Section 2: Climate Change Review

Learning outcomes

- how and why humans are affecting climate (not covered in class; see separate document)
- patterns of recent and future climate change (not covered in class; see separate document)
- aspects of physical climate important to biology
- spatial resolution of climate data
- climate velocity

Annual water balance

climatic water deficit, D

Sierra Nevada, CA: Coniferous

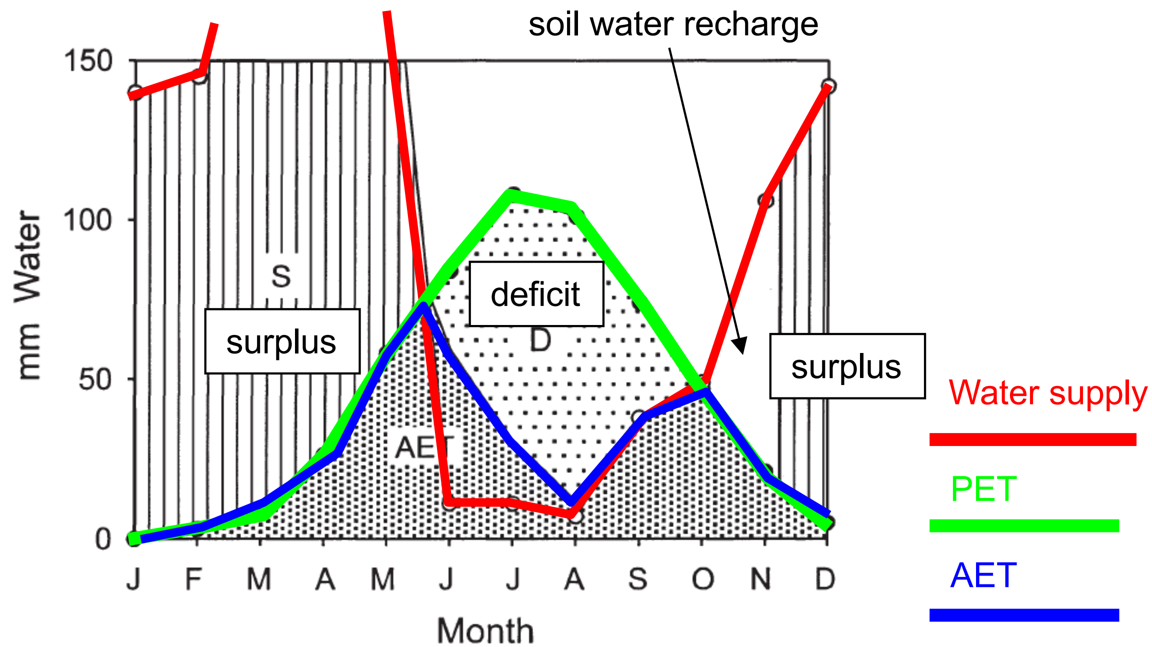
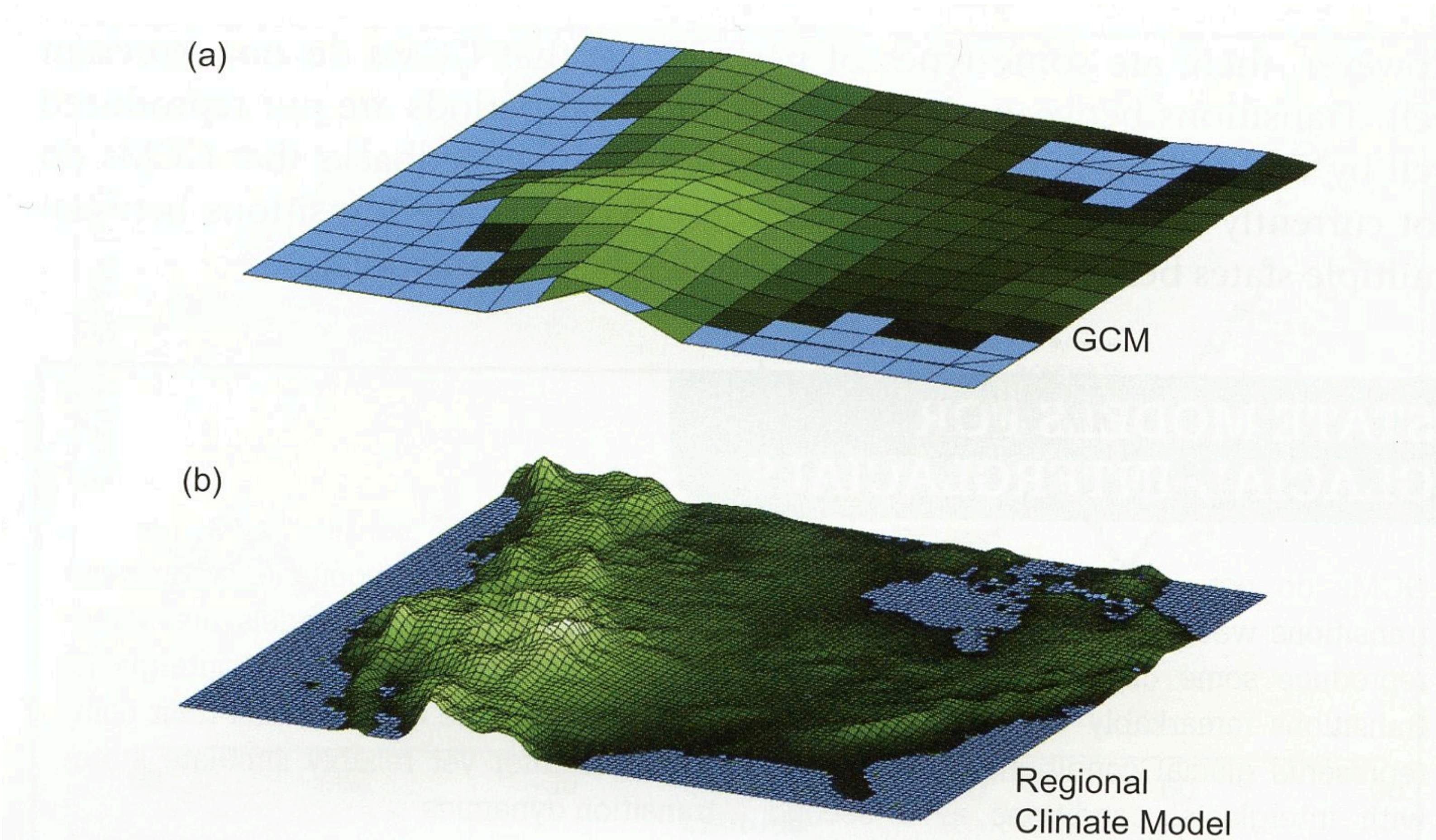


FIG. 1. The annual water balance of a site on level ground, soils of 0.5 m depth, at 2000 m elevation, and in the wet Kaweah watershed of the southern Sierra Nevada (data from Stephenson, 1988). From October through May, water supply (rain plus snowmelt, ○) exceeds evaporative demand (potential evapotranspiration or PET, ●); during this period, actual evapotranspiration (AET, *dense stippling*) equals PET. In October and November, excess water replaces soil water used during the summer; the white area between the water supply and PET curves represents soil–water recharge. From November through May, after soil water has been replenished, the difference between water supply and PET is surplus (S, *vertical stripes*). From June through September, PET exceeds water supply. During this period, AET equals water supply plus water extracted from the soil (which is shown as the curve between the water supply and PET curves). Deficit (D, *light stippling*) is the difference between PET and AET.

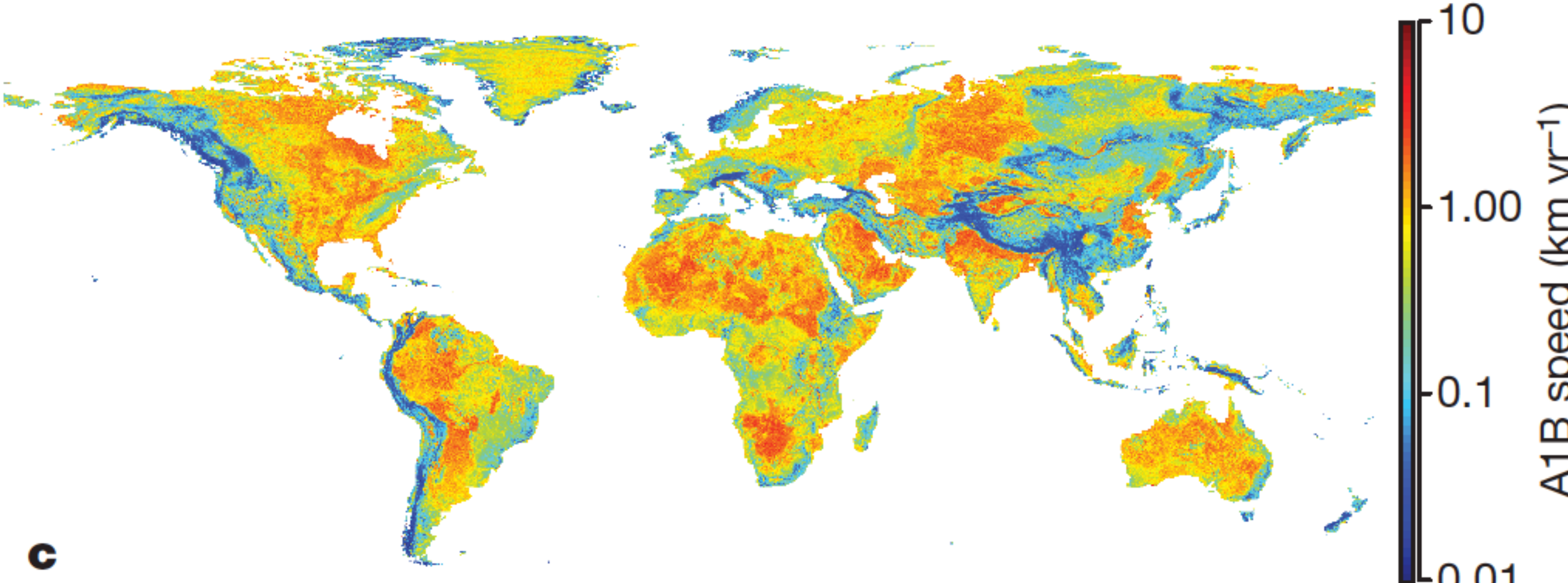
Stephenson, 1998

Why does finer spatial resolution climate data help climate change ecology studies?



Hannah, *Climate Change Biology*, 2011

“Climate velocity”



Loarie et al., Nature, 2009