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During the coordinated campaign to observe Jupiter's atmosphere during the simultanous Galileo and Cassini encounter in December, 2000, and January, 2001, data were obtained from (1) Galileo's Photopolarimeter-Radiometer (PPR) at 27 μm, (2) Cassini's Composite Infrared Spectrometer (CIRS) between 7 and 16 μ, and (3) ground-based imaging from the NASA IRTF between 5 and 24 μm were obtained in order to map temperature structure, minor and trace constituent abundances and the NH$_3$ condensate cloud field. Targets for the three sets of data included the Great Red Spot (GRS), the merged white oval ``BA'' and 5-μm hot spots. In addition, the IRTF data provided (a) contextual information for planetary-scale and regional phenomena, such as thermal waves and polar phenomena), as well as (b) a study of the evolution of various phenomena. The GRS remains the coldest feature in Jupiter's upper troposphere at temperate or equatorial latitudes, and it is consistent with an upwelling cyclonic vortex. A warm region remains semi-permanently associated with it to the south. Little thermal variability is detectable that can be associated with the 5-μm hot spots. Jupiter exhibits seasonal variability in its stratopshere, and the ``quasiquadrennial oscillation'' of the last 12 years dominates the meridional organization of the stratosphere. Greater than normal abundances of NH$_3$ gas are associated with regions of substantial cloudiness. The meridional variability of zonally averaged {\it para-}H$_2$ abundances is similar to that observed by Voyager IRIS at Jupiter; it is more abundant in the Great Red Spot than in surrouding regions. Implications of these and other observations will be discussed. This work was supported by NASA grants to JPL, GSFC and Cornell, as well as the Galileo and Cassini projects.