

Precipitation patterns

Zone 5 Sub-tropical highs

- scanty winter rainfall
- dominated by sub-tropical highs, but occasional mid-latitude depressions bring rain

Zone 6 Mediterranean zone

- semi-arid/sub-humid region
- long dry summer, short wet winter
- sub-tropical highs in summer
- mid-latitude depressions in winter

Zone 7 Middle and high latitudes

- depressions and fronts
- precipitation in all seasons
- maximum precipitation in winter (cyclonic activity)

Zone 8 Polar regions

- low precipitation
- cold subsiding air
- some depressions in winter

MODIFICATIONS TO THE ZONAL MODEL

Orographic barriers

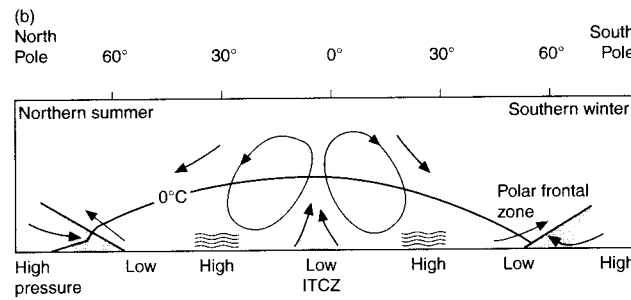
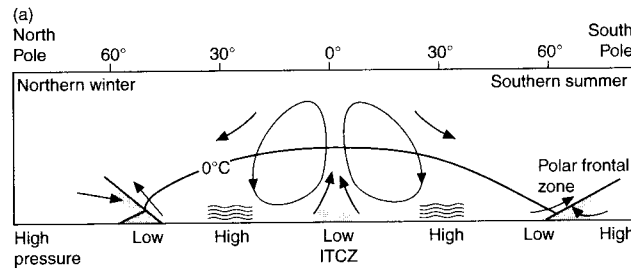
- zone of mid-latitude depressions; rise due to western Cordillera
- heavy orographic precipitation along windward sides, e.g. Olympic mountains receive 3750 mm, the leeward side only 750 mm

Ocean currents

- warm air passes over cold ocean current
- the result is temperature inversion and fog on the coast
- the stability prevents convection cell
- the result is the Atacama desert

THE ZONAL MODEL

- Abundance of rain in the equatorial zone; moderate to large amounts in the mid-latitudes; relatively low rainfall in the sub-tropics and particularly at the poles.
- Rainfall is abundant in the uplift areas of the convergence/convection zone of the equatorial trough (ITCZ) and in the polar frontal zones of the mid-latitudes.



(c)

8	7	6	5	4	3	2	1	2	3	4	5	6	7	8
Sparse precipitation all seasons	Precipitation in all seasons	Winter rain, summer dryness	Slight winter rain	Dry all seasons	Slight summer rain	Summer rain, winter dryness	Rain in all seasons	Summer rain, winter dryness	Slight summer rain	Dry all seasons	Slight winter rain	Winter rain, summer dryness	Precipitation in all seasons	Sparse precipitation all seasons

Zone 1 Equatorial zone

- abundant rainfall throughout the year associated with the permanence of the ITCZ

Zone 2 Wet and dry tropics

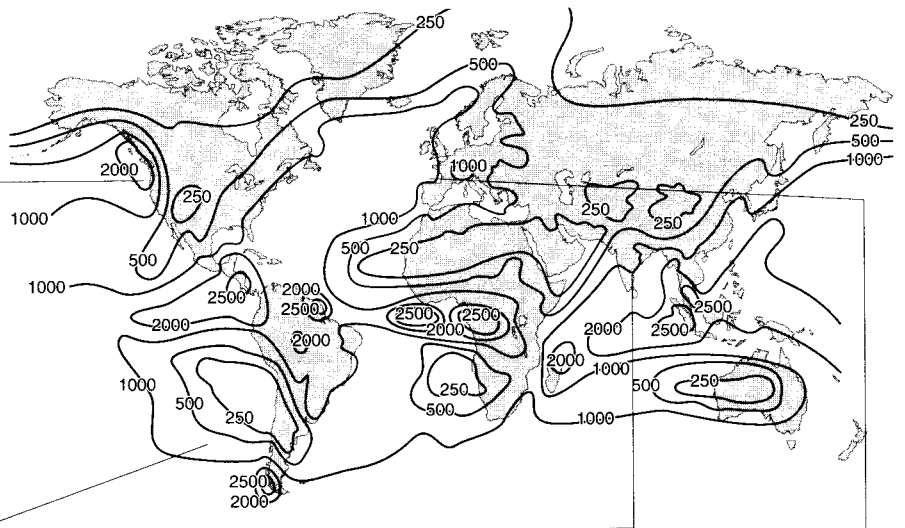
- wet in summer, dry in winter
- summer rains due to ITCZ
- winter dry period due to sub-tropical anticyclones

Zone 3 Tropical semi-arid

- small amount of rain in summer, very dry in other seasons
- associated with equatorial margin of sub-tropical high

Zone 4 Arid zones

- permanent dryness
- year-long dominance of sub-tropical highs



Monsoon

- shift of ITCZ gives rise to intense but strongly seasonal rainfall, e.g. India

Mid-latitude cyclonic belt

- mid-latitude depressions moving west to east
- moist air due to evaporation over the warm Atlantic
- rain dropped on western sides of continents, e.g. the UK