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Observations of the southern seasonal cap of Mars before the local spring equinox by OMEGA on Mars Express

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The OMEGA VIS-IR imaging spectrometer on board Mars Express has observed the evolution of the southern seasonal cap of Mars from mid december 2004 to march 2005. The spectral range, spectral resolution and high S/N of OMEGA in the 1.1 – 2.6 μm wavelength range makes it possible to unambiguously identify CO_2 ice and H_2O ice. This period corresponds to late winter in the South. The southern seasonal cap markedly differs from the northern seasonal cap at the same season. A major contribution of water ice is only observed at longitudes 60˚ to 120˚ E, strongly linked with Hellas, while in the north water ice dominates the outer fringes of the seasonal cap, with an axisymetric distribution. The CO_2 distribution in the south is close to axisymetric, similarly to what is observed in the North for water ice frost. When the H_2O ice content is low, the seasonal cap has a lower albedo than the same regions observed in January 2004 (end of summer in the South). H_2O rich regions are brighter than ice free regions, similarly to what is observed in the North. The observed spectra present extremely strong CO_2 absorption bands. This supports a model in which slab CO2 ice dominates the southern seasonal cap, as already suggested by Kieffer and Titus for specific regions of the North seasonal cap.