



## Spectral variability on Ceres

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Older ground-based observations are reprocessed in order to assess the spectral variability of Ceres surface before the beginning of observations by the Dawn spacecraft.

Ceres was observed with NACO on the VLT in 2004 and 2005, producing resolved spectra of the disk under different attitudes. The data cover the range from 0.91-3.80  $\mu\text{m}$  (J, H, K, and L bands), except in the telluric regions. They consist in spectral scans of the dayside, typically with 15 lines of 20 samples, an actual resolution of  $\sim 100$  km, and a spectral resolution  $R \sim 500$  to 1500. A specific calibration scheme has been applied to preprocess the data and to evidence small compositional variations at the surface of Ceres.

The major signatures observed are two bands centered at 3.06 and 3.30  $\mu\text{m}$ , which exhibit significant spatial variations at this scale (5 to 10%). These features are best fit by ammoniated minerals (phyllosilicates or feldspars), although the lack of secondary hydration bands seems to rule out phyllosilicates. No significant absorption or variation is observed in J, H and K bands, consistently with [1]. No presence of ices ( $\text{H}_2\text{O}$ ,  $\text{CO}_2$ ...) is detected, even at the poles. If Ceres was once rich in ices (e.g., [2]), this suggests a global resurfacing with melting of ices in the subsurface, and alteration under the influence of  $\text{H}_2\text{O}$  and perhaps  $\text{NH}_3$ , with reduced production of phyllosilicates.

### References

[1] Carry et al (2012) *Icarus* 217, 20 [2] McCord, T. B. and C. Sotin (2005) *JGR* 110, 05009.