

Diurnal variations in the aphelion cloud belt as observed by the Emirates Exploration Imager (EXI)

Abstract

Observations by the Emirates eXploration Imager (EXI) on-board the Emirates Mars Mission are used to characterize the diurnal seasonal and spatial behavior of Aphelion Cloud Belt during Mars Year 36 L30-190. Building from previously work with the Mars Color Imager (MARCI) on-board the Mars Reconnaissance Orbiter we retrieve water ice extinction optical depth (τ) with an uncertainty 0.022 (excluding particle size effects). We connect EXI and MARCI using radiance and τ . Zonal and meridional diurnal trends are analyzed over 6h-18h Local True Solar Time. The retrievals show large morning-evening asymmetries about a minimum near 12h. The latitudinal distributions in early morning are extensive and particularly striking near mid-summer. Comparisons to the Mars Planetary Climate Model show reasonable agreement with the basic diurnal behavior but noticeable departures include too much water ice in early morning the general latitudinal extent and behavior smaller scales like the volcanoes and other topographically distinct features.