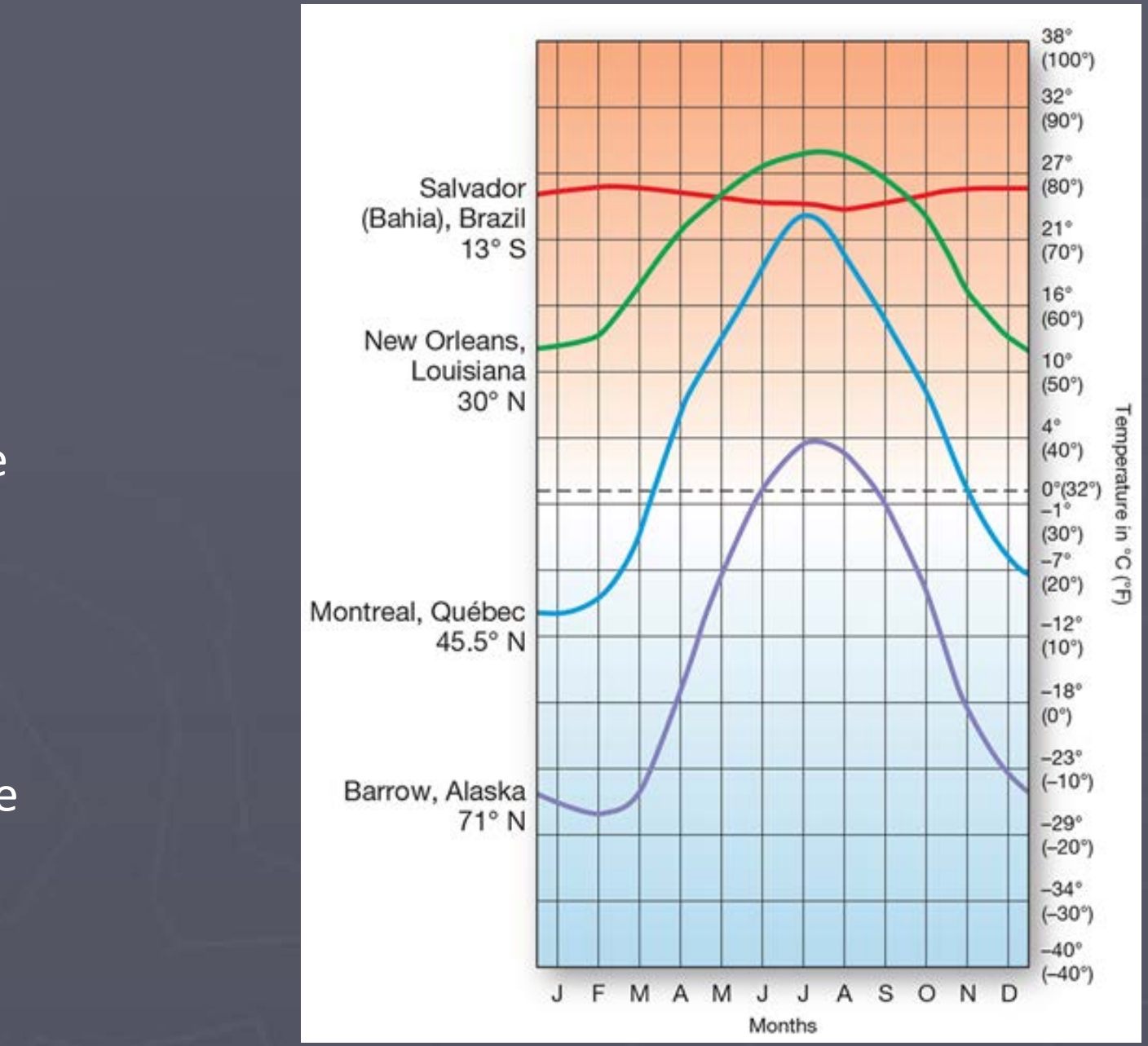
Temperature Control

Chapter 4: Atmospheric Energy and Global Temperatures

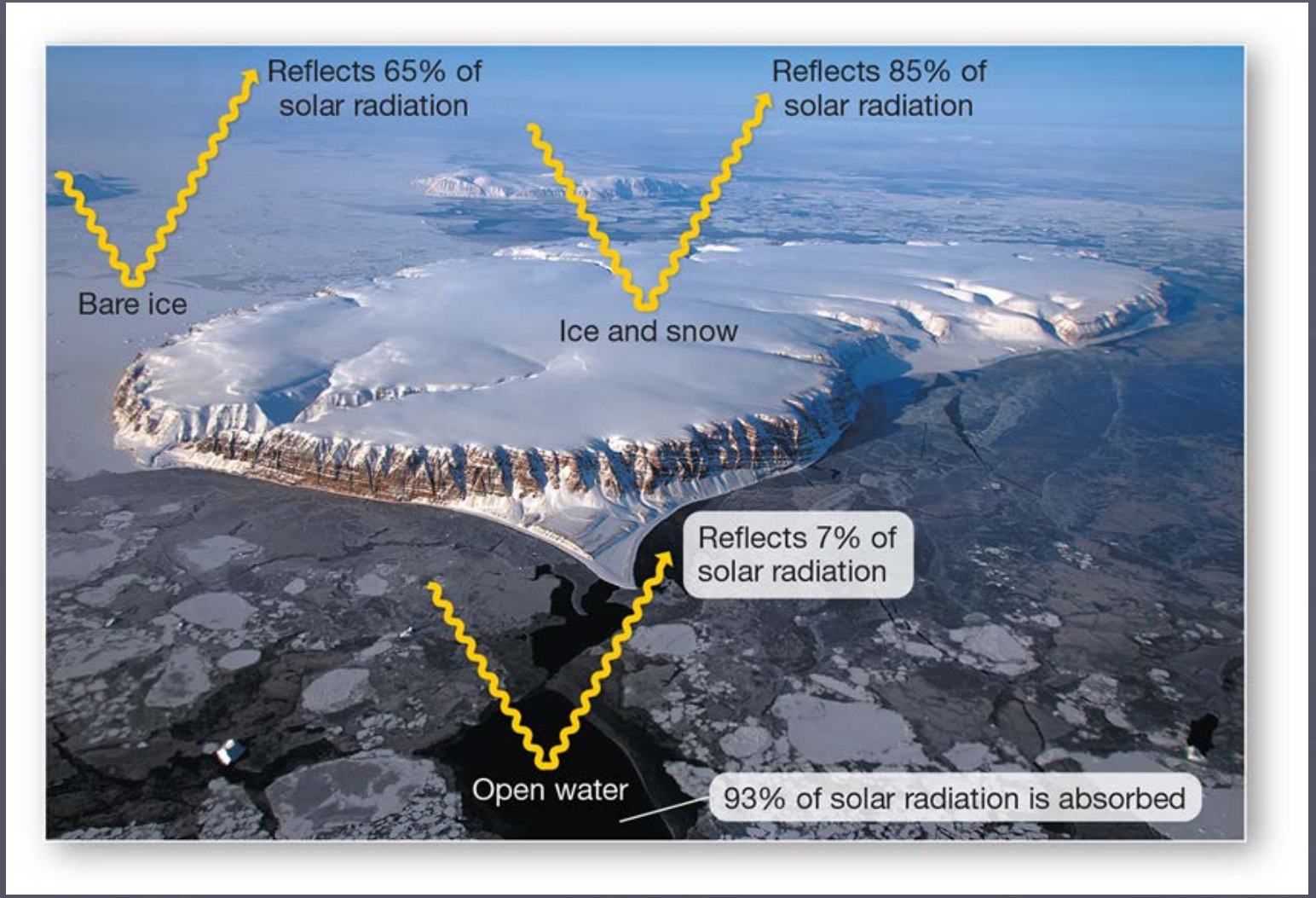
Latitude

- Lower Latitudes
  - Higher average temperatures
  - Lower temperature range
- High Latitudes
  - Lower average temperatures
  - Higher temperature range

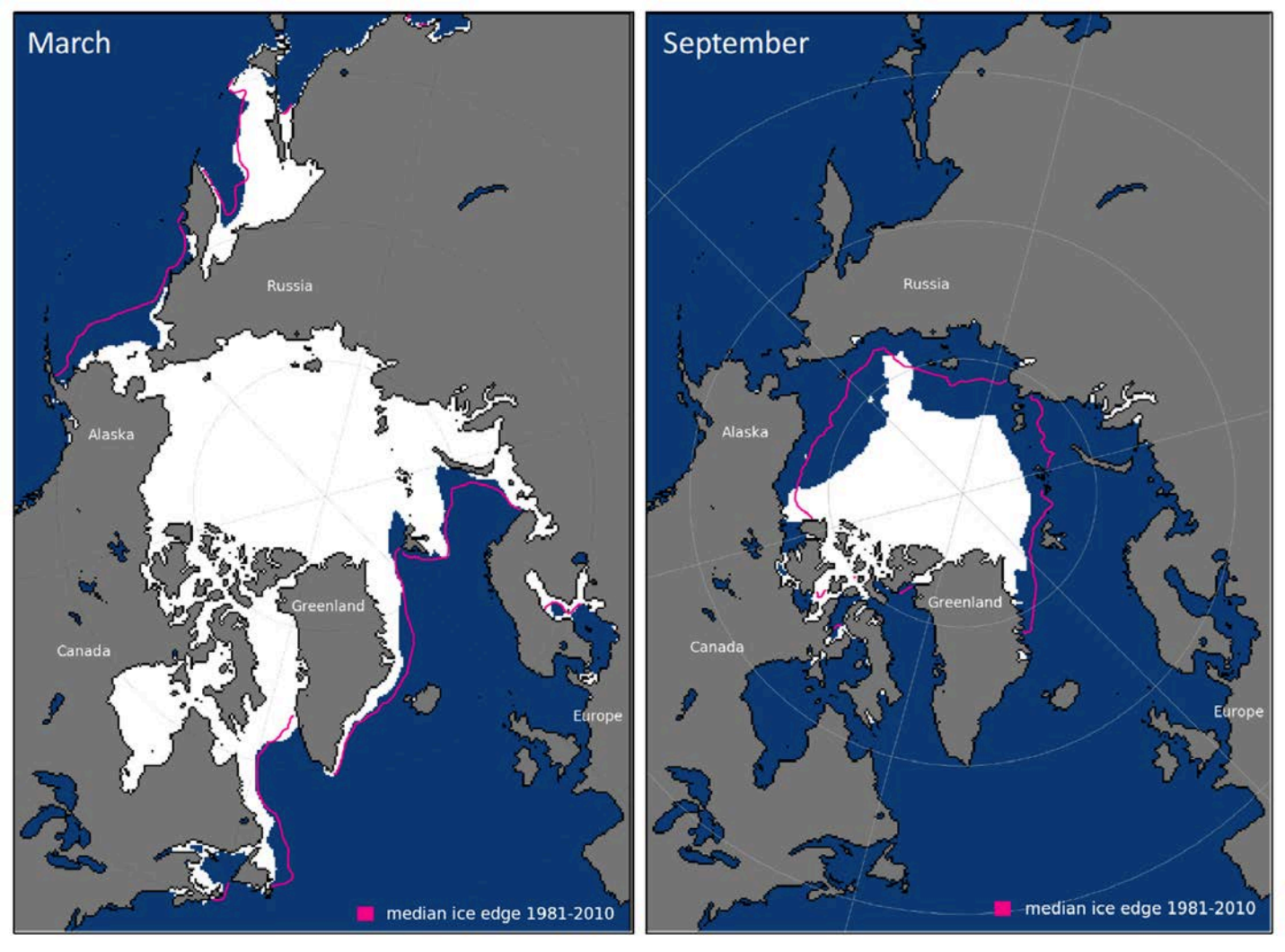


Ice Caps at Temperature Regulators

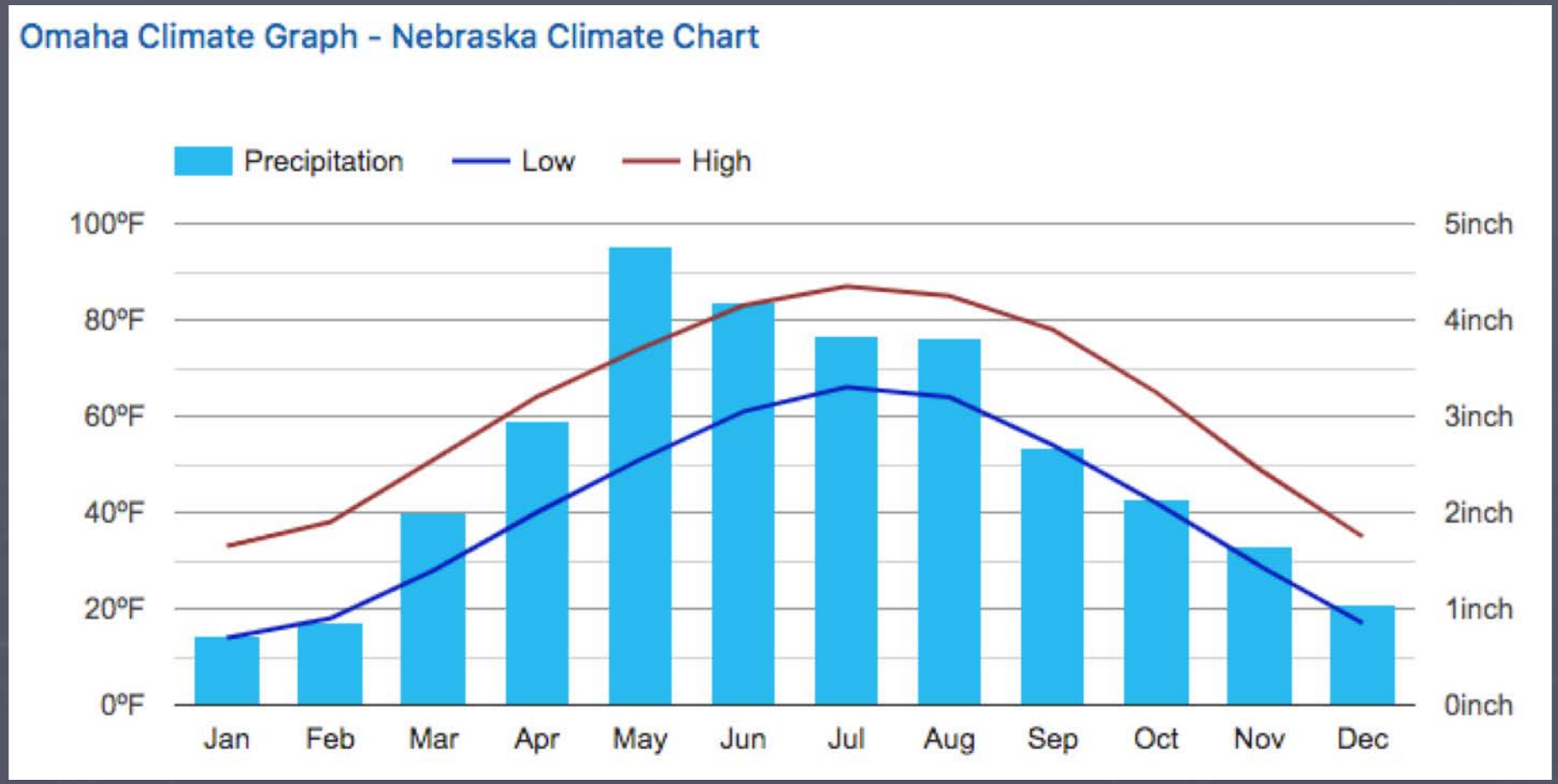
- Ice sheets and sea ice act as important temperature regulators due to Albedo Effect



Polar Ice and Temperature Regulation

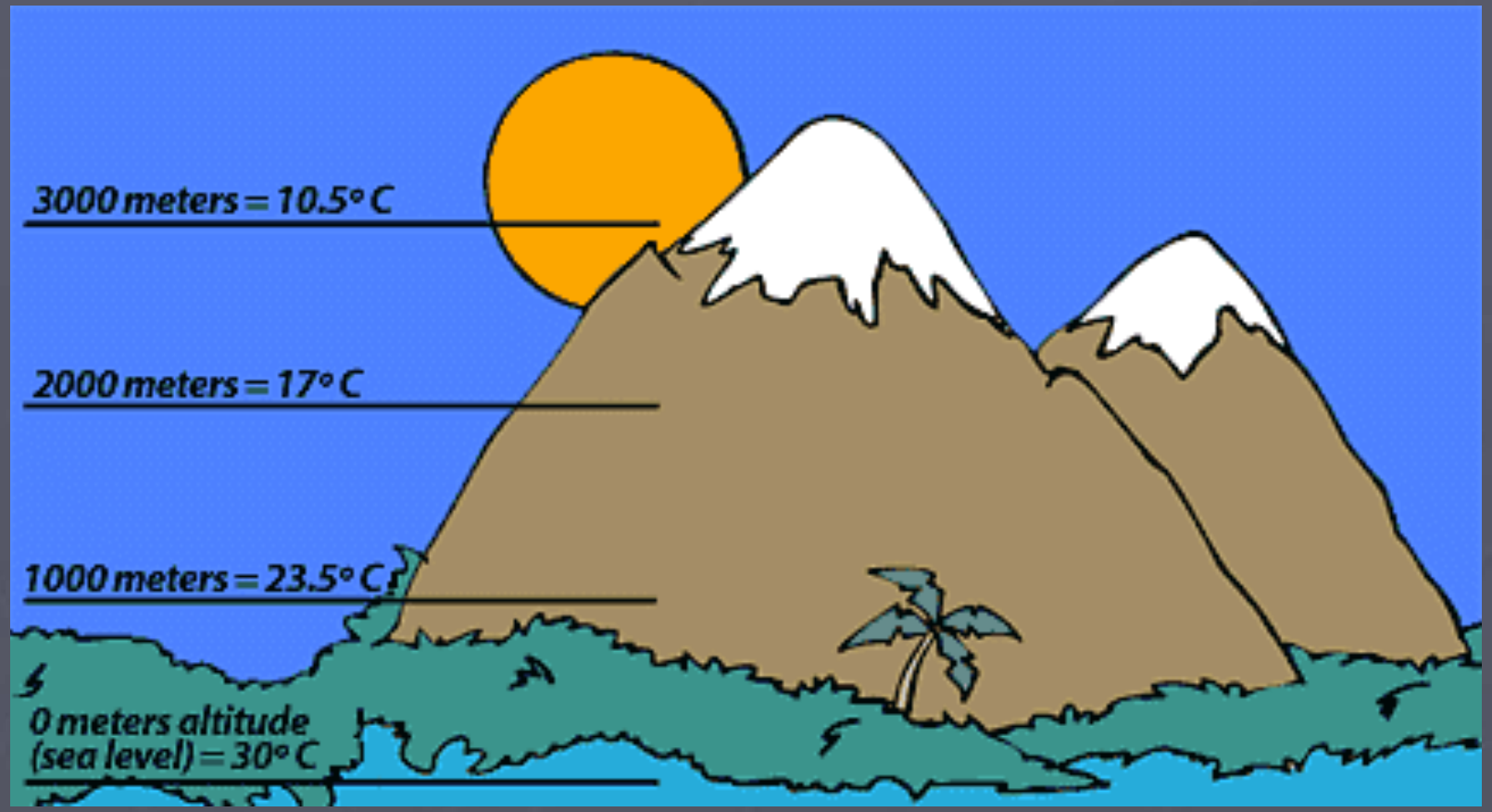


Sea Ice and Global Climate

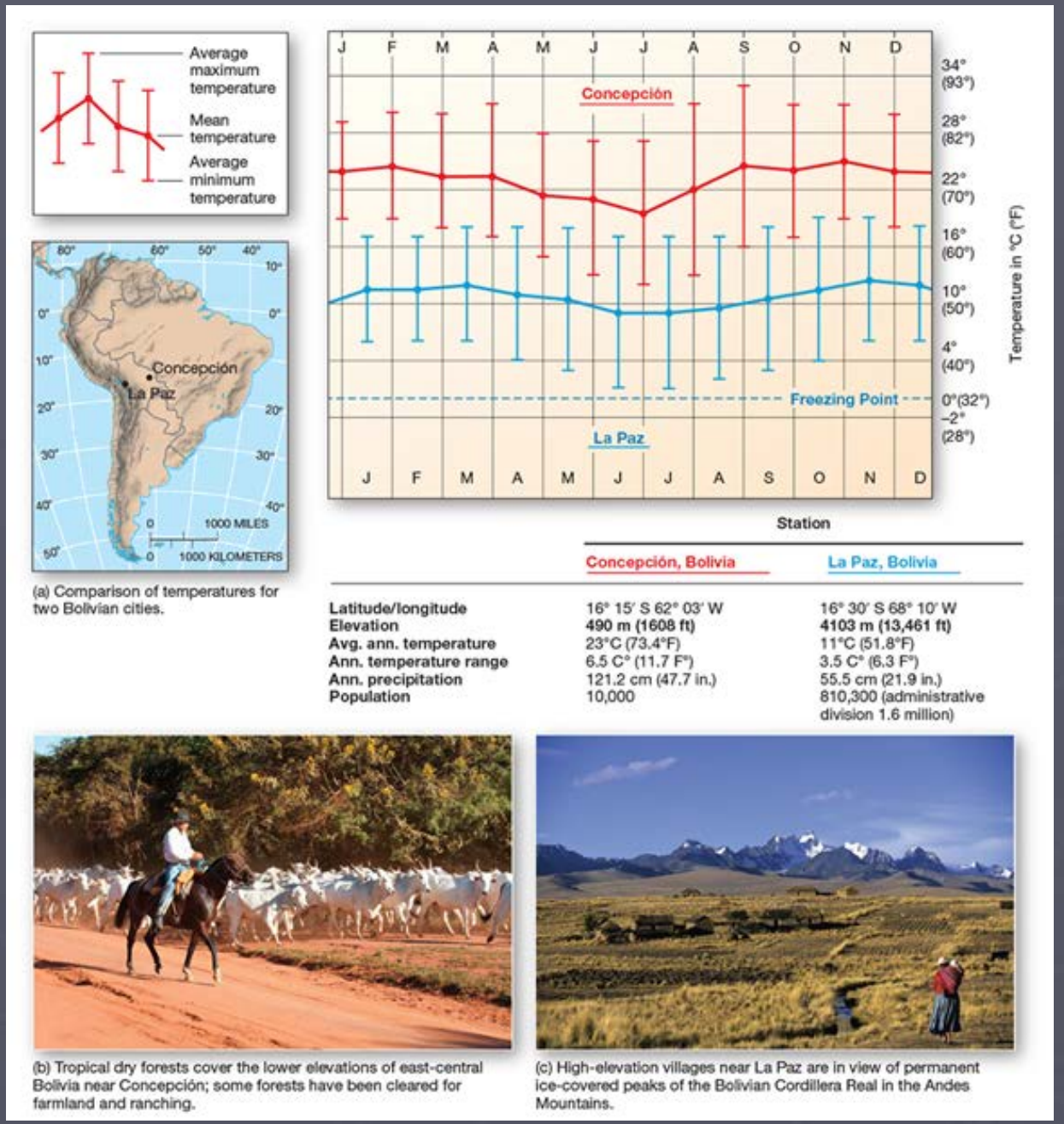


Altitude/Elevation

- As altitude increases, average temperature decreases
- Thinner air has les ability to absorb heat



Case Study: Bolivia



(a) Comparison of temperatures for two Bolivian cities.

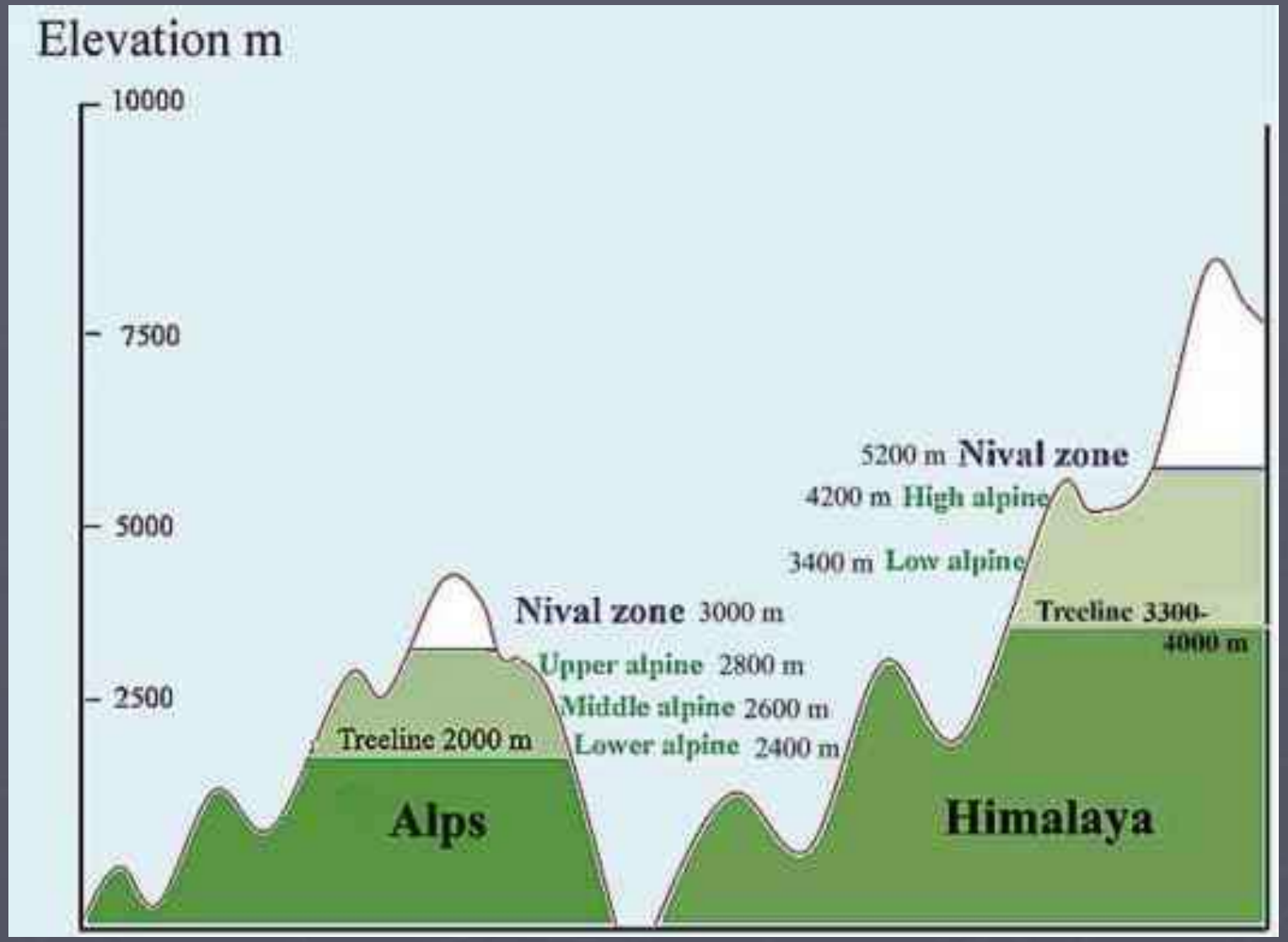
	Concepción, Bolivia	La Paz, Bolivia
Latitude/longitude	16° 15′ S 62° 03′ W	16° 30′ S 68° 10′ W
Elevation	**490 m (1608 ft)**	**4103 m (13,461 ft)**
Avg. ann. temperature	23°C (73.4°F)	11°C (51.8°F)
Ann. temperature range	6.5 C° (11.7 F°)	3.5 C° (6.3 F°)
Ann. precipitation	121.2 cm (47.7 in.)	55.5 cm (21.9 in.)
Population	10,000	810,300 (administrative division 1.6 million)

(b) Tropical dry forests cover the lower elevations of east-central Bolivia near Concepción; some forests have been cleared for farmland and ranching.

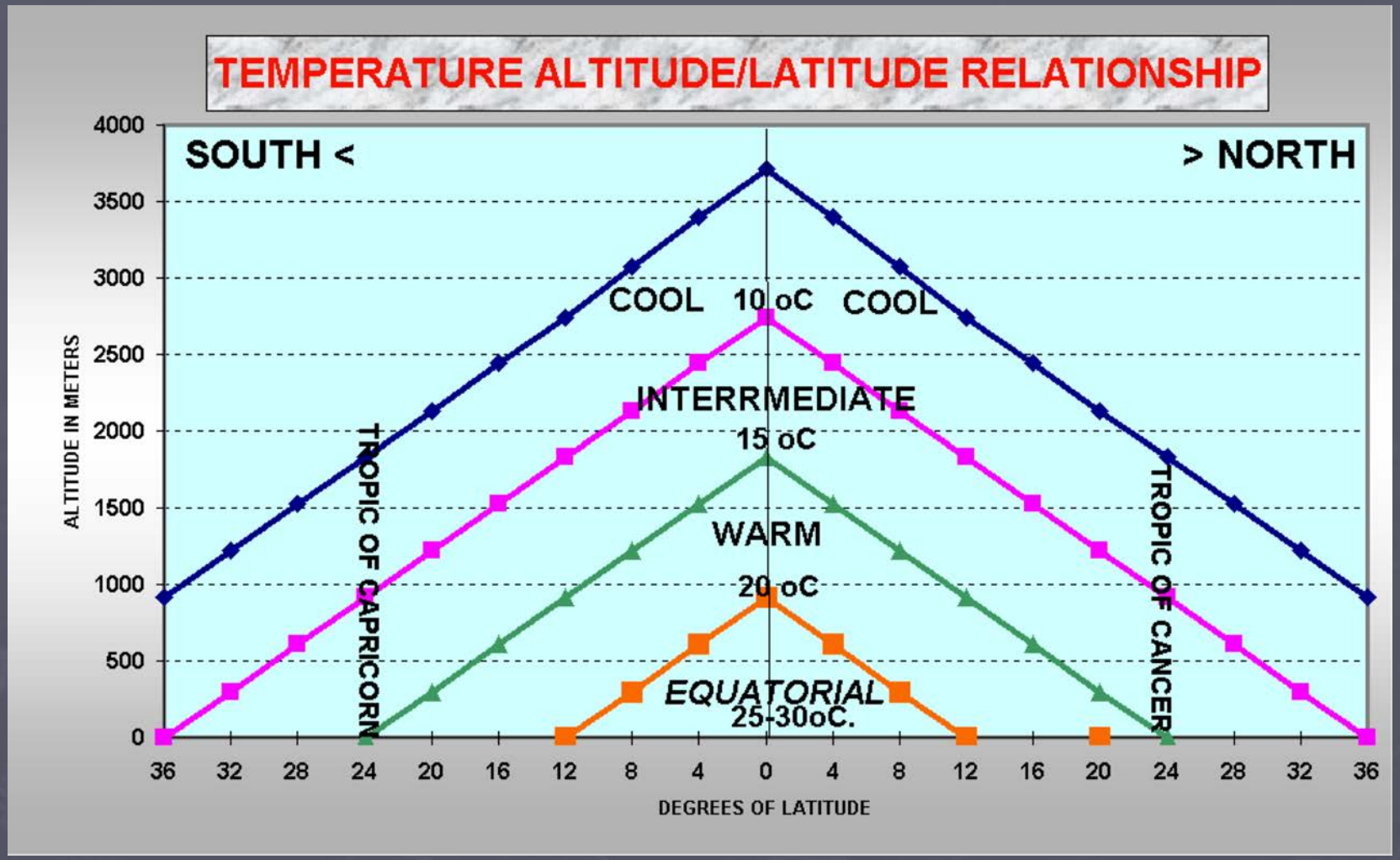
(c) High-elevation villages near La Paz are in view of permanent ice-covered peaks of the Bolivian Cordillera Real in the Andes Mountains.

Case Study: Alps and Himalayas

- Multiple factors will contribute to the climate of a region

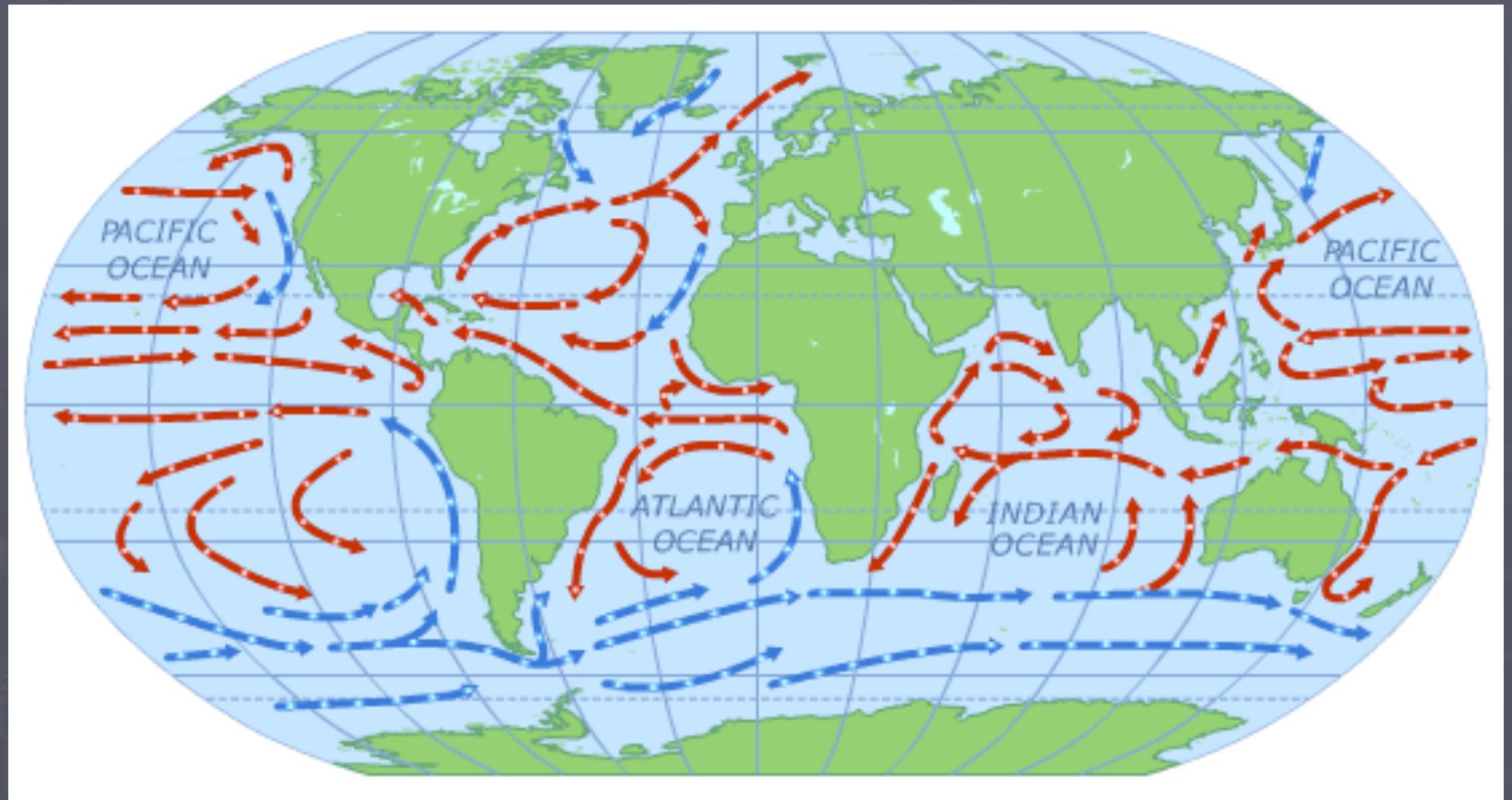


Altitude/Latitude Relationship

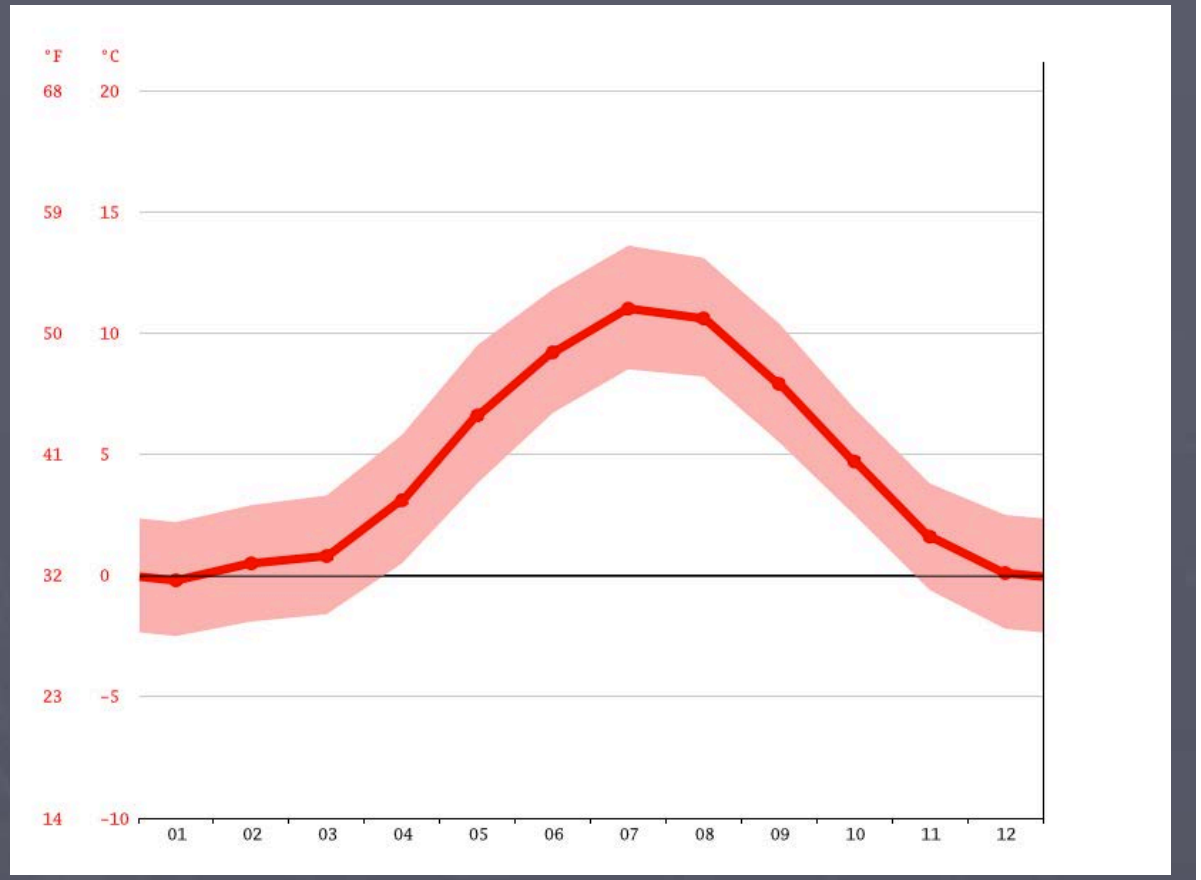


Ocean Currents

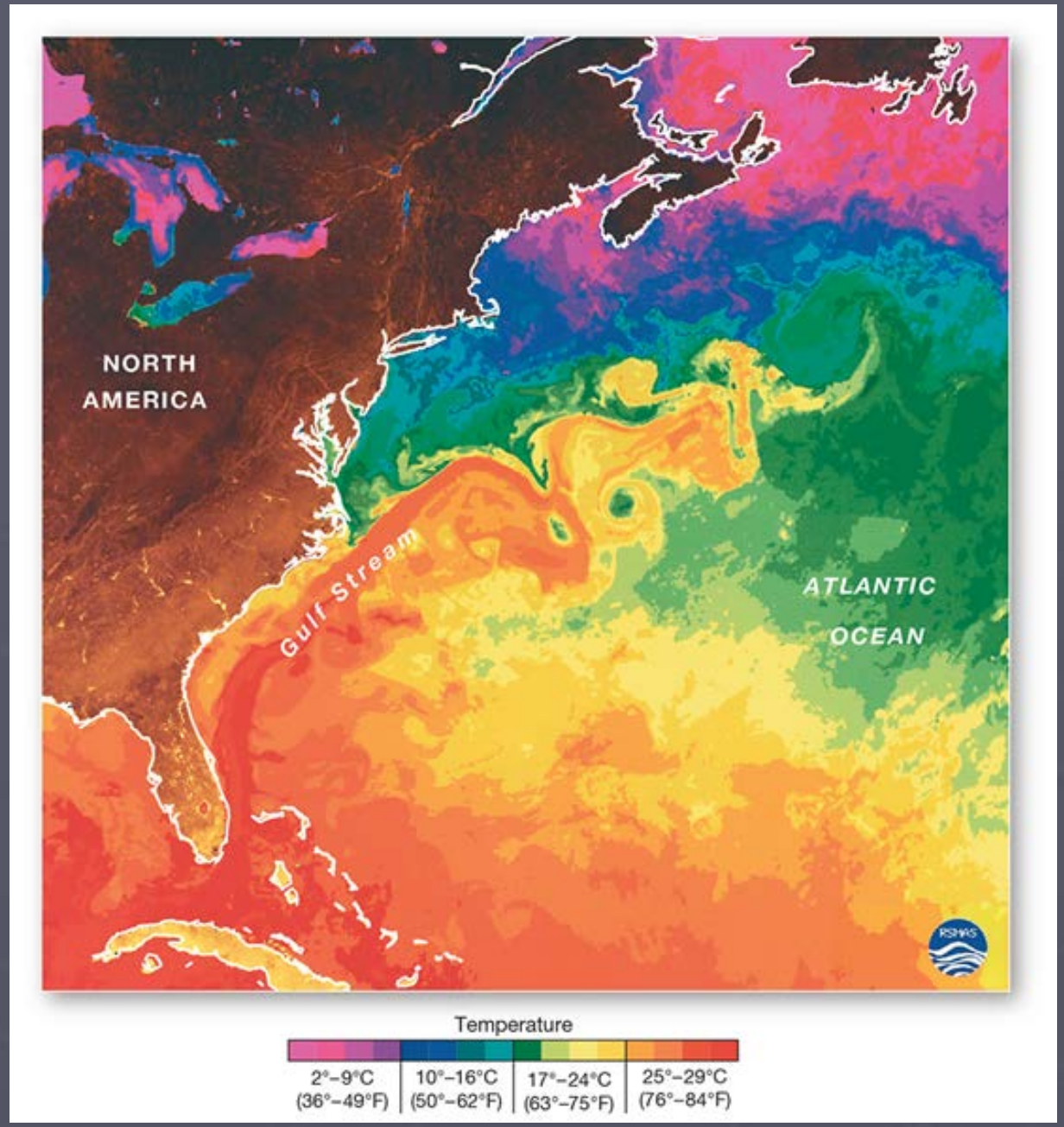
- Ocean currents work to distribute warm water from near the equator to the poles, and bring cold water from the poles to be reheated



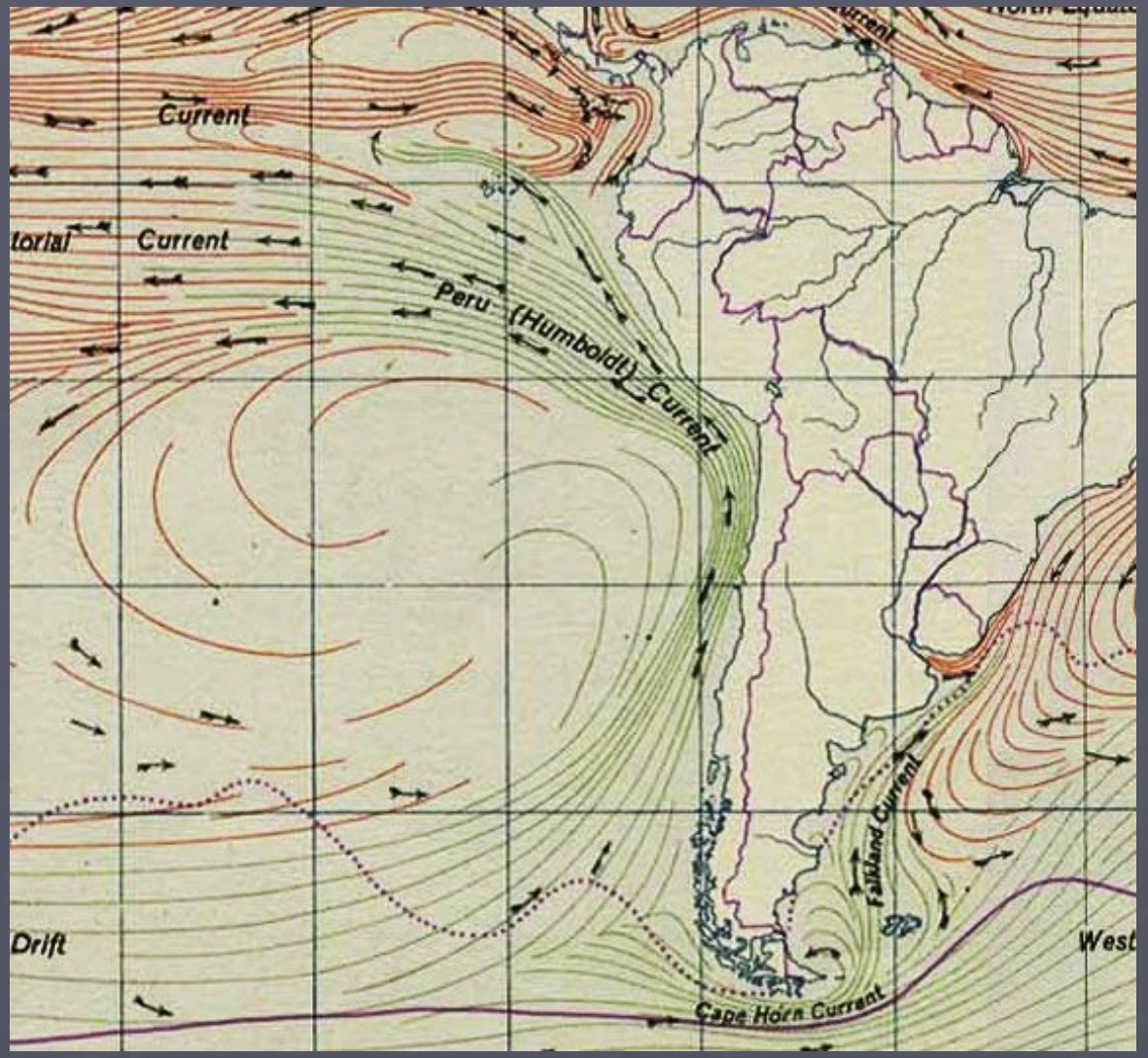
Case Study: Gulf Stream



Reykjavik, Iceland (64.14 degrees North)



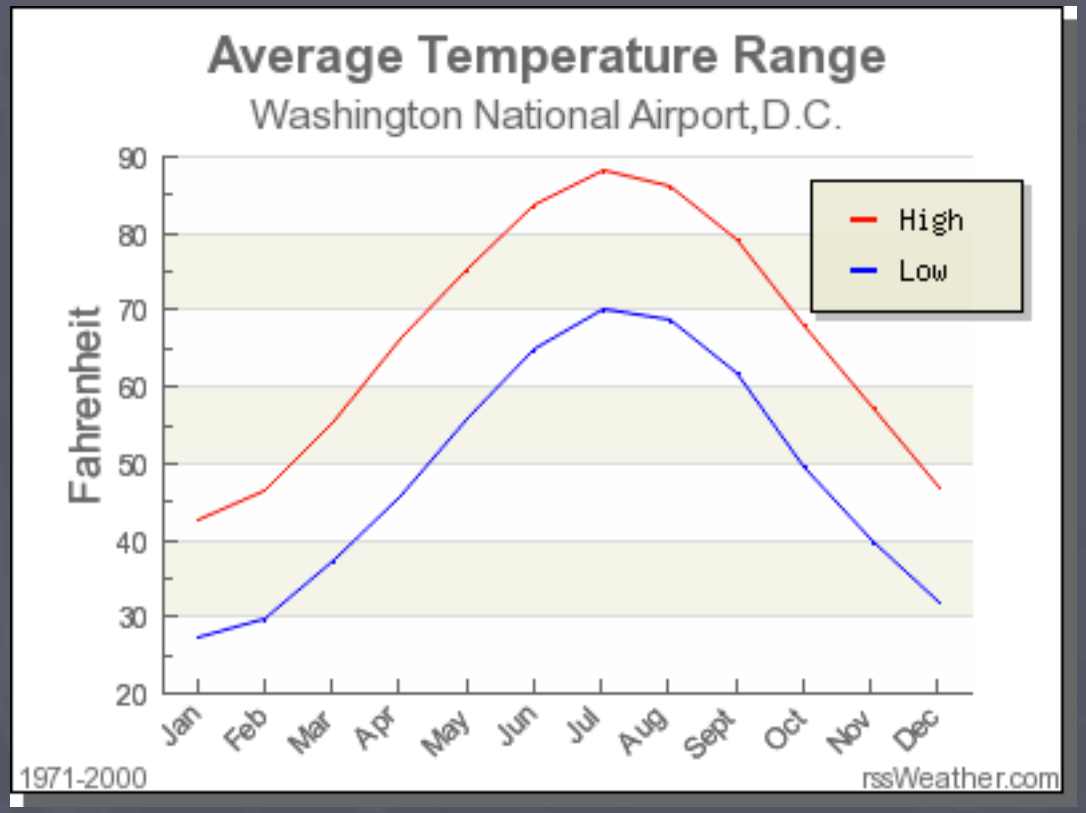
Case Study: Humboldt Current



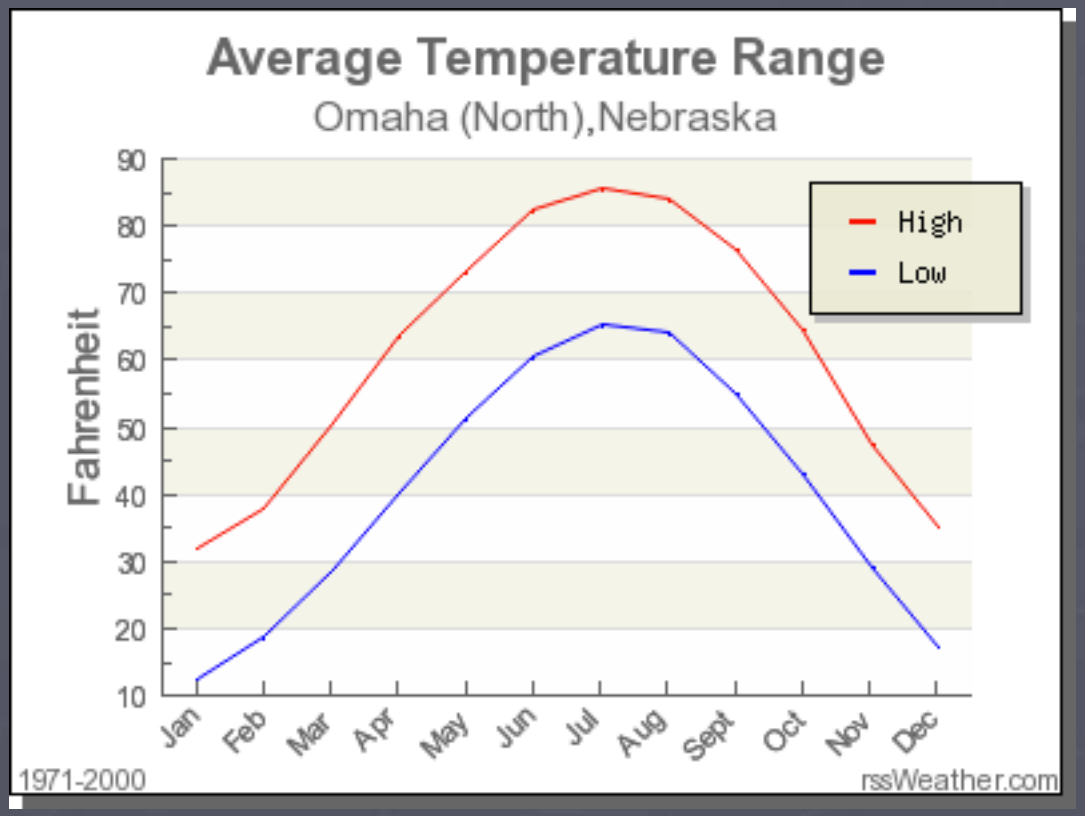
Marine and Continental Climates

- **Marine Effect**, or maritime, describes the lower temperature ranges of locations by the ocean
  - Less seasonal fluctuation
- **Continental Effect** is inland areas that typically experience greater temperature ranges on a daily and yearly basis

Temperature Fluctuations

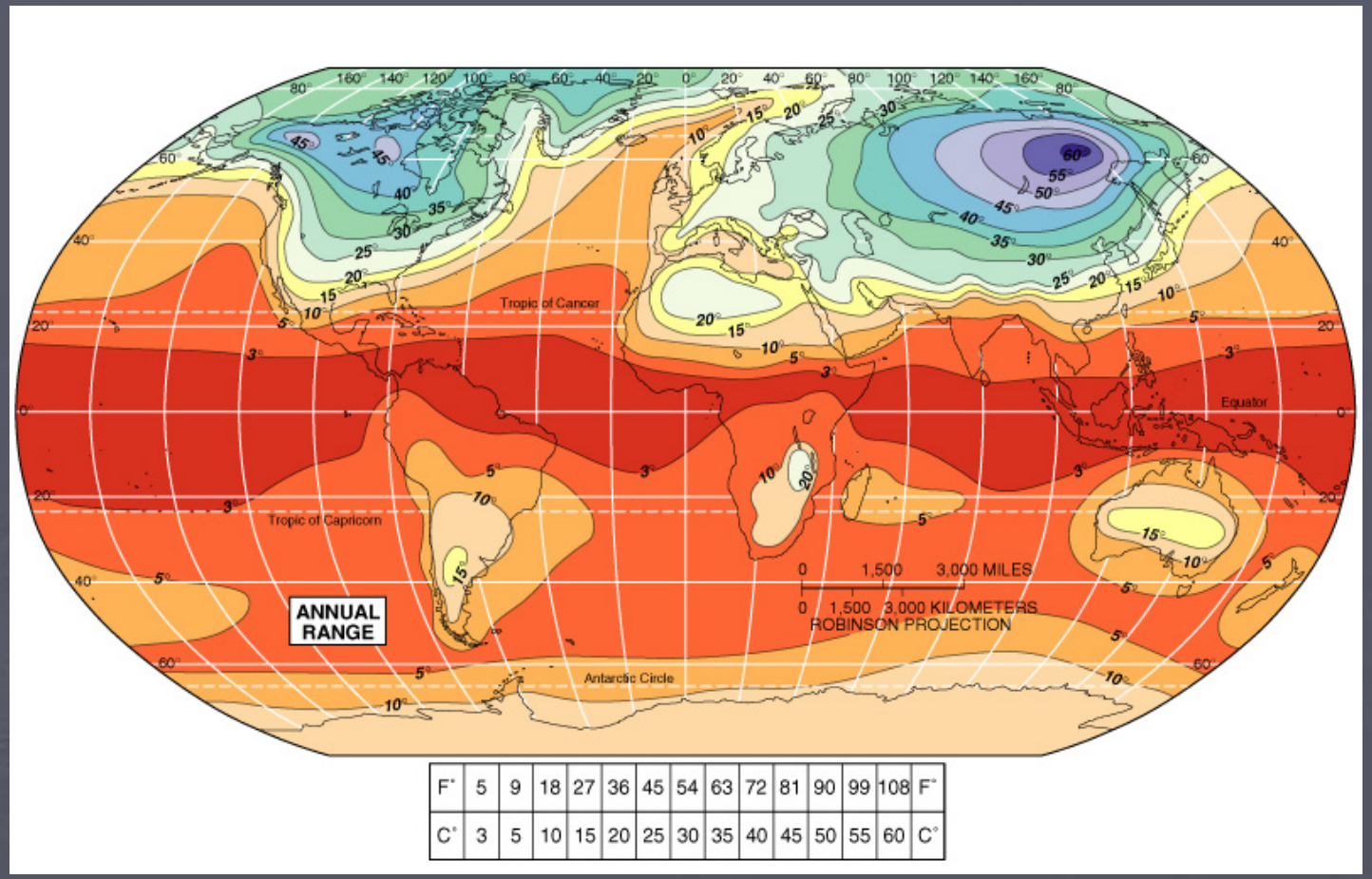


Washington D.C., 38.86 Degrees North



Omaha, Ne, 41.23 Degrees North

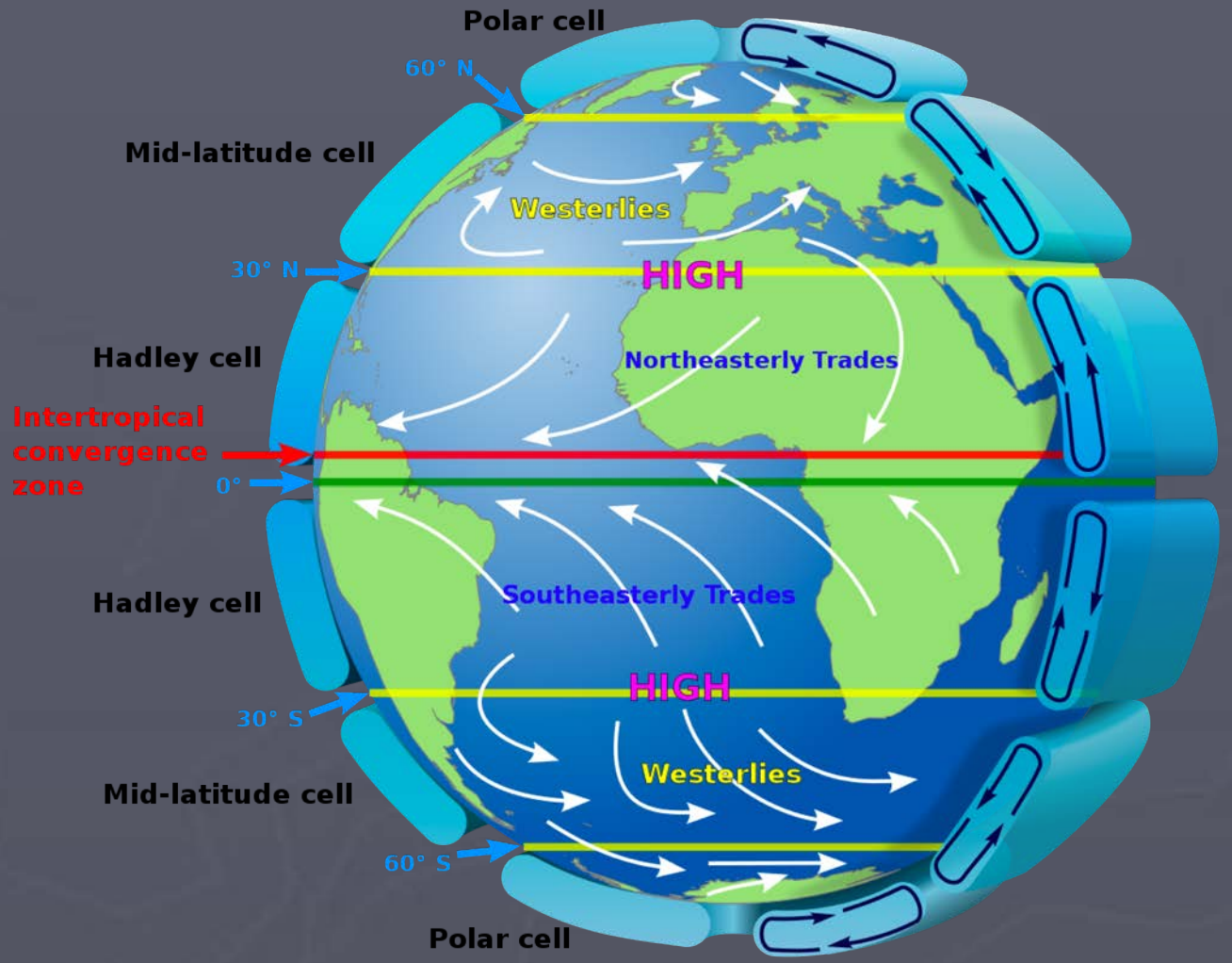
Global Temperature Ranges



F°	5	9	18	27	36	45	54	63	72	81	90	99	108	F°
C°	3	5	10	15	20	25	30	35	40	45	50	55	60	C°

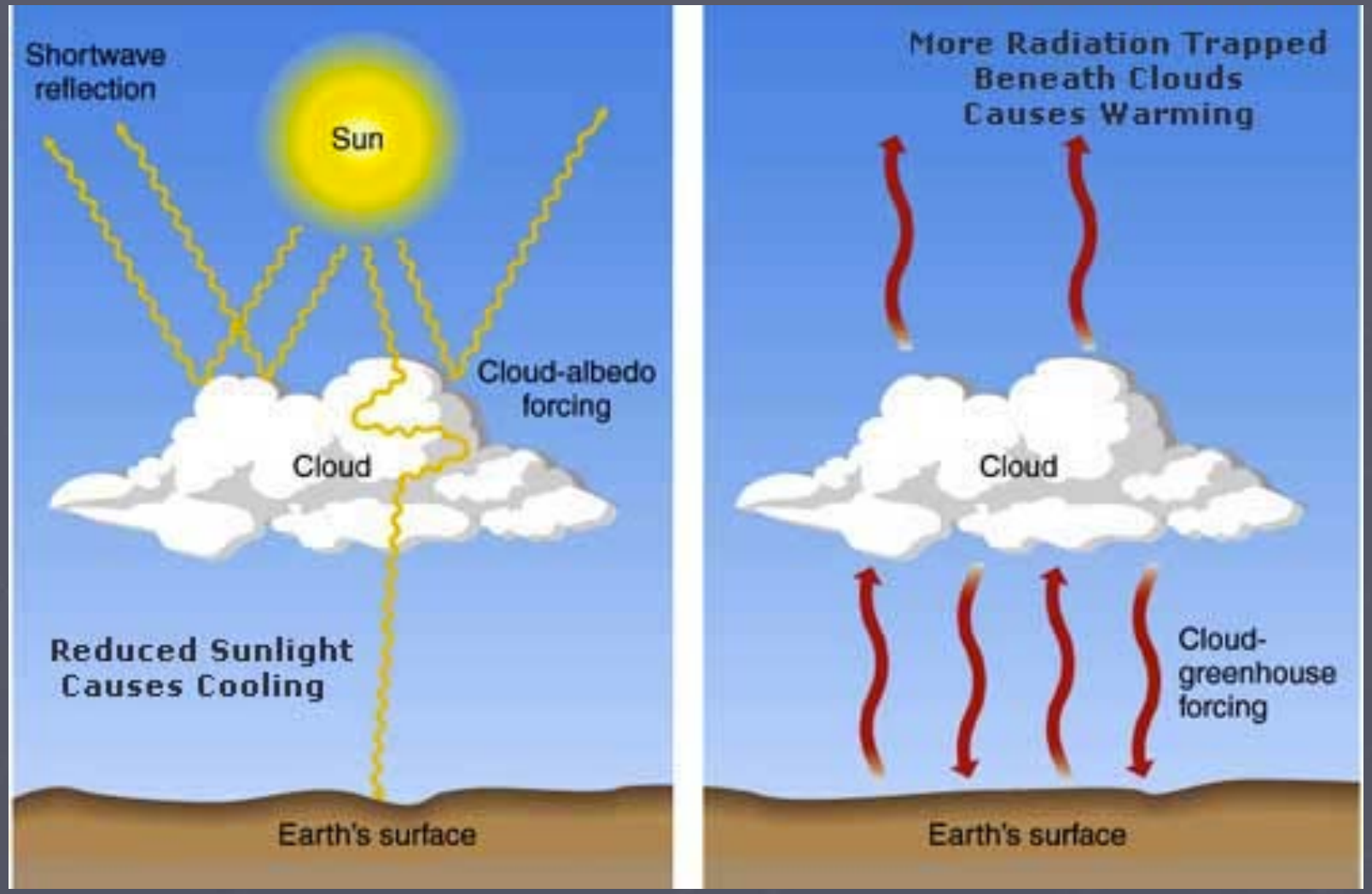
Wind Currents

- Wind currents work to cycle heat out away from equator
  - 75-80% of horizontal heat transfer happens in the atmosphere



Cloud Coverage

- Clouds can cool the Earth's surface by shielding the Sun's Radiation
  - Can also heat by trapping in heat



Ground Cover

- Ground cover can act as insolation, trapping in heat