

**Atmos. Chem. Lecture 15, 11/4/13:
Atmospheric aqueous chemistry**

1st half:

Importance of aqueous chemistry

H₂O, CO₂ equilibria

SO₂ equilibria

Open vs. closed systems

2nd half: Midterm discussion

project proposals due Nov. 8

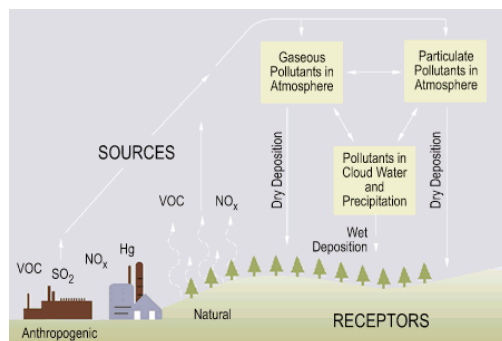
Water in the atmosphere

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Atmospheric aqueous chemistry

- effect on gas-phase concentrations
- “acid rain” (acid deposition)
- aerosol formation
- interaction between atmosphere, hydrosphere



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<http://www.epa.gov/acidrain/what/>

Henry's Law

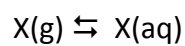
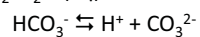
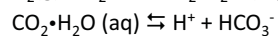
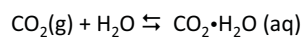
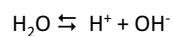


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[Note: Additional material is discussed here during lecture.]

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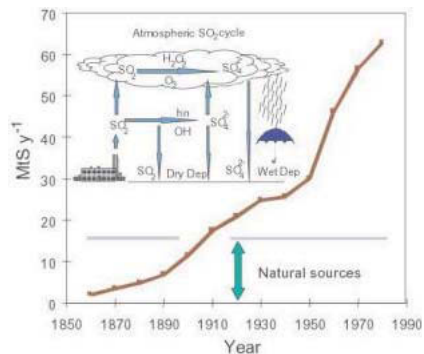
“Pure” water: H₂O, CO₂ equilibria



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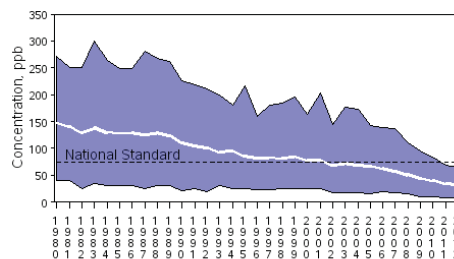
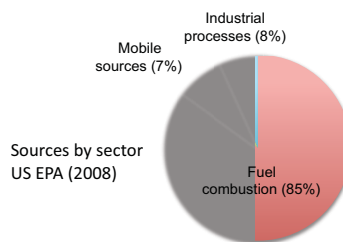
Sulfur dioxide: SO₂

Anthropogenic sulfur emissions:



Courtesy of Thomas Wagner. Used with permission.

<http://joseba.mpch-mainz.mpg.de/so2t2.htm>

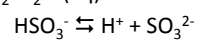
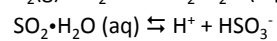
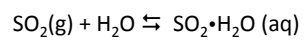


1980 to 2012 : 78% decrease in National Average

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<http://epa.gov/airtrends/sulfur.html>

S(IV) aqueous equilibria



[Note: Additional material is discussed here during lecture.]

S(IV) partitioning

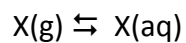
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Open vs. closed systems

Open system: concentration in gas phase is fixed, unchanged by uptake to the aqueous phase (no mass conservation)

Closed system: finite amount of the compound; partitioning into aqueous phase will deplete gas phase (conservation of mass)



[Note: Additional material is discussed here during lecture.]

Open vs. closed systems

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