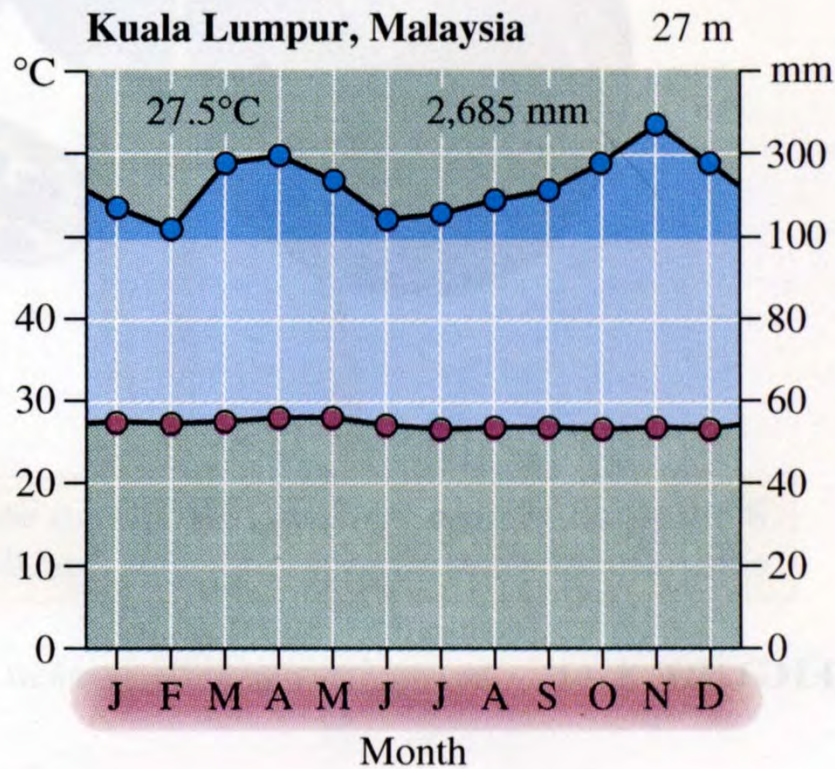
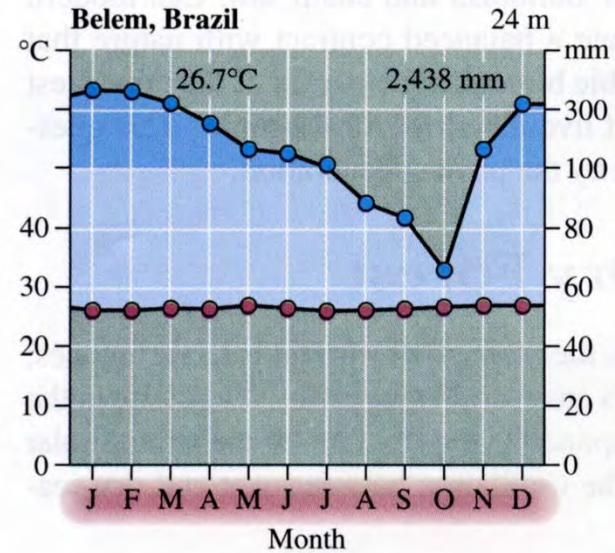
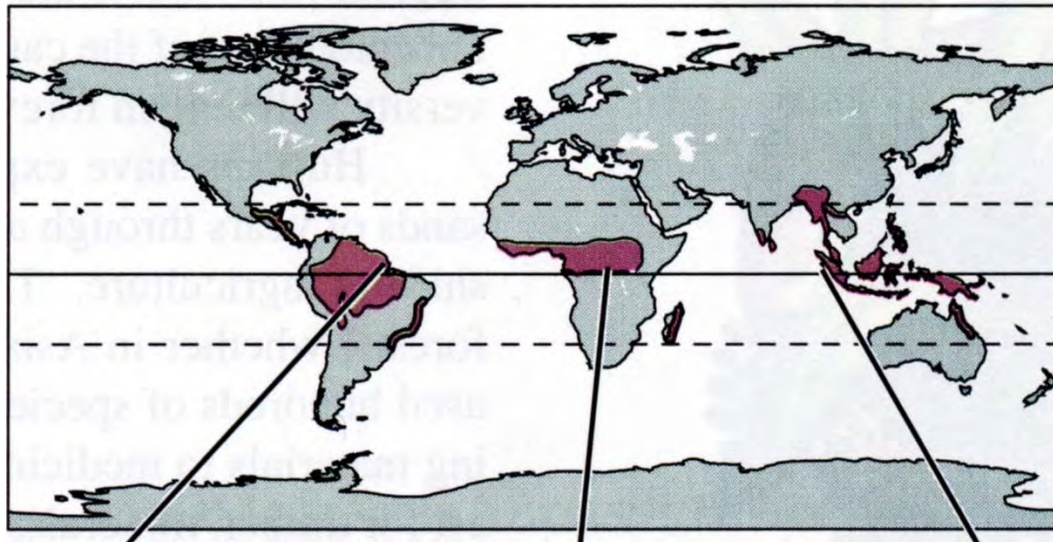


Example Climate Diagrams:

Temp on left (C); precip on right (mm)
 Every 10C = 20mm precipitation → minimum to maintain non-drought conditions.
 Red is for temp; blue is for precip → if red above blue, then drought; if blue above red, then non-drought.
 Months on x-axis: red highlighting indicates growing season (ave temp > 0C).
 Year average temp (upper left) and total rainfall (upper right).
 Location in far upper left; elevation far upper right.



Tropical Rainforest.

C. & S. America (Amazon); Equatorial Africa, Madagascar; Indonesia, Malaysia, some SE Asia, Borneo, NE Aussie.

Constant high rain; Constant very warm temps (27 C).

No drought ever.

12 months of growing season.

>2000 mm total rainfall typical in a year.

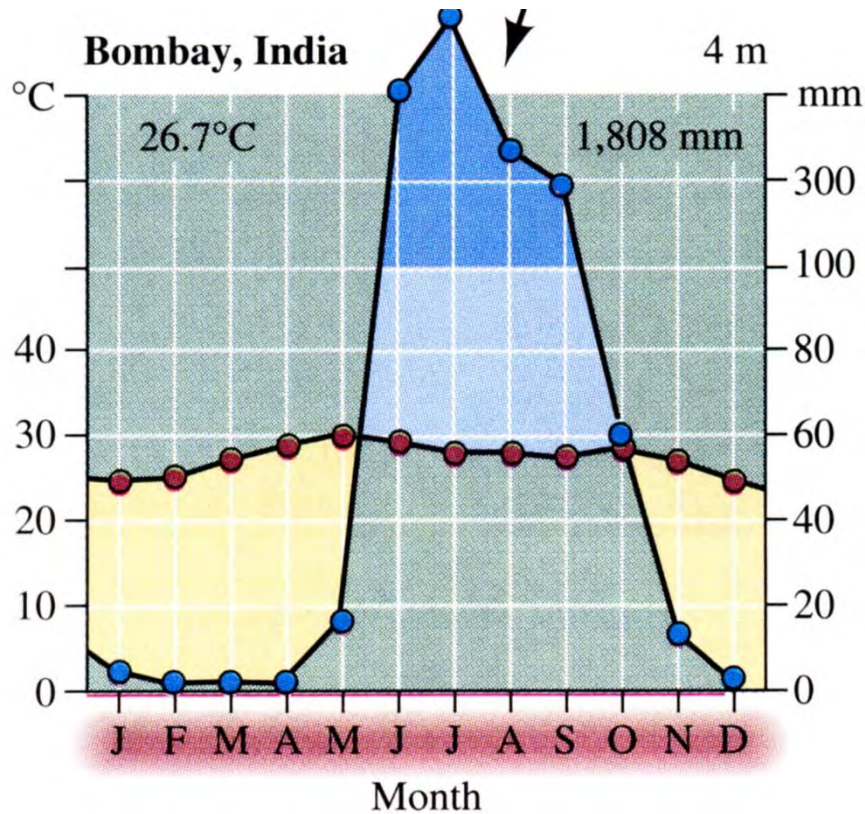
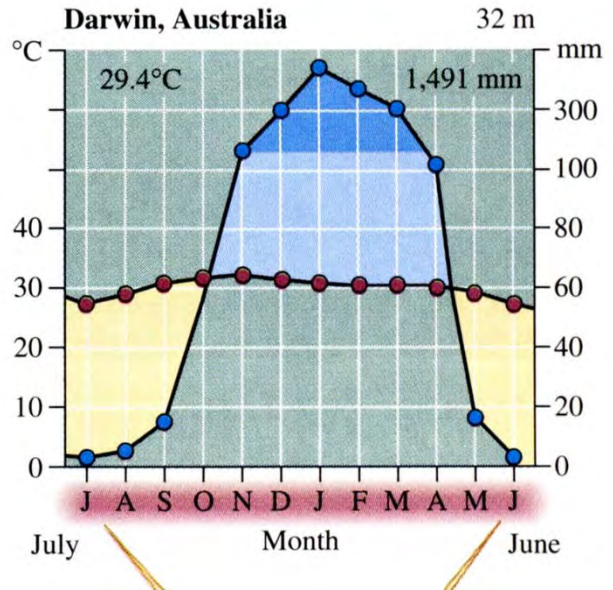
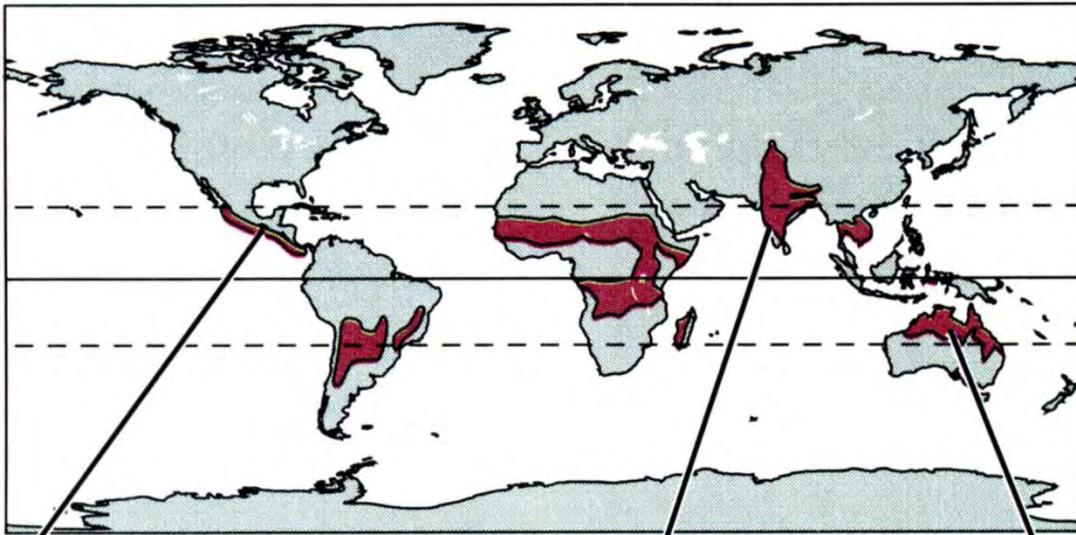
Diverse forests (300 species trees / hectare).

Canopy animals and plants → distinct 3-D ecosystem.

High decomposition rate in forest floor.

Soils leached of nutrients and carbon; most tied up in trees.

Very high biodiversity.



Tropical Dry Forest.

C.A (western); S.A. (south of Amazon); band around TRF in Africa; western Madagascar; India; SE Asia; much of northern Aussie.

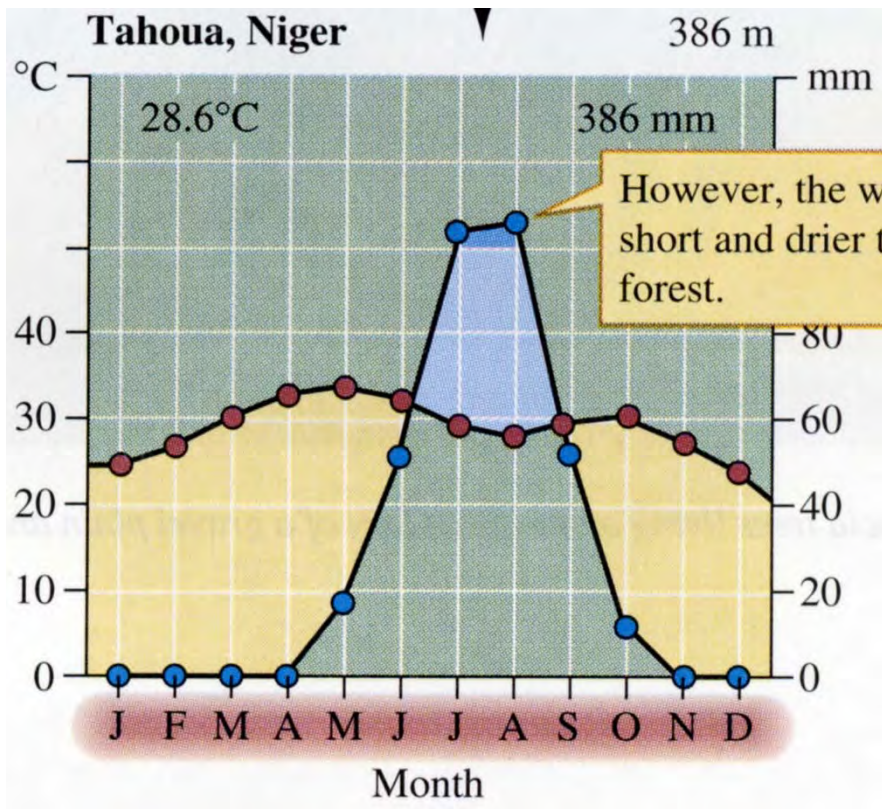
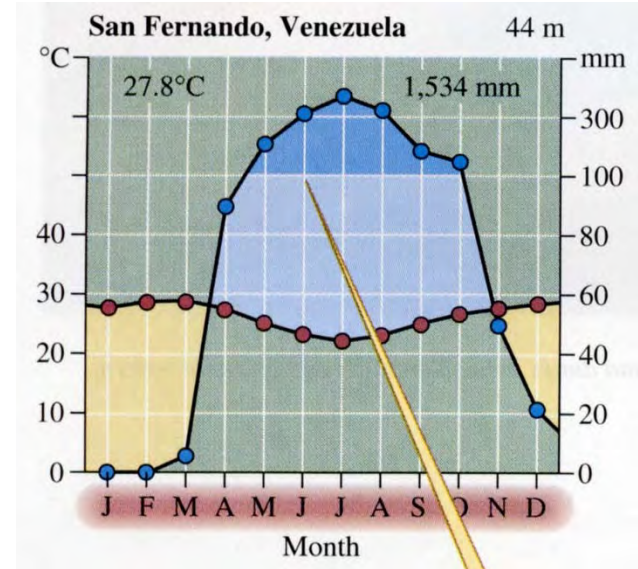
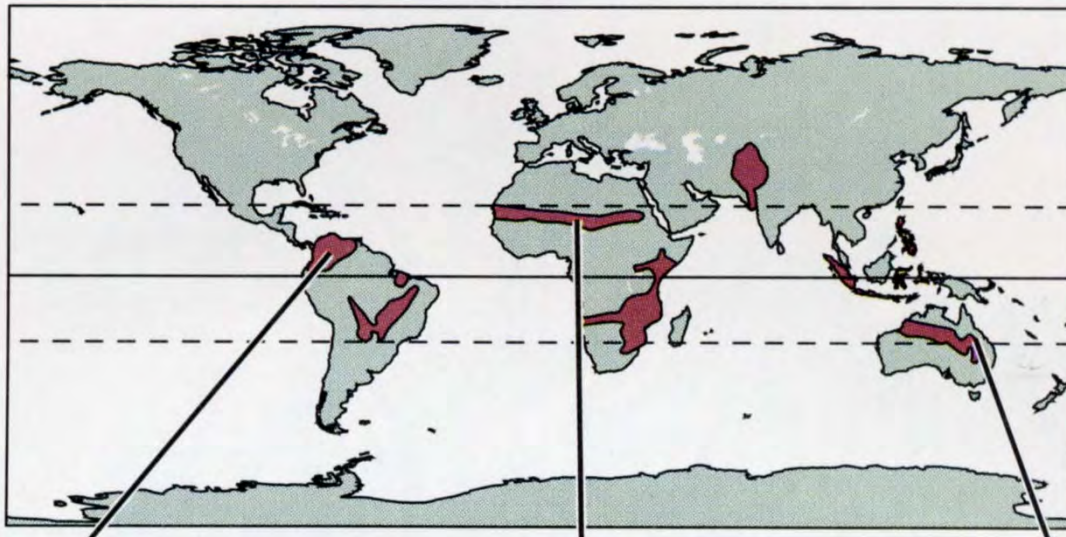
Rainy season (very); dry season; Constant very warm to hot temps (27-30 C), but no distinct seasonality in temp. Severe drought for up to ½ of year. 12 months of growing season. >1500 mm total rainfall typical in a year.

Diverse forests, but not evergreen.

Migration of animals to TRF during dry season.

Far more heavily colonized by humans; <2% of original remaining in C. America.

Cultural reference → Forest Gump while fighting in Vietnam and the rain that just kept raining . . . Until it just stopped.



Tropical Savanna.

S.A (northern and south of Amazon); band just below Sahara, and SE Africa; to NW of India; band in Aussie.

Similar to TDF, but with shorter rainy season, less overall rain, and some more variation in temps.

Drought is severe; fires during onset of wet seasons storms.

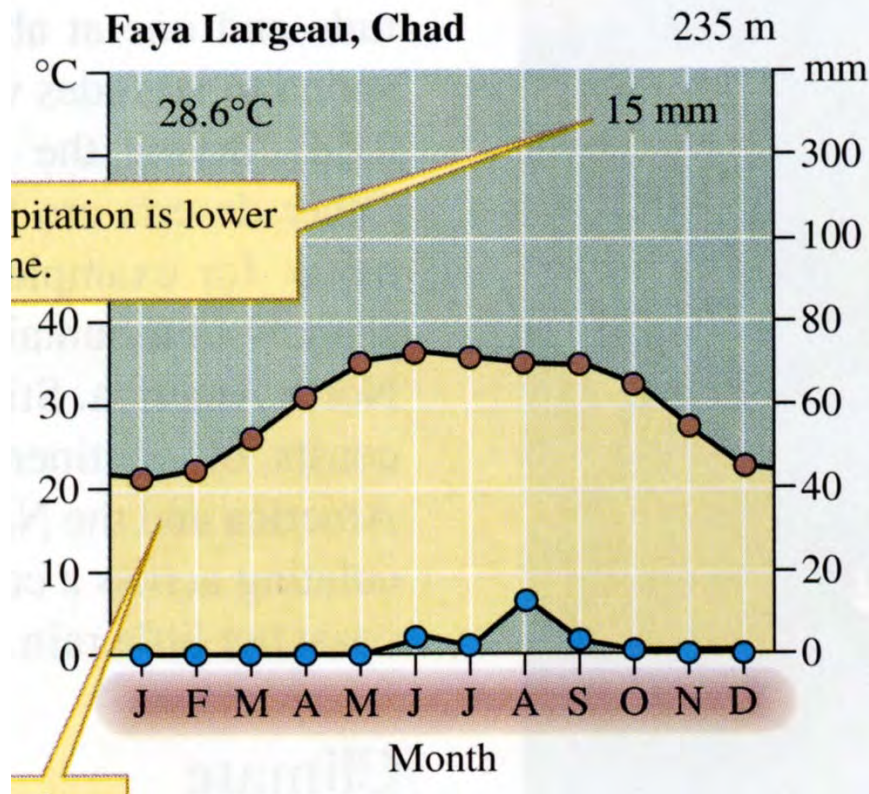
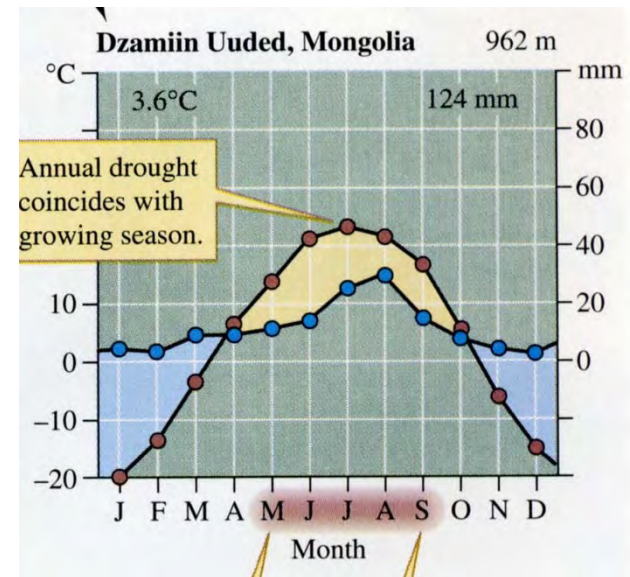
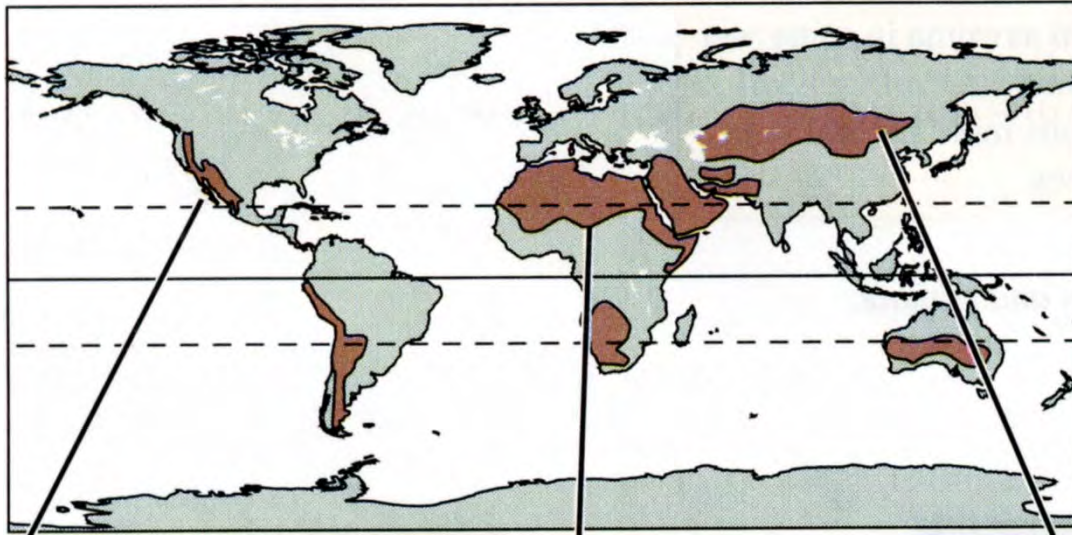
12 months of growing season.

Total rainfall variable.

Grasslands of the tropics.

Megafauna (elephants, lions, herds of ungulates; kangaroos).

Fire, impermeable soils, and often perched water belowground keep trees out.



Desert.

Band at 30N and 30S, w/ some areas outside (Asian steppe).

Drought conditions on a yearly basis (see left), and/or freezing conditions with little precipitation (see above), depending on elevation and position on continent.

Growing season varies a lot.

Total rainfall very small, on average.

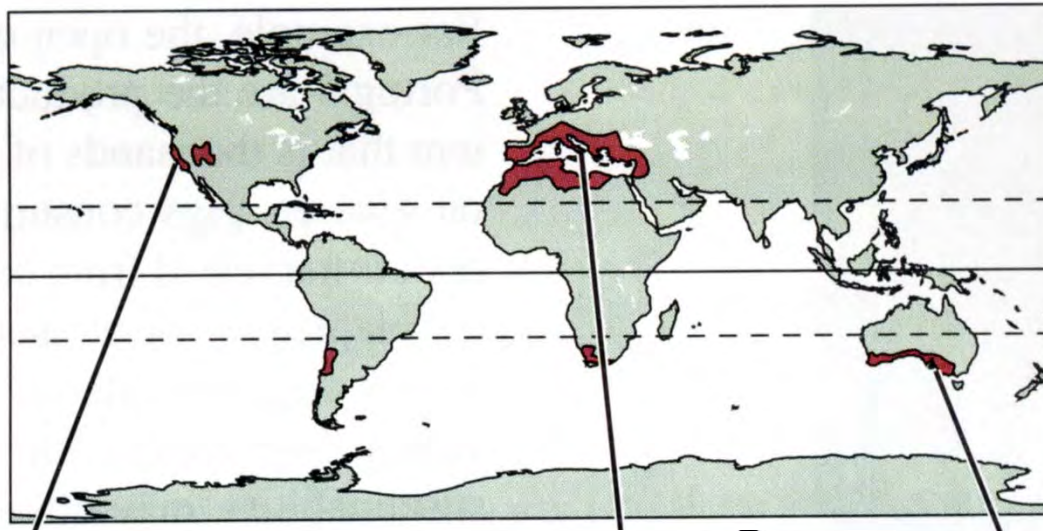
Evaporation always greater than precipitation.

Highly variable biologically.

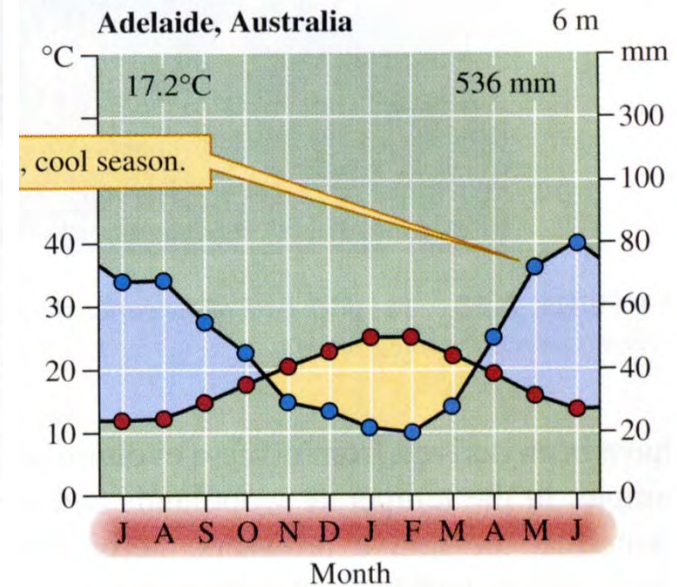
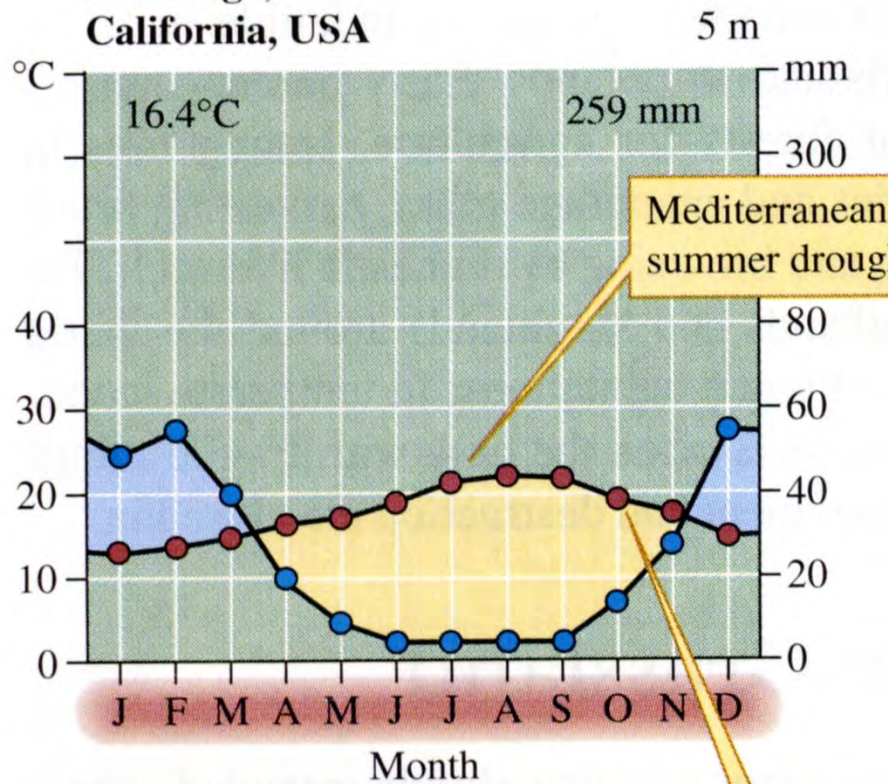
Cactus, other succulents, adaptation to extreme temps/desiccation among plants.

Secretive animals; many belowground.

Sandy to hardpan to salt crust (caliche).



San Diego,
California, USA



Temperate woodland/shrubland.

Also called Mediterranean biome b/c of band around Med Sea; N California, SW S.A.; S Africa; S. Aussie.

Wine Country.

Seasonal temps, but mild in winter, just warm in winter (little freezing).

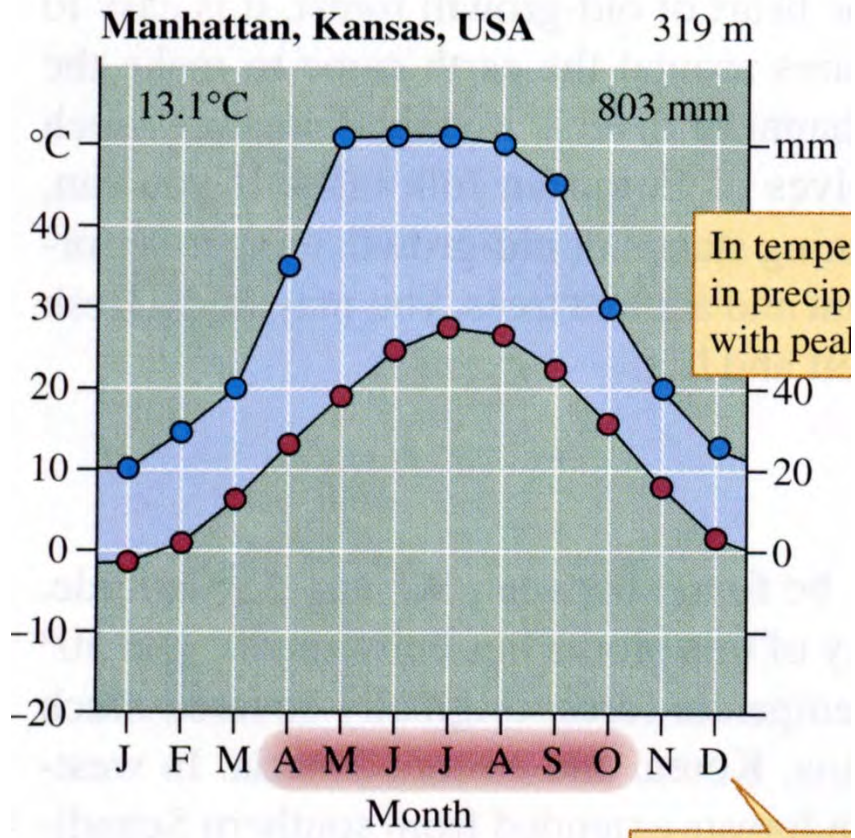
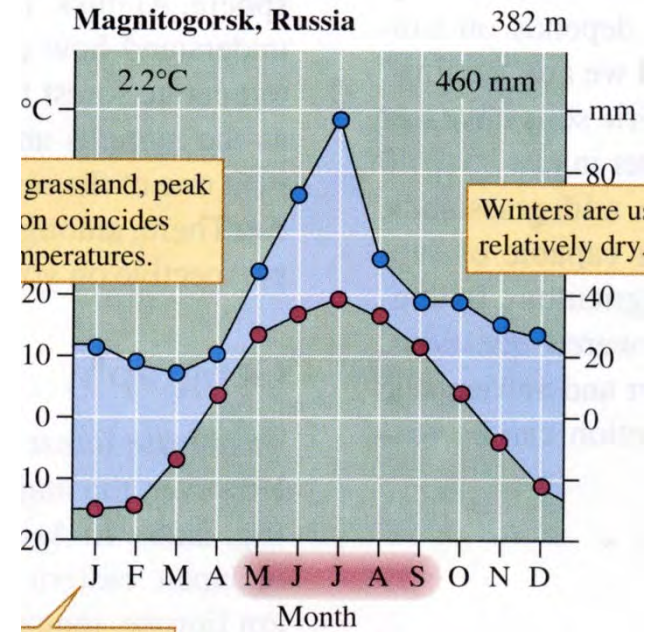
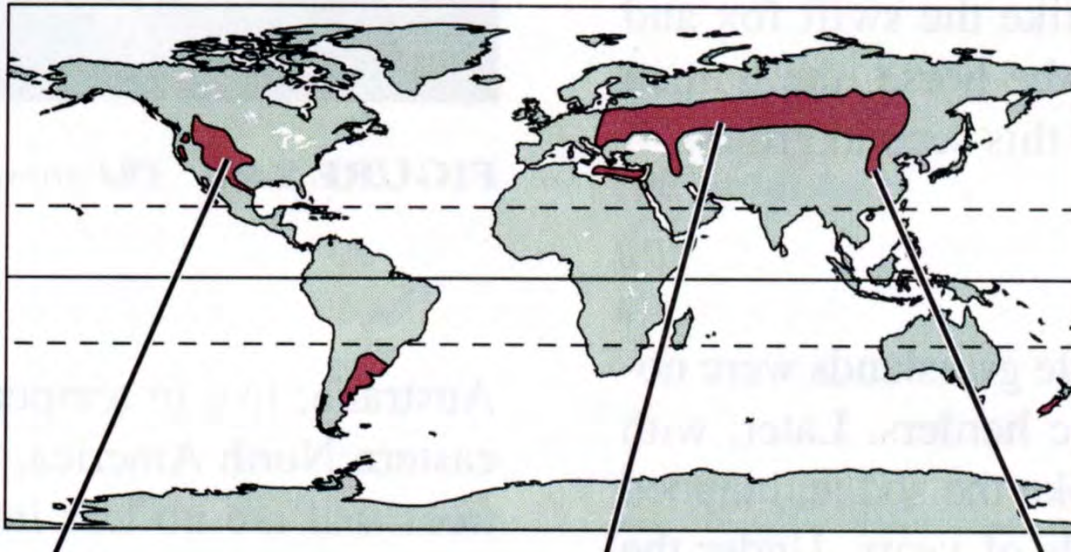
Seasonal rain → summer drought; winter rain.

Essential for concentrating sugars in grapes prior to harvest for wine production.

Fire common; trees often fire resistant; shrubs grown back from rootstock.

Idyllic mix of moderately-sized woodland trees with medium grasses and flowers on rolling hills (a place for picnics).

Very heavily populated by humans.



Temperate Grassland.

Great Plains of N.A.; Argentina and Uruguay; breadbasket across Eurasia; a bit in N. Africa / middle east.

Highly seasonal temps, w/ freezing winter.
 Highly seasonal precip that follows pattern for temp.
 This is where you live right now, more or less.

Fire common. Mixed (from short to tall) grass prairies and mixed woodlands.

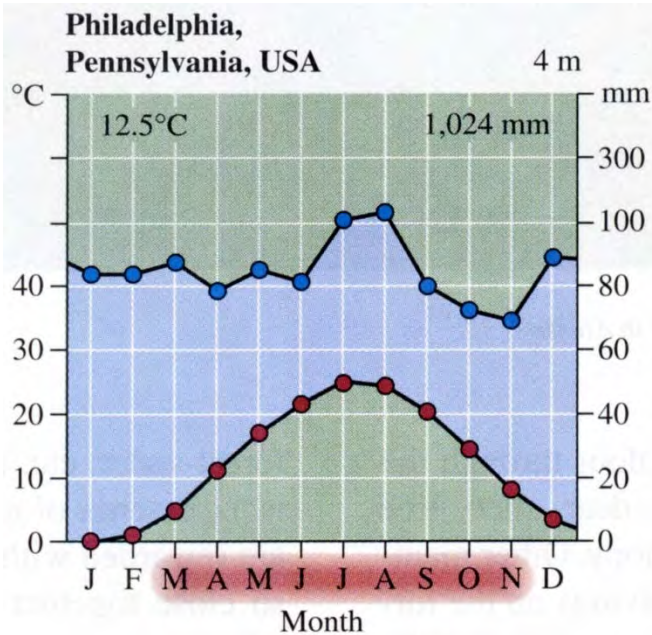
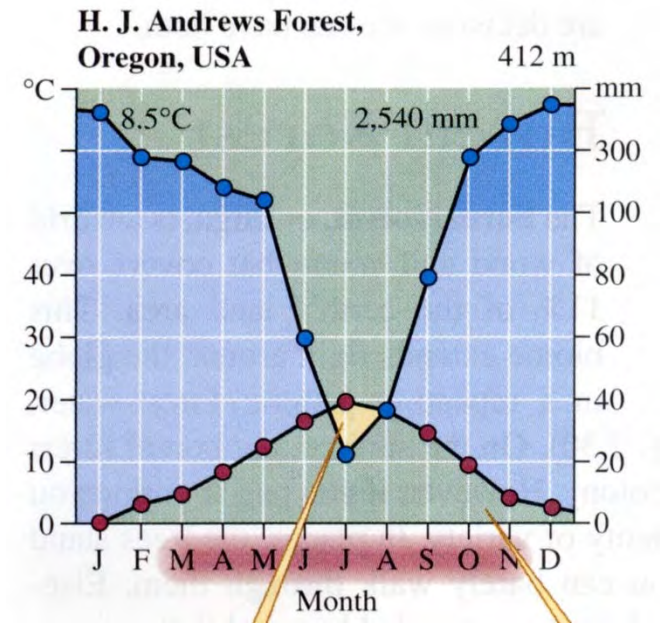
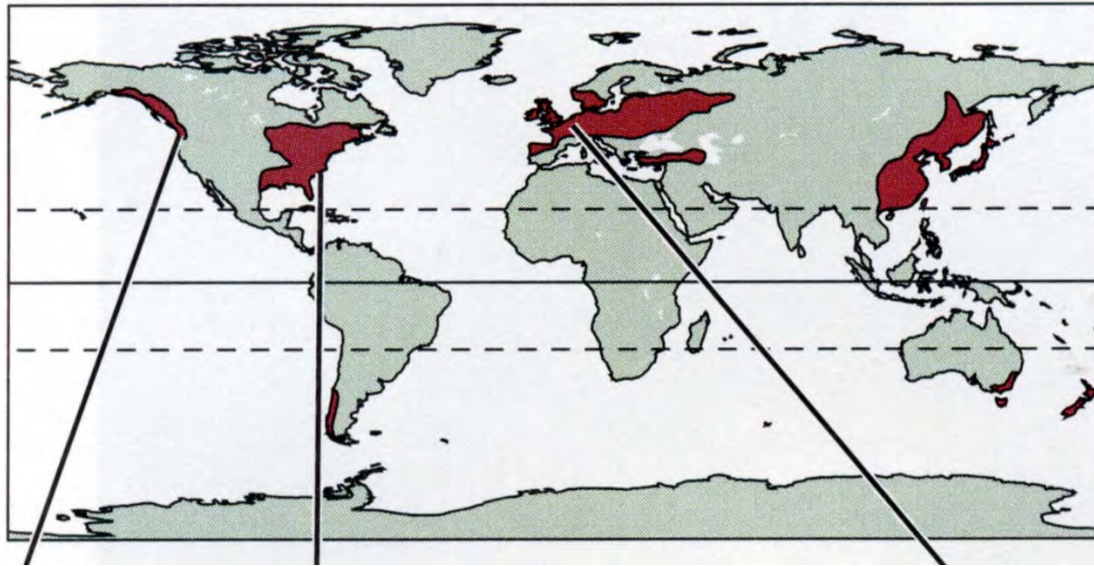
Most turned to plow, no largely row-crop agriculture.

Often heavily irrigated.

Cattle production worldwide.

Historically, area of large herbivores (bison, elk, etc.).

Light on humans; heavy on human impacts.



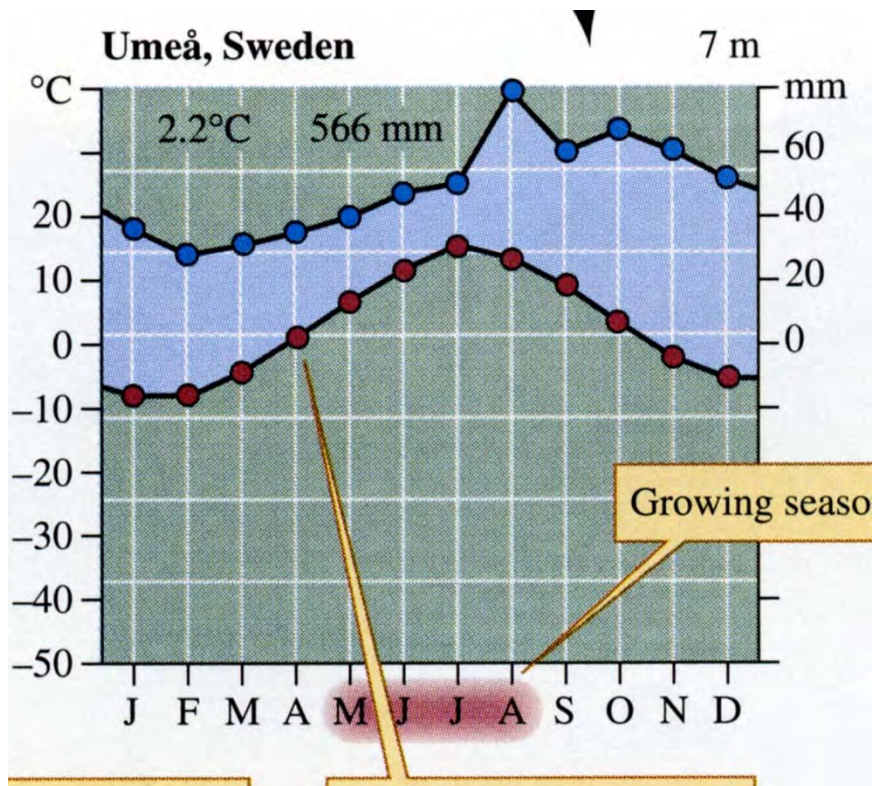
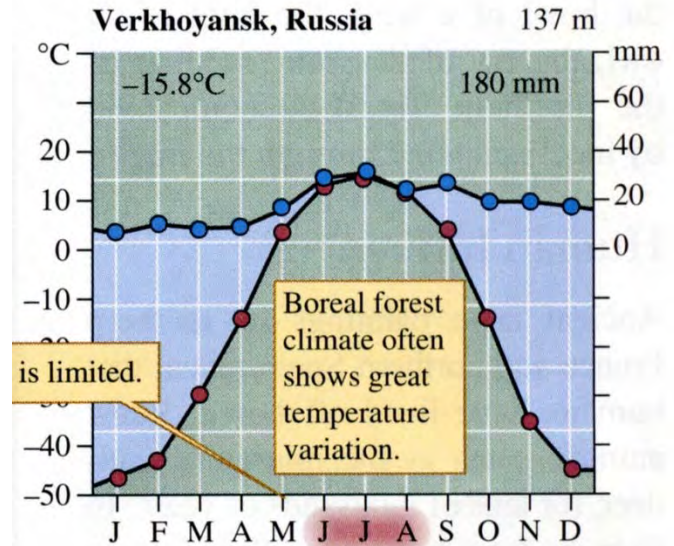
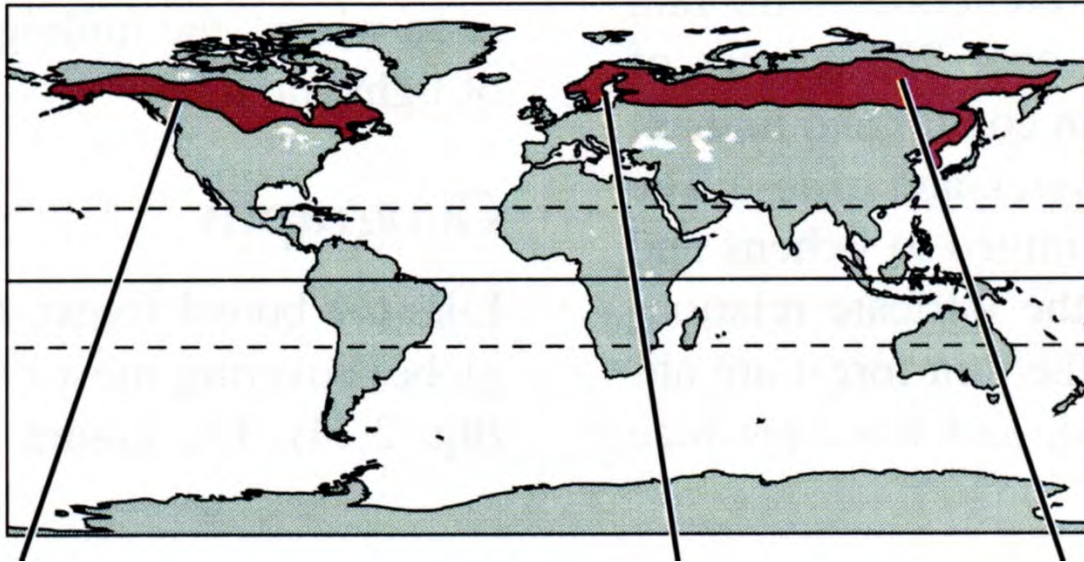
Temperate Forest.

Eastern N.A. and NW N.A.; most of N. Europe and W. Asia; some (historically) in middle east; China and north into Russia; SE Aussie.

Highly seasonal temps, w/ mild to just-freezing winter.
 Deciduous-dominated (left) → mod. High, aseasonal rainfall.
 Coniferous-dominated (up) → summer drought, w/ heavy rainfall otherwise.

Soils very fertile (accumulation of organic matter).
 Diversity of trees low (dozens per hectare), but biomass high (old-growth is higher than tropical rainforest in terms of biomass).
 Heavy on humans; heavy on human impacts.

Cultural reference → this is the biome of all our fairy tales, e.g., the dark and foreboding forest into which some poor sap or saplings wander to stumble over a horrific fate . . . or eat a unicorn (Voldemort) . . . or whatever.



Boreal Forest (Taiga).

Nothing in S. hemisphere; band across NA and Asia.

Highly seasonal temps, w/ cold to bitter winter.
 Low precipitation, mostly as snow.

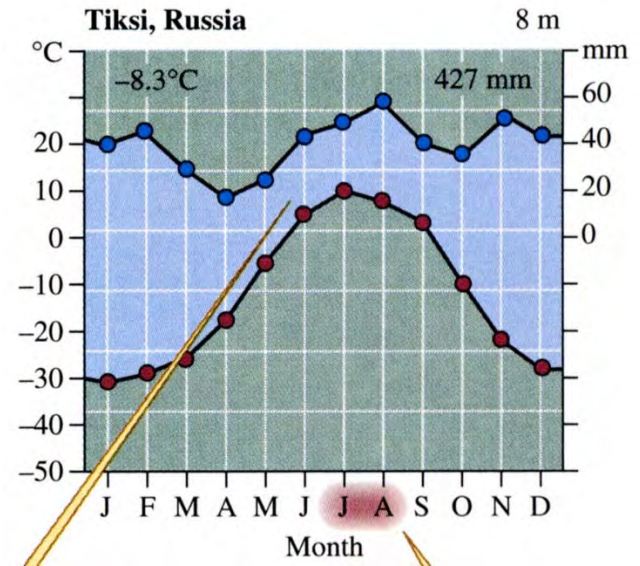
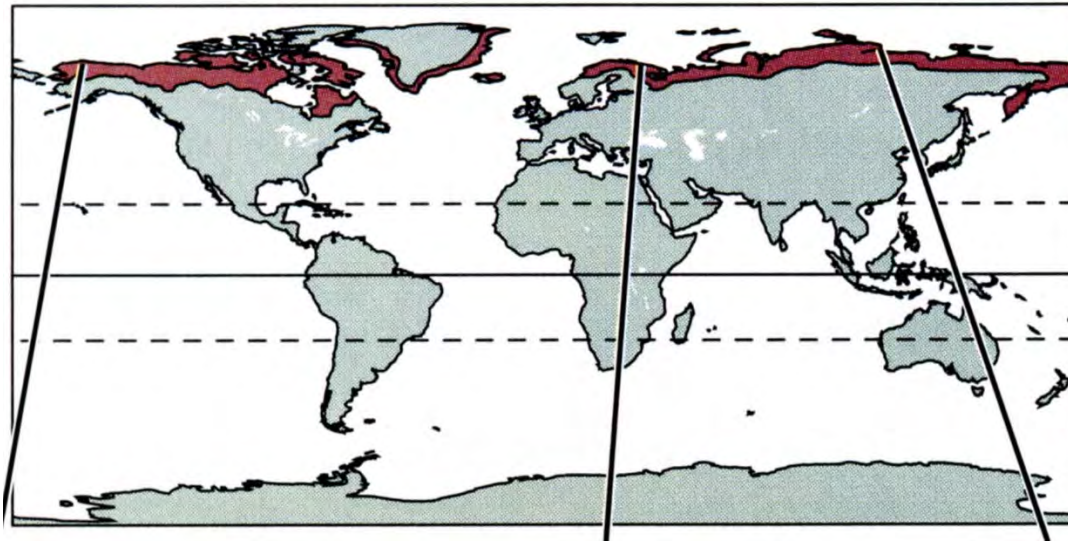
Soils very thin and infertile b/c of low decomposition rates and of permafrost.

Diversity of trees very low (often 1-5 species dominate huge swaths of land. Biomass moderately high.

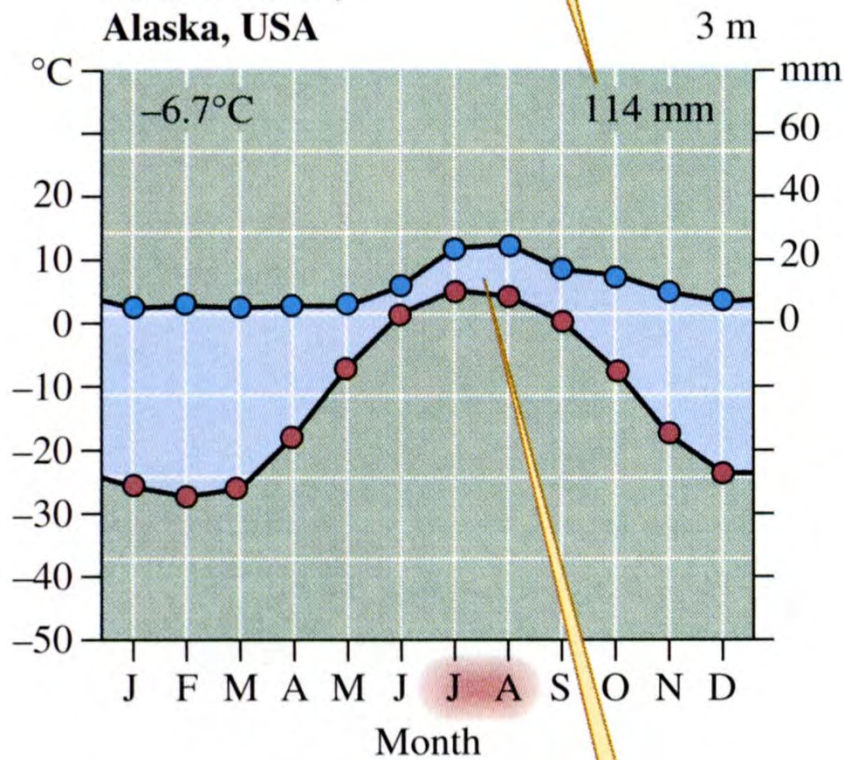
Light on humans; light on human impacts.

Caribou, wolves, bears, etc.

Cultural reference → all those Alaska shows.



**Point Barrow,
Alaska, USA**



Tundra.

Nothing in S. hemisphere; band across NA and Asia above taiga.

Highly seasonal temps, w/ cold to bitter winter.
Low precipitation, mostly as snow.

Permafrost, ice.

Cold-adapted plants (low forms; mosses, lichens, sedges; no trees).

Seasonal light and dark cycles.

Migrating waterfowl and mammals dominate in summer → HUGE influxes of animal life during short growing season.

Cultural reference → all the OTHER Alaska shows.

