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Investigations of selected areas of the south seasonal cap of Mars in early 2009

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A coordinated campaign of observations of the retreating South seasonal cap of Mars is under way, combining observations in the near IR (OMEGA, CRISM) and the thermal IR (THEMIS) with high resolution observations with HIRISE (30 cm IFOV). This will be the 3^{rd} set of observations with OMEGA/Mex, providing information on interannual variations of the evolution of the seasonal cap. The pericenter of the orbit of Mex is now at high southern latitudes, so that OMEGA observes the seasonal cap with an IFOV of 300 m (similar to that of the pushbroom mode of CRISM but with a better spectral sampling), while HR observations with CRISM provide a much higher spatial resolution (IFOV 18 m) on selected areas. Previous observation campaigns have demonstrated that two types of areas could be identified in the "cryptic region" (dark and cold in mid-spring): those with a significant CO2 ice signature (type "A") with clear evidence for a venting process (spots, fans, spiders) and those which become heavily contaminated with surface dust shortly after equinox (type "B"), with little evidence for large scale venting. Shortly after equinox, there is a widespread surface contamination by H_2O frost. During early spring, H2O frost becomes restricted to a few locations around the cryptic region . These patches disappear after mid-spring.

The main focus of this contribution is on the evolution of two end-members of the seasonal cap: cryptic region type "B" and the evolution of H_2O frost patches. One of the major issues is the role of several candidate processes for surface dust contamination in cryptic region B:

- venting similarly to region A, but on smaller spatial scales

- direct dust sedimentation on the surface

- scavenging of airborne dust by condensation of H2O frost

Previous OMEGA observations have indeed shown that regions corresponding to H_2O frost deposition are depleted in aerosols when compared to a well-mixed model for the lower 10 km of the martian atmosphere. The evolution of H_2O frost patches is of particular interest when compared to that in previous martian years, as these features are linked to topography and wind patterns.

References : H.H. Kieffer et al., *JGR* **105**, 9653 (2000) ; Y. Langevin et al., *Nature* **442**, 790 (2006) ; Y. Langevin et al., *JGR* **112**, E08S08 (2007) ; H.H. Kieffer et al., *Nature* **442**, 793 (2006) ; S. Piqueux et al., *JGR* **108**, E8 3-1 (2003) ; H.H. Kieffer, *JGR* **112** E08005 (2007) ; M. Vincendon et al., *Icarus* **196**, 488 (2008)