Last day of class ☺ [Class canceled on Friday]

Today, we will:

- Discuss some miscellaneous items about air pollution
- Do some review for the final exam

MISCELLANEOUS AIR POLLUTION TOPICS

TO REMOVE VOCs (typ. vapors) from the air

5 primary ways (a, b, c's)

1) Absorption
2) Adsorption
3) Biofiltration
4) Combustion
5) Condensation

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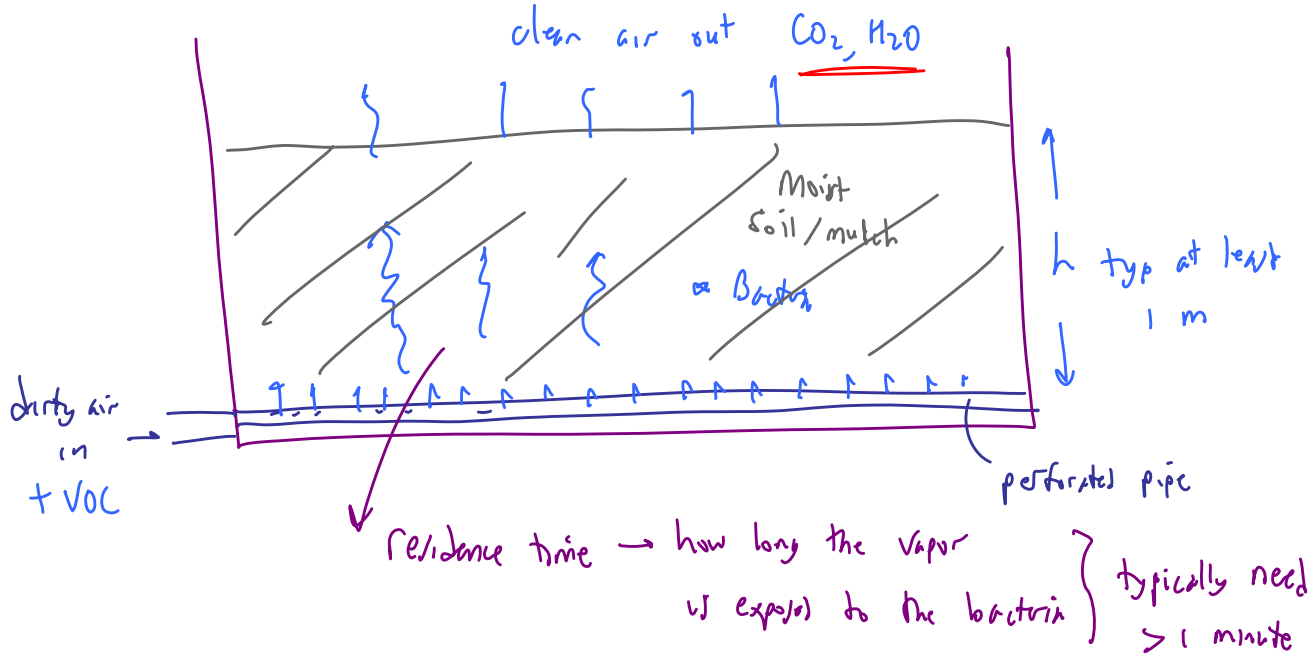
1) ABSORPTION: VOCs dissolve into a liquid (typ. water or some other solvent)
   → [e.g. salt or sugar absorbs into water]

   Typically use wet scrubbers to do this

2) ADSORPTION – gas molecules of the VOC attach to the surface of a solid – e.g., activated charcoal

3) BIOFILTRATION – let microorganisms (e.g., bacteria) oxide the VOC by converting it to CO_2 & H_2O

   Use either water or some kind of moist soil or mulch



residence time → how long the vapor is exposed to the bacteria } typically need > 1 minute

Various kinds of tanks — see pics on website

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4) COMBUSTION → Burn the VOC — do not try to recover it

(incineration) e.g. Benzene vapors

Combustion → $C_6H_6 + 7.5\,O_2 \rightarrow 6\,CO_2 + 3\,H_2O$ ★

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5) CONDENSATION → try to recover the VOC vapors

↓

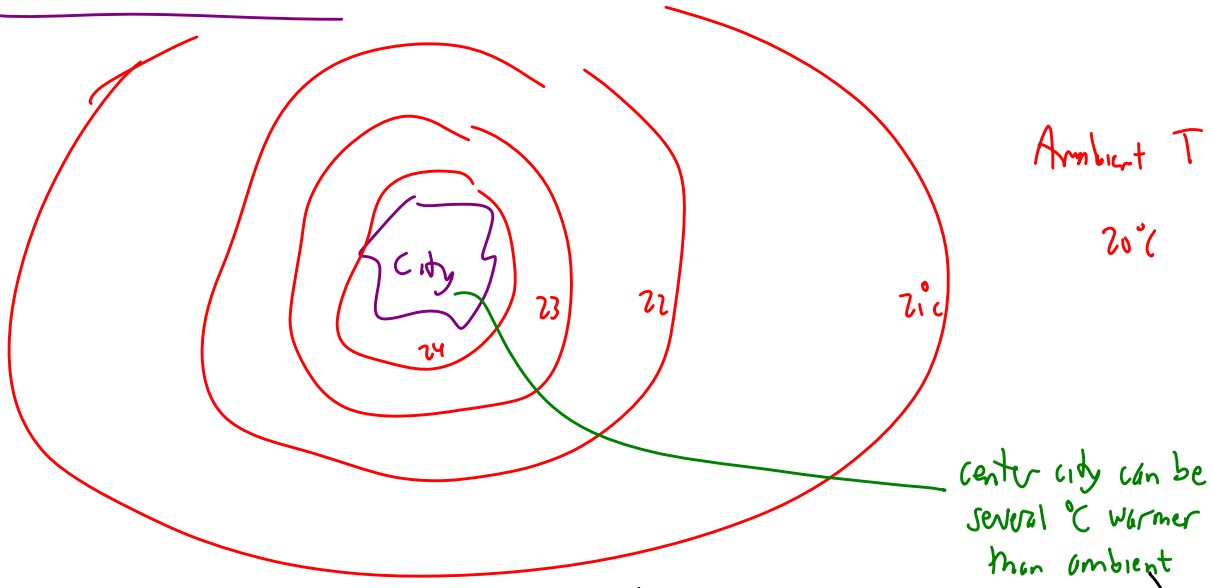
cool the gas enough to condense it into liquid

Separate the liquid from the air → recover it

e.g. gasoline vapor recovery systems

Typ. require very low temperature, sometimes need multi-stage cooling (costly $$)

- Thermal Air Pollution — we have "heat islands" around cities

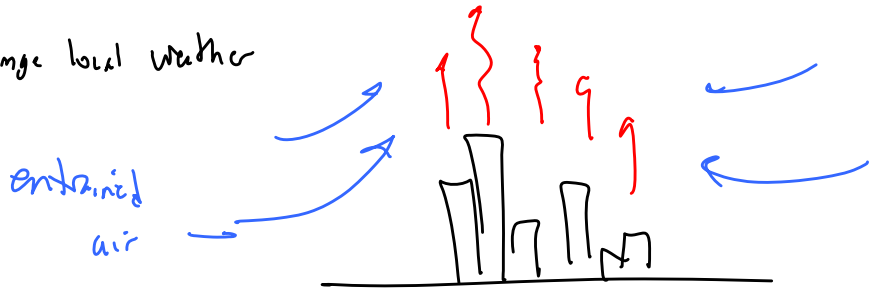


Sources of heat — 1) waste heat (machinery, buildings heated or cooled, automobiles)

2) solar absorption — pavement, brick, concrete, etc absorb more solar energy than does vegetation

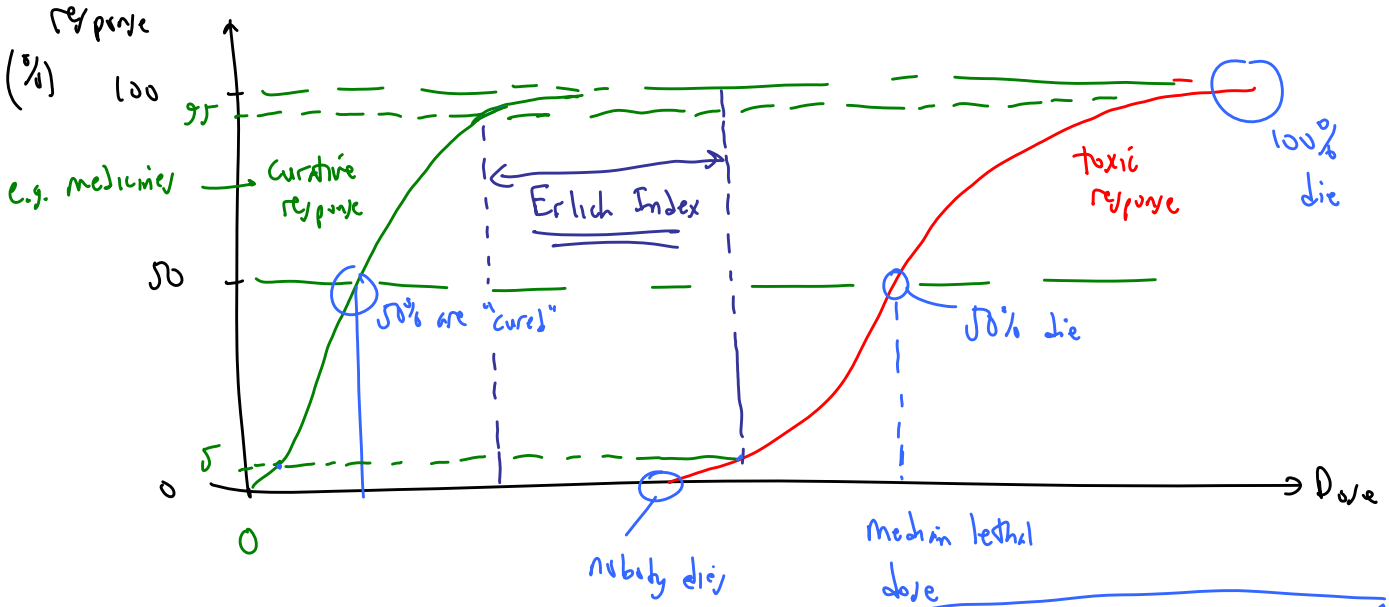
3) decreased ventilation - Building block wind

Can actually change local weather



TOXICITY – Almost any chemical is toxic if high enough dose

typically



LCT_{50} = median lethal concentration and time

An ideal medication has a huge Erlich index

- Odor air pollution → Odors are #1 complaint about air pollution

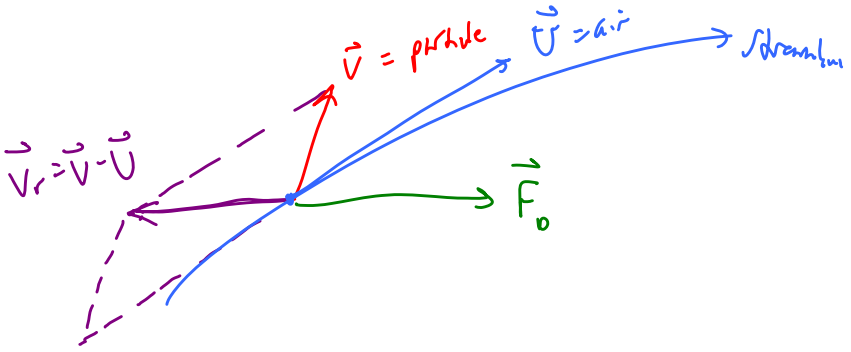
"if you smell something bad, you get concerned"

eg. farms – manure odors

Review for Final

CLOSED BOOK

Know
- 7 CAPs — CO, NO_2, SO_2, O_3, $PM_{2.5}$, PM_{10}, $[Pb]$
- terms for particle dia's — fine, respirable, inhalable, etc.
- vectors for particle drag



- Terminology throughout the course (isokinetic, equivalence ratio, dust cake, lapse rate)

OPEN BOOK

- Fundamentals — mol fraction, mass concentration, etc. partial pressures
- Gaussian Plume Model
- Powder → gravimetric setting, inertial separation

APCS systems — how they work

Be able to plot a cumulative dist. on log-probability paper. ☆