

LACEMOPS – Controls on Climates

The climate of a particular place is controlled by a variety of geographic and atmospheric forces operating at that place.

Latitude

Air Masses

Continentality and Marine Effects

Elevation

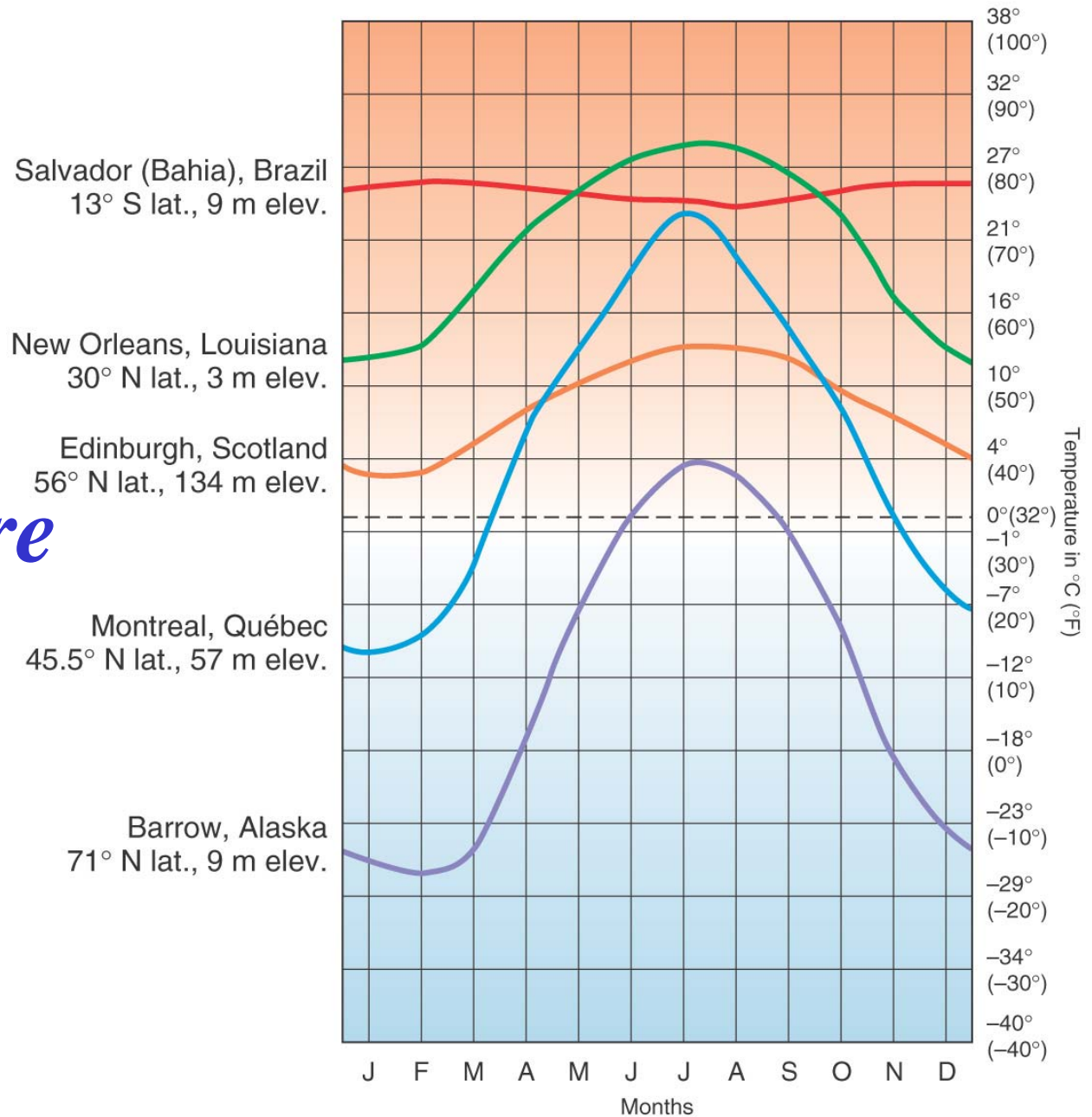
Mountain Barriers

Ocean Currents – Hot or Cold

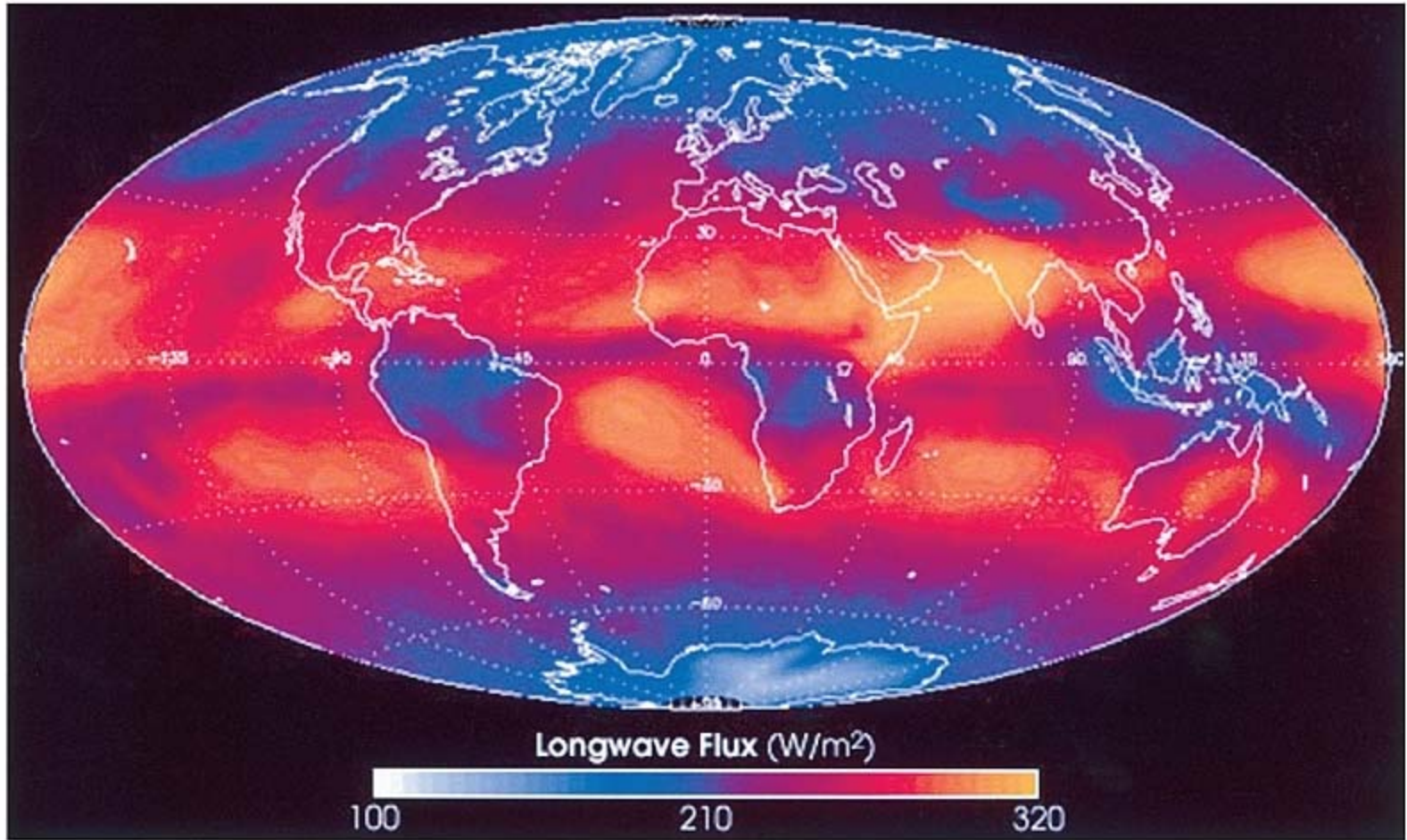
Pressure Cells

Storm Tracks

Latitude and Temperature



Heat Leaving the Earth Shows Importance of Latitude



(b) Longwave energy flux to space.

Arctic Sea Ice Changes

1979

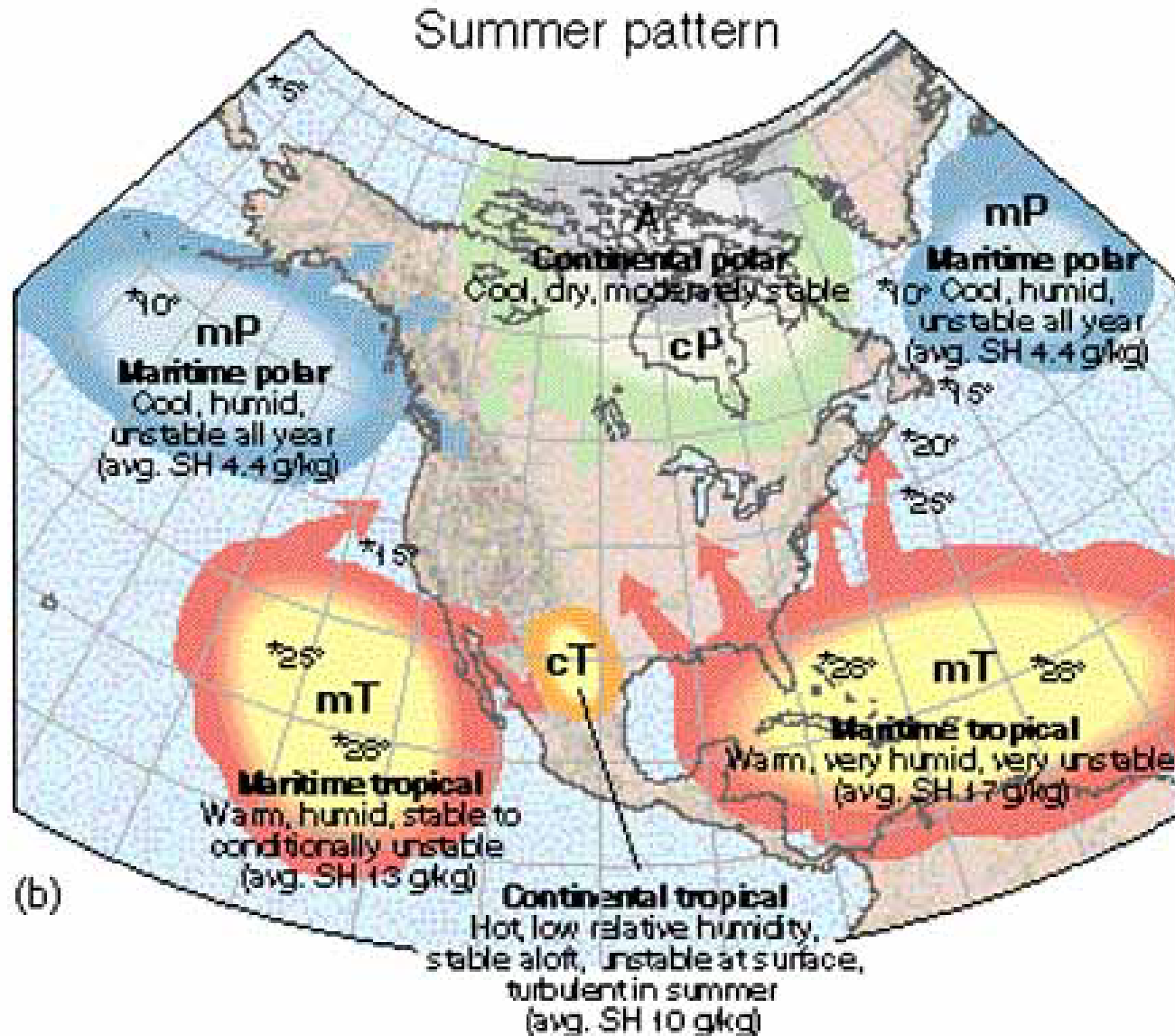


2007



Figure H1.C

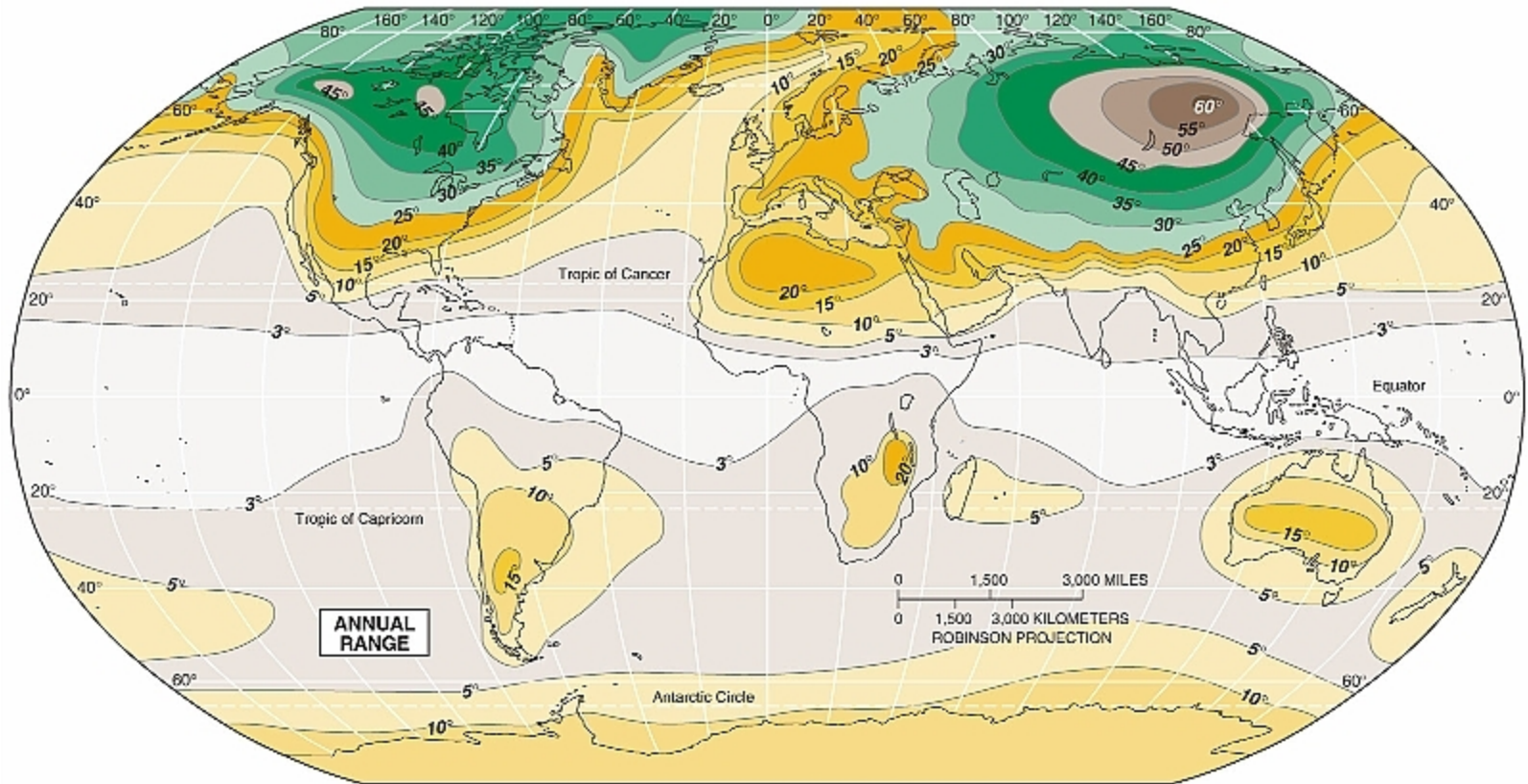
Air Masses Originate in Different Climatic Regions and, Therefore, Have Different Characteristics



Map Showing Effects of Continentality

Interiors of North America and Asia

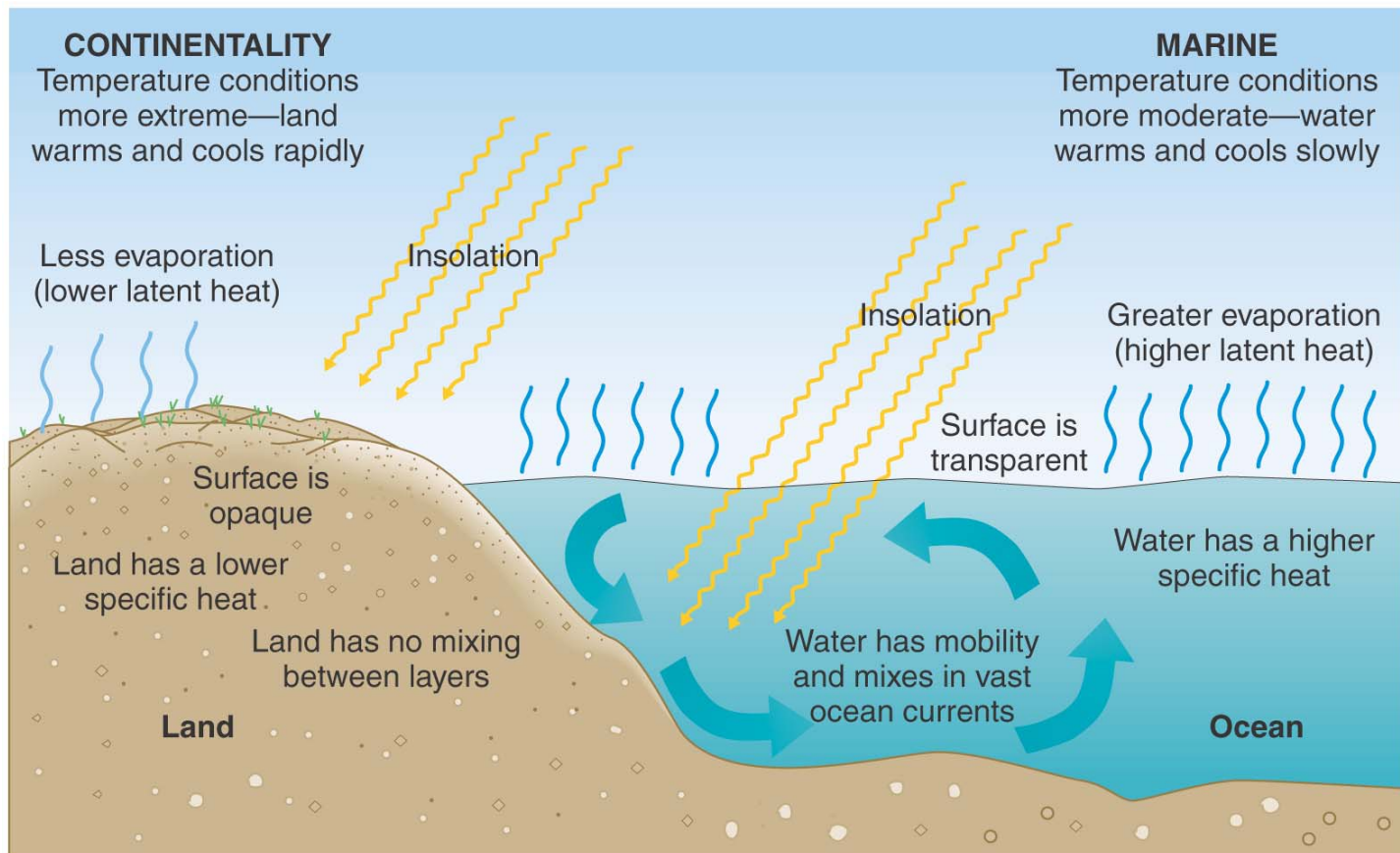
Have a Large Annual Range of Temperature



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°

Continentality Implies a Large Seasonal Range in Temps.
Marine Implies Minimal Seasonal Changes in Temp

Land–Water Heating Differences

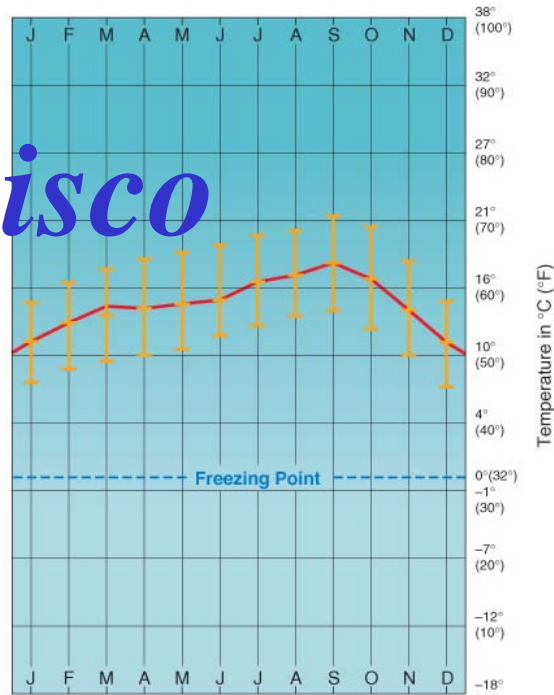


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Figure :

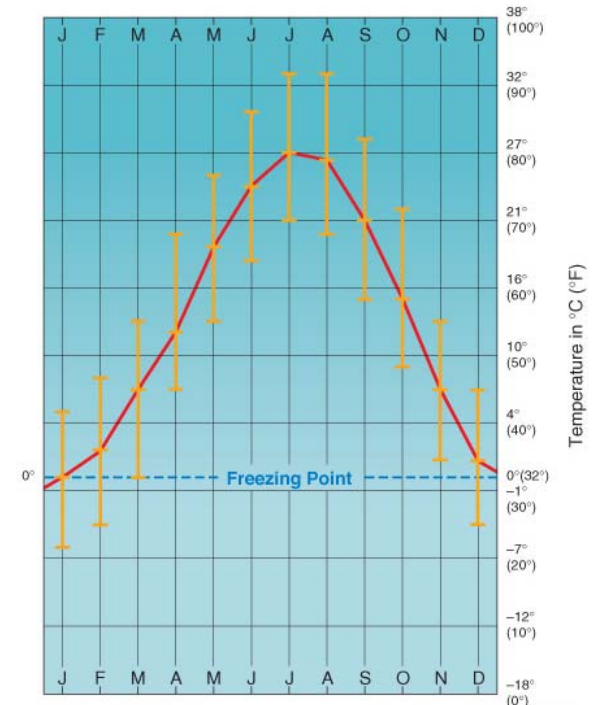
Marine and Continental

Climates: San Francisco vs. Wichita



Station: San Francisco, California
Lat/long: 37° 37' N 122° 23' W
Avg. ann. temp.: 14.6°C (58.3°F)
Total ann. precip.: 56.6 cm (22.3 in.)

Elevation: 5 m (16.4 ft)
Population: 777,000
Ann. temp. range: 11.4 C° (20.5 F°)



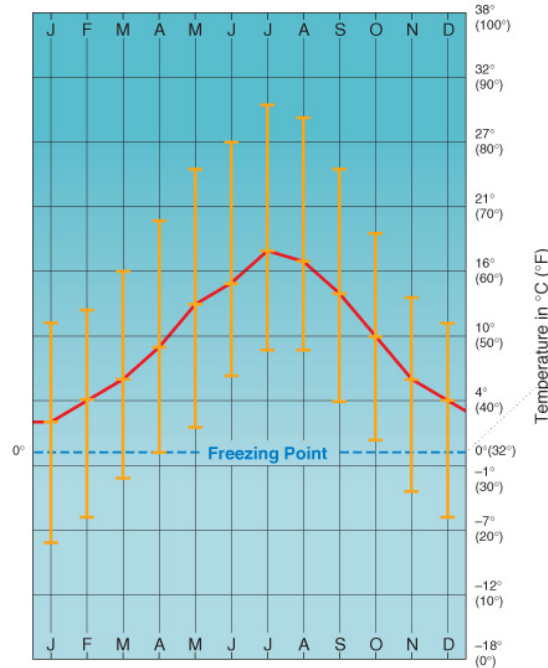
Station: Wichita, Kansas
Lat/long: 37° 39' N 97° 25' W
Avg. ann. temp.: 13.7°C (56.6°F)
Total ann. precip.: 72.2 cm (28.4 in.)

Elevation: 402.6 m (1321 ft)
Population: 327,000
Ann. temp. range: 27 C° (48.6 F°)



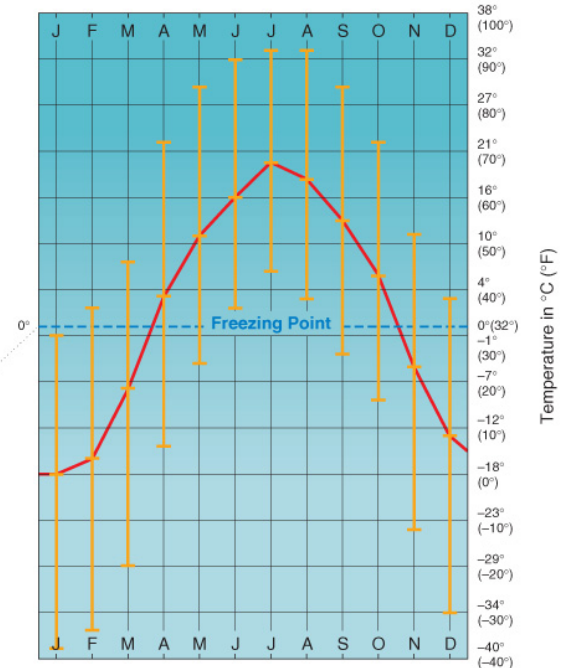
Figure 5.13

Marine and Continental Climates: Vancouver vs. Winnipeg



Station: Vancouver, British Columbia
Lat/long: 49° 11' N 123° 10' W
Avg. ann. temp.: 10°C (50°F)
Total ann. precip.: 104.8 cm (41.3 in.)

Elevation: sea level
Population: 520,000
Ann. temp. range: 16 C° (28.8 F°)



Station: Winnipeg, Manitoba
Lat/long: 49° 54' N 97° 14' W
Avg. ann. temp.: 2°C (35.6°F)
Total ann. precip.: 51.7 cm (20.3 in.)

Elevation: 248 m (813.6 ft)
Population: 620,000
Ann. temp. range: 38 C° (68.4 F°)



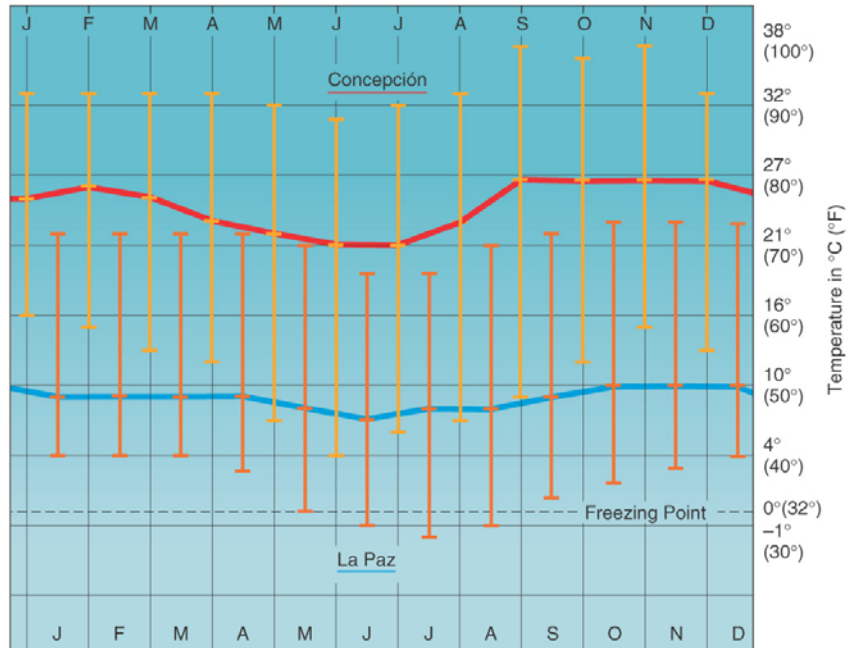
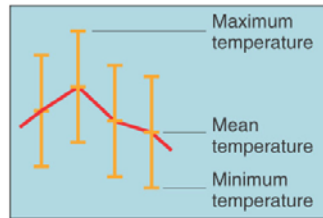
Figure 5.12

Elevation – The Higher the Elevation the Cooler the Climate



La Paz, Bolivia at 13,400 ft. Is Much Cooler than Concepción at 1608 ft.

Altitude

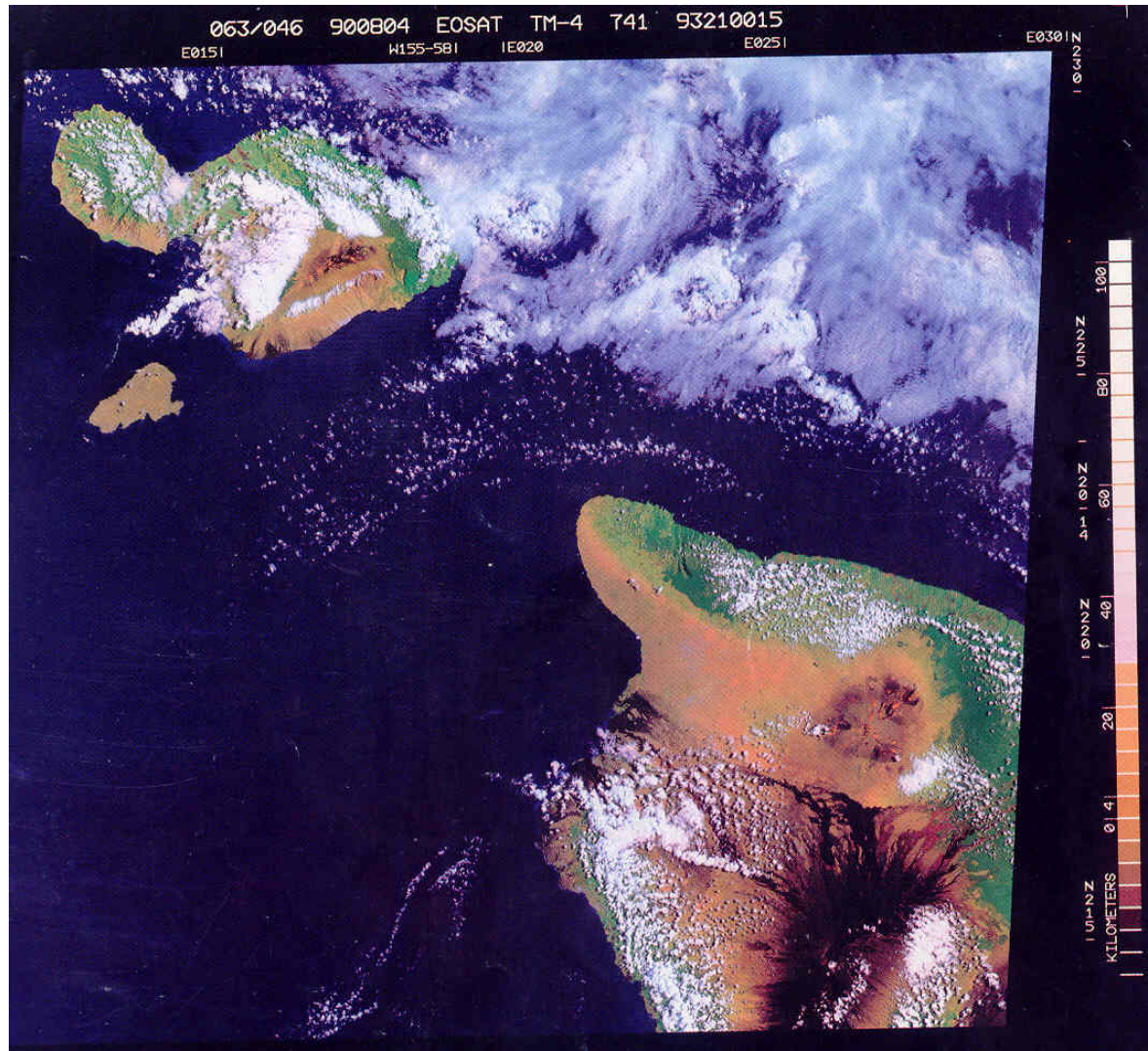


	Station	
	Concepción, Bolivia	La Paz, Bolivia
Latitude/longitude	16° 15' S 62° 03' W	16° 30' S 68° 10' W
Elevation	490 m (1608 ft)	4103 m (13,461 ft)
Avg. ann. temperature	24°C (75.2°F)	9°C (48.2°F)
Ann. temperature range	5°C (9°F)	3°C (5.4°F)
Ann. precipitation	121.2 cm (47.7 in.)	55.5 cm (21.9 in.)
Population	10,000	810,300 (Administrative division 1.6 million)

Mummy Mountain, RCNP, Shows Effects of Elevation in Vegetation Patterns

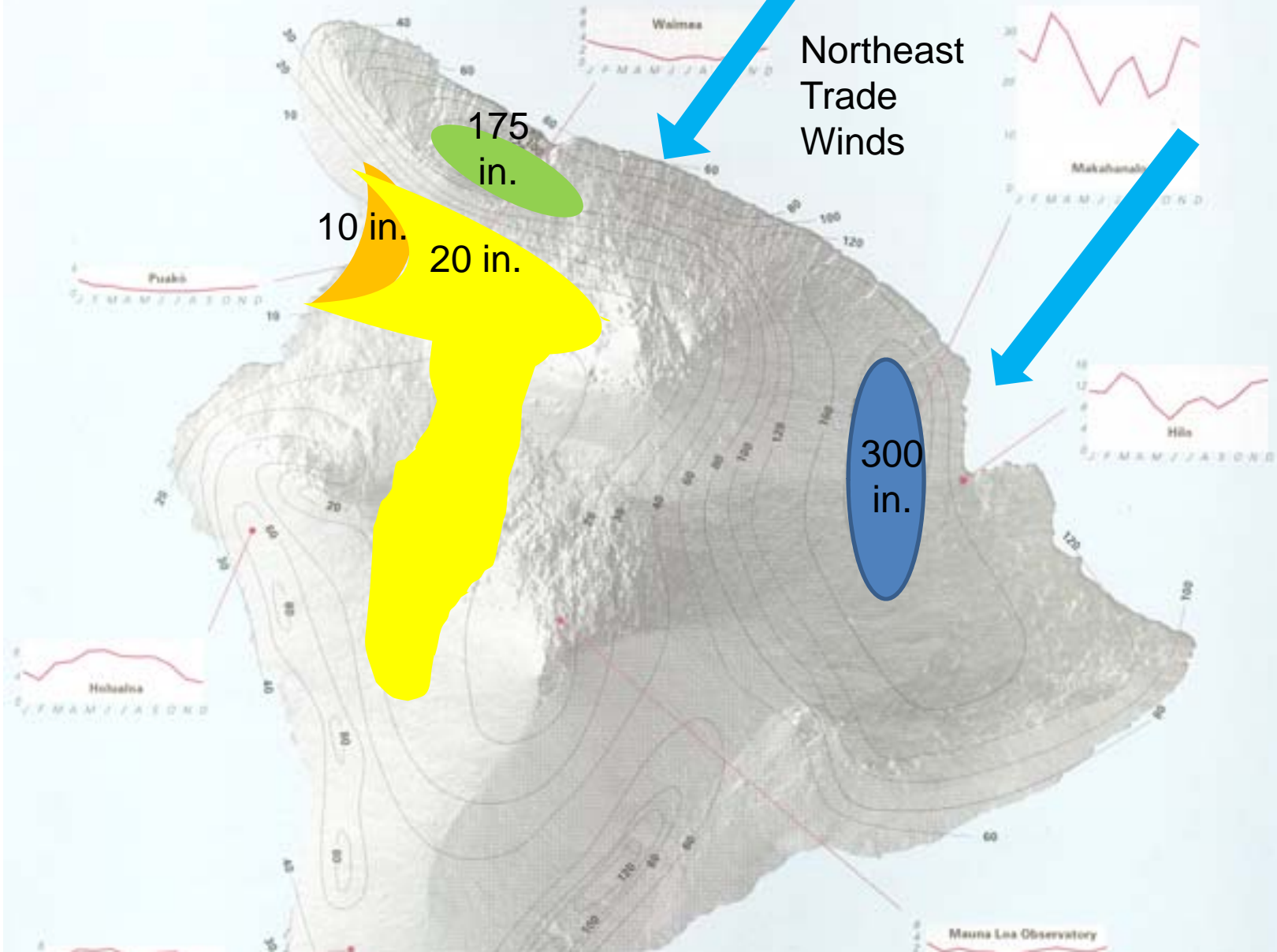


Mountains Are Very Effective Barriers to the Movement of Moisture. Some of the Wettest Places in the World are on the Windward Side of Mountains While Some of the Driest are on the Leeward Side

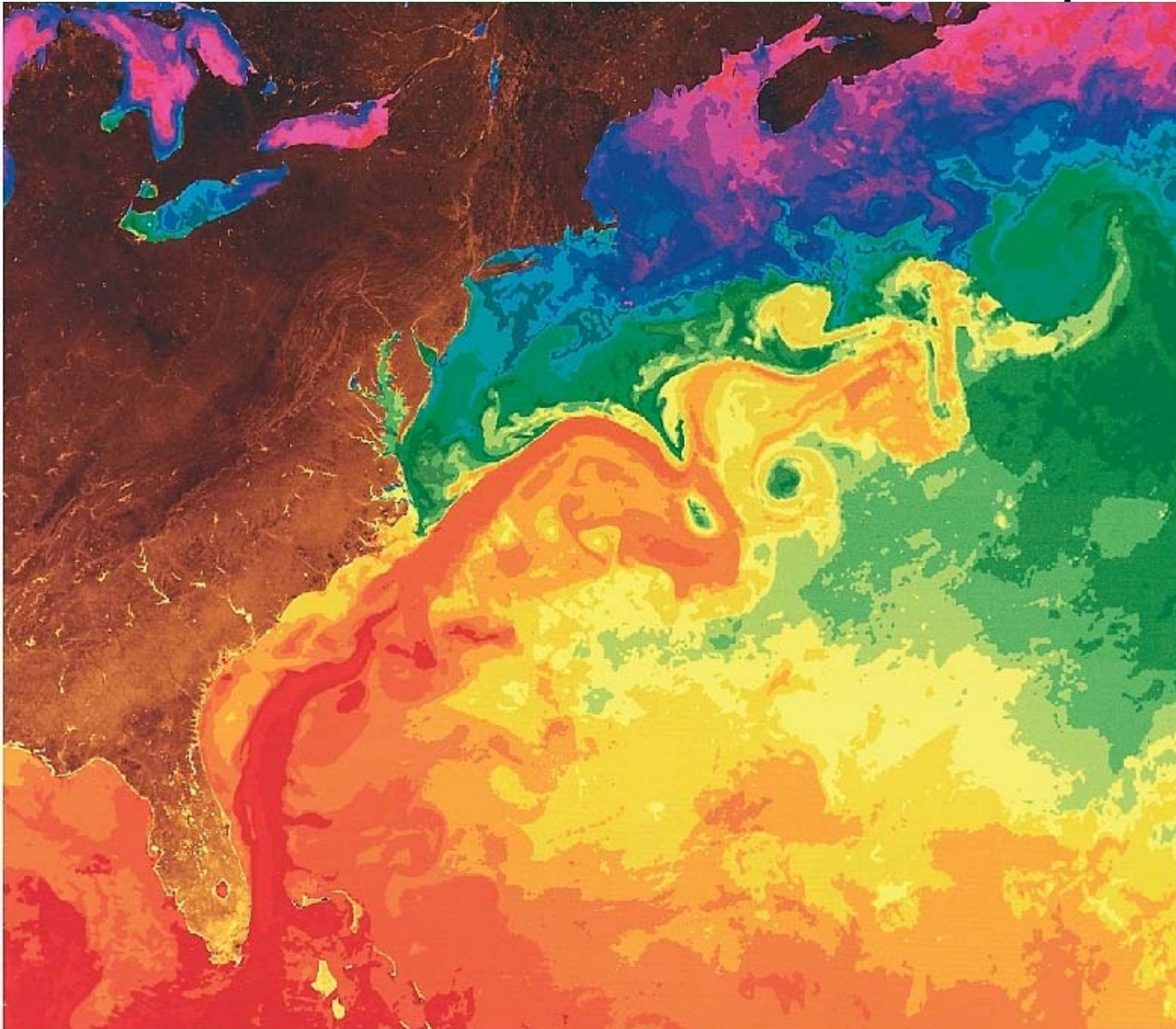


Hawai'i

Average Annual Rainfall on Hawaii



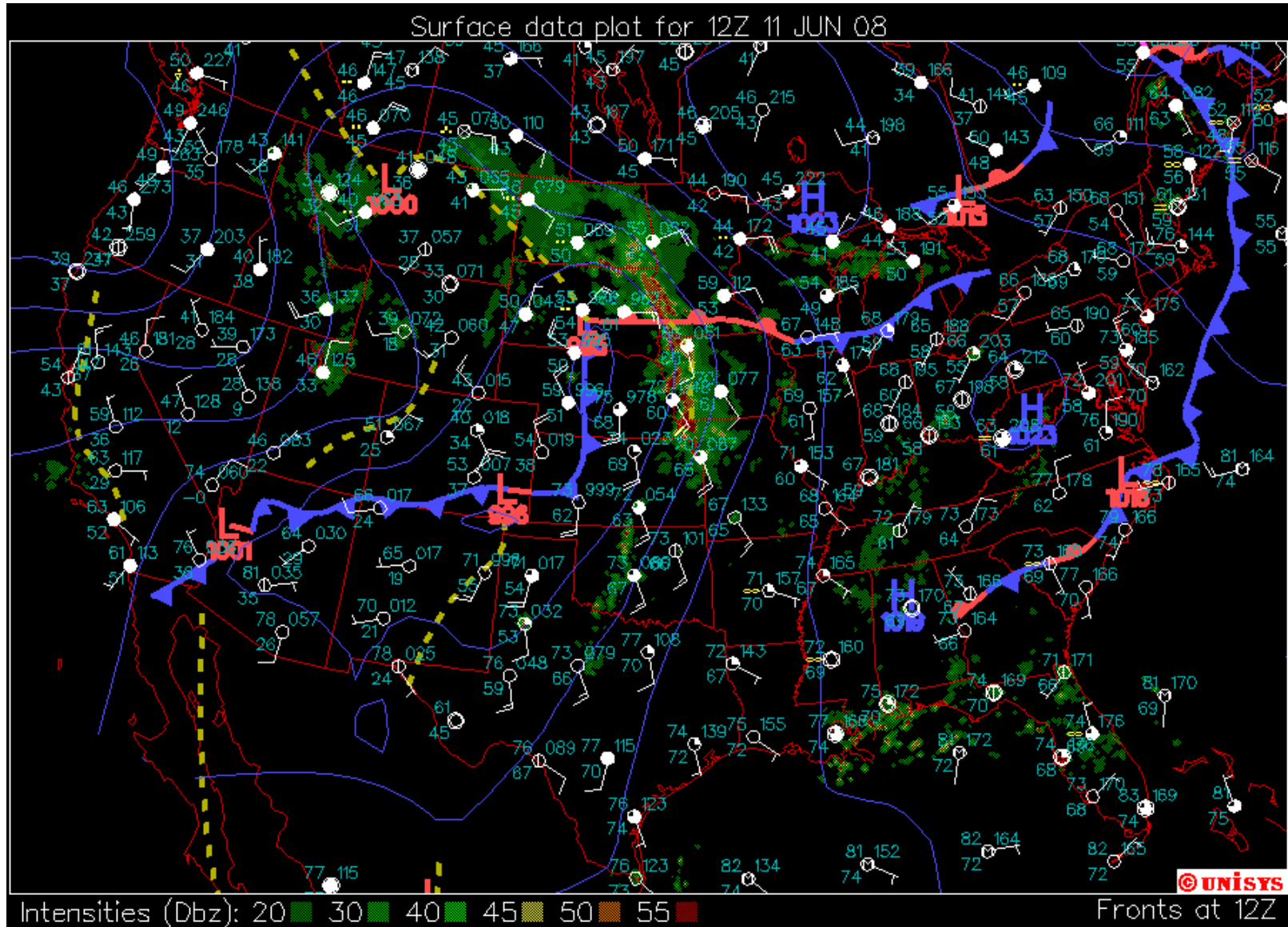
Ocean Currents – The Gulf Stream Carries Warm Water Toward Europe



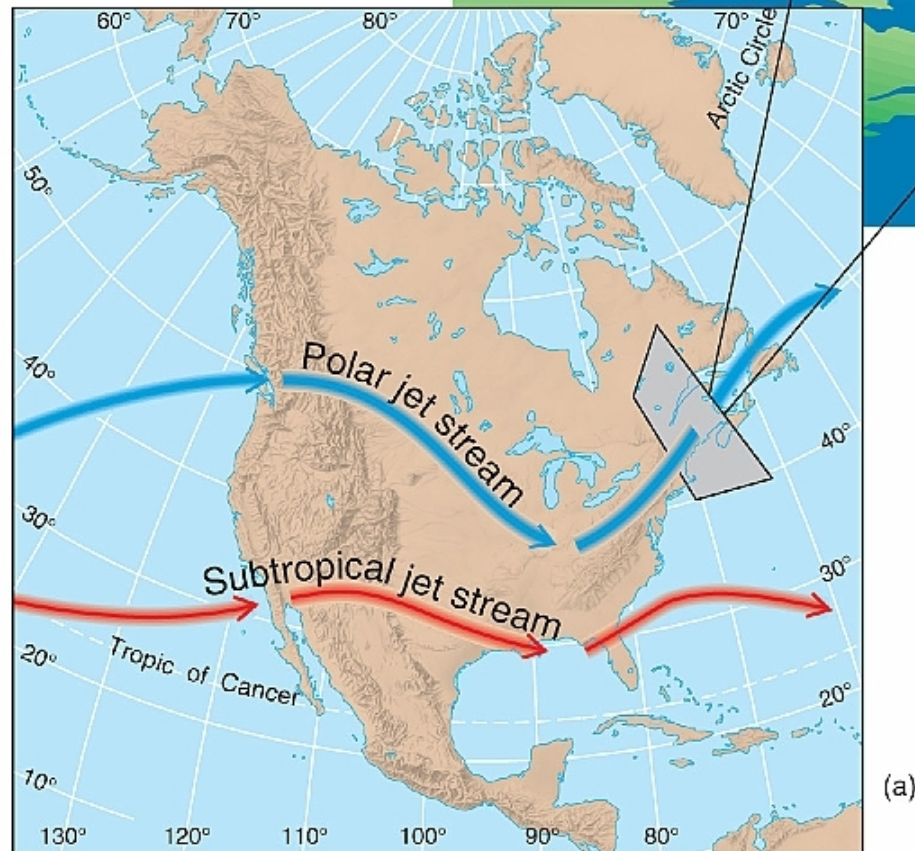
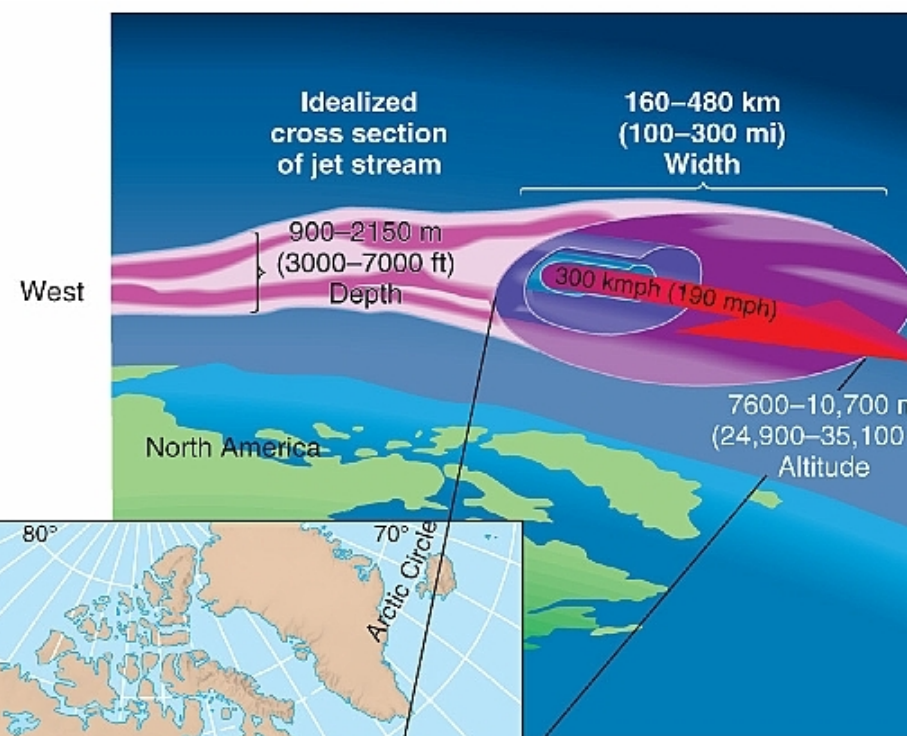
California Surfers Have to Fight the Cold Water of the California Current



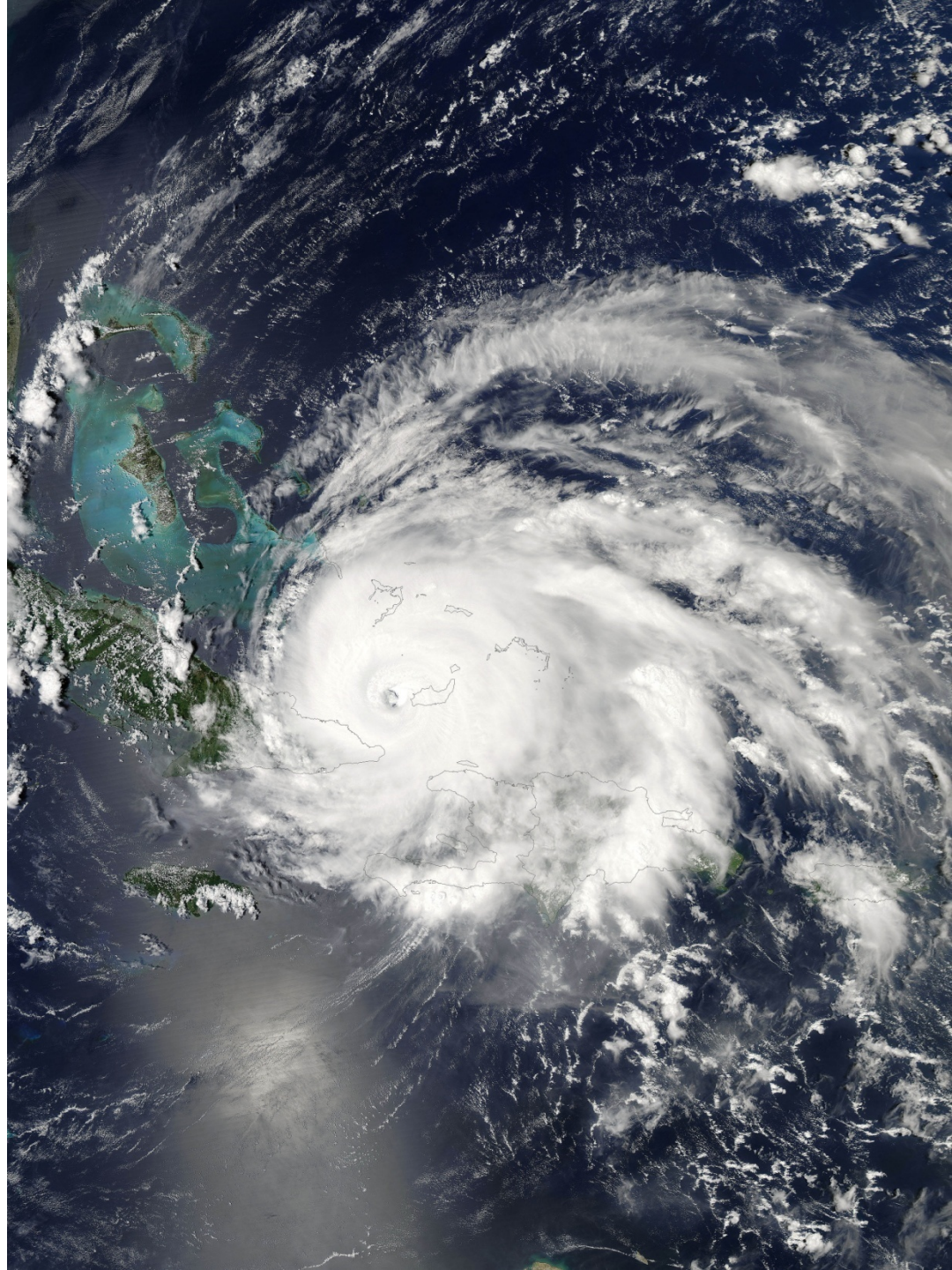
The Dynamics of High and Low Pressure Cells Causes Frequent Changes of Weather in the U.S.



The Westerlies Push Cyclones and Anticyclones Across the Country



Hurricane Ike Over Cuba



I-45 Near Galveston After Hurricane Ike

