

Temperatures and composition in the Saturn system from observations in the thermal infrared by Cassini CIRS

F. M. Flasar (1) and the Cassini CIRS Science Team

(1) NASA Goddard Space Flight Center, USA (f.m.flasar@nasa.gov)

We summarize recent observations by the Composite Infrared Spectrometer of Saturn, its rings, Titan, and the icy satellites. The CIRS observations provide maps of the meridional distribution of atmospheric temperatures, zonal winds, and composition on Saturn during its southern summer season. In conjunction with radio-occultation measurements, CIRS thermal-infrared spectra can also lead to a more accurate determination of the atmospheric helium abundance. Thermal observations of Saturn's rings provide evidence of slowly rotating ring particles that have moderate thermal inertia. Titan's north winter pole exhibits several characteristics—cold stratospheric temperatures, strong circumpolar winds, warm mesospheric temperatures, and anomalous concentrations of several organic gases—that are analogous to what is observed in the winter polar vortices on Earth. The observed diurnal behavior of temperatures on the icy satellites implies that their surfaces are highly porous, more so than those of the Galilean satellites. Thermal observations of Enceladus indicate hot spots associated with fissures in the south polar region, most likely of endogenic origin. The mechanism providing the energy and confining it to the south pole are not well understood.