

Chapter

# Wind Patterns

# 19

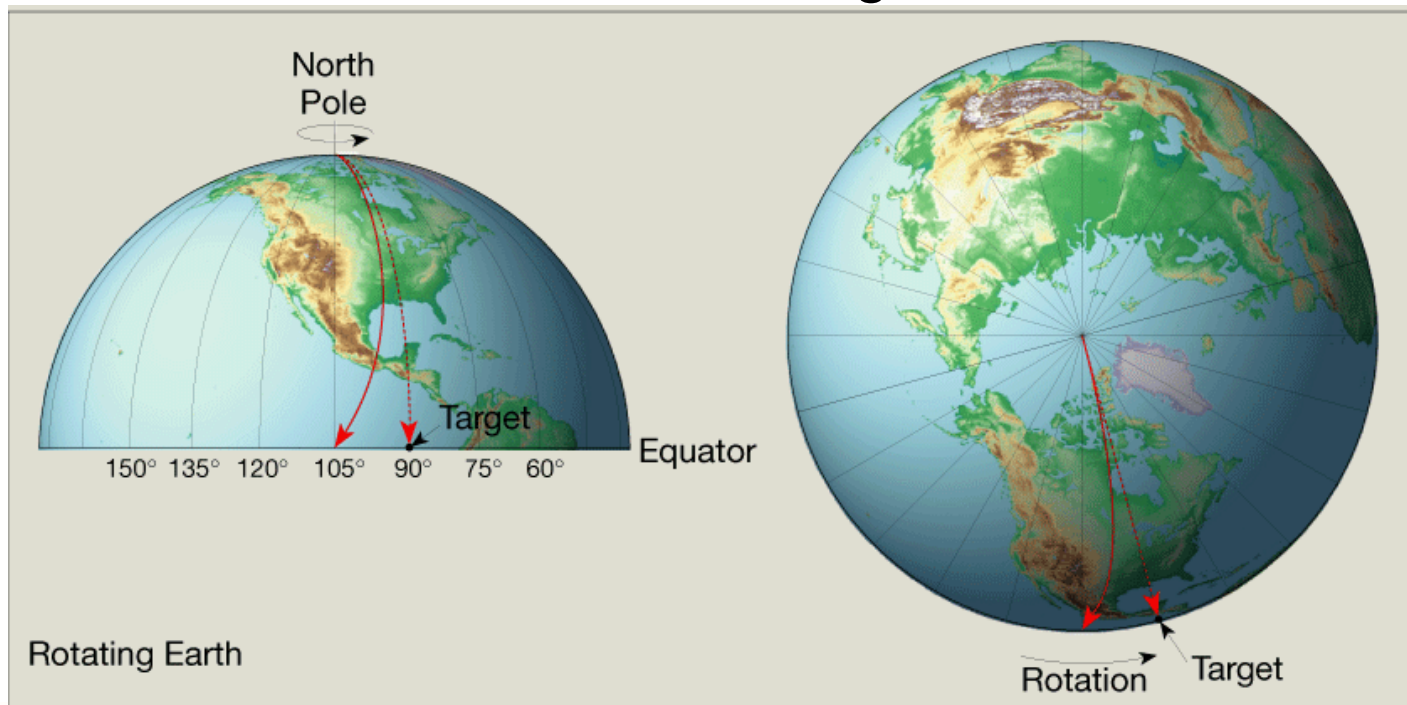
**Be able to ...**

- *Describe the general wind direction across the U.S.*
- *Identify the instrument that measures wind speed*
- *Describe the global and local winds of the world*

# 19.1 Factors Affecting Wind

## ◆ Coriolis Effect

- The **Coriolis effect** describes how Earth's rotation affects moving objects.
  - Northern Hemisphere - all free-moving objects or fluids are deflected to the right.



# 19.1 Factors Affecting Wind

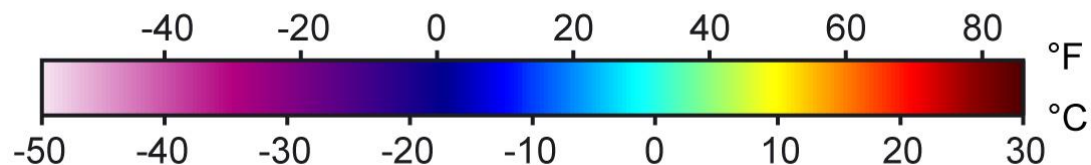
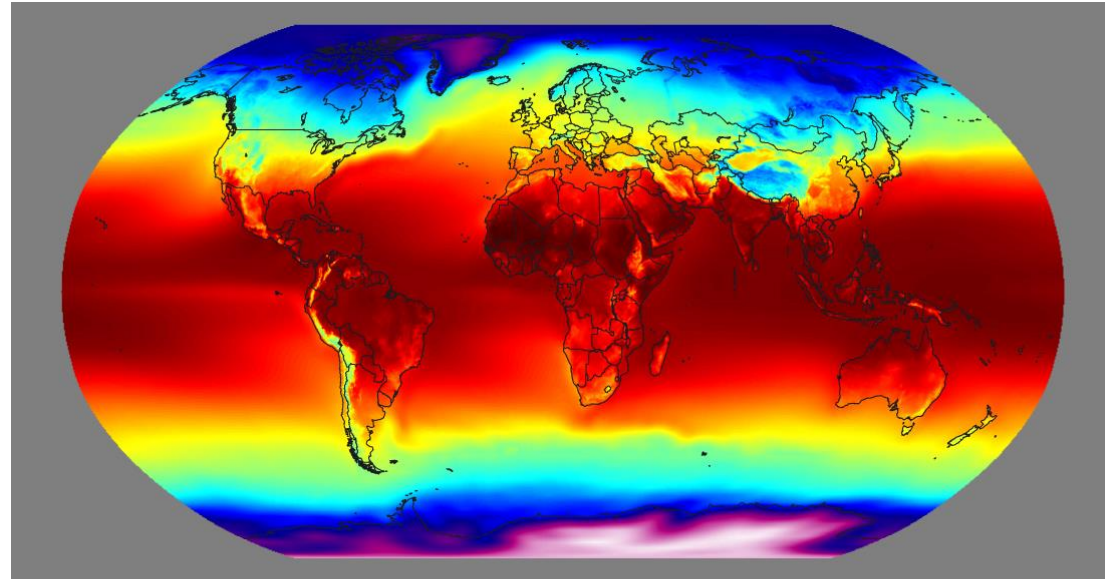
## ◆ Friction

- Friction acts to slow air movement.
  - *Winds are slower at the surface than higher above.*
- **Jet streams** are fast-moving rivers of air in the upper troposphere that travel 200 to 300 mph in a west-to-east direction.



# 19.2 Global Winds

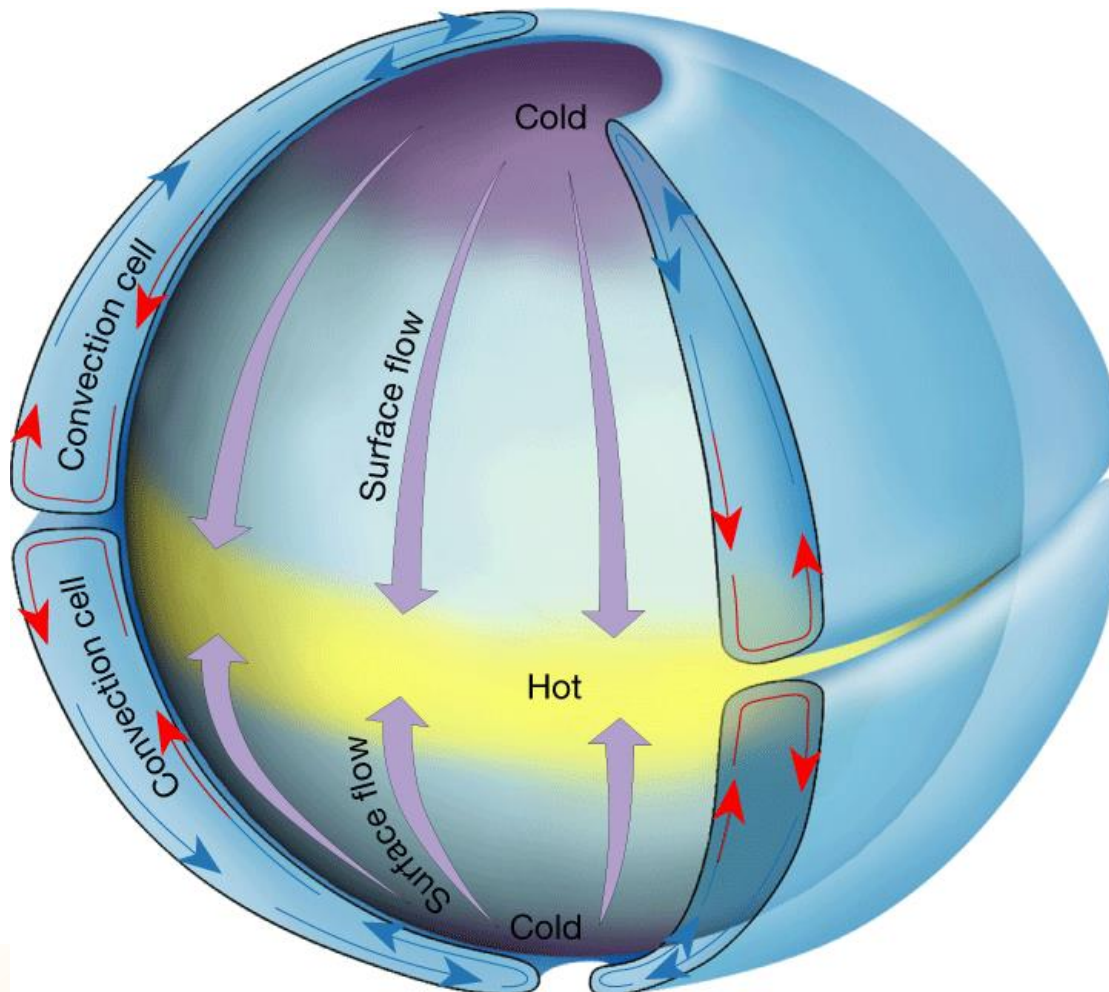
- ◆ Winds are created to balance earth's temperatures. (warm at the equator and cold at the poles).



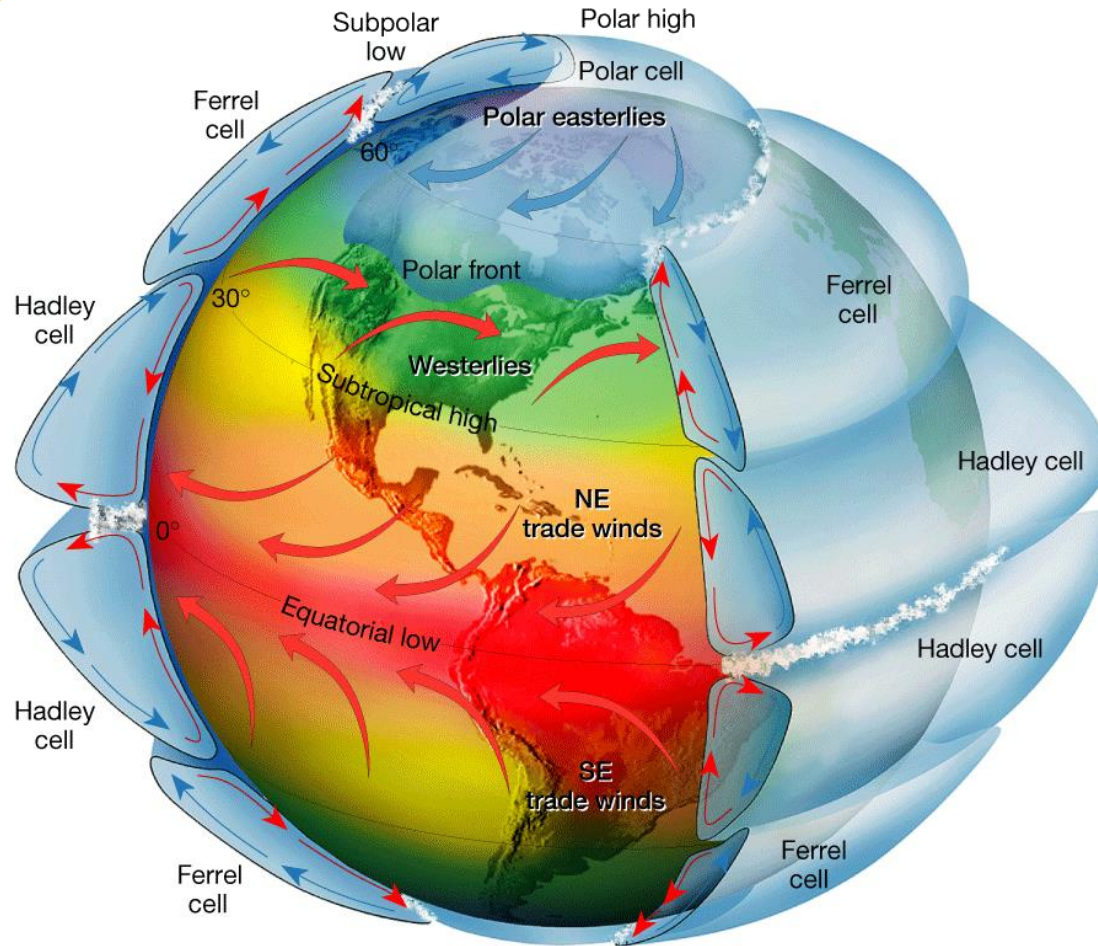
**Annual Mean Temperature**

# 19.2 Global Winds

## ◆ Non-Rotating Earth Model



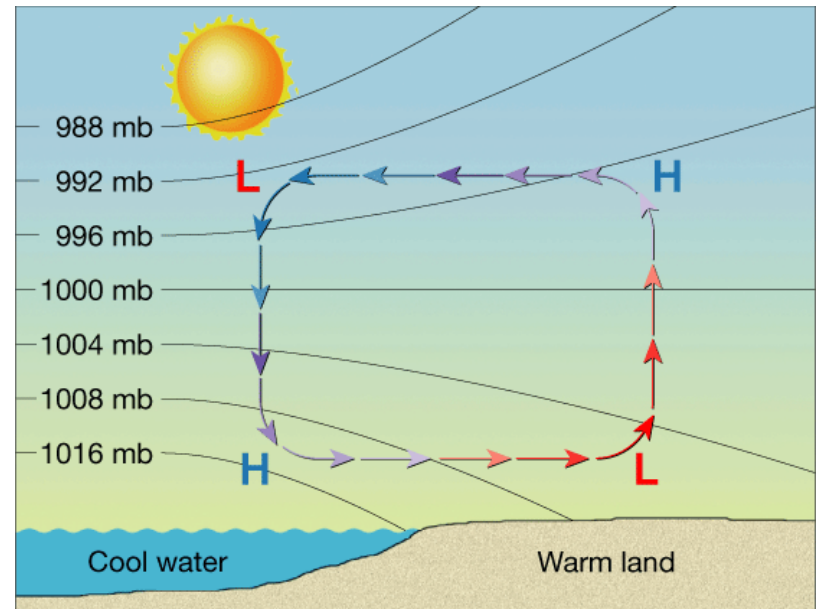
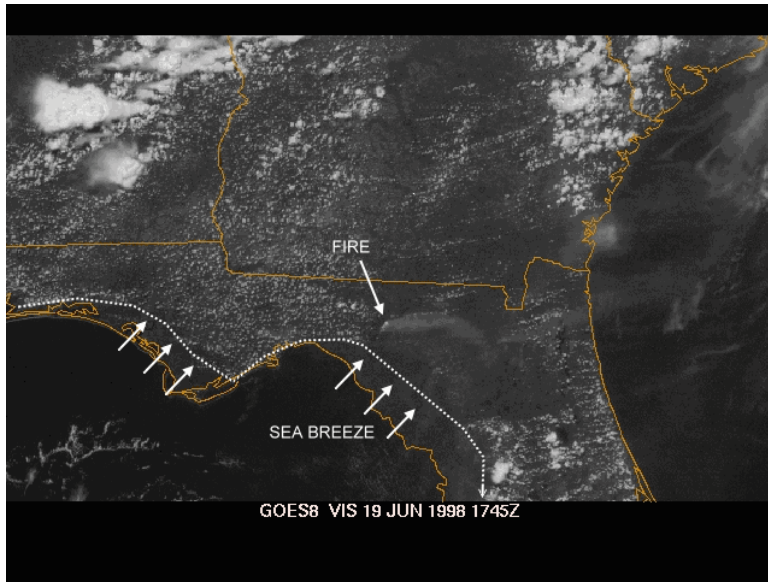
# Circulation on a Rotating Earth



# 19.3 Local Winds

## ◆ Sea Breezes

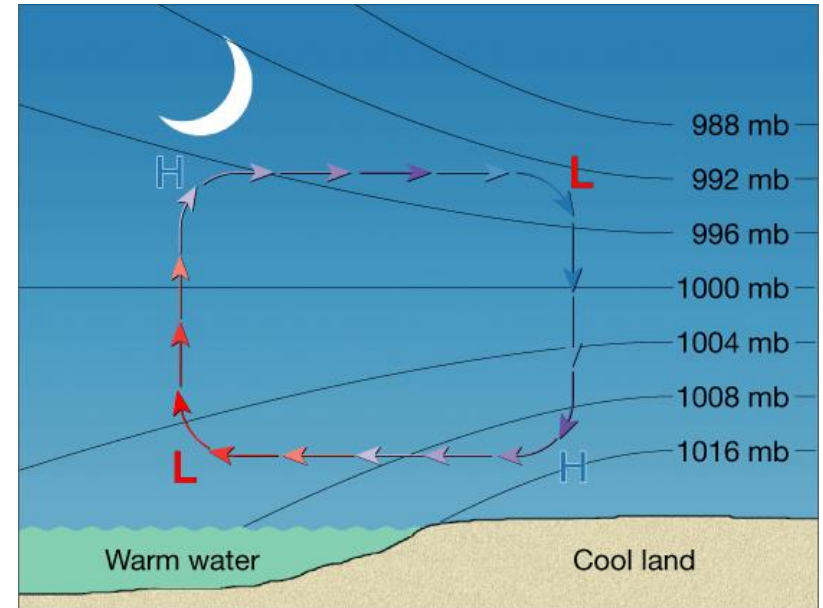
- During daytime hours the wind flows from the sea towards the land.



# 19.3 Local Winds

## ◆ Land Breezes

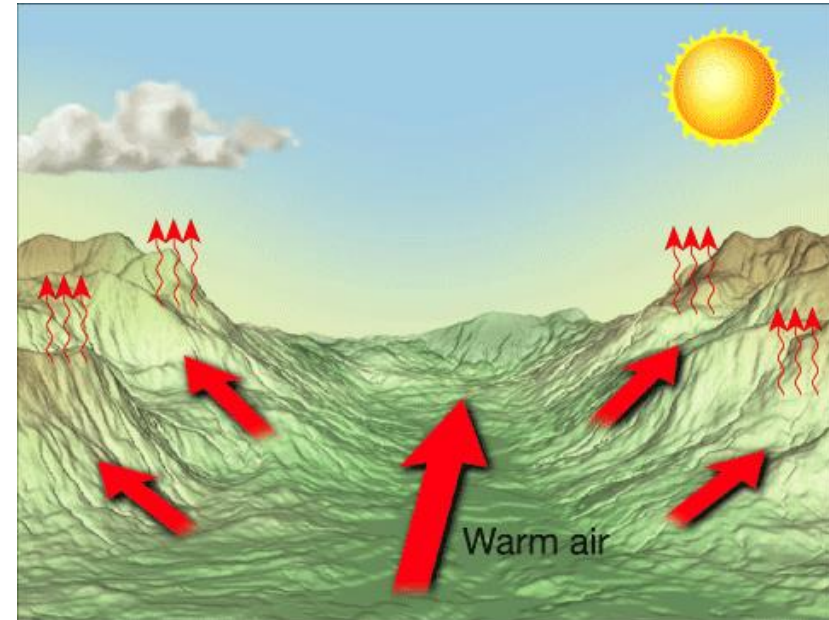
- During night time hours, the wind flows from the land to the water.



# 19.3 Local Winds

## ◆ Valley Breezes

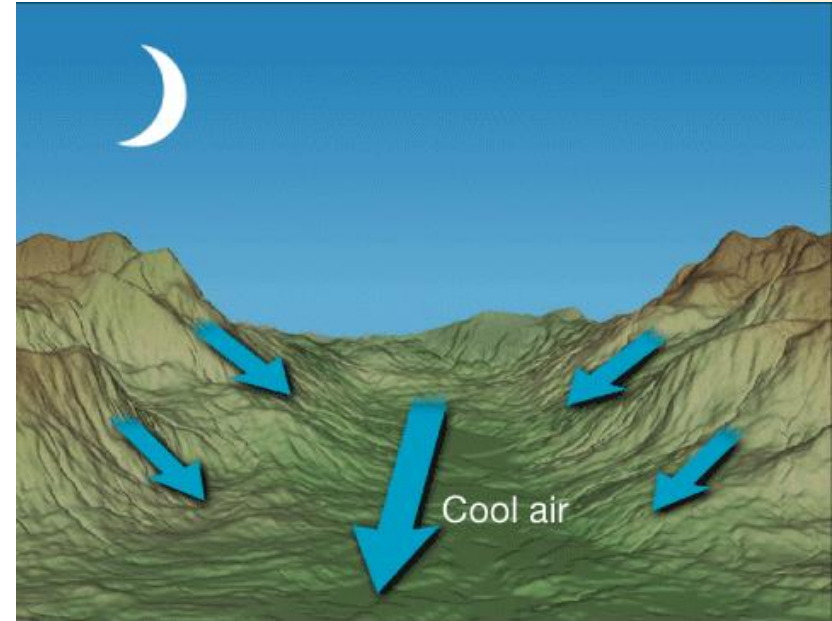
- During daytime hours, warm air flows up from the valley to the top of the mountain



# 19.3 Local Winds

## ◆ Mountain Breezes

- During night time hours, cold air flows down the mountain to the valley floor.



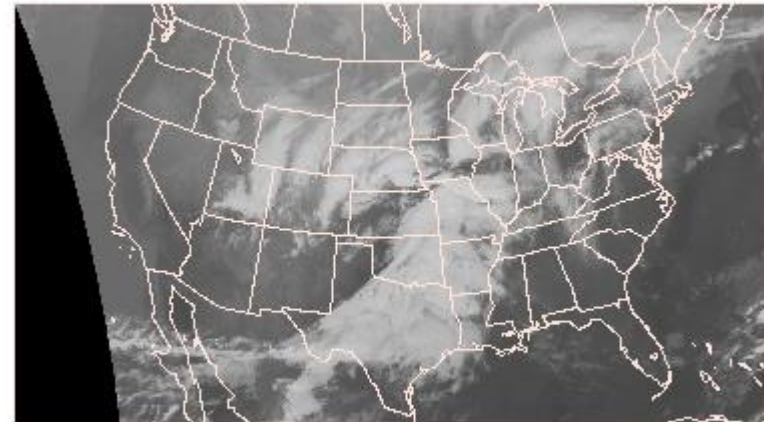
# 19.3 Wind Direction

- The **prevailing wind** is the wind that blows more often from one direction than from any other.
- In the United States, the westerlies consistently move weather from west to east across the continent.



Infrared Image

1215Z 13 APR 2014

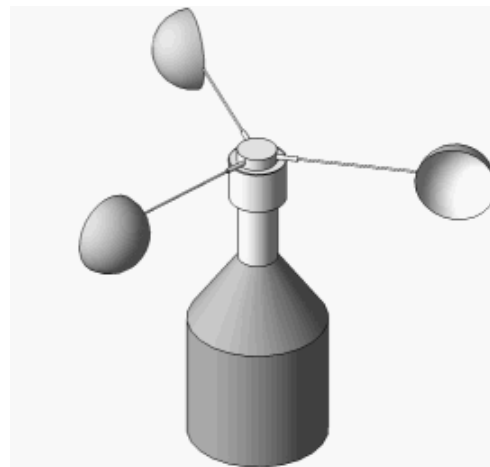


NCEP/NWS/NOAA

# 19.3 How Wind is Measured

## ◆ Wind Speed

- An **anemometer** is an instrument that resembles a cup and is commonly used to measure wind speed.



# What causes local winds?

## Lesson Review

Match each term in **Column B** with its description in **Column A**. Write the correct letter in the space provided.

### Column A

1. breeze coming from the sea toward land
2. wind that changes directions with the seasons
3. air moving from a valley up a mountain
4. breeze coming from the land toward the sea
5. air moving down a mountain toward a valley

### Column B

- a. land breeze
- b. monsoon
- c. mountain breeze
- d. sea breeze
- e. valley breeze

       **d.**

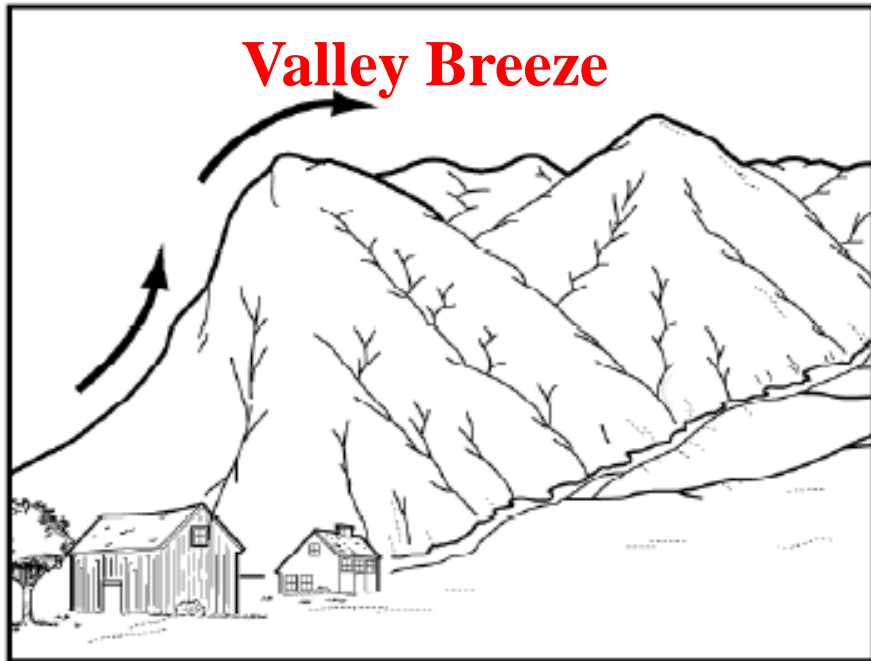
       **b.**

       **e.**

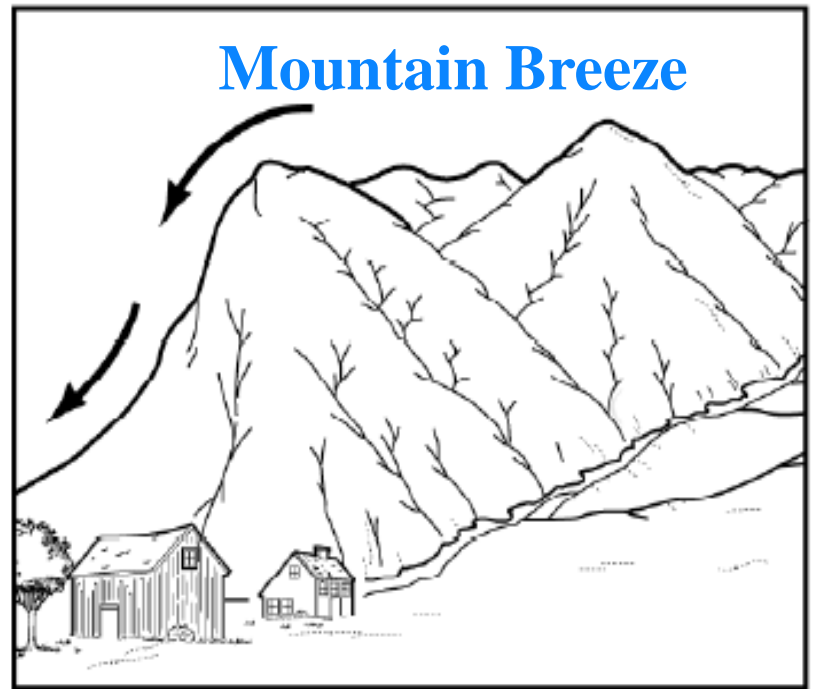
       **a.**

       **c.**

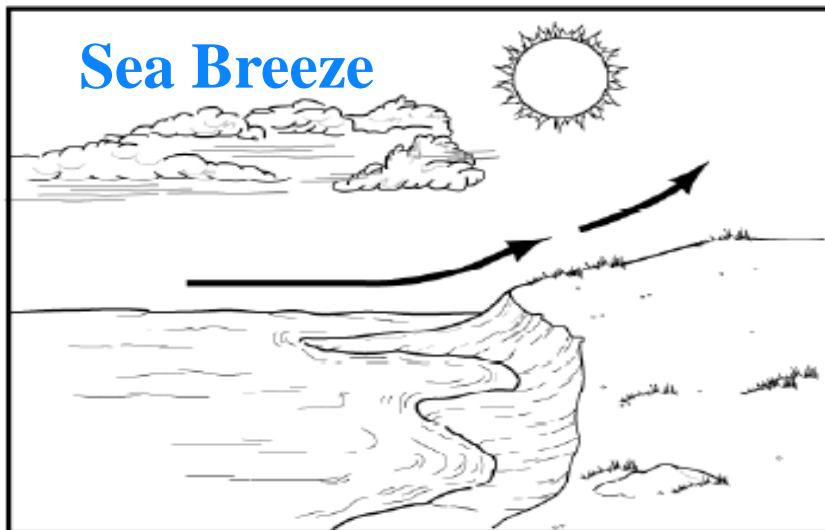
**Valley Breeze**



**Mountain Breeze**



**Sea Breeze**



**Land Breeze**

