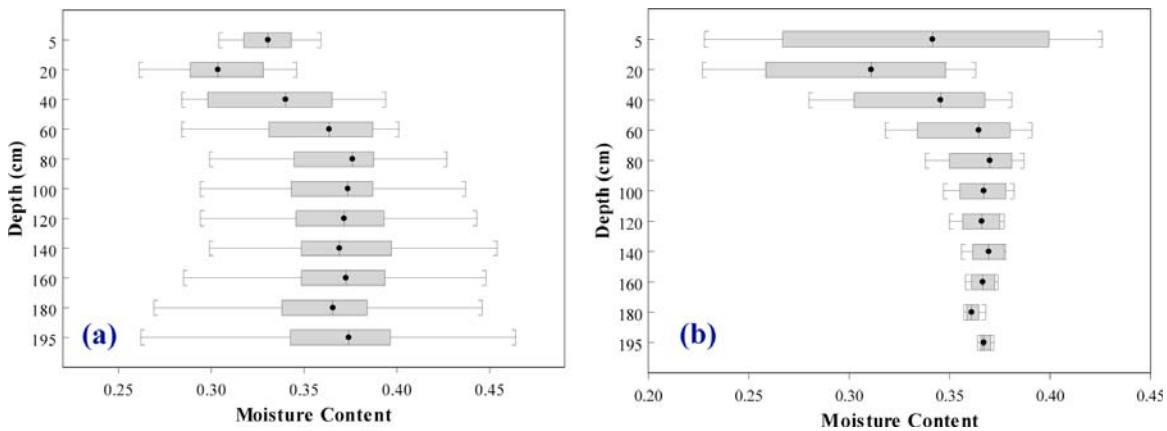


**Fig. 1** Soil moisture (a) spatial variability and (b) temporal variability.

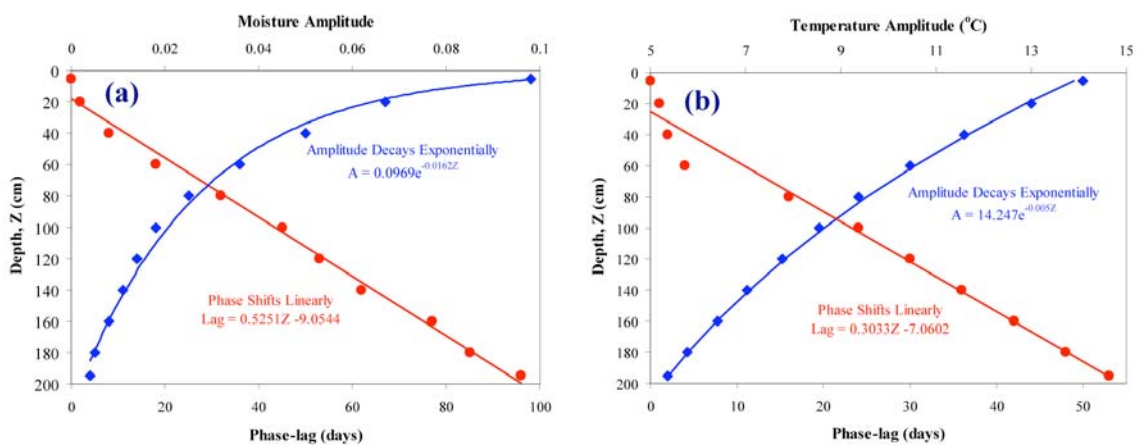


**Fig. 2** Phase-lag and amplitude decay profiles of (a) soil moisture and (b) soil temperature.

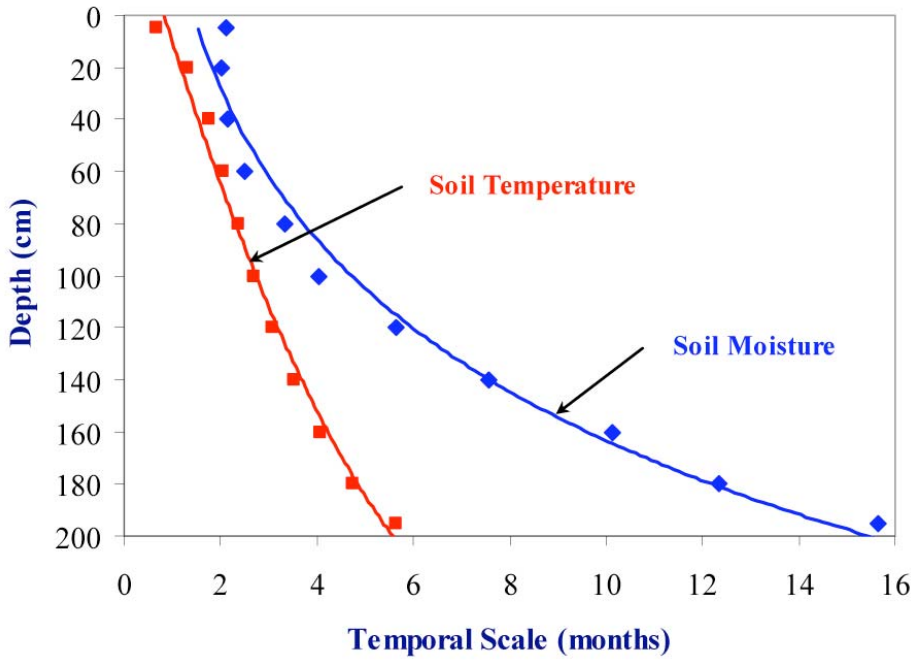


**Fig. 3** Profiles of soil moisture and temperature temporal scales.

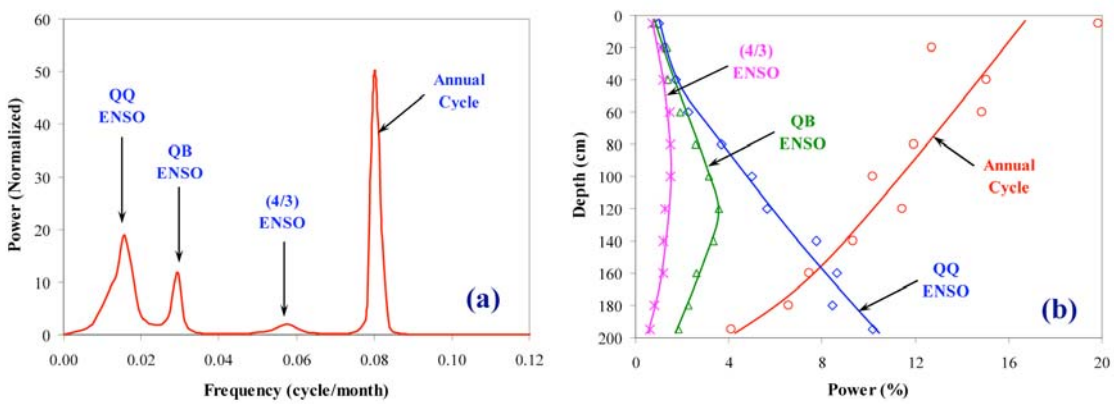


**Fig. 4 (a)** Power spectra of the dominant modes in soil moisture and (b) their relative significance with depth.

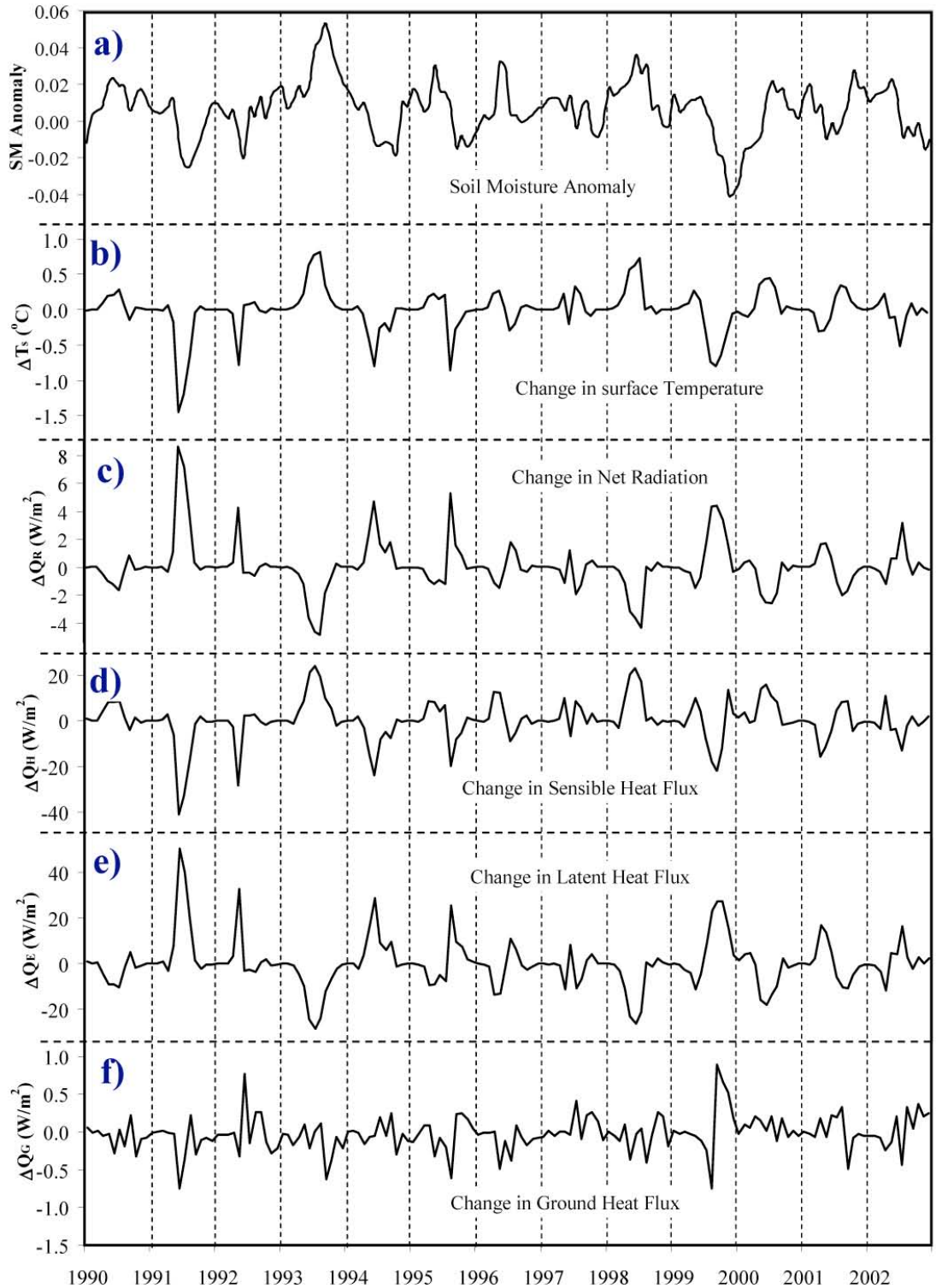


**Fig.5 (a)** Time series plot of depth-averaged soil moisture anomaly. Time series plot of the changes in (b) surface temperature, (c) net radiation, (d) sensible heat flux, (e) latent heat flux, and (f) ground heat flux between Case-1, where soil moisture is set to the actual observation and Case-2, where soil moisture is set to annual cycle (i.e., inter-annual variability in soil moisture is removed). Positive values indicate Case-2 is greater than Case-1.

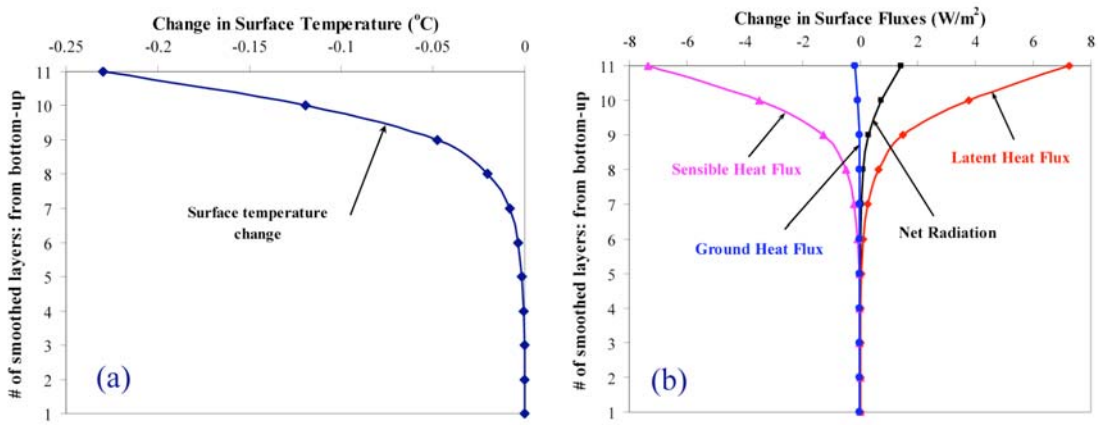


**Fig. 6** The cumulative effect of soil moisture smoothing at different layers (from bottom-up) on (a) surface temperature and (b) surface energy fluxes.

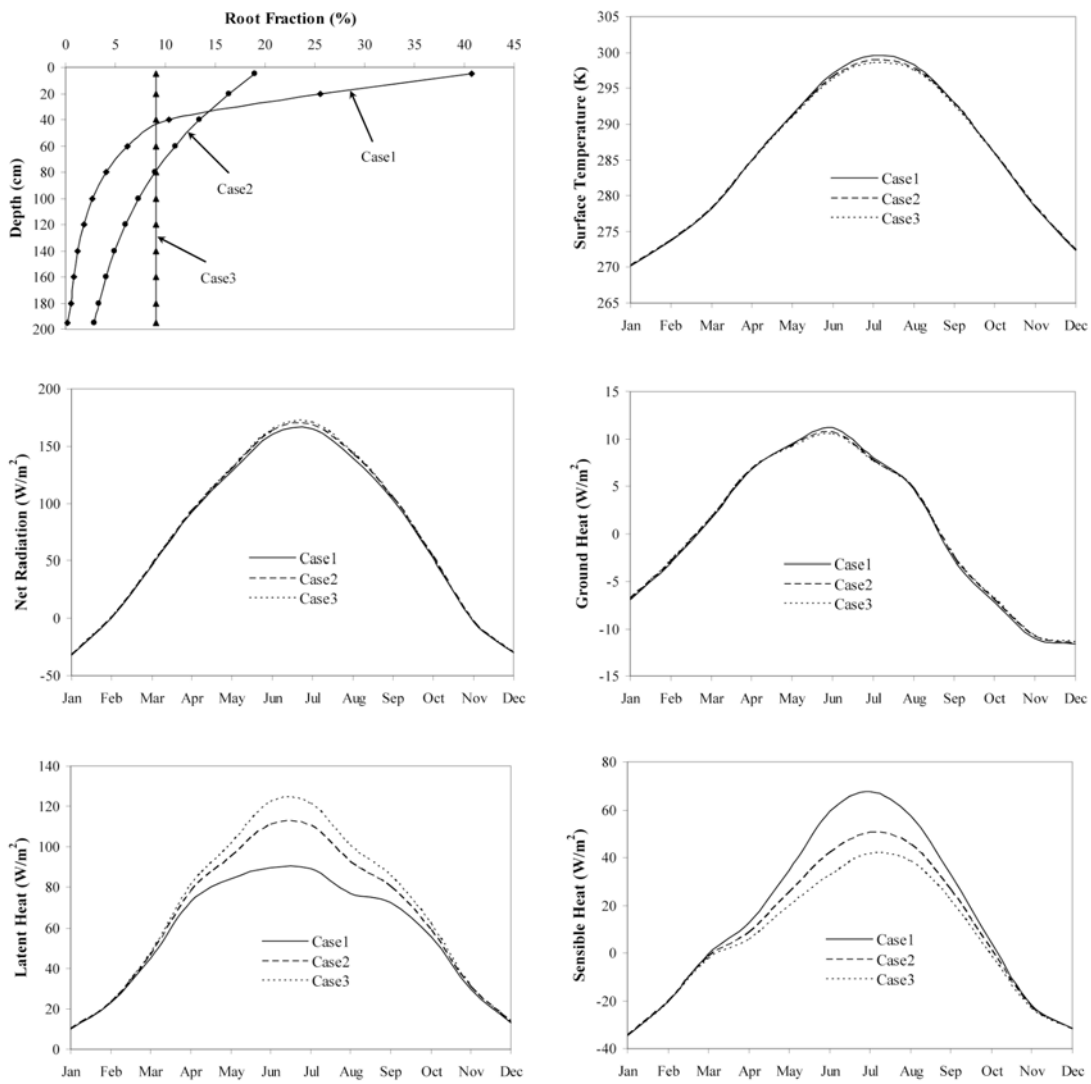


**Fig. 7. (a)** Profiles of root distribution for the different cases. Annual cycles of simulated (b) surface temperature, (c) net radiation, (d) ground heat flux, (e) latent heat flux, and (f) sensible heat flux for the different cases of root distributions.

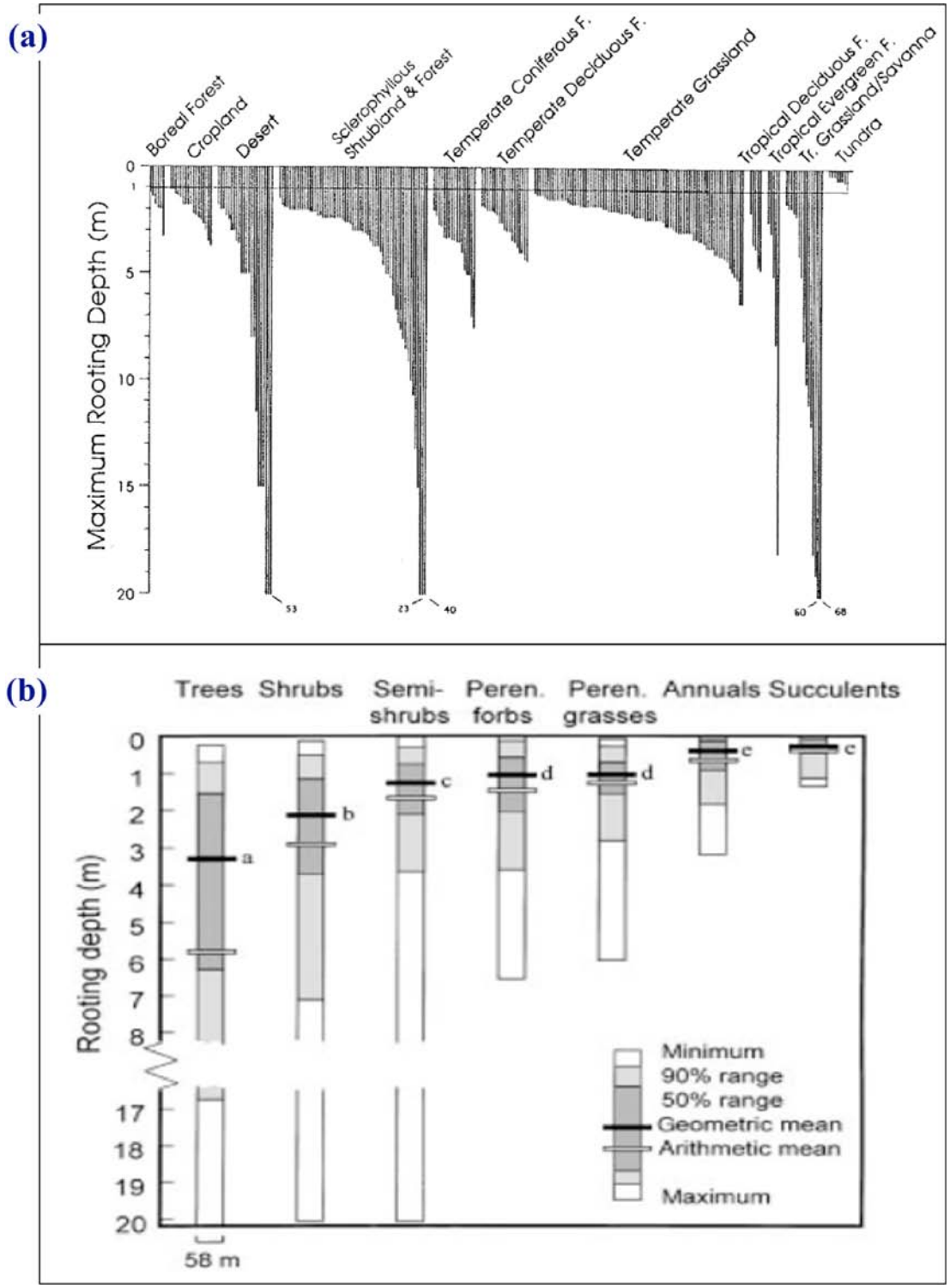


**Fig. A1 (a)** Maximum rooting depths based on direct observations around the globe (adapted from Canadell et al., 1996); (b) Maximum rooting depth statistics of plant growth forms (*adapted from Schenk and Jackson., 2002*).

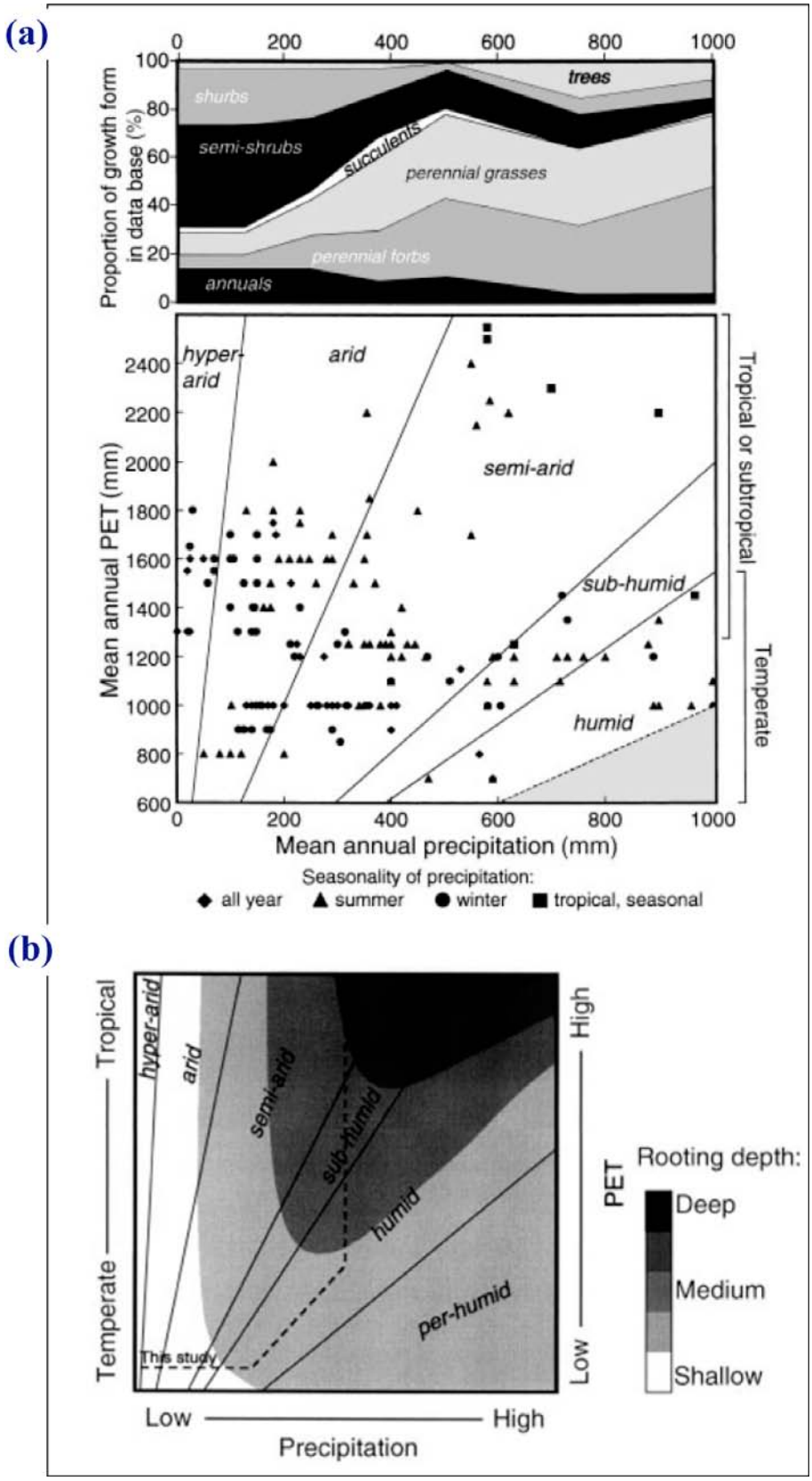


**Fig. A2** Relationships between (a) climate and vegetation type and (b) climate and rooting depth. (*Adapted from Schenk and Jackson, 2002*).