RevMexAA (Serie de Conferencias), **49**, 71–71 (2017)

CRYOCLAST DISTRIBUTION ON THE DAMASCUS SULCUS REGION OF ENCELADUS MOON (SATURN) USING VIMS IMAGES

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XV Latin American Regional IAU Meeting (Cartagena de Indias, Colombia, 3-7 October 2016)
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At Damascus Sulcus area within SPT (South Polar Terrain) there were interpreted a series of images where it was analyzed the distribution of different size particles that are ejected by distinct criovolcanic sources based on the analysis of the morphology, tectonic, reflectance and spectral signature of the surface material. This work shows these observations by comparing high resolution images of VIMS and ISS in combination with a Digital Elevation Model.

The cryovolcanism on Enceladus produces huge quantities of material which it's accumulated and transported, modifying the surface. The water ice is main component of this icy moon cortex, although also has smaller amounts of ammonia, carbon dioxide and organics.

There exist defined absorption ranges for the different materials that cover the moon surface which are related with the diameters of ejected particles and the distribution of them. These ranges are used to characterize and differentiate the abundance and distribution of different clasts that occupy the region and achieve the development of a correlation between tectonic and cryovolcanic features present in the Damascus Sulcus area which have a direct consequence of Enceladus' surface dynamics.

The images were treated on specialized software, which were analyzed according to the wavelengths of 1.04, 1.25, 1.5 y 2.0 μm, which have proved to be very useful for studies of grain size on icy moons.

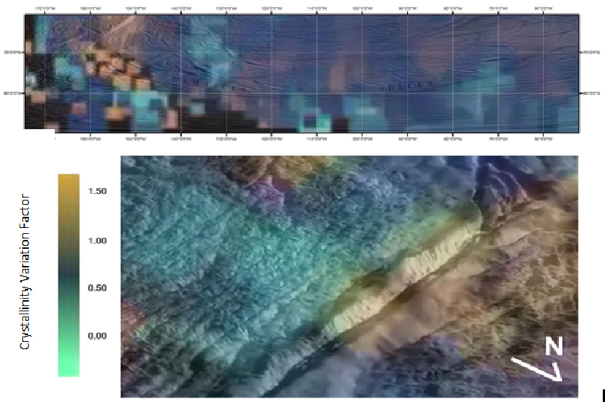

Fig. 1. (A) Scipioni et al. (2015) Spectroscopic variation of water ice abundance and submicron ice grains across Enceladus, Mimas, and Tethys' surface Using Cassini VIMS data. (B) DEM for Damascus Sulcus Tiger Stripe where a variation in crystallinity is observed in the vicinities of the cryovolcanic plumes.

It was possible to generate a zoning of the different sizes and the particle distribution found over the area and interpret a geological evolution for the region, developing a surface thematic map corresponding to cryoclast distribution in order to interpret the correlation with already established surface ages and so conclude the morphologic, tectonic and cryovolcanic relation in Enceladus' surface.

REFERENCES

Scipioni et al. 2015, in 46th Lunar and Planetary Science Conference, LPI Contribution No. 1832, p.1919

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