



HAO Colloquium Series

(Refreshments served)

Speaker: John Emmert, Space Science Division, NRL

Time: 1:30–2:30 pm

Date: Wednesday, October 19, 2011

Location: CG1-South Auditorium

Title: Whither the thermosphere? The evolving climate of the near-Earth space environment

Abstract:

Earth's thermosphere is the region of tenuous, hot, and partially ionized gas between altitudes of 90 and 800 km. Its composition and structure depend on solar energetic forcing and on the dynamics and chemistry of the underlying portion of the atmosphere. Accumulated measurements over the past 50 years afford a complex picture of thermospheric climate and how the system is changing with time. Most observed climatological features of the thermosphere are predicted by current theory, but many aspects of its behavior are unexplained. The dominant mode of thermospheric variability is its 11-year expansion and contraction in response to heating from solar ultraviolet irradiance. The thermosphere also undergoes global annual and semiannual oscillations that most likely originate in the lower and middle atmosphere. Anthropogenic increases in carbon dioxide, the thermosphere's primary cooling agent, are inducing long-term trends. And the unusual solar minimum of 2008 produced a thermosphere more contracted than any observed since the beginning of the space age. In this presentation, we review current understanding of these and other characteristics of thermospheric climate.