Big Questions (Session I) Plenary Discussion:

This discussion focused on the Session I general overview talks and big questions for each discipline. Several major points were brought up in these talks including: the roles of intrinsic heat vs. rotation rate and incident stellar flux in driving atmospheric circulation, atmospheric evolution and the role of greenhouse gases and H_2, in paleoclimates, the width of a habitable zone around a star, use of the correct databases in radiative transfer modeling, and 1-D vs. simplified dynamical vs. general circulation modeling and when each is appropriate.

A general finding was that "the devil is in the details." In many cases, it is necessary to apply broad knowledge and simpler models, for example when modeling exoplanet atmospheres, before diving into complexities. As our knowledge increases, the improved understanding can then be applied to the other disciplines, which subsequently provide feedback on initial conditions and assumptions. This means applying the atmospheric physics we have learned from the Earth to Solar System bodies, using those diverse atmospheres as a new set of boundary conditions that test the sensitivities of the Earth models, and then applying this knowledge to exoplanets to constrain the needed observations that allow for informed modeling. For the atmospheres best observed, studies then progress towards predictive modeling, where the smallest atmospheric forcings and feedbacks begin to play a role. This will also inform the need for proper laboratory data, for example, high temperature line lists for H_2O, CH_4, and other compounds.