

THE CONTEXT OF ALIPHATIC ORGANICS ON CERES

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Introduction: Strong diagnostic absorptions of aliphatic organics at 3.4 μm have been identified and mapped across a broad ~ 200 km region of northern Ceres using the Dawn Visible-InfraRed (VIR) imaging spectrometer [1]. These distinctively organic-rich areas also exhibit broad absorption affecting the visible part of the spectrum and are particularly red sloped in seven-filter color measurements of the Dawn Framing Camera (FC) [2]. The organics found on Ceres are currently the most pronounced examples of extraterrestrial aliphatic organics in the solar system that have been detected and mapped by the highly diagnostic 3.4 μm absorption.

Observations and Analysis: This coupled visible-nearIR spectral signature of red-organic-rich (ROR) material allows us to use the high resolution color images of FC to investigate the geologic setting of the organics in greater detail for those regions where organics are the dominant coloring agent in the visible. All areas of distinct ROR material identified to date either are found to be associated with small (100s of m) very fresh craters or as diffuse regions that exhibit the same but weaker absorption signature located near or between some of these small craters. All but one of the ROR small fresh craters are located across an elongate region centered at $\sim 53^\circ\text{N}$, 45°E near the crater Ernutet. We evaluate the geologic context of these ROR materials in order to place constraints on their origin, such as whether they have been a) produced by internal processes during evolution of the dwarf planet Ceres and now exposed on the surface, b) recently delivered to Ceres' surface from a TBD external source, or even c) temporarily created from Ceres' surface regolith chemistry through P,T conditions of recent small impact events.

We invite community participation in this complex and multi-dimensional investigation. Are these observed red-organic-rich materials unique or special to Ceres (in time or place) or are they a newly visible indication of common solar system processes? Or both?

References: [1] De Sanctis, M. C., et al. (2017) *Science* 355, 719-722. [2] Nathues et al. (2016) *Planetary & Space Sci.*, dx.doi.org/10.1016/j.pss.2016.10.017.