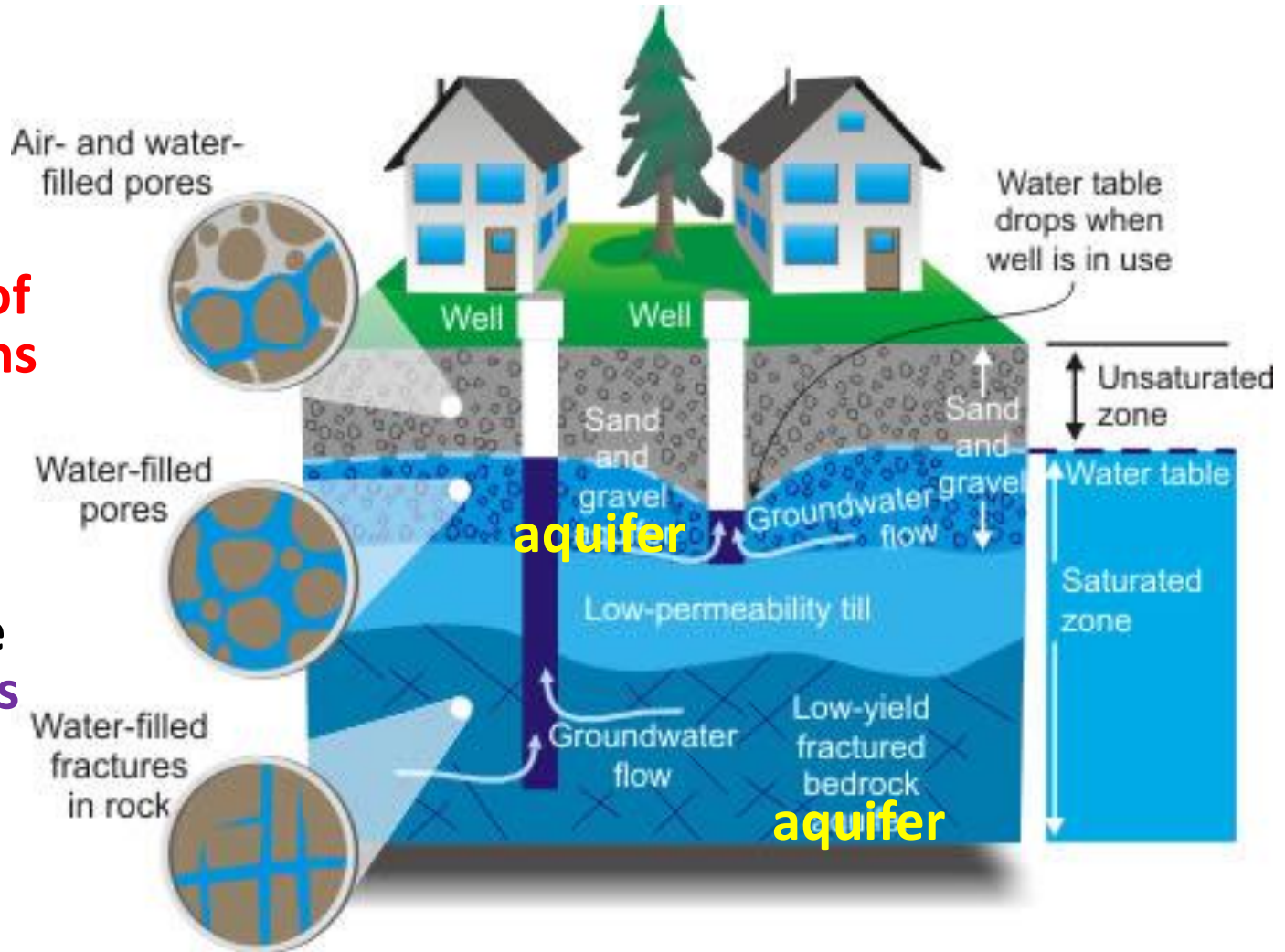


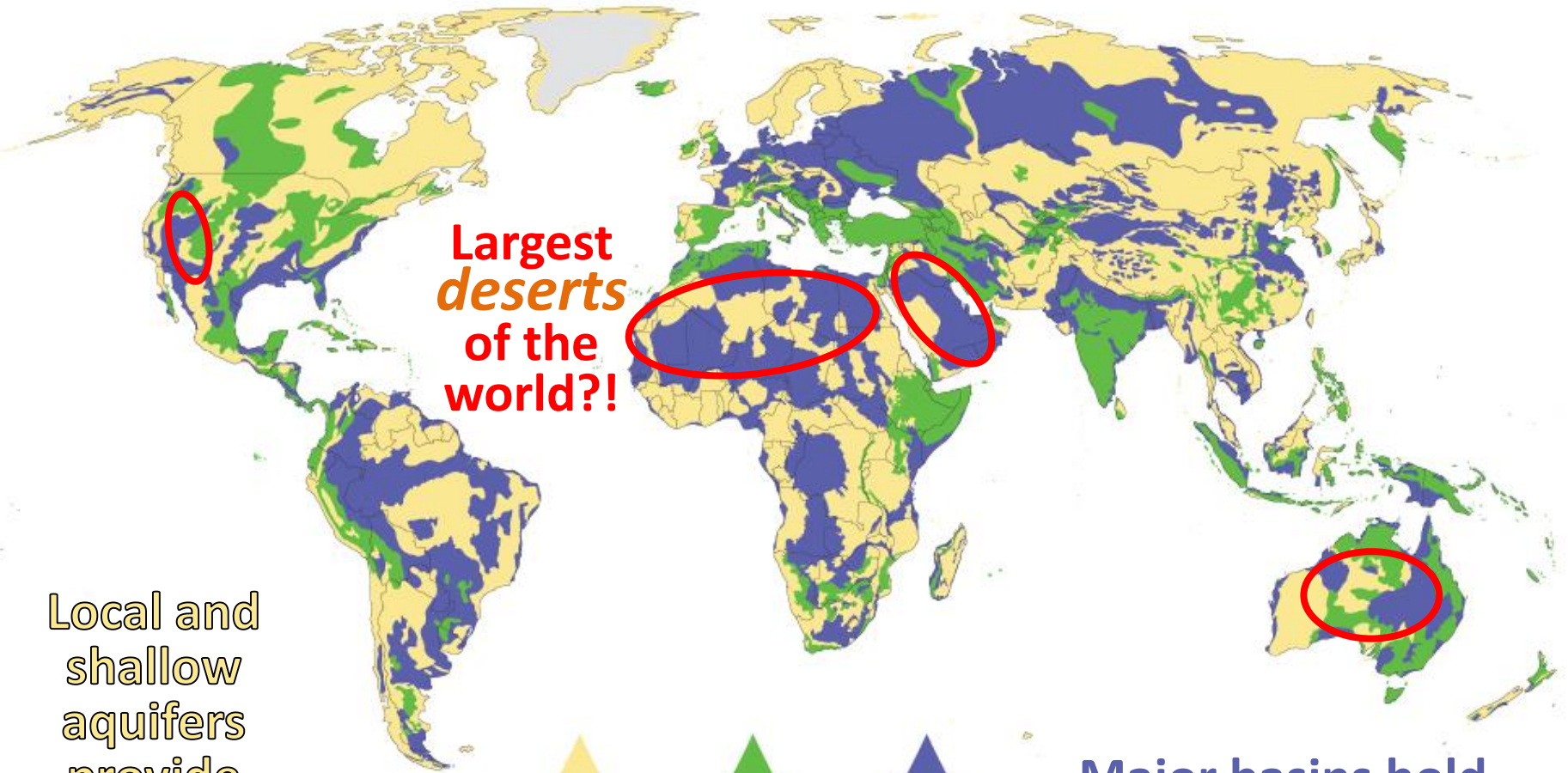
Groundwater Aquifer

Aquifer is an underground sand/gravel or rock layer that stores water and allows water to flow through it.

- **Drinking water supply.**
- About **half of all Americans** get *most* of their water from wells.
- Aquifers are **Long Island's only source** of potable water.



Global Groundwater Resources



**Largest
deserts
of the
world?!**

Local and shallow aquifers provide limited quantities of water.



LOCAL AND SHALLOW AQUIFERS



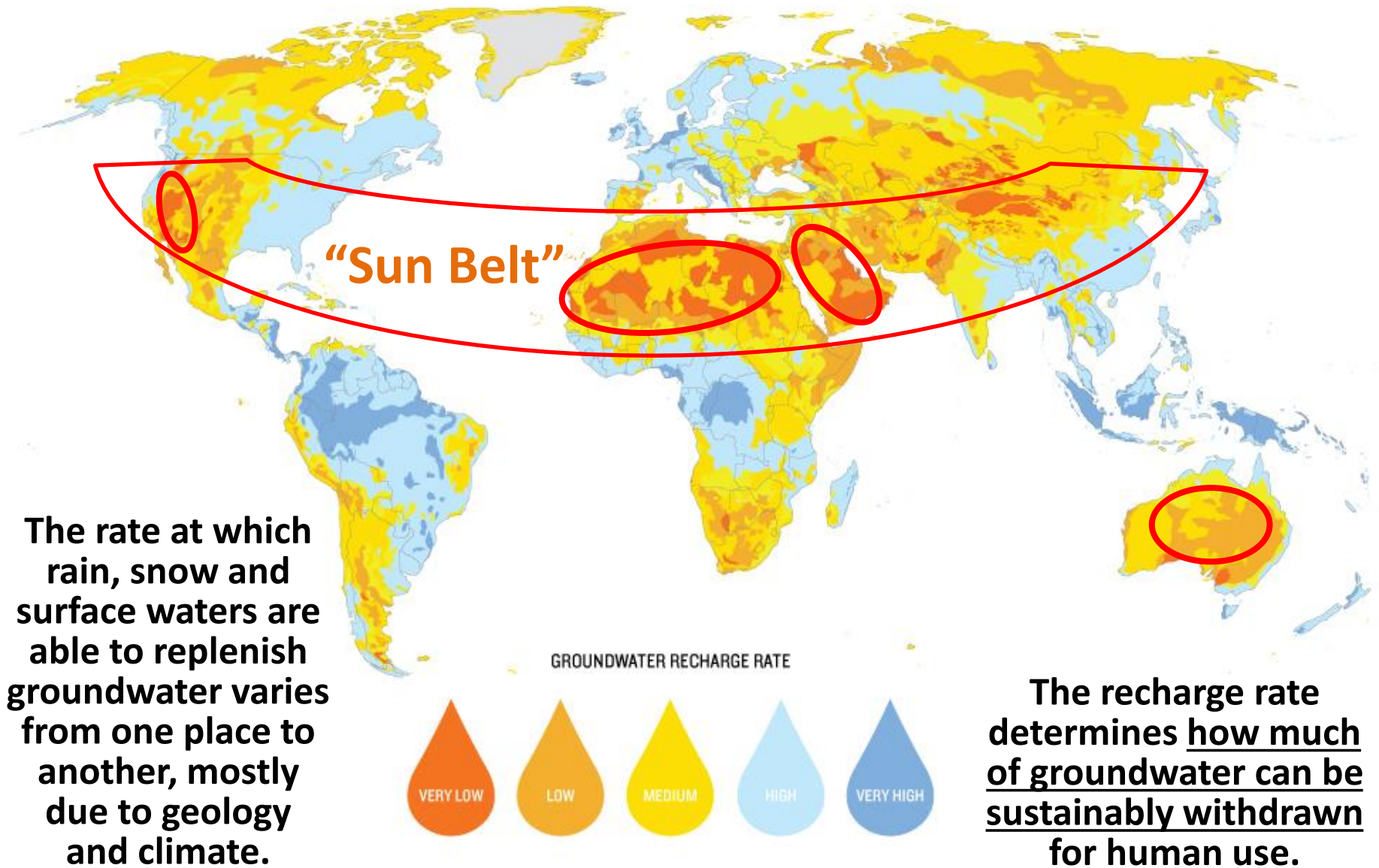
COMPLEX HYDROGEOLOGICAL STRUCTURE



MAJOR GROUNDWATER BASIN

Major basins hold abundant, relatively easily extracted groundwater.

Groundwater Recharge



The rate at which rain, snow and surface waters are able to replenish groundwater varies from one place to another, mostly due to geology and climate.

The recharge rate determines how much of groundwater can be sustainably withdrawn for human use.

Atmospheric Water

Atmospheric water plays a **crucial role** in the **weather**.



← **Clouds and precipitation**
(water droplets and ice crystals or a mixture of the two)

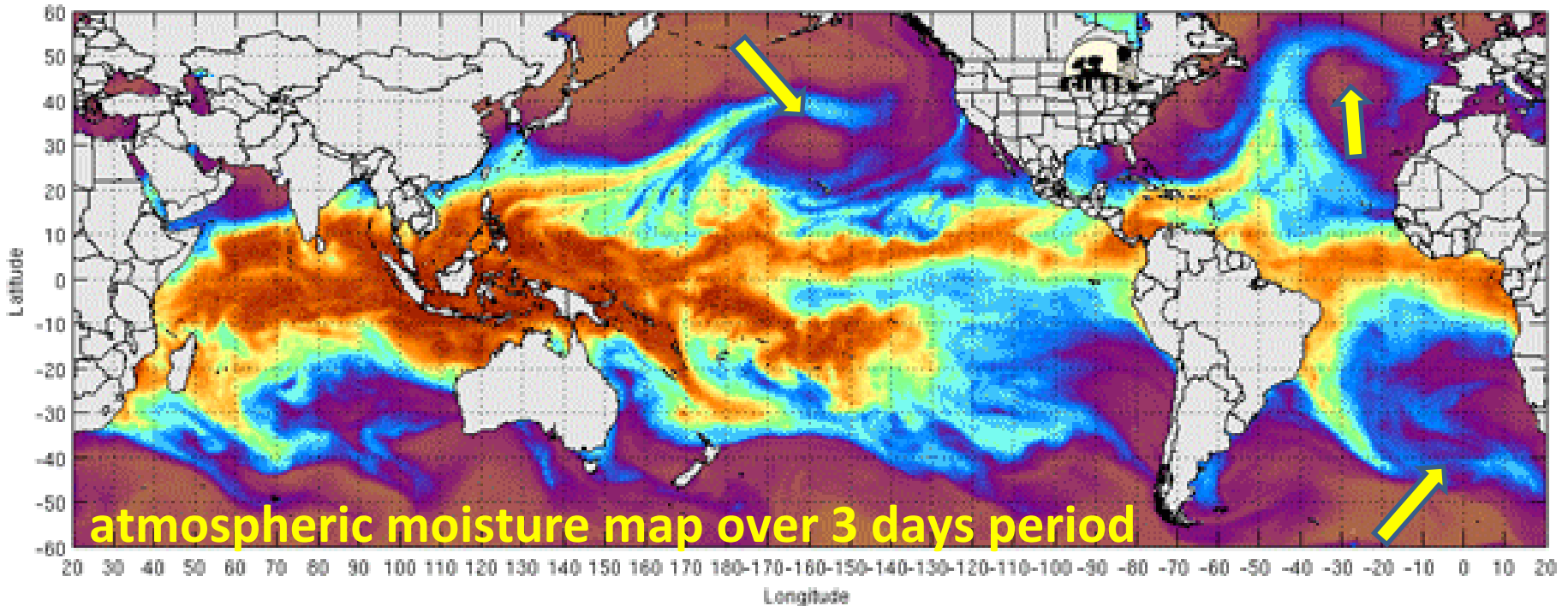
Water vapor →
(gas lighter than air; continuously generated by evaporation and removed by condensation)



- The mean global amount of water vapor in the atmosphere is roughly sufficient to cover the surface of the planet with a layer of liquid water about one inch (25 mm) deep.
- On average, the **residence time of a water molecule in the troposphere** is about **9 to 10 days**.

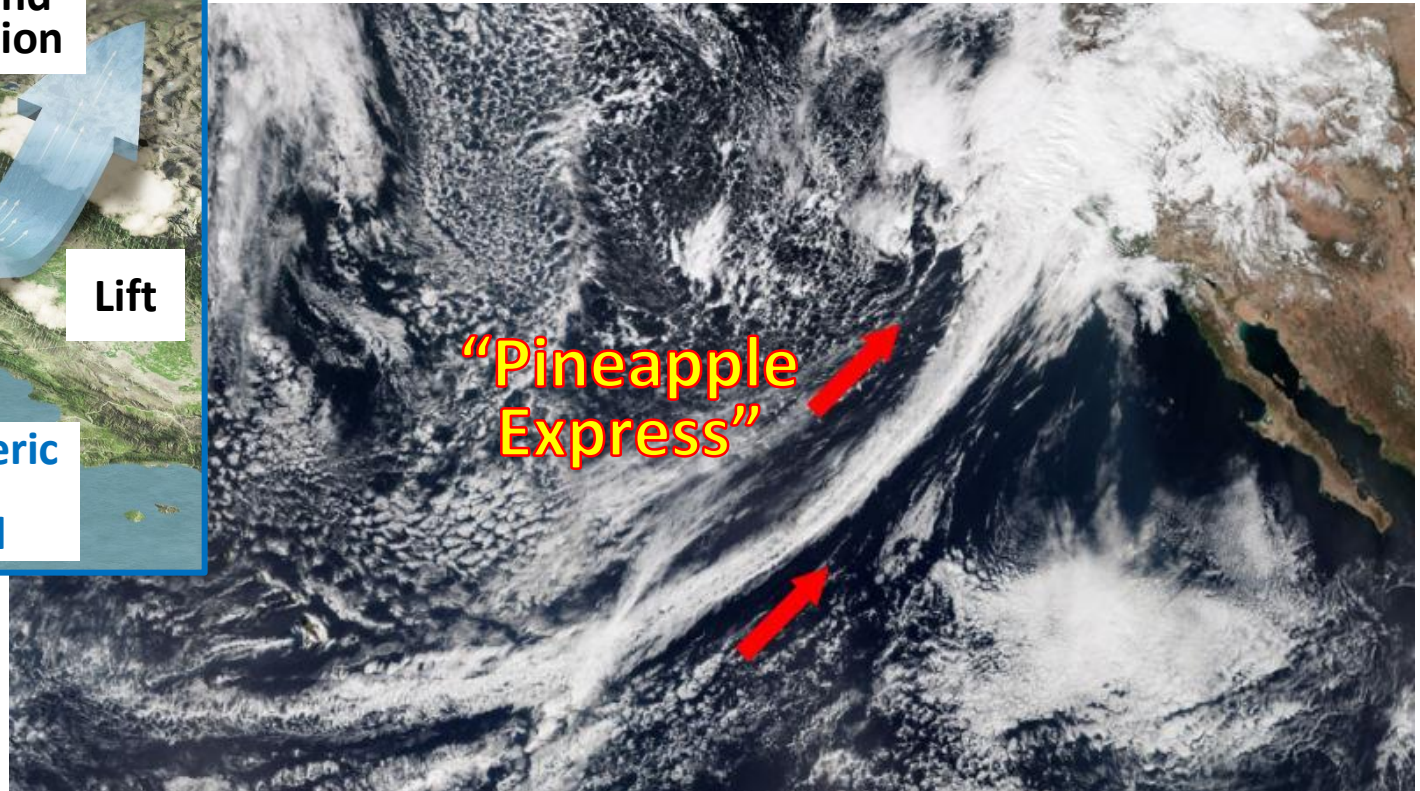
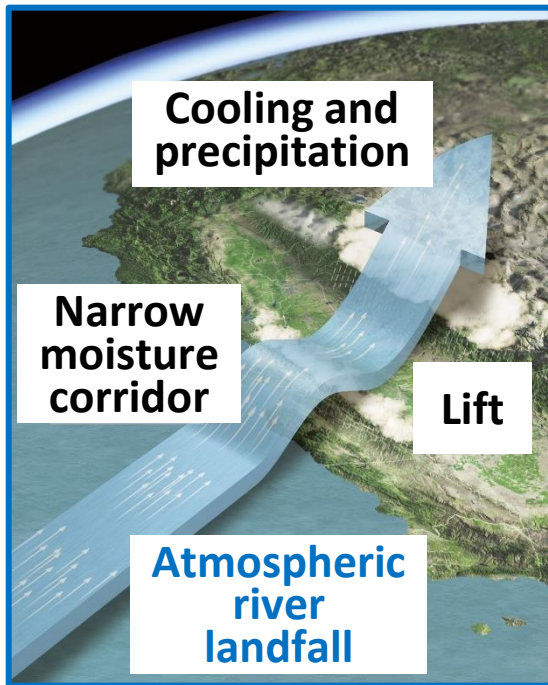
Rivers in the Sky?

An **atmospheric river** is a moving narrow corridor of concentrated moisture in the atmosphere.

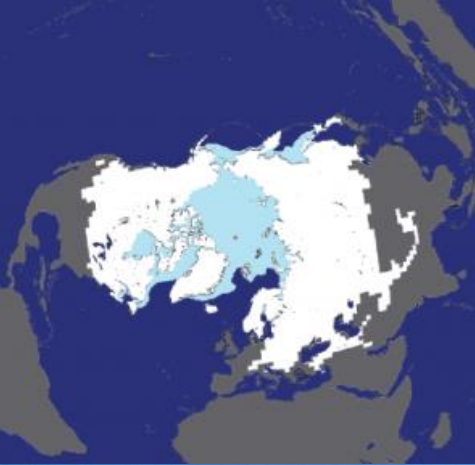


- get their start over warm tropical waters
- flow eastwards and towards the poles about a mile above the ocean surface
- may extend for thousands of miles, but are only a few hundred miles wide
- can transport up to 10 times more water than the Mississippi river
- when making landfall, often release a lot of precipitation

California: from drought to flood

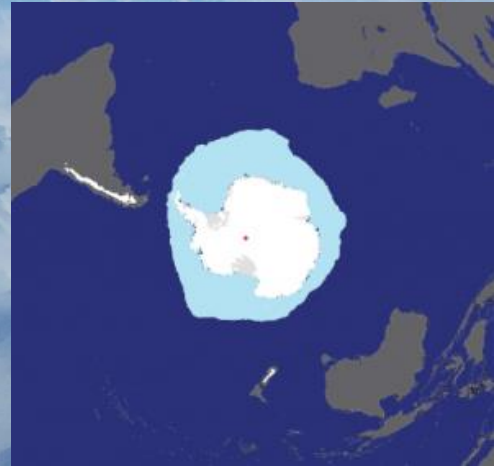


- **Not enough atmospheric rivers:** the region gradually falls into **drought** which may last *years*.
- **Too many atmospheric rivers:** **floods** can occur.



CRYOSPHERE

THE FROZEN EARTH



About **2/3** of the world's freshwater is **frozen** in ice sheets, glaciers, permafrost and sea ice.

Cryosphere Components

ICE SHEETS

(permanent ice caps of Antarctica and Greenland)

PERMAFROST

(frozen ground)

SEA ICE

GLACIERS

SNOW

(50% snow extent line
MAX snow extent line)

