AOSC 433/633 & CHEM 433/633 Atmospheric Chemistry and Climate

Admission Ticket, Lecture 16
Due: Tuesday, 2 April 2013 (at start of class)
15 points
Your name: _____

We will examine the role that heterogeneous chemistry plays in mid-latitude and polar ozone depletion. Answers to these questions draw upon material presented in class and the reading for Lecture 15 as well as the reading for upcoming Lecture 16.

a) (2 points) What type of aerosol particles are present in the mid-latitude stratosphere?

b) (2 points) What chemical heterogeneous chemical reaction occurs on the aerosol particles present in the mid-latitude stratosphere? (This is called a "heterogeneous reaction" since it involves a reaction of gaseous constituents on the surface of a liquid particle: i.e., it involves different, "heterogeneous" phases).

c) (2 point) What is the effect on ClO of the "heterogeneous" reaction from part b)?

d) (2 point) What type of particles are present in the polar stratosphere during winter?

e) (2 point) What is the effect of these particles on the chemical composition of the polar stratosphere (i.e., atmospheric scientists have shown that chemical reactions occurring on the surface of these particles convert species such as _____ and _____ to more reactive species such as _____ and _____) ?

f) (5 points) Why does the heterogeneous reaction of part e) occur only at high-latitudes during winter (you may want to draw upon material presented in Lecture 11 as well as reading from Lecture 2)?