Topics covered by Mid Term – Spring 2016

Week 1 - Earth's Atmosphere (Introduction and Basics)

- Motivation why we care
- Temperature, pressure, vertical structure

Week 2 – Composition and structure

- Major gases, minor gases, concentration and mixing ratios, pressure, conversions
- Simple aerosol basics

Week 3 – Physics of the Atmosphere

- Hydrostatic balance
- Vertical motion, pollutant buildup
- Stability, lapse rates
- Some large-scale transport, Hadley circulation, winds

Week 4 – Energy, light, bond strengths

- Photon energy, converting bond strength to minimum photolysis energy
- Photodissociation of ozone
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Week 5 – Introduction to gas-phase chemistry

- Fundamental reaction, kinetics, rate constants
- Radicals, lifetimes, energy surface
- pH, acidity

Week 6 – Simple box models

- Sources, sinks, steady state
- Formation of hydroxyl (from ozone and H2O)
- Atmospheric lifetime of methane (example of rate/lifetime calculation)

Week 7 – complex reaction schemes

- Chapman chemistry, odd oxygen (stratosphere)
- Oxidation of methane, formation of intermediates,
- CO, ozone, formaldehyde
- Simple calculation of photolysis rates

Other topics along the way

- Smoke and sulfur pollution London "smog")
- Acid rain we will look at this after the midterm)
- Science and policy (in particular, smog reduction)