

November 9, 2015

Finishing up Biogeographic Processes

Restate photosynthesis by bacterial and later plants – conversion of water and CO₂ into carbohydrates and oxygen. Restate respiration – organisms use oxygen to break down carbohydrates and release energy, water, CO₂. Limits of photosynthesis due to heat increasing respiration and also through limiting availability of water, stomata. Geographic dispersal, Physical factors (Temperature, availability of water [xerophytes, deciduous vs. evergreen trees], other climate factors, distribution of soils, landforms), Biotic factors (competition, amensalism [one species inhibited by another], predation, mutualism), Disturbance, Species dispersal vs. vicariance (like Gondwana splitting), endemic species.

Unit 25

The global distribution of plants, biomes, terrestrial vs. marine, Primary factors: climate and terrain, climate factors: (1) atmosphere and its circulation systems [which determine moisture-carrying airmasses], (2) solar radiation, terrain factors: (1) distribution of the landmasses and ocean basins, (2) topography of the continents. Relationship of latitudinal transition of biomes to altitudinal ecotone transitions in high mountain areas [von Humboldt]. Principal Terrestrial Biomes (1) Tropical Rainforest (Af, Am, sometimes Aw), dominated by tall, closely-spaced evergreen trees, multi-level canopy structure, presence of epiphytes and lianas, leaf litter decomposition, monsoon rainforests. (2) Tropical Savanna, Aw, thorn forests, lower trees, fire and grass mat, deciduous trees such as acacia and baobab. (3) Desert (BW and BS), sparse vegetation, perennials more dominant in savannas, ephemerals more dominant in deserts, succulents, root structures of trees, cacti, etc. (4) Temperate Grassland (BS), climate-controlled, tall-grass & short-grass prairie, organic-rich soil, grazing animals, agriculture, (5) Temperate Forest, several varieties including temperate deciduous forest biome (in Cf) – oak, beech, birch, walnut, maple, ash, some conifers, temperate evergreen forest (in Cf or Cs) – needle-leaf trees in northern hemisphere such as doug firs and redwoods, in New Zealand trees there are broadleaf and small-leaf. (6) Mediterranean Scrub (in Cs) – pine, oak, hot dry summers and cool moist winters, California/Mediterranean, central Chile, South Africa Cape Province, dense human population. (7) Northern Coniferous Forest (in D climates) – boreal forest, taiga, needle-leaf trees, some adaptation to freezing and waterlogged soils. (8) Tundra – frozen soils, no trees, but instead sedges, mosses, lichens, dwarf trees in some places, xeriphytic adaptations.

Unit 26

Zoogeography, animal range, habitat, ecological niche, example of Kirtland's warbler and jack pine, natural selection, mutations, von Humboldt and Darwin and Alfred Russel Wallace, Wallace's Line vs. Weber's Line, Zoogeographic realms, Examples of realms such as Palearctic, Madagascar, New Zealand, etc., convergent evolution. Ecological zoogeography, island biogeography, island size vs. number of species, balance of between arrivals of new species and extinctions of those already present, island biogeography and conservation efforts, habitat preservation.

Unit 27

Earth's interior, evidence of denser materials nearer the earth's center, earthquakes and seismic waves, speed of waves and material density, mapping interior structure with seismic waves. Inner Core (solid, iron+nickel, 760 miles thick), Outer Core (liquid, nickel & iron, 1400 miles thick, earth's magnetic field), Lower Mantle (solid, iron, magnesium, silicon, 1385 miles thick), Upper Mantle (solid, 415 miles thick, lower portion is mostly solid but 'plastic', upper part is more rigid), Mohorovicic discontinuity (Moho) – significant density and composition change, Earth's crust – oceanic (~5 miles thick) vs. continental (~ 25 miles average thickness). Felsic vs. Mafic rocks. Lithosphere (crust + uppermost rigid part of the mantle) vs. the asthenosphere – but boundary is not abrupt. Lithospheric plates, the crustal surface, patterns and reasons for topographic relief, high vs. low relief. Continental shields vs. orogenic belts, cratons. Canadian Shield, Guyana Shield, Brazilian Shield, African Shield, Scandinavian, Siberian, Indian Shield, Australian, Antarctic Shields. Orogenies, examples such as Appalachians, Sierra Nevada, Andes, Alps, Himalayas. Weathering and erosion.