Range of Henry's Law Constants

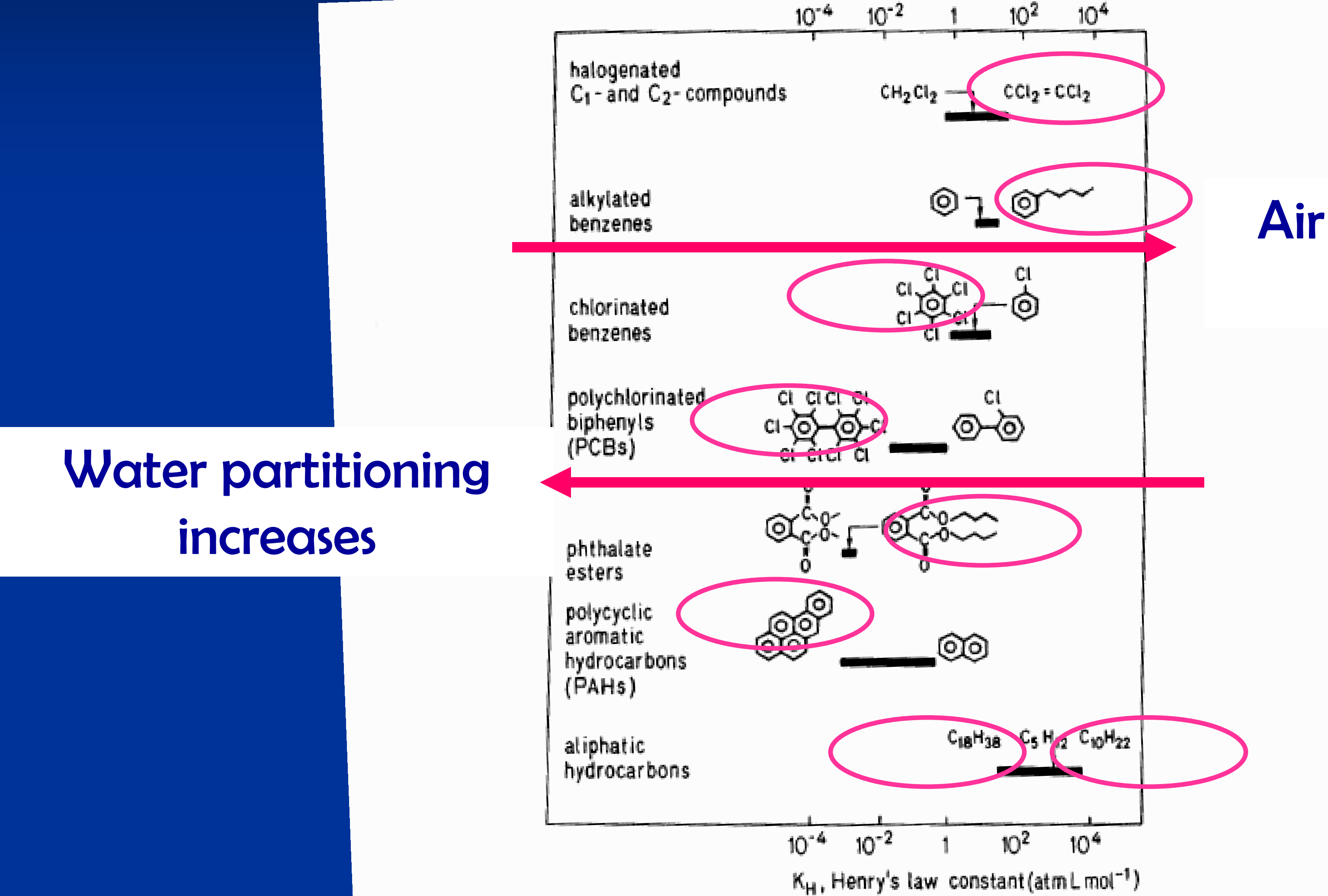
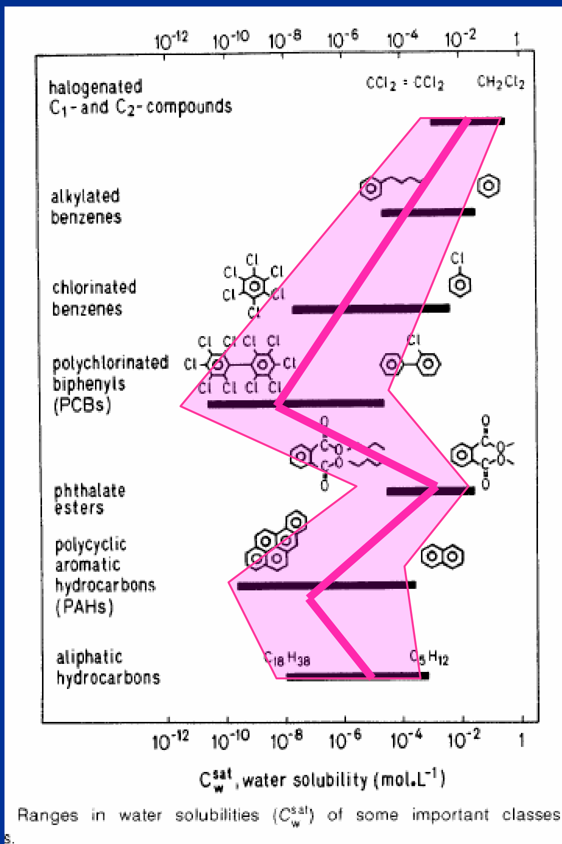


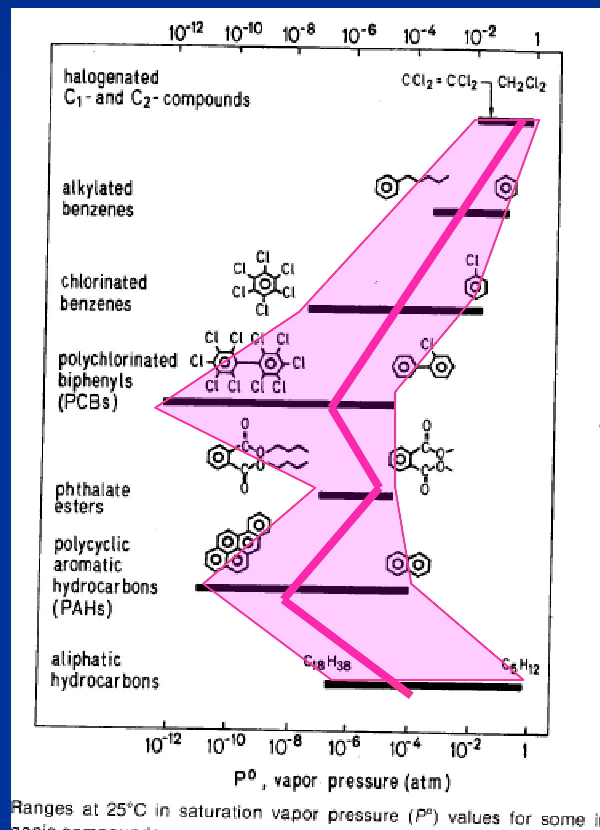
Figure 6.2 Ranges in Henry's Law constants (K_H) for some important classes of organic compounds.

Relative range in values

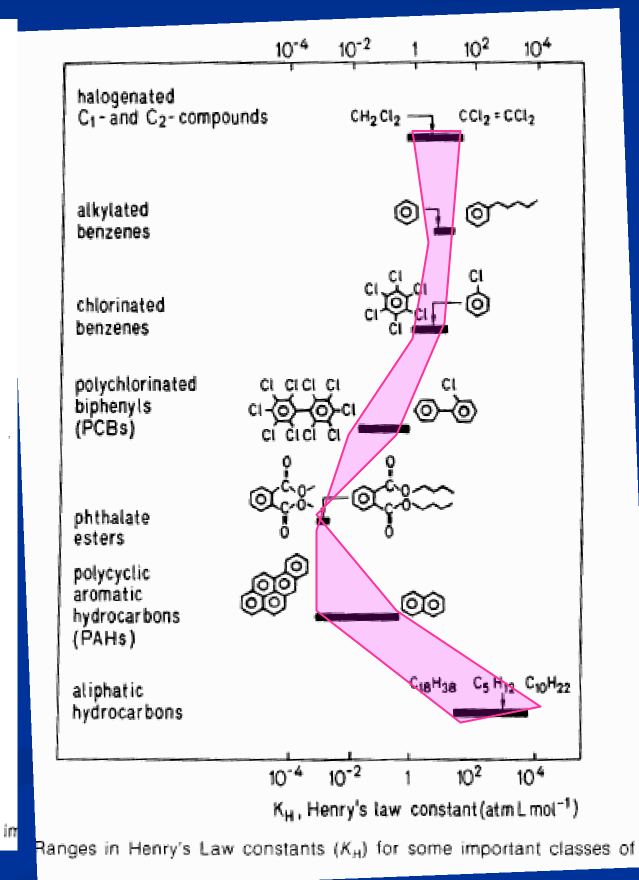
solubility



Vapor pressure



Henry's coefficient



Presentations: powerpoint on go/echem

- 15 minutes + 5 for questions
- Paper of your choosing, approved by me
  - *Environmental Science & Technology* (ACS)
  - Organic compounds in the environment
  - Chemistry & Experimental focus
- Sources beyond the article are expected
  - Textbooks/online sources to refine understanding of terms, particularly in the Methods section, as needed
  - at least 2 important sources cited in the Discussion of your article – integrate other literature findings that your article is being interpreted in light of

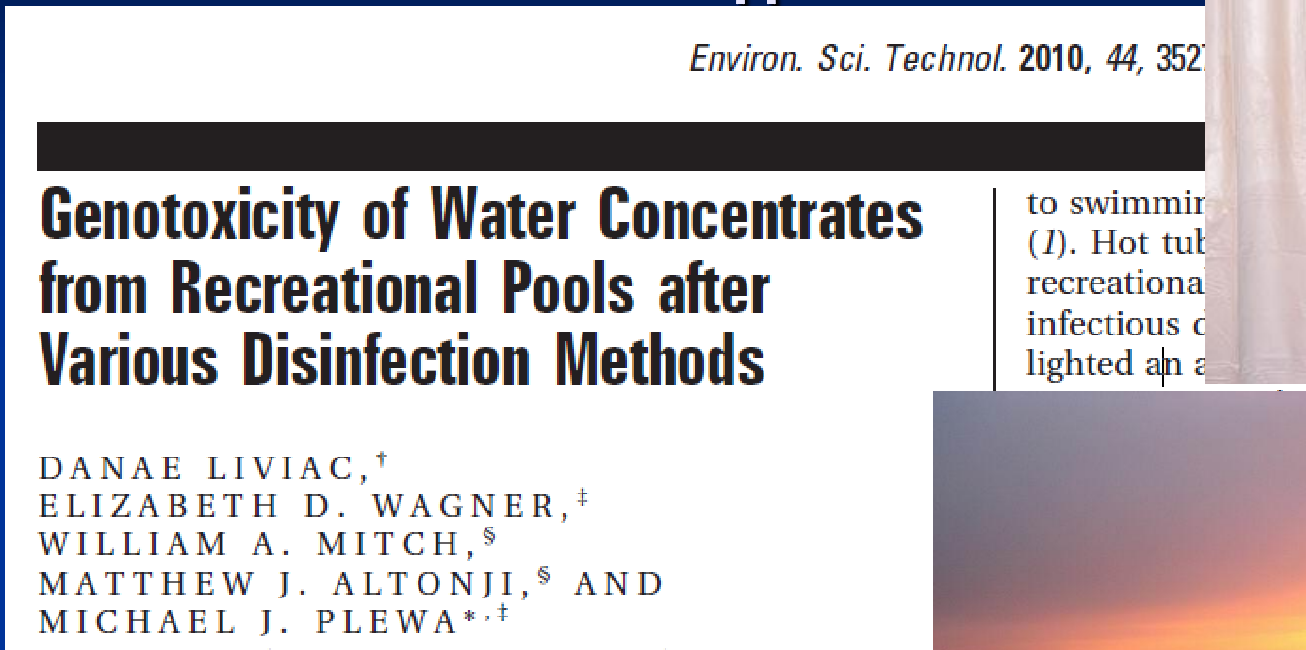
Intermolecular force LFER for K_H

$$\ln \gamma_{iw} = -\ln p^{\circ}_{iL} - 0.572\left[(V_i)^{2/3}\left(\frac{n_{Di}^2 - 1}{n_{Di}^2 + 2}\right)\right] - 5.78\pi_i - 8.77(\alpha_i) - 11.1(\beta_i) + 0.0472V_i + 9.49$$

$$\ln K_{i,h}(-) = -0.540\left[(V_i)^{2/3}\left(\frac{n_{Di}^2 - 1}{n_{Di}^2 + 2}\right)\right] - 5.71\pi_i - 8.74\alpha_i - 11.2\beta_i + 0.0459V_i + 2.25$$

London dispersion forces	**Dipolar (HDA) interactions**	**HDA interactions**	**Entropy/size**
n_D = refractive index (polarizability, Table 3.1)	π = "pi term" (Table 5.5)	H-donor (α) & H-acceptor (β) terms (Table 4.3)	Volume term

K_H resources


Environ. Sci. Technol. **2010**, *44*, 352

Genotoxicity of Water Concentrates from Recreational Pools after Various Disinfection Methods

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WILLIAM A. MITCH,[§]
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MICHAEL J. PLEWA*,[‡]

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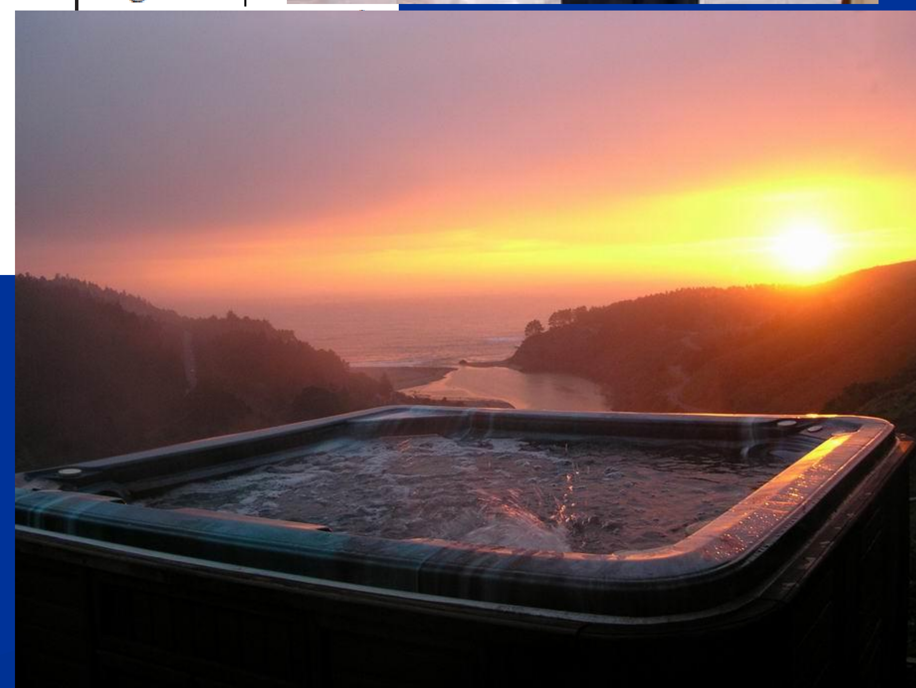
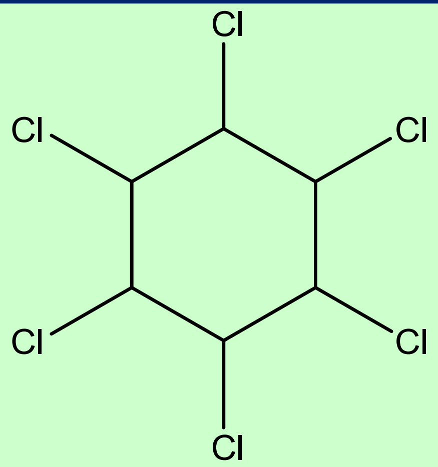


- Killer Showers
- Killer Hot Tubs
- EPA Estimator

http://www.undercovercaterer.com/wp-content/uploads/2010/09/hot-tub.jpg

Lindane Global Transport



1,2,3,4,5,6-hexachlorocyclohexane

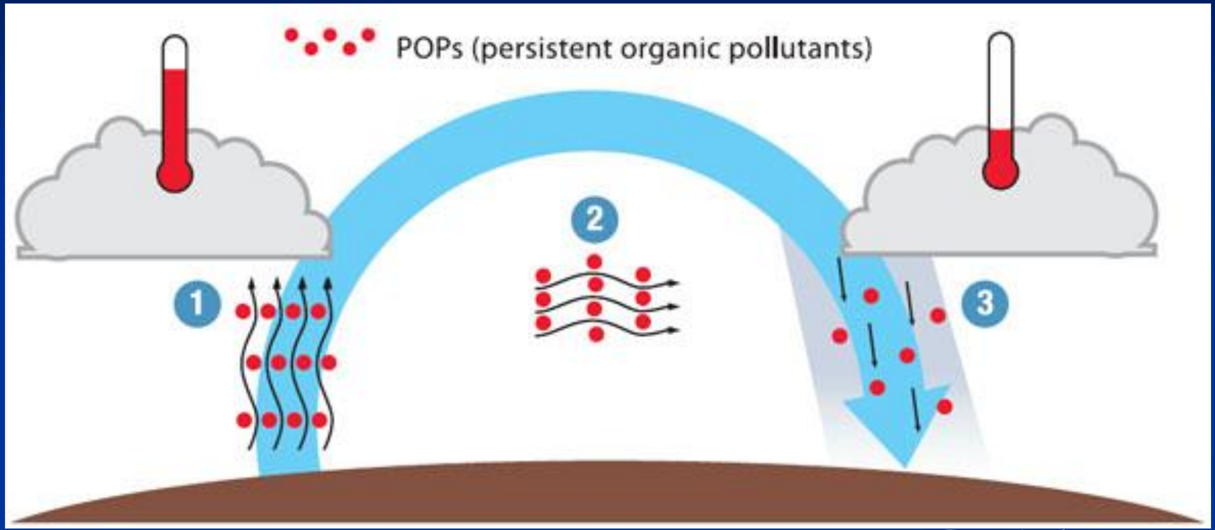
- γ-HCH – a "toxic 21" POP
- K_{aw}(25 °C) = 0.24 Pa m^3/mol
- ΔH_{aw} (25 °C) = 61400 J/mol
- R = 8.314 Pa m^3/(mol K)

Compare $[L]_w$ in Lake Champlain (25 °C) near a farm that uses it on its crops with…

$[L]_w$ in the Arctic (1 °C)

given that the $[L]_a$ is 100 and 10 pg/m^3 in each location, respectively.

Grasshopper effect: spatial & temporal



Warmer areas

Net evaporation

higher K_H

(source)

Colder areas

Net condensation

Lower K_H

(sink)

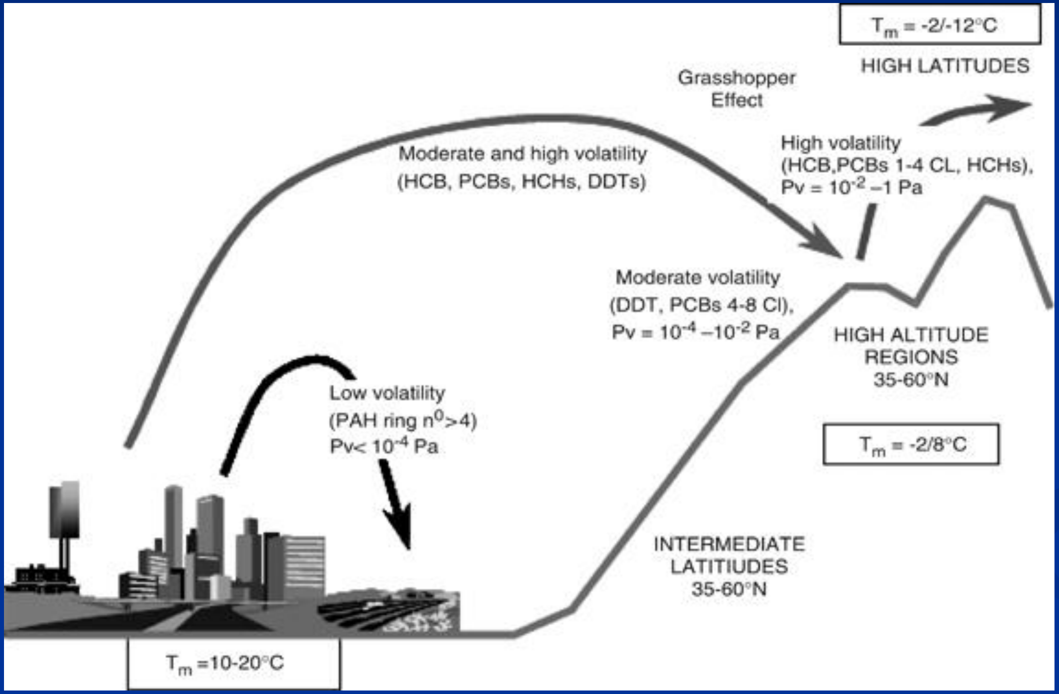
Elevational, latitudinal

Daily, seasonal

Coastal/continental

http://www.ainc-inac.gc.ca/ai/scr/nt/images/nt/pop-pop-1-eng.jpg

Global Distillation



- More volatile compounds are transported faster (atmosphere moves faster than ocean)

Journal of Exposure Science and Environmental Epidemiology (2006) 16, 207–224. doi:10.1038/sj.jes.7500456