

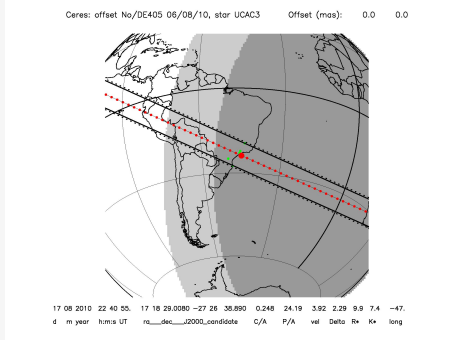
The 17 August 2010 stellar occultation by the dwarf-planet 1 Ceres

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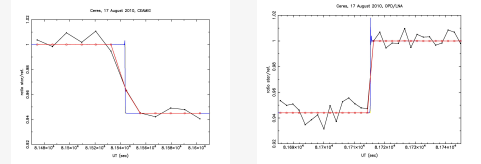
We present preliminary results of the occultation of Tycho star 6833-00163-1 by the dwarf-planet 1 Ceres. The 11.8 visual magnitude star was occulted in the night of 17 August 2010, with the shadow passing through south, south-east and central parts of Brazil. The observation was a challenge because the drop in magnitude was only 0.07 for a visual magnitude of 8.4 foreseen for Ceres at the time of the occultation. We obtained data from five sites, with successful detections of the event from four of them. Occultation chords span from the extreme north portion of the asteroid to the south of it. As this is a recent event, analysis is still in progress. Preliminary results are presented on Ceres' radius, and possibly, on its oblateness.

- Ceres is the only dwarf-planet in the asteroids main belt;
- In 2015 it will be visited by de NASA's DAWN Discovery mission (Russel *et al.* 2003);
- In the night of 17 August 2010, Ceres has occulted the 11.8 visual magnitude Tycho 6833-0163-1 (see map);
- The event was foreseen to last up to 470 seconds with a magnitude drop of 0.05, as Ceres had 8.4 visual magnitude.
- The only observation of this kind ever publish is from 1984 (Millis *et al.* 1987)



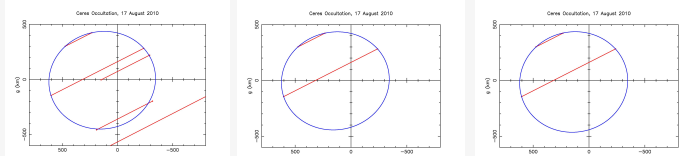
- We used a diffracting model, that accounts for the diameter of the star, to determine the times of immersion and emersion of the star.

| Site | Immersion (UTC) | error (s) | Emersion (UTC) | error (s) |
|---------|-----------------|-----------|----------------|-----------|
| CEAMIG | 22 39 03.7 | 0.6 | 22 40 20.0 | 6.0 |
| OPD/LNA | 22 37 30.3 | 0.6 | 22 41 55.3 | 0.6 |
| INPE | - | - | 22 42 03.0 | 1.7 |
| UEPG | 22 37 16.7 | 13.4 | 22 39 56.2 | 13.1 |

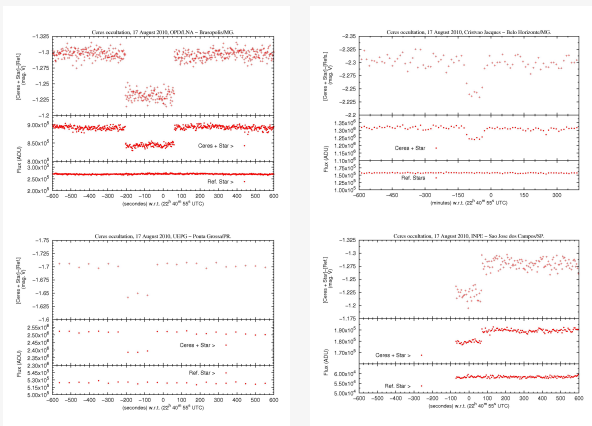


- An elliptical limb profile were adjusted;
- Three possible solutions are discussed:

→ 1) All the data; 2) Better constrained points; 3) Literature oblateness



- Observations were carried out in five stations in Brazil;
- Four sites presented positive detection of the event;

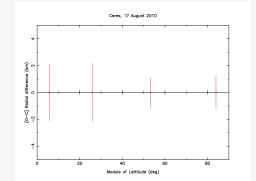


| Parameter | Station 1 | Station 2 | Station 3 |
|-------------------|----------------|-------------------------|----------------|
| Equatorial Radius | 485.2 ± 4.5 km | 484.3 ± 2.7 km | 485.0 ± 2.8 km |
| Polar Radius | 440.4 ± 9.0 km | 437.8 ± 5.0 km | 449.1 ± 2.8 km |
| Oblateness | 0.091 ± 0.03 | 0.096 ± 0.015 | 0.074 * |
| Position angle | 11.2 ° | 11.2 ° | 11.2 ° |
| χ² | 2.29 | 2.91 x 10 ⁻⁶ | 2.11 |

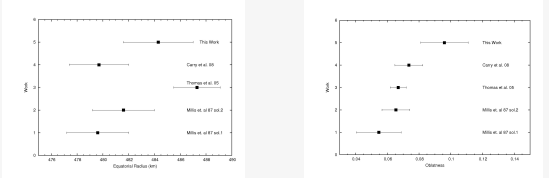
* from Carry *et al.* 2008

- The different results may be affected by Ceres relief features.

- Relief features of about 5 Km can change our measured oblateness by 2% to 3%.



- We compared our best fit with radius and oblateness estimates from the literature.:



- Observations were carried with professional, institutional and amateur telescopes/CCDs.

| Site name | Longitude (W) | Latitude | Altitude | Tel. aperture | Exposure | Sampling | Observers |
|-----------|---------------|-------------|----------|---------------|----------|----------|---|
| CEAMIG | 43 59 51.0 | -19 49 49.0 | 825 m | 31 cm | 5 s | 12 s | C. Jacques, E. Pimentel |
| OPD/LNA | 45 34 45.1 | -22 32 03.7 | 1864 m | 60 cm | 1 s | 2 s | J. I. B. Camargo, G. B. Rossi |
| INPE | 45 51 44.0 | -23 12 33.0 | 975 m | 28 cm | 2 s | 5 s | A. C. Milone, T. Maldonado, M. Okada |
| UEPG | 50 05 56.0 | -25 05 22.2 | 910 m | 40 cm | 30 s | 52 s | M. Emilio, L. Mehret |
| UFSC | 48 31 20.5 | -27 36 12.3 | 20 m | 28 cm | 3 s | 6 s | W. Schoenell, A. J. T. Mello, F. R. Herpich |

References:
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