Biogeography

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Lecture 5

Outline

MINOT STATE UNIVERSITY

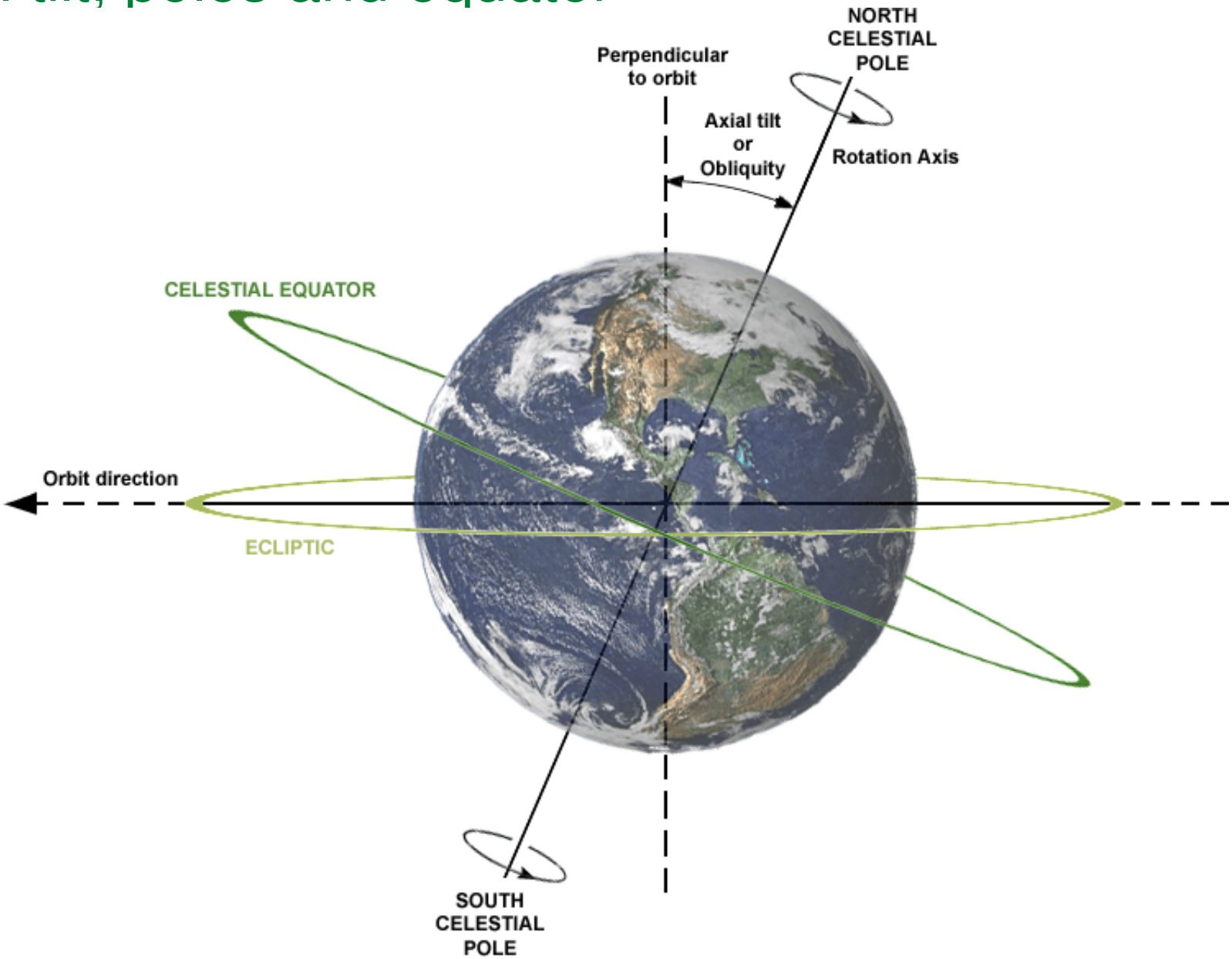
Basics of physical geography

Basics of geodesy

Basics of geodesy

- Axial tilt
- Equator
- Poles (and magnetic poles)
- Tropics
- Arctic circles
- Longitude and latitude, prime meridian and international date line
- Time zones and UTC
- Hemispheres

Axial tilt, poles and equator



180° Meridian, Taveuni, Fiji

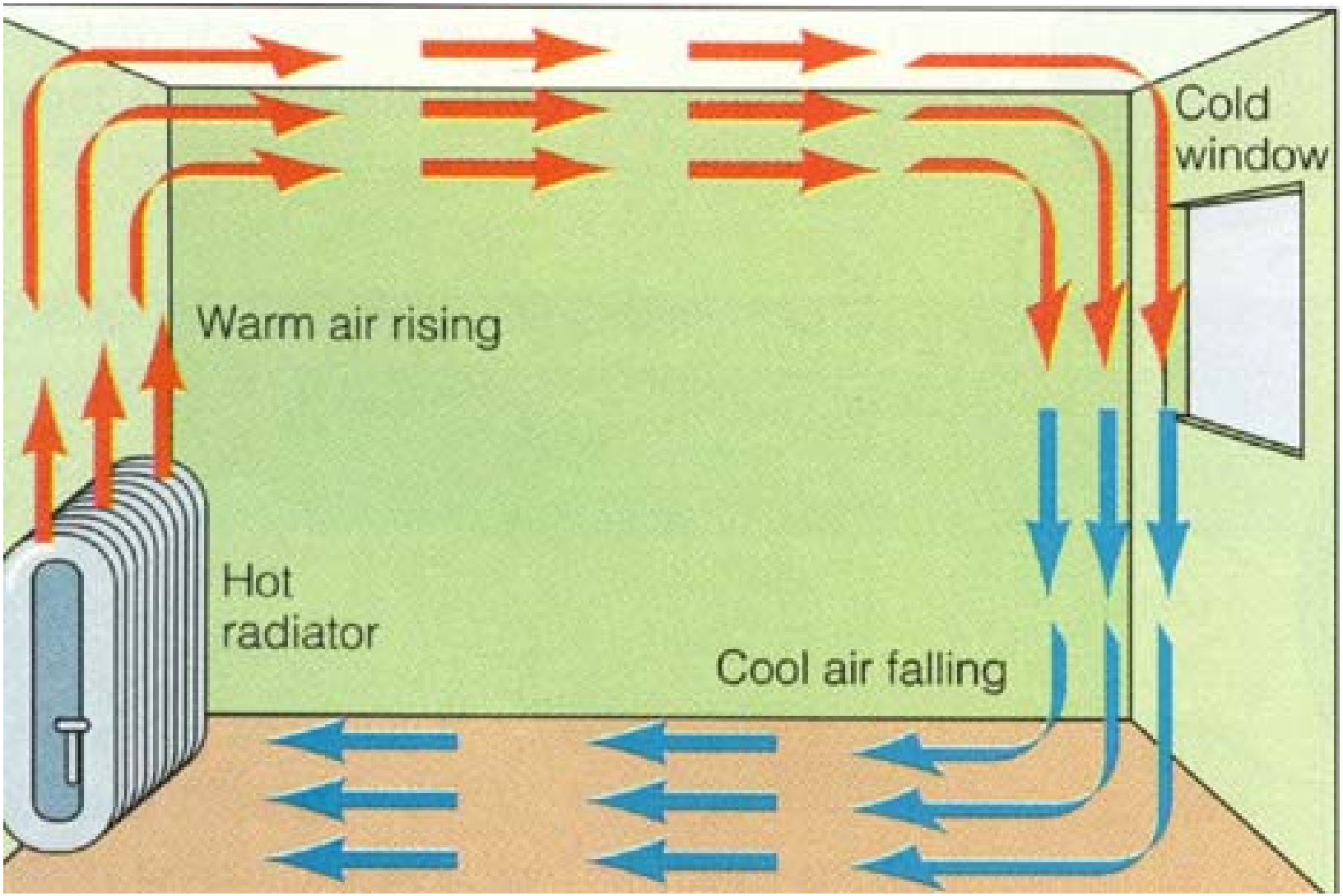
Basics of physical geography

Basics of climatology

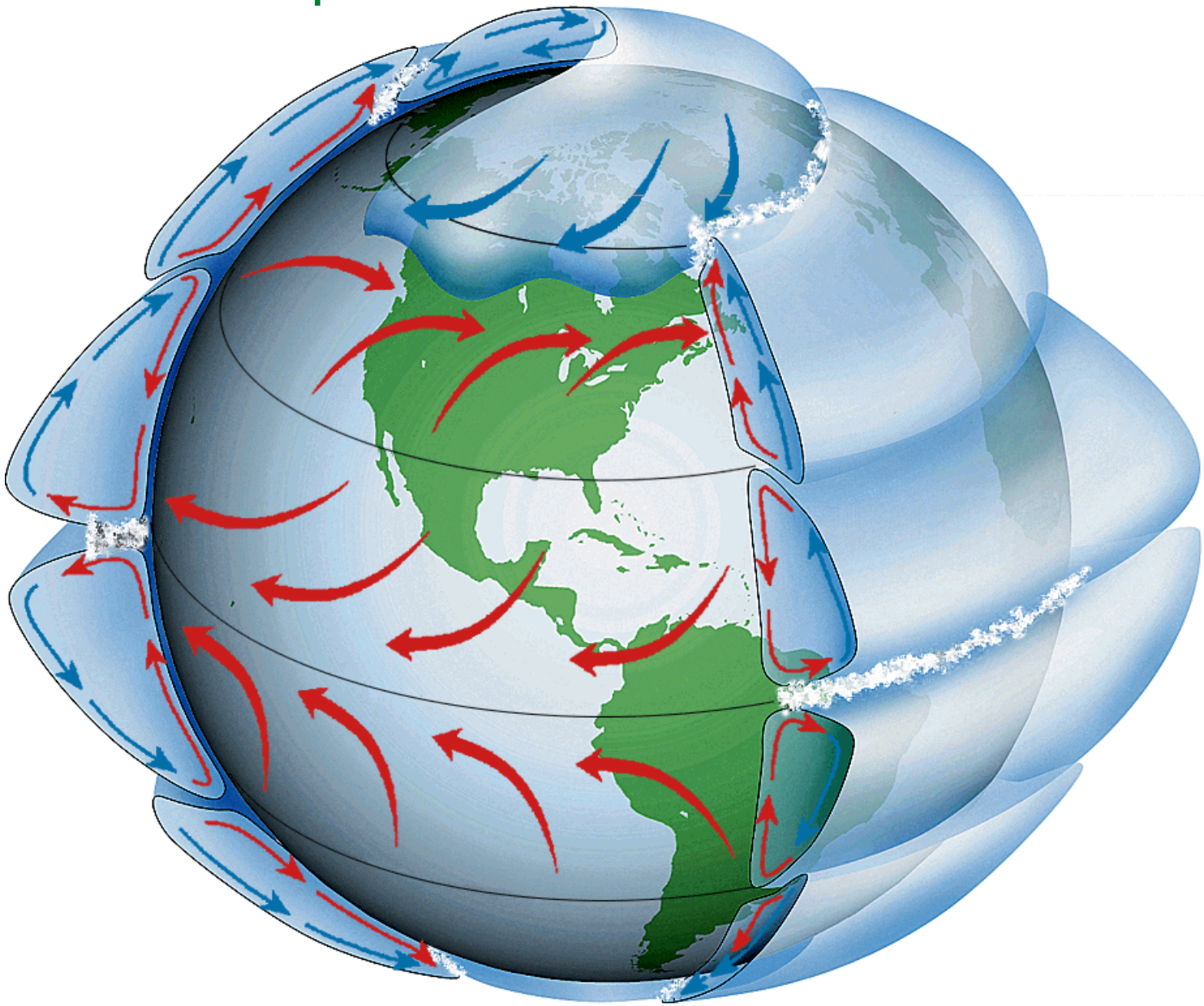
Atmospheric circulation

- High pressure and low pressure zones, cyclones and anticyclones
- Circulation cells
- Trade winds and westerlies
- Horse latitudes and zone of convergence

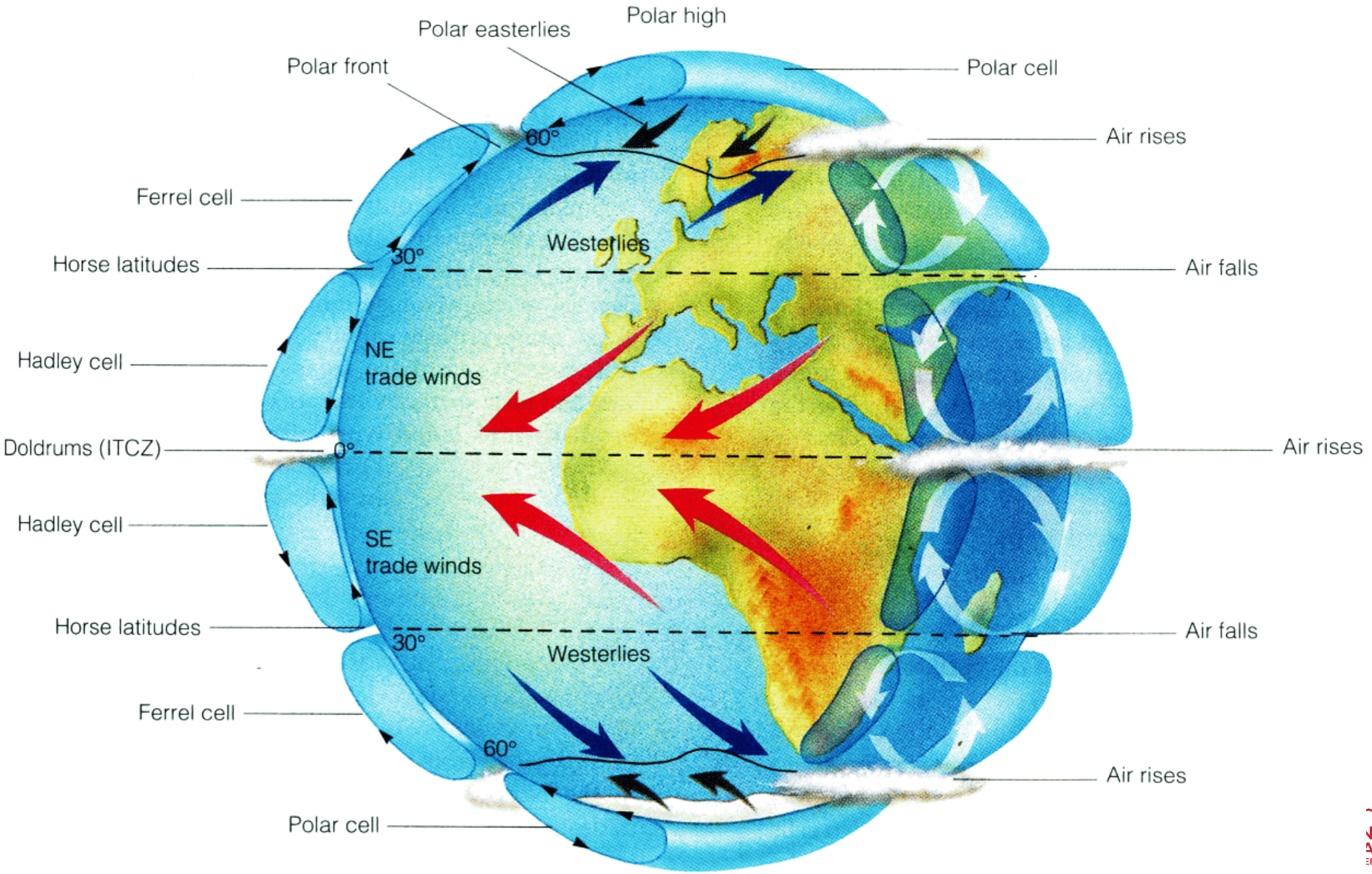
Circulation in a room



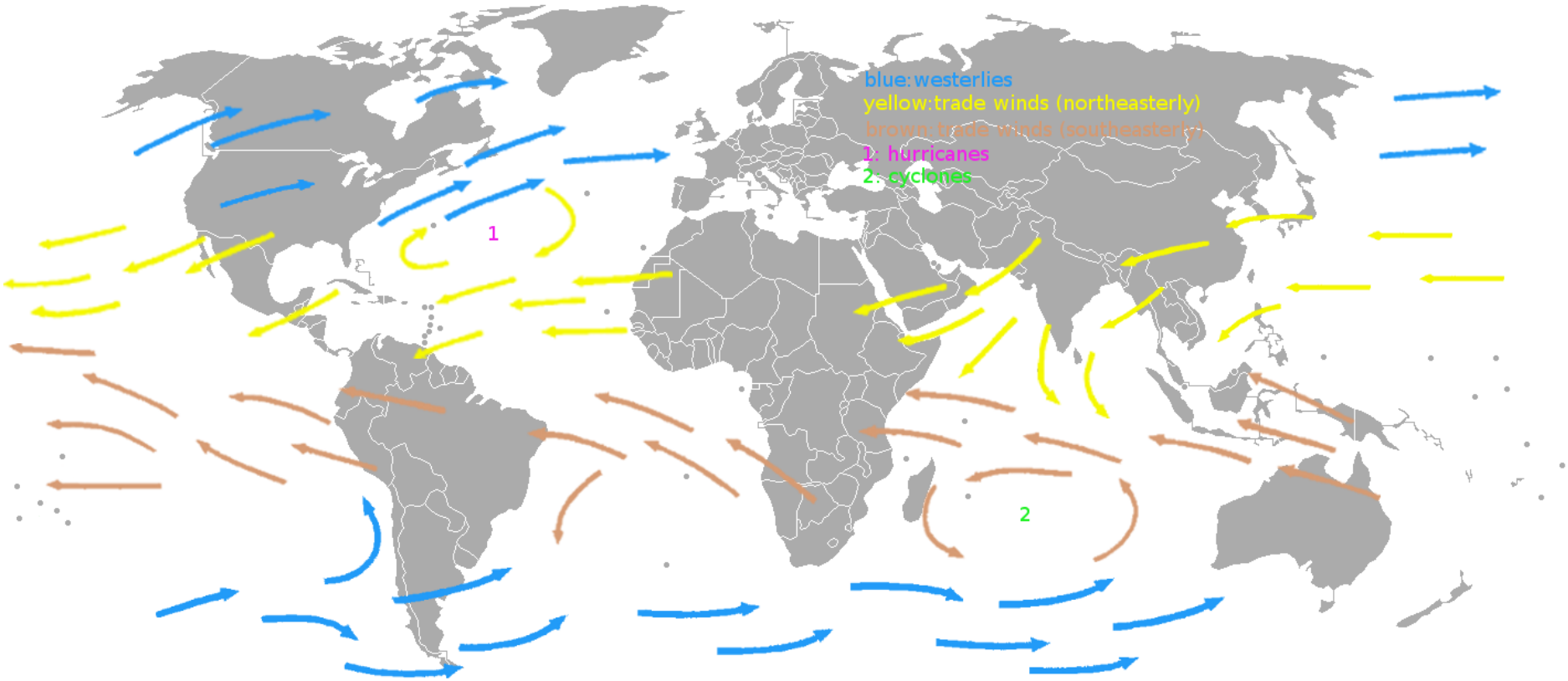
Idealized atmospheric circulation on Earth



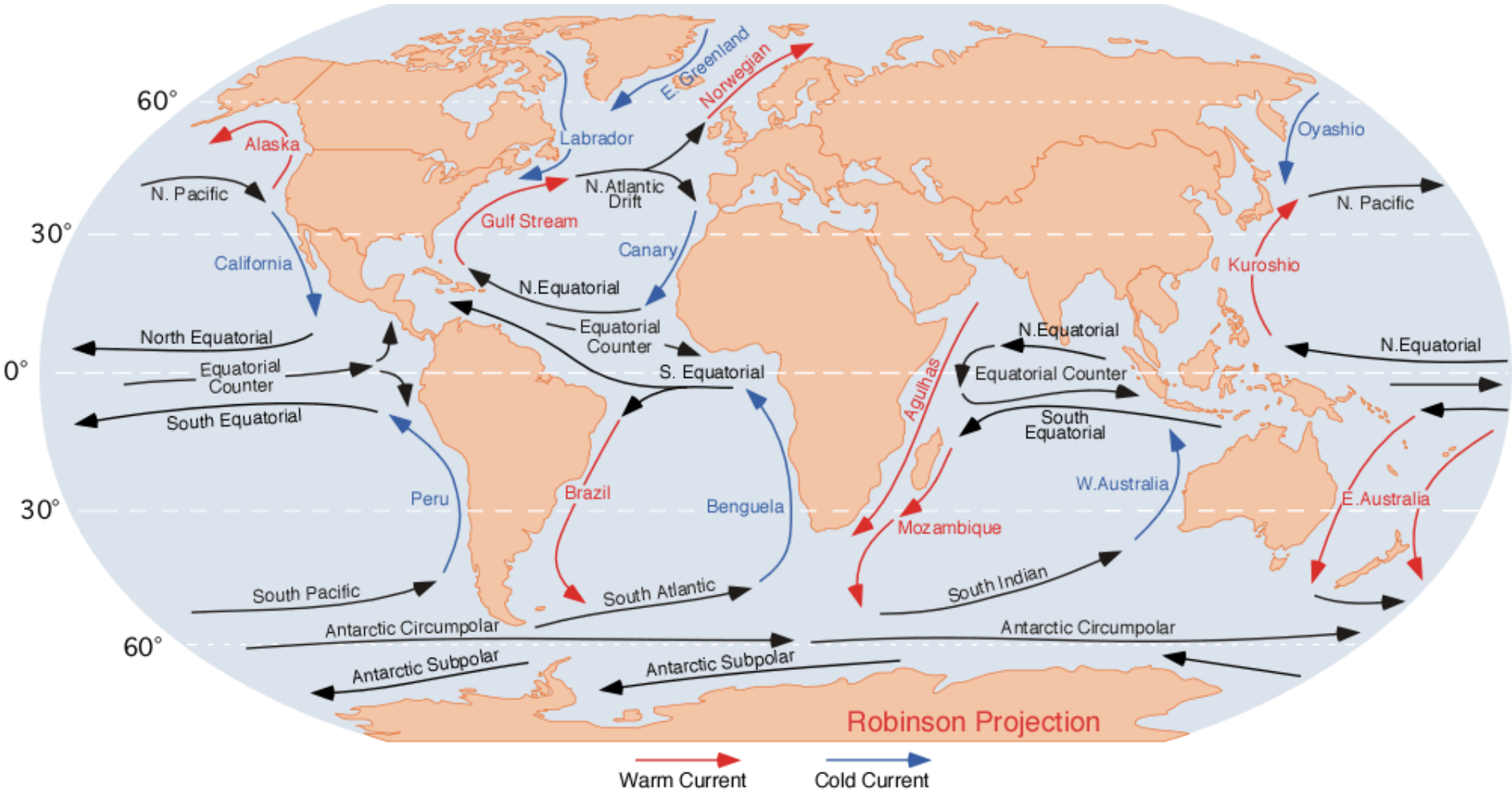
Idealized atmospheric circulation on Earth (with labels)



Prevailing winds



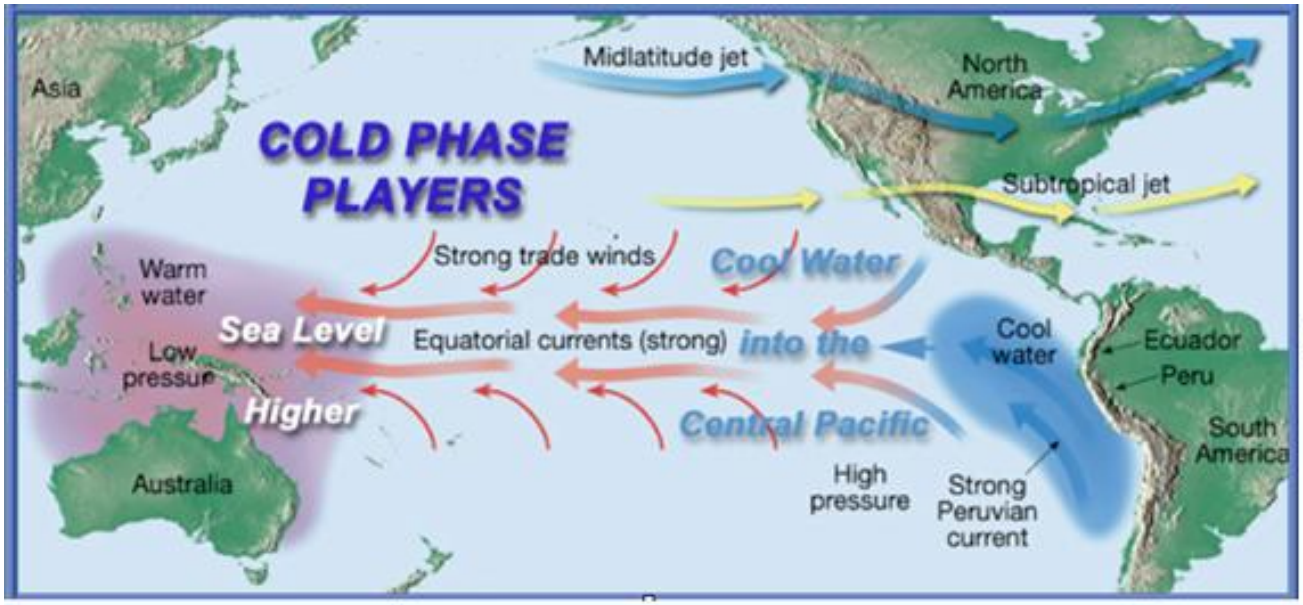
Ocean currents



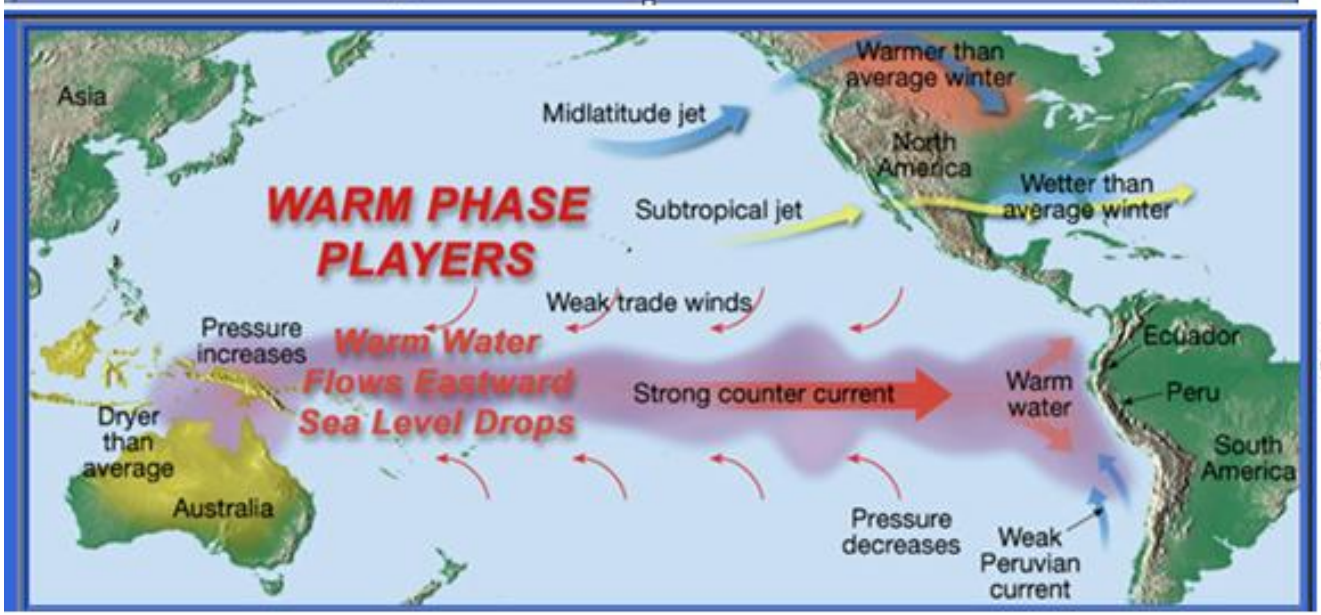
El Niño: climatic oscillation

- Sometimes, western warm currents change atmospheric cicrulation in East Pacific
- They will bring wet and warm weather, mostly damaging to the living organisms from western North and South America (adapted to low precipitation)

La Niña *versus* El Niño

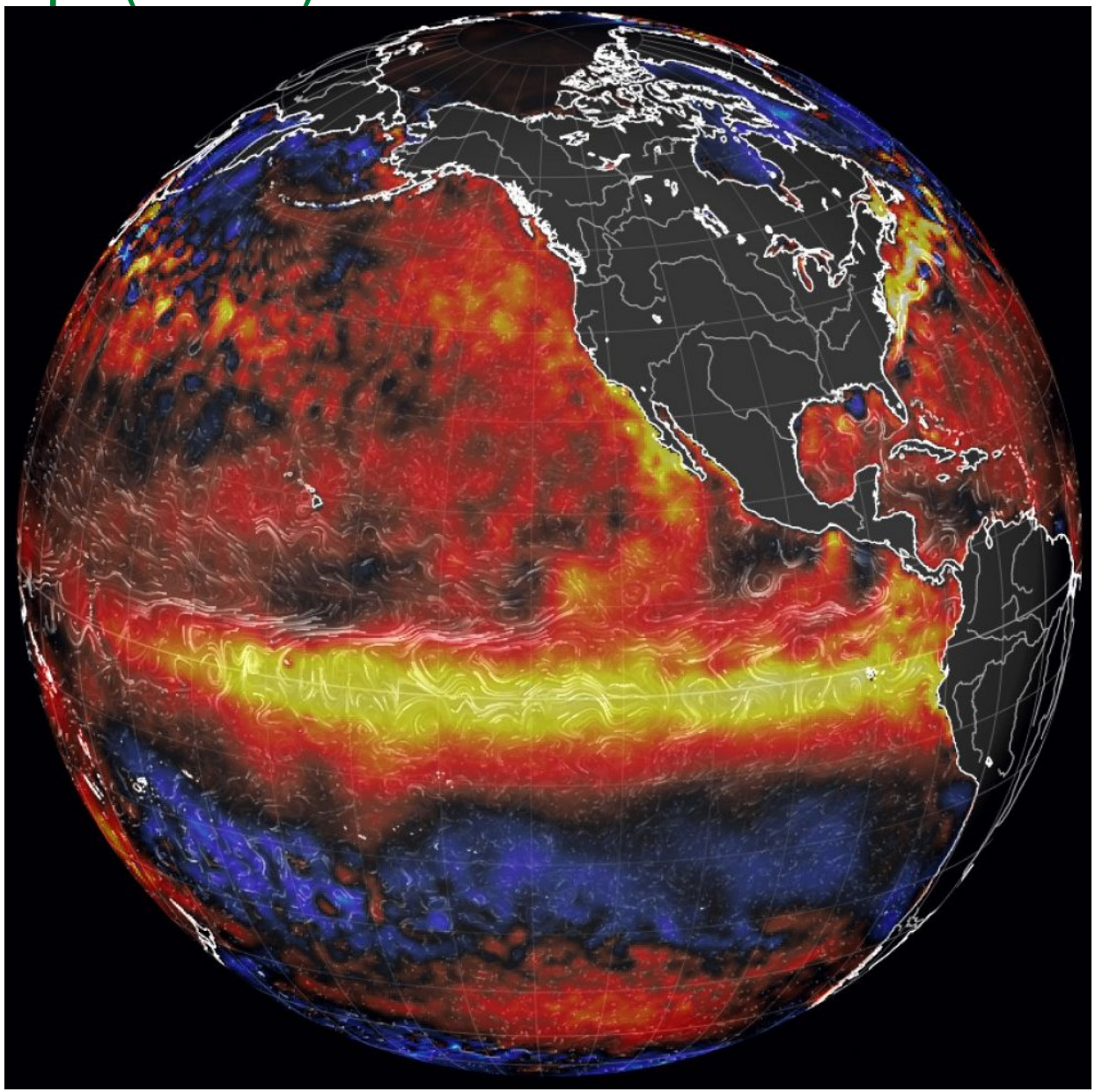


Normal Situation



El Nino Situation

Last El Ninjo (2016)



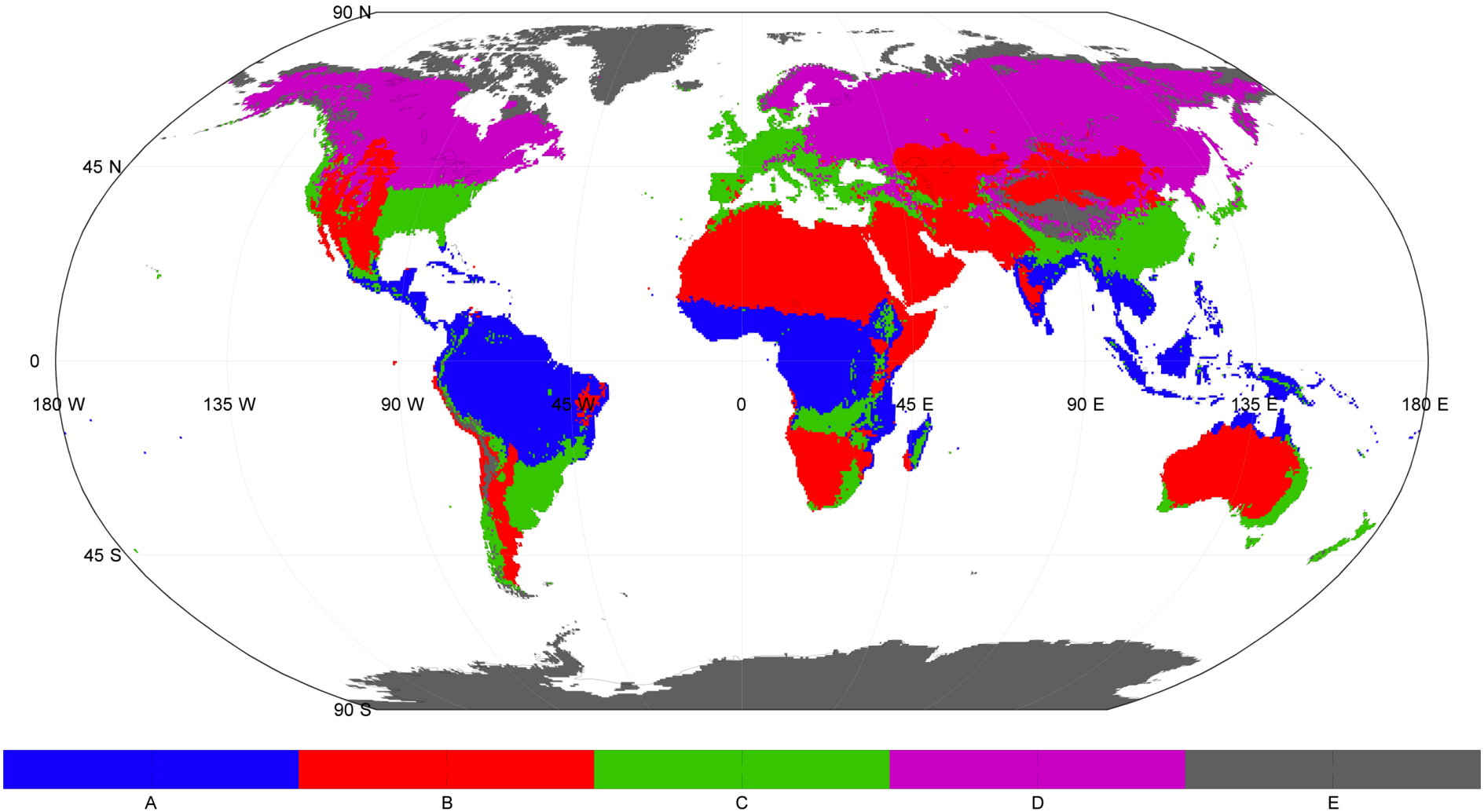
Seasons

- Temperature seasons: axial, not orbital effects
- Tropical wet seasons (monsoons) are related with temperature seasons and circulation

Climates

- Geographical zones: arctic, temperate and tropical
- Koeppen climates: A, tropical; B, dry; C, mild mid-latitude; D, cold mid-latitude; and E, polar

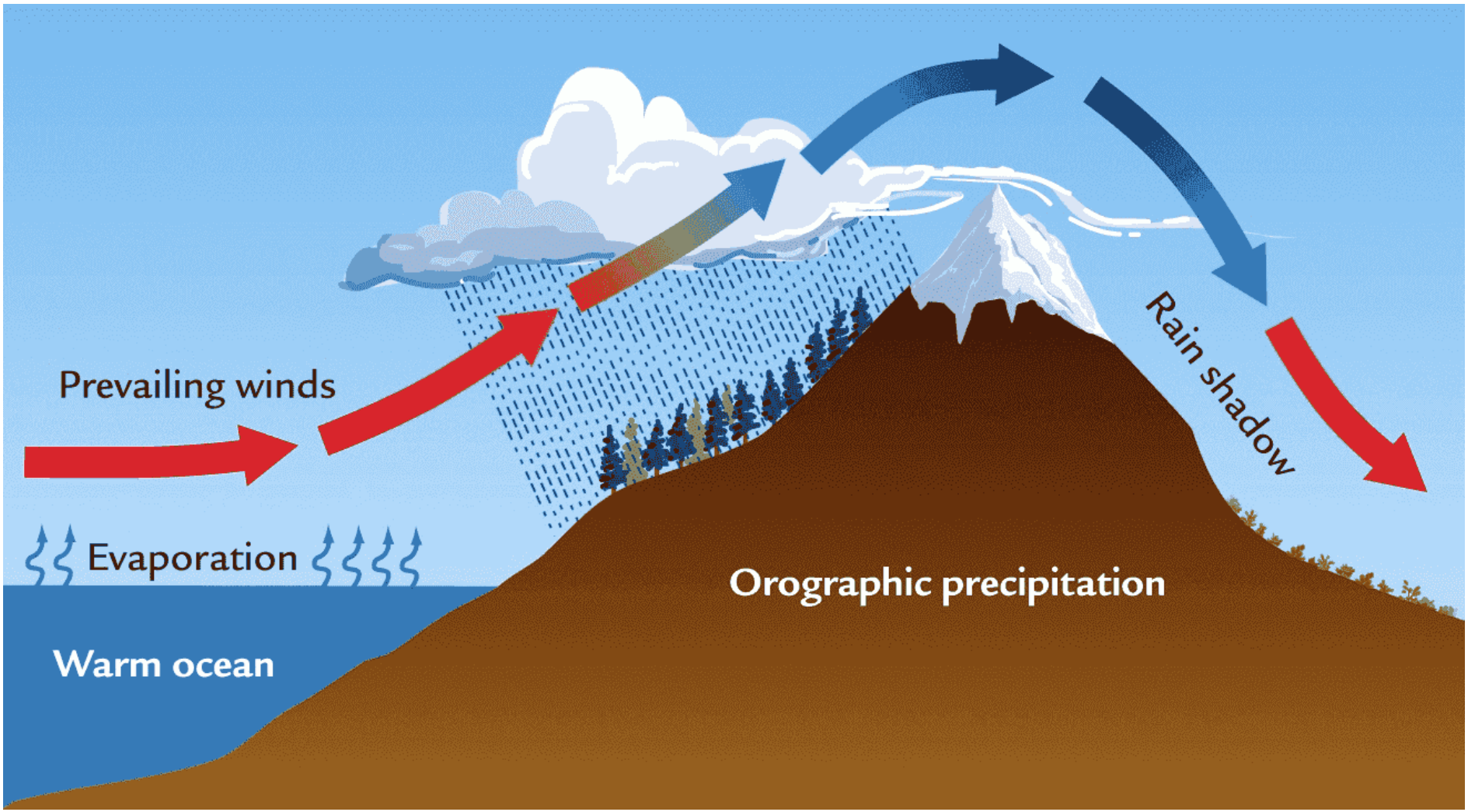
Koeppen climates



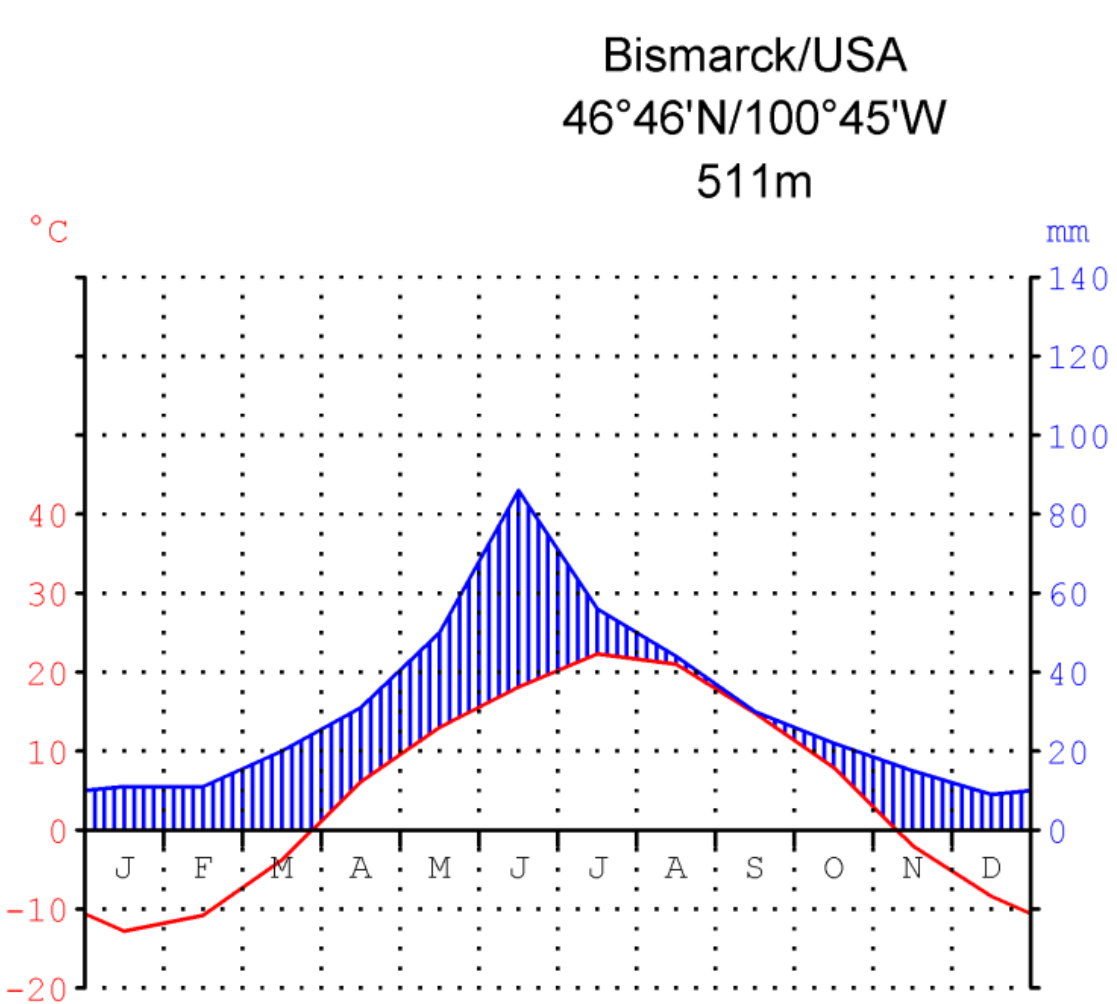
Climate and altitude

- Sea warming and rain shadow
- Altitudinal zones: lowland, montane, subalpine, alpine and snow

Sea warming and rain shadow



Climate diagram I

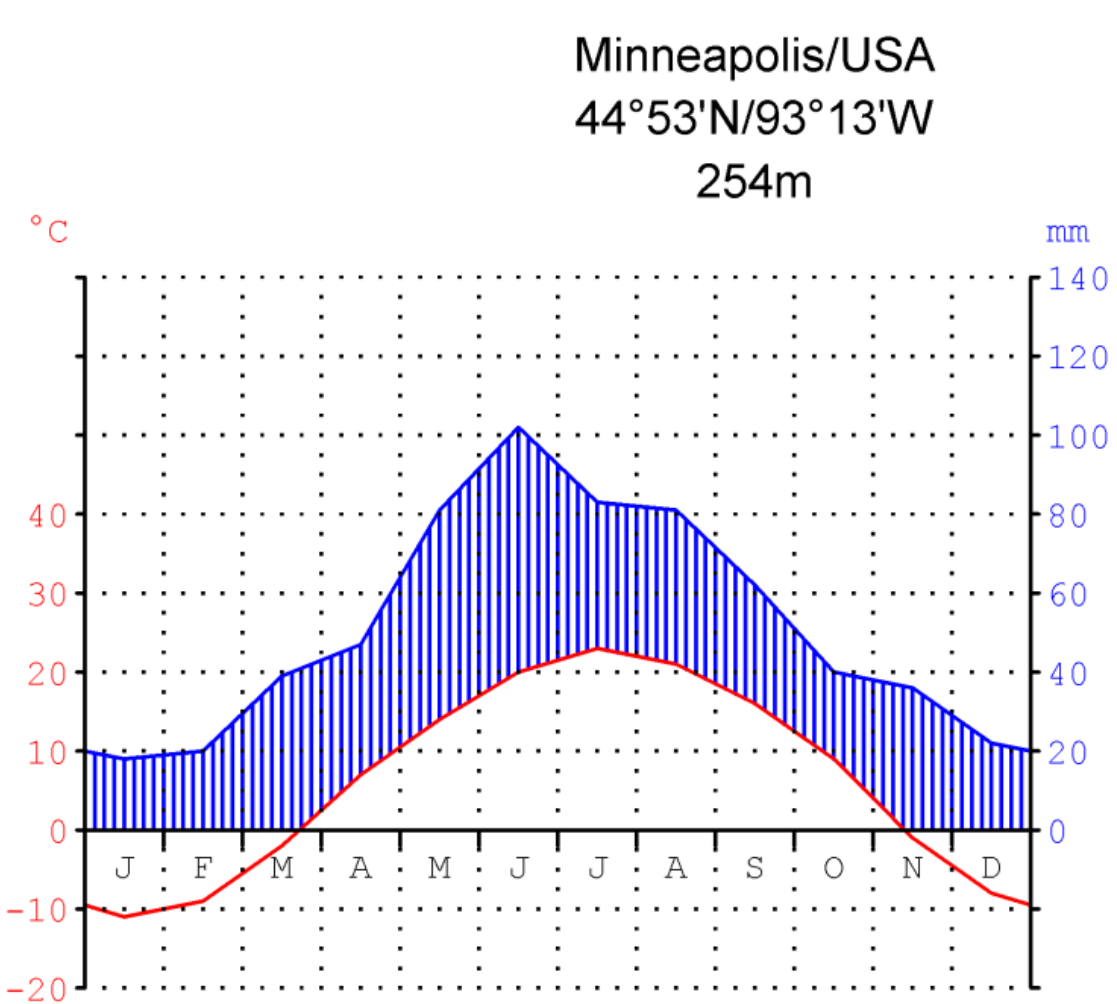


Monat	Temp. (°C)	Nied. (mm)
JAN	-12,8	11
FEB	-10,8	11
MRZ	-3,8	20
APR	6,1	31
MAI	13,0	50
JUN	18,1	86
JUL	22,3	56
AUG	21,0	44
SEP	14,8	30
OKT	7,9	22
NOV	-2,0	15
DEZ	-8,4	9

Temp.-Jahresmittel
5,4 °C

Niederschlagssumme
385 mm

Climate diagram II



Monat	Temp. (°C)	Nied. (mm)
JAN	-11,0	18
FEB	-9,0	20
MRZ	-2,0	39
APR	7,0	47
MAI	14,0	81
JUN	20,0	102
JUL	23,0	83
AUG	21,0	81
SEP	16,0	62
OKT	9,0	40
NOV	-1,0	36
DEZ	-8,0	22

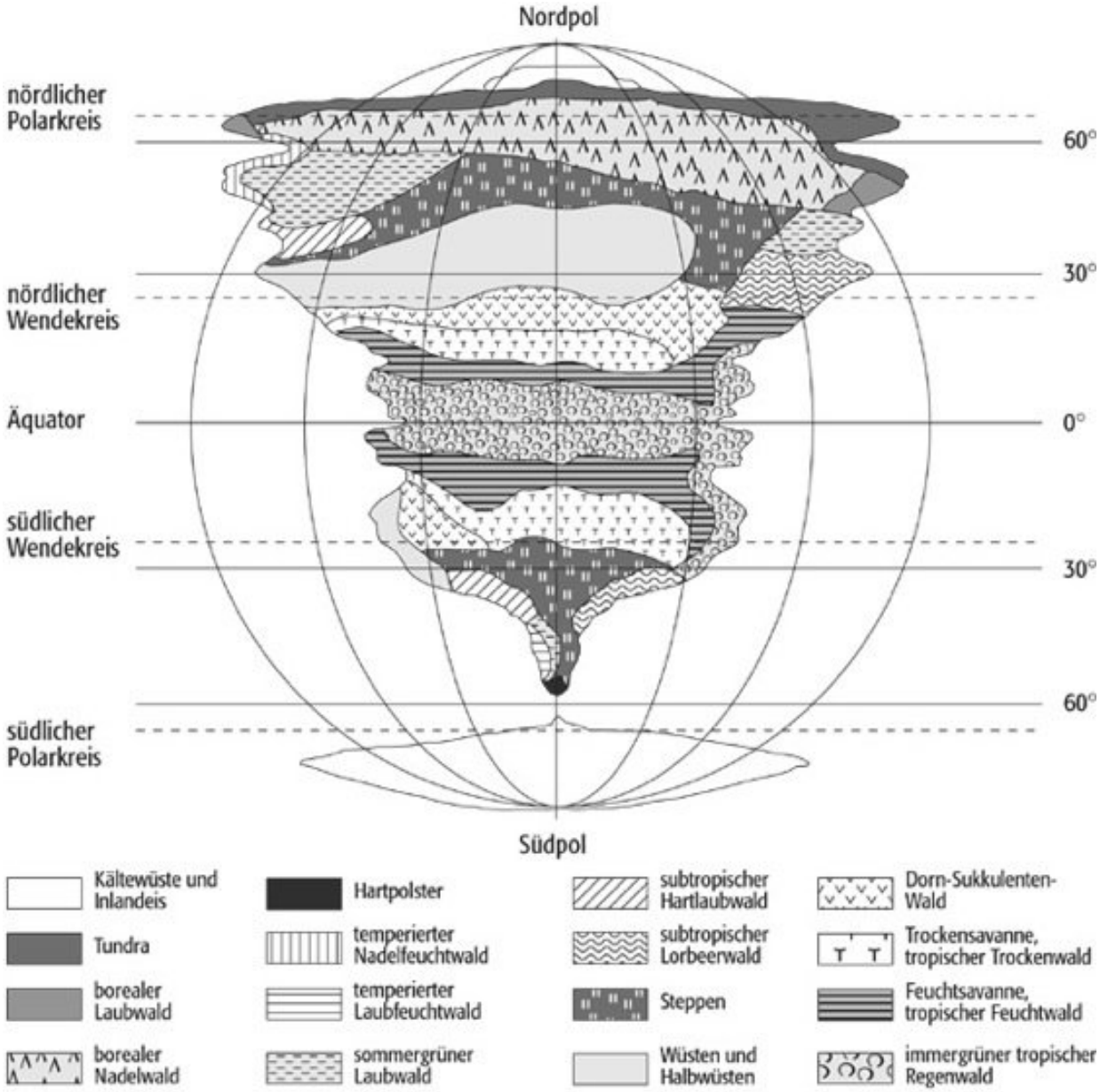
Temp.-Jahresmittel
6,6 °C

Niederschlagssumme
631 mm

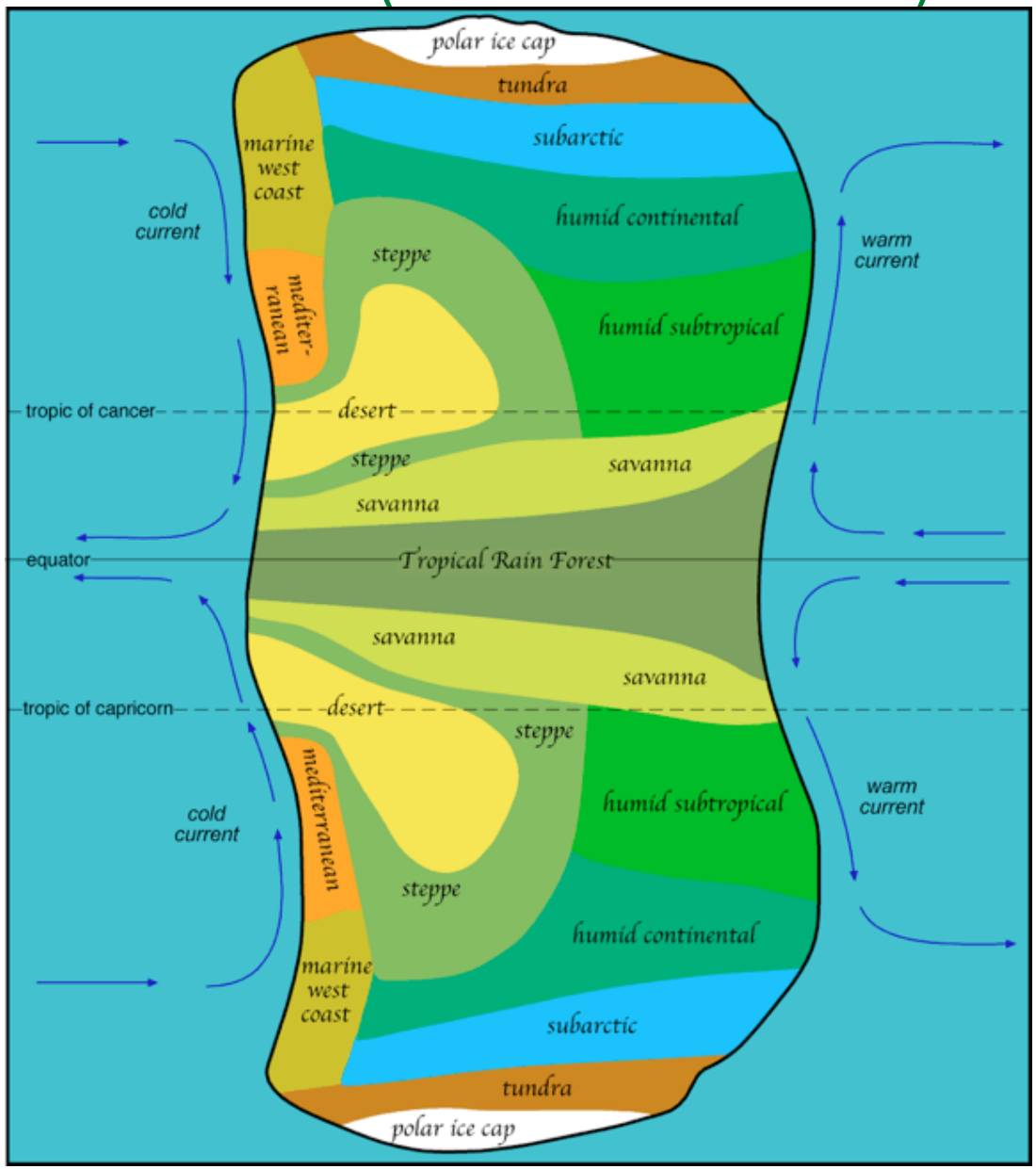
Climate and life

- Life zones are basing on temperature and precipitation
- Ideal continent (“Idealkontinent” in German)

Idealkontinent



Hypothetical continent (another version)



Summary

- Temperature seasons: axial, not orbital effects
- Tropical wet seasons (monsoons) are related with temperature seasons and circulation

For Further Reading

A. Shipunov.
Biogeography [Electronic resource].
2014—onwards.
Mode of access:
http://ashipunov.info/shipunov/school/biol_330

Major circles of latitude.
http://en.wikipedia.org/wiki/Circle_of_latitude

Atmospheric circulation.
http://en.wikipedia.org/wiki/Atmospheric_circulation