

Layers & Quality Notes

Chapter 1.3 Layers of the Atmosphere
Chapter 1.4 Air Quality

Layers of the Atmosphere



- Earth's atmosphere is **thick** compared to Mar's or Mercury's
- Earth's atmosphere is **thin** compared to the size of the whole planet
- Earth's atmosphere is **complex**, is has layers differ by:
 - temperature
 - density
 - composition

Troposphere

- Inner layer (lowest, bottom)
- tropo- means "turning" or "changing", layer is chaotic and constantly changing
- Shallowest layer, only 9-16 km thick
- Contains 80% of atmosphere's mass
- Most weather occurs in troposphere

Stratosphere

- 2nd lowest layer, above the troposphere
- Contains the ozone layer (*protects against UV radiation*)
- Some jet aircraft travel in the stratosphere
- A calm, dry layer, with very little weather
- Contains 19% of atmosphere's mass (*tropo + strato contains 99% of mass*)

Mesosphere

- meso- means "middle", the middle layer
- Protects Earth's surface from meteors (shooting stars)
- Meso + thermo is only 1% of atmosphere's mass!

Thermosphere

- thermo- means "heat", air is thin but very hot (why?)
- Outer layer of atmosphere, blends into space, no clear boundary
- Contains the ionosphere, air particles become ions (electrically charged particles), and auroras occur in this layer
- Contains the exosphere, outermost part of atmosphere, spacecraft and satellites orbit Earth in this layer

Air Quality

- **Pollutants:** harmful substances in the air, water, or soil
- **Air pollution:** air that contains harmful particles, pollutants.
- **Natural sources:** forest fires, soil erosion, dust storms, mold, pollen, volcanic ash
- **Human activities:** farming, construction, burning fossil fuels (coal, oil, natural gas) in cars and factories . . . and many other activities

Smog & Acid Rain

- **Smog:** (*combo of smoke & fog*) visible, cloudy air pollution, usually in cities
 - **London-Type Smog:** coal smog, not really in London anymore, but common now in large Chinese cities
 - **Photochemical Smog:** brownish haze common in all large cities, often from car and factory output
- **Acid Rain:** rain that contains more acid than usual, can kill plants & wildlife and degrade buildings over time. Caused by burning coal.

Improving Air Quality

- Many countries, including the USA, have regulations (laws) that limit pollution.
- EPA (Environmental Protection Agency) is the federal agency in charge of reducing pollution in the USA.
- What can we do?
 - Switch from fossil fuels to cleaner sources (wind, hydro, solar)
 - Encourage public transportation, reduce number of cars