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Mars observations by OMEGA/Mex during the dust events from 2004 to 2019

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The OMEGA [1] imaging spectrometer on board the ESA/Mars Express mission has acquired regular hyperspectral images of the surface and the atmosphere of Mars in nadir and limb modes.

OMEGA measurements gathered over more than 16the 16 yeas years offer an opportunity to explore the yearly variability of the Martian atmosphere, with sufficient time sampling or spatial coverage to put constrains on several aspects of the atmospheric dynamic. OMEGA still provides unique aerosols compositional characterization capabilities that enable detailed analyses of clouds and other poorly known high altitude aerosols layers.

During these 16 years Mars Express observed 10 dust storms (Fig 1.)

year	period	Ls	orbits
2004	December	120-140	1110-1220
2007	July-August	270-300	1190-4650
2008	October-November	135-165	6100-6280
2009	April	240-260	6730-6850
2010	January-February	33-60	7700-7880
2012	November	195-220	11200-11350
2014	October-November	215-239	13700-13830
2016	September	220-235	16080-16150
2017	February	309-325	16575-16675
2018	May-June	170-200	18140-18330
2019	January	318-335	18990-19100

Fig1: list of Dusts Storms observed by MeX.

We shall present an overview of results acquired during these dust events in nadir and limb modes, and will discuss the relationship between dust storms and appearance of gravity wave ([2],fig 2.) as well as apparition of high altitude H2O ice clouds (~80kms) [3,4]

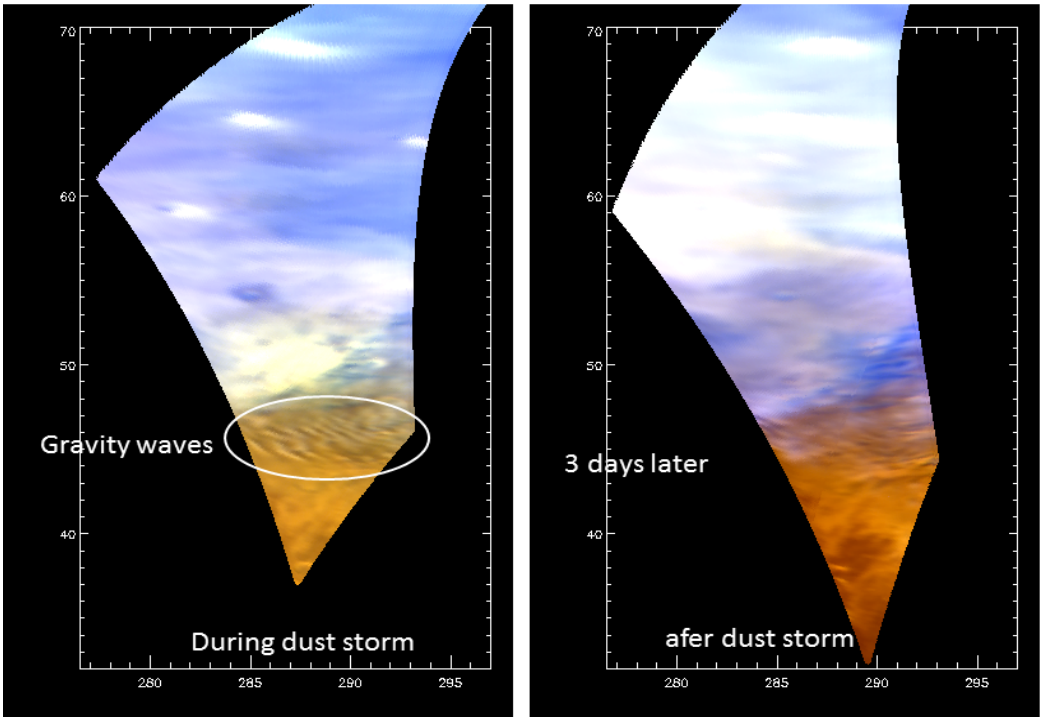

Fig 2. : Omega gravity waves observations during January 2019 dust storm in the visible (R(850 nm) G(600nm) B(450 nm)). With the chosen criteria the “yellow color” is characteristic of the dust (red slope). The dust disappeared 3 days later.

[1] Bibring, J.P. ., et al., OMEGA: Observatoire pour la Minéralogie, l’Eau, les Glaces et l’Activité, ESA SP 1240, 37-49, 2004a, [2] Spiga, A. Gravity waves, cold pockets and CO_2 clouds in the Martian mesosphere, GRL , Volume 39, Issue 2 , [3] Vincendon, M:. New near-IR observations of mesospheric CO_2 and HO_2 clouds on Mars 2012, JGR, VOL 116, [4] Gondet, B. et al. Mars observations by OMEGA/Mex during the dust event of 2018**,** EGU2019-4918