

# Biogeography

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Lectures 25–27

# Outline

## Biogeography of the World

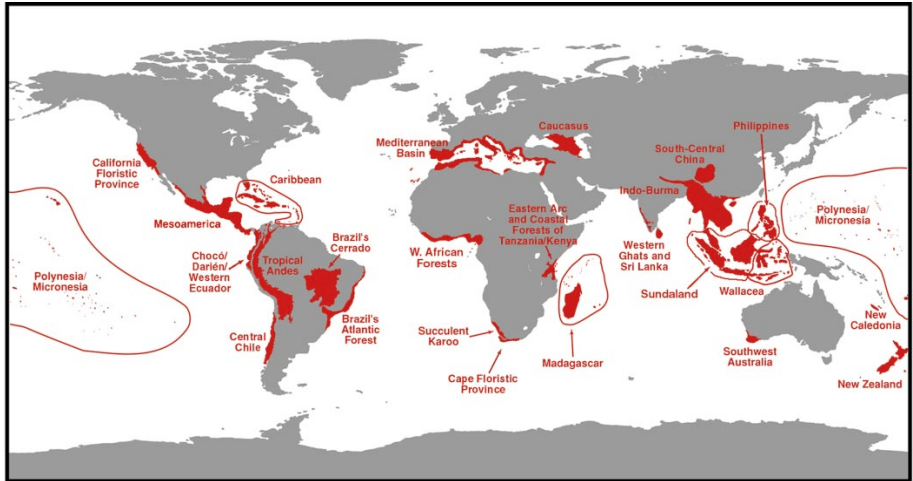
- Biogeography rules

- Biogeography of South America, or Neotropics

# Biogeography of the World

## Biogeography rules

# Biodiversity hotspots of the world



(From Myers et al., 2000)

# Biogeography rules

- ▶ Allen's rule: endotherms minimize surface in cold climates and maximize in warm climates
- ▶ Bergmann's rule: northern are bigger
- ▶ Carlquist's rule: island plants tend to be woody
- ▶ Flight rule: island insects and birds often do not fly
- ▶ Foster's rule: island species tend to be either giants or dwarves
- ▶ Gloger's rule: pigmentation increases in humid climates
- ▶ Rapoport's rule: latitudinal ranges are smaller at lower latitudes

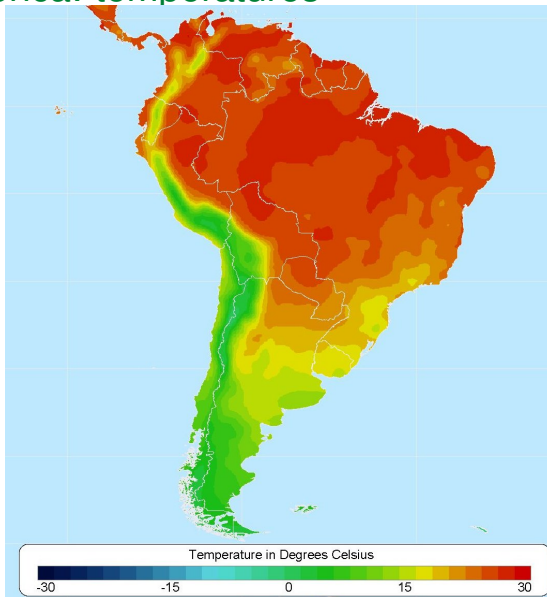
# Biogeography of the World

## Biogeography of South America, or Neotropics



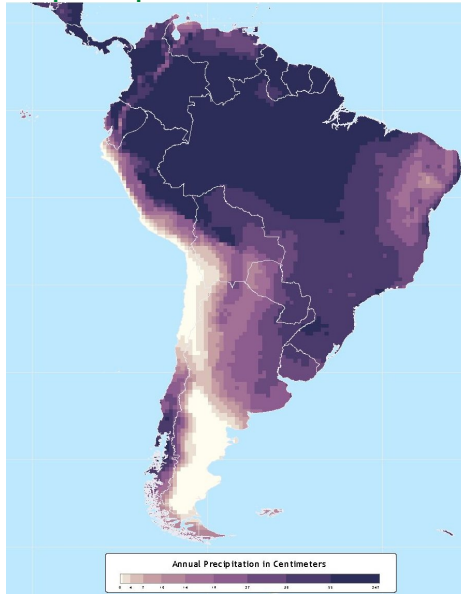
[Southern, tropical, low, new Andes, Amazon and Parana]

# South America: temperatures

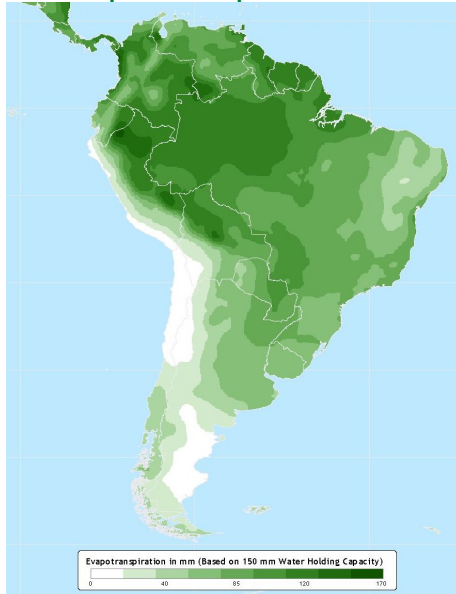




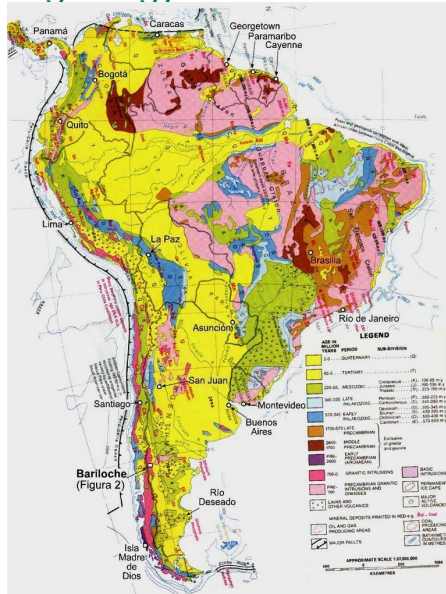
# South America: precipitation



# South America: evapotranspiration



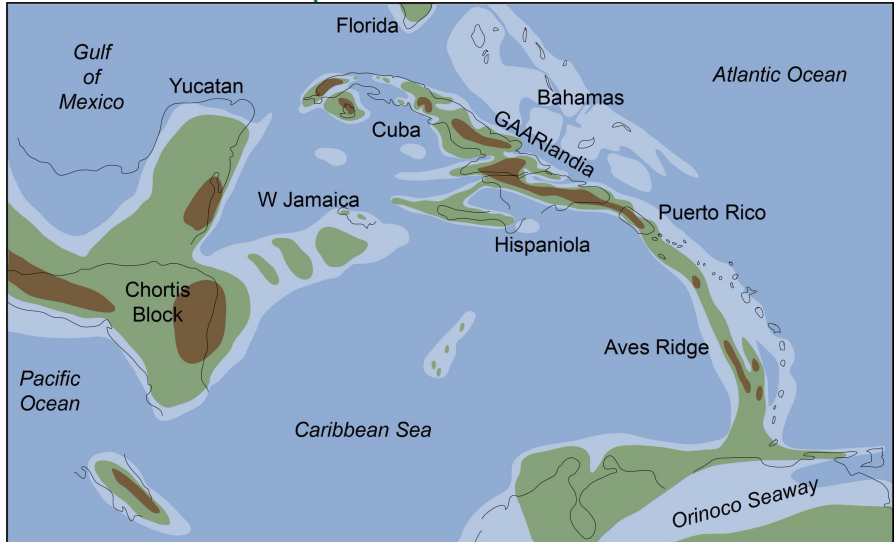
# South America: geology



# South America: ecoregions



# GAARlandia concept



Lowlands



Highlands



Shallow marine environments

# South America: 13 biogeographical regions

1. Tropical Central America
2. West Indies
3. Venezuela and Guiana Shield
4. Amazonian Basin
5. Brazilian Northeast and Plateau
6. Brazilian Atlantic Forest
7. Gran Chaco
8. North and Central Andes (Columbia, Ecuador and Peru)
9. Pampas
10. Atacama desert
11. *Galapagos Islands*
12. Patagonia and Juan Fernandez
13. *South American Antarctic Islands*

# Regions 1 and 2: Tropical Central America and West Indies

- ▶ Central America is similar to West Indies. The most pronounced difference is the richer fauna and especially flora: many endemic species, genera (like *Haptanthus*) and even families.
- ▶ Cuba, Hispaniola and Puerto Rico are micro-continents and have unique biogeographical features, like *Buxus* hotspot on Cuba, or one of most primitive placental mammals, *Solenodon* on Hispaniola and Cuba.
- ▶ Central America served as a bridge for the American flora and fauna. Many temperate groups migrated through Central American mountains to the north or south.

## Regions 3 and 4: Venezuela, Guiana Shield and Amazonia

- ▶ Llanos are northern grasslands in South America; they cover the big part of Venezuela
- ▶ Guiana Shield is the famous “lost world” with a high level of endemism in both plant and animal groups plus the highest waterfall on Earth, Angel Falls.
- ▶ **Amazonia** is a geologically new region, speciation processes are just starting there. Nevertheless, the diversity is overwhelming.
- ▶ The most famous plant and animal representatives are:
  - ▶ Victoria regia giant waterlily, chocolate tree (Theobroma cacao) and Brazil nut (Bertholletia excelsa), papaya (Carica papaya) and guarana (Paulinia cupana)
  - ▶ Morpho butterfly, Theraphosa blondi giant birdeater spider, and leafcutter ants (Atta colombica)
  - ▶ Four-eyed (Anableps) and piranha (Hydrolycus) fish
  - ▶ Trumpeter (Psophia), hoatzin (Opisthocomus) and toucans (Ramphastos) birds
  - ▶ Anteaters like tamandua, tree anteater (Tamandua tetradactyla), American tapir (Tapirus terrestris), giant capybara (Hydrochoerus), specific Platyrrhini monkeys, Desmodus vampire bats and Bradypus sloths.



# For Further Reading



## South America.

[http://en.wikipedia.org/wiki/South\\_America](http://en.wikipedia.org/wiki/South_America)



## Africa.

<http://en.wikipedia.org/wiki/Africa>



## A. Shipunov.

*Biogeography* [Electronic resource].

2014—onwards.

Mode of access:

[http://ashipunov.info/shipunov/school/biol\\_330](http://ashipunov.info/shipunov/school/biol_330)



## A. Shipunov.

*Introduction to Biogeography and Tropical Biology* [Electronic resource].

2017—onwards.

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