

A new moon-induced structure

Nicole Albers

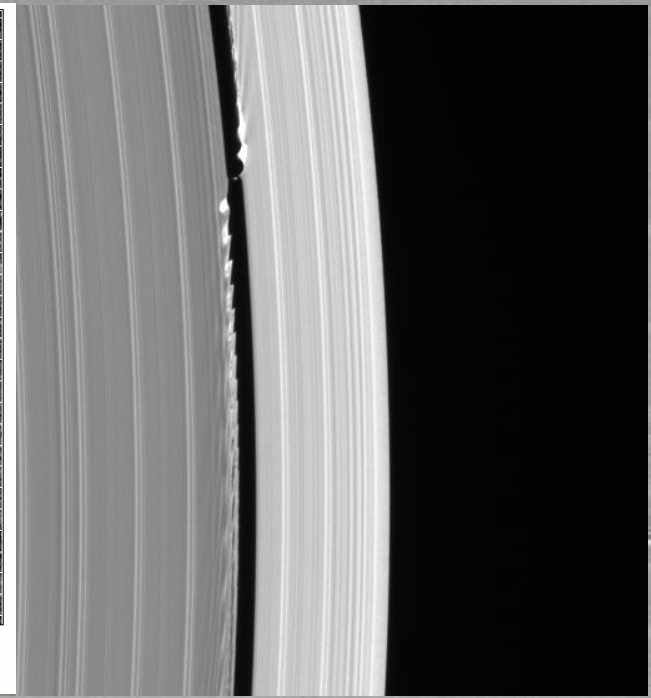
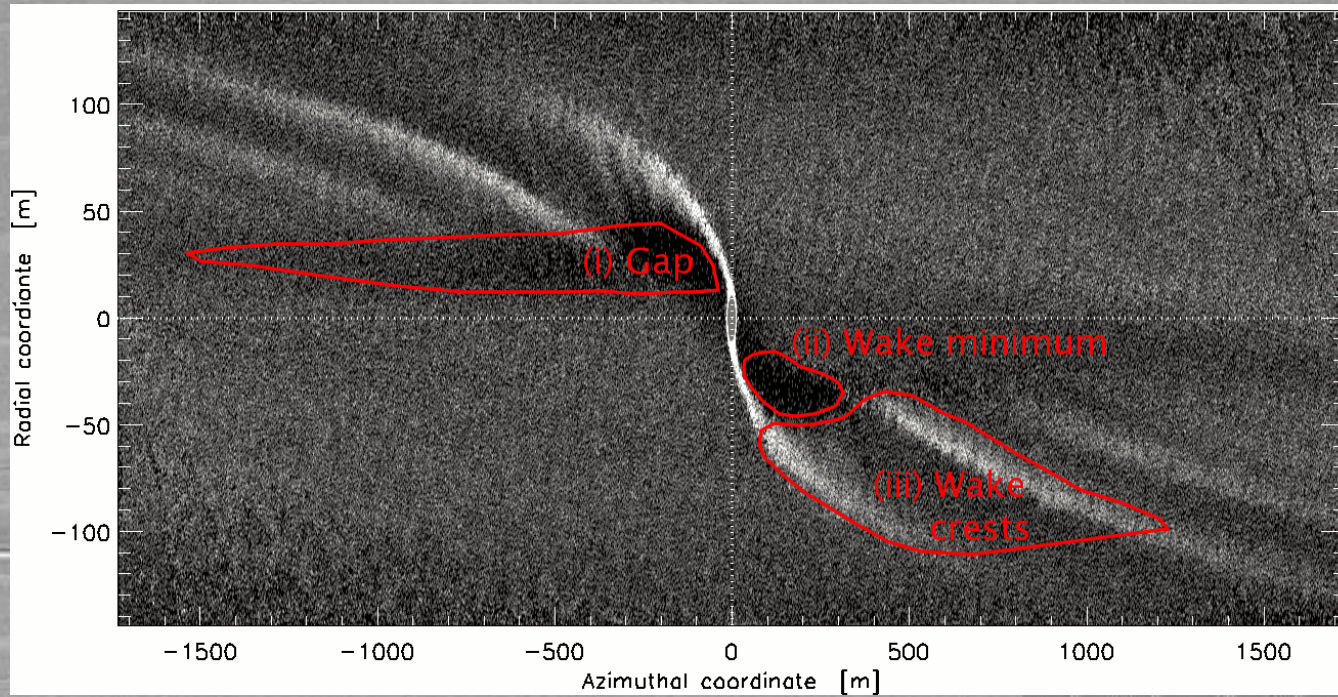
LASP, University of Colorado

Rings Workshop

13-15 August 2014 in Boulder, CO



Embedded Moons and Moonlets



 Daphnis (Keeler Gap)

Embedded Moons [Showalter et al. (1986)]

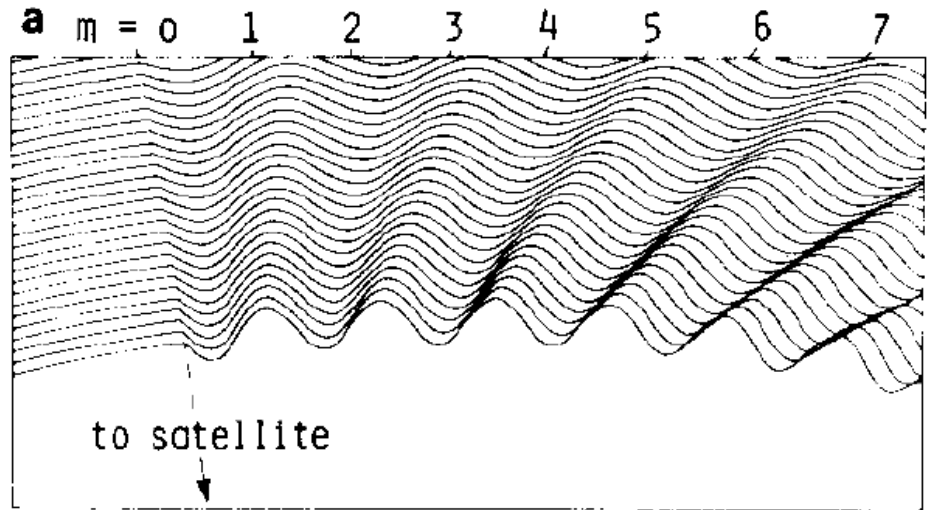
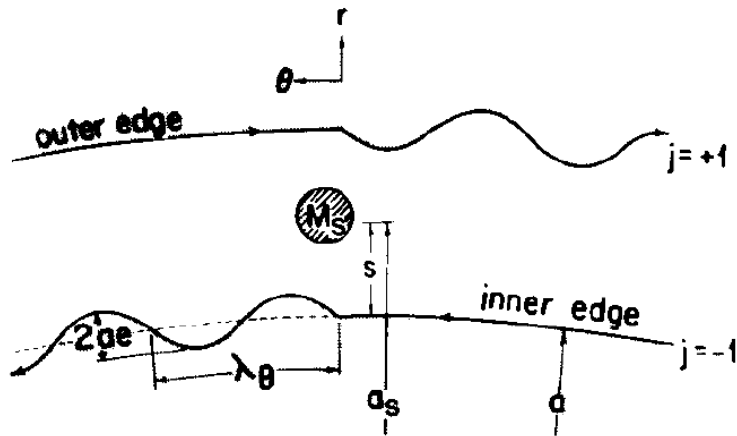
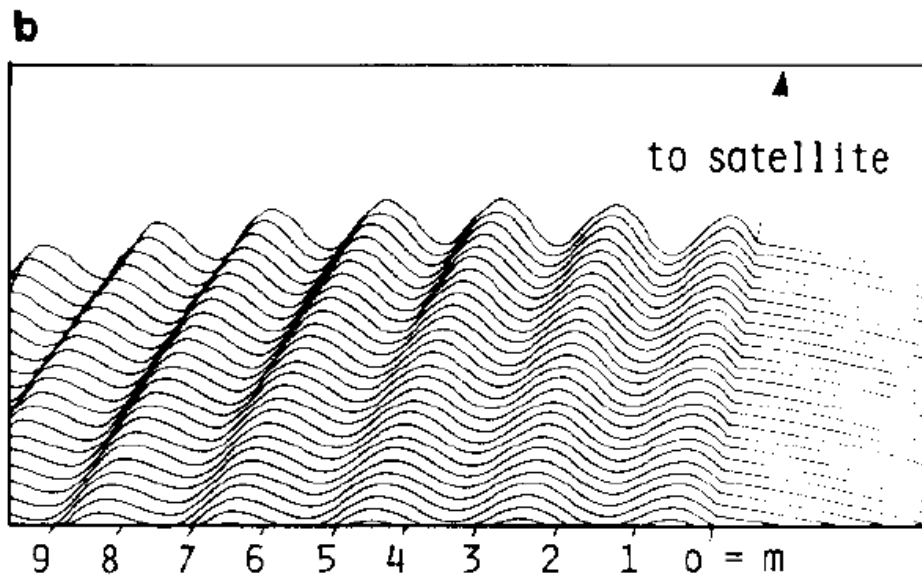
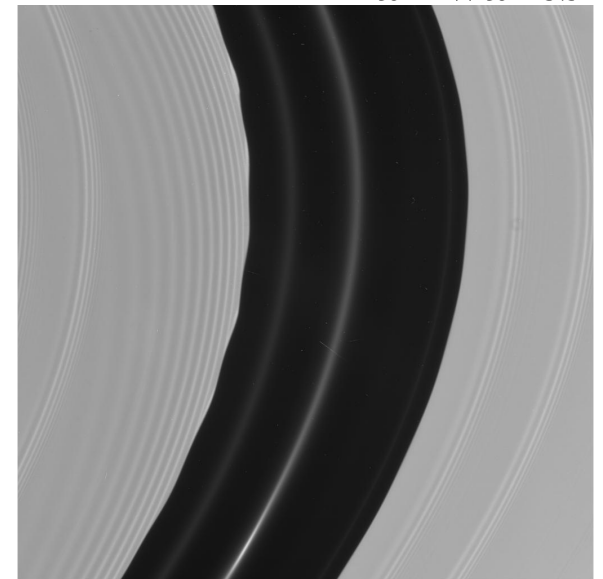


FIG. 1.1. The ring-moonlet interaction, as viewed in the rotating frame of the moonlet. Each particle re-

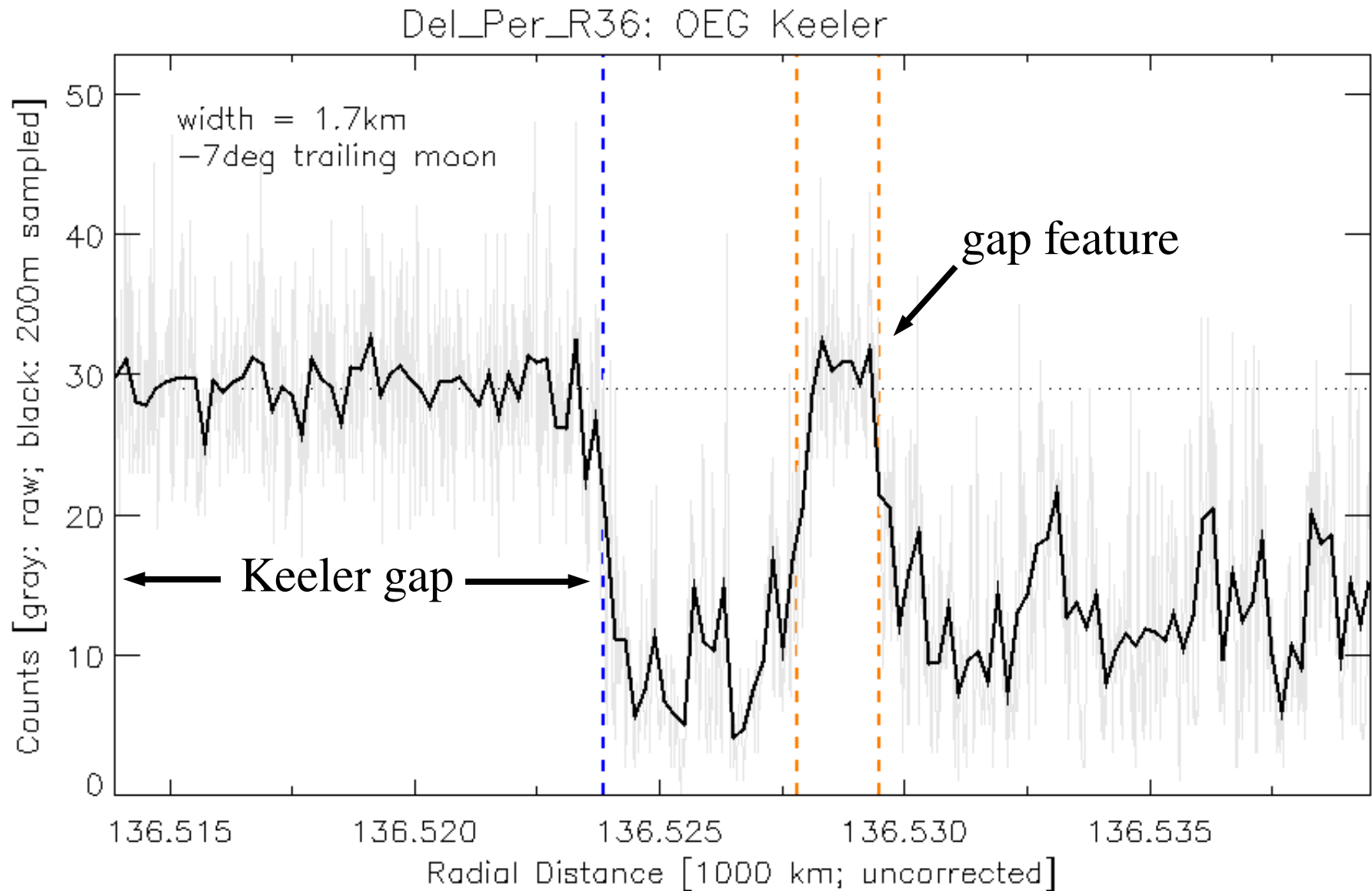


Pan wakes

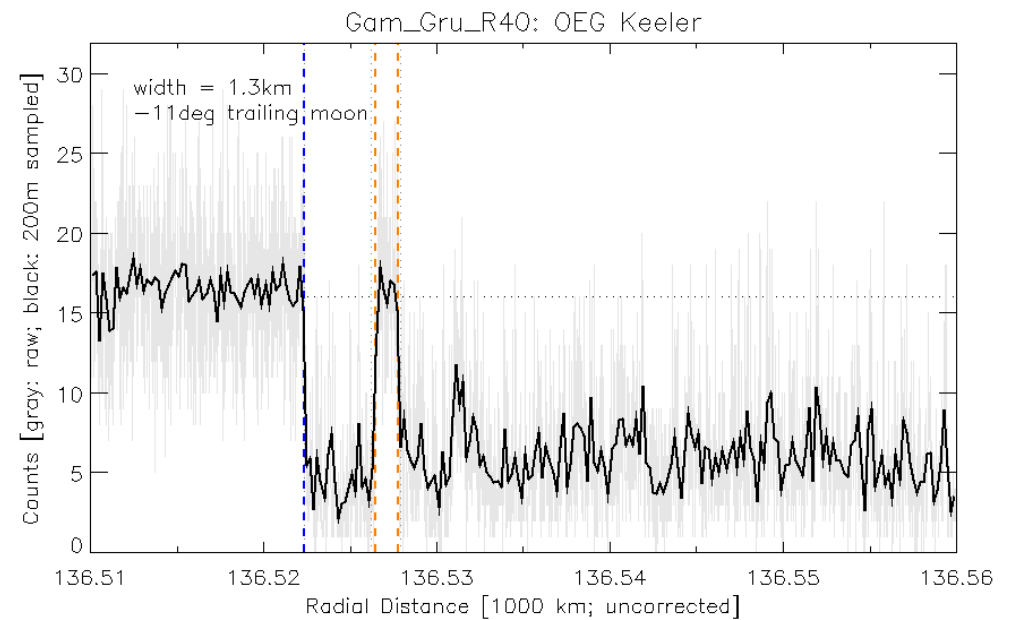
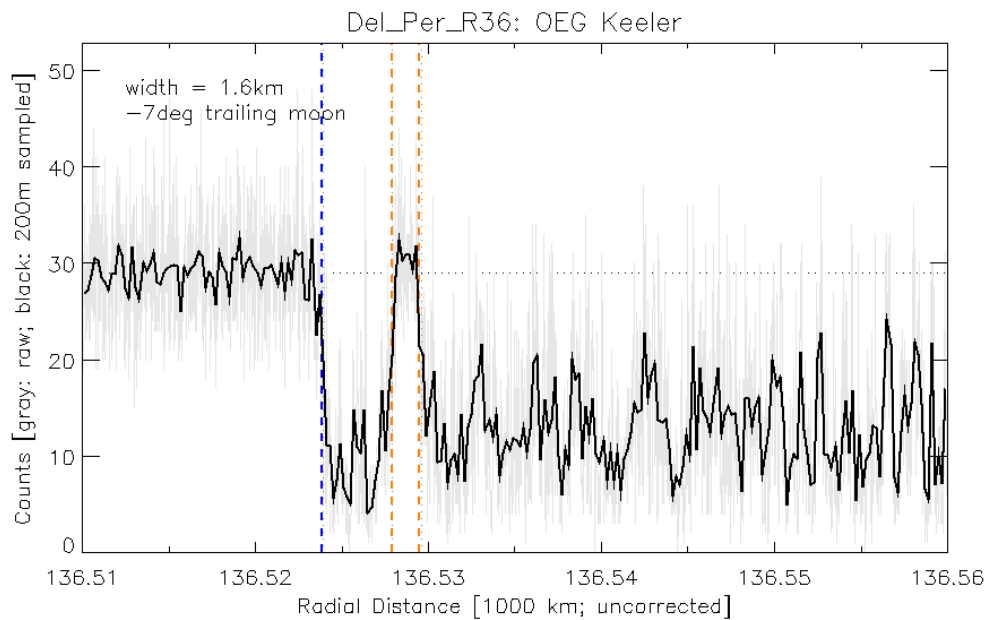
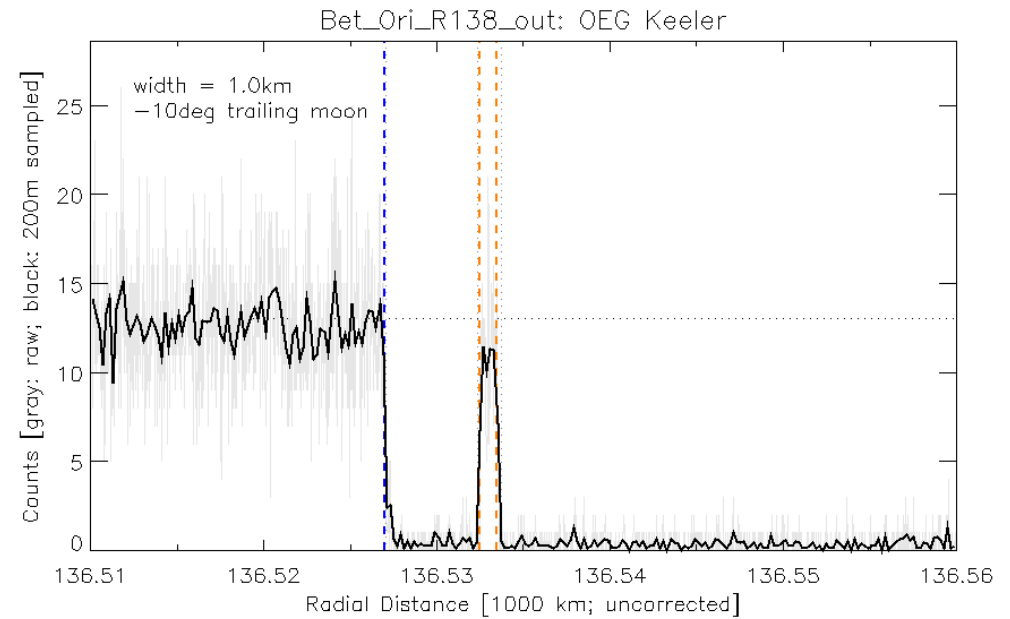
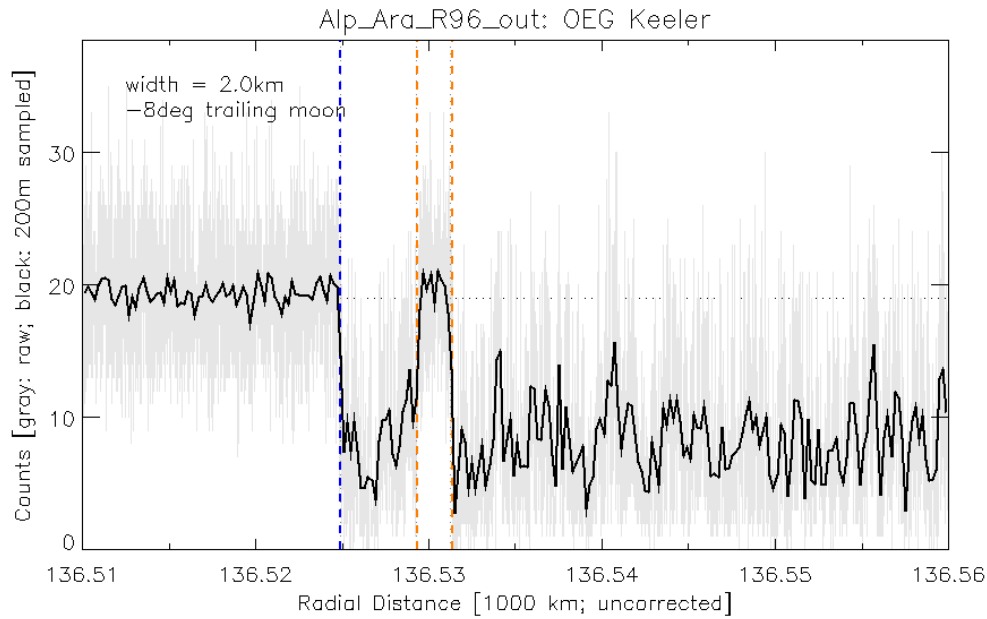


Example Occultation across Keeler Gap (Daphnis)

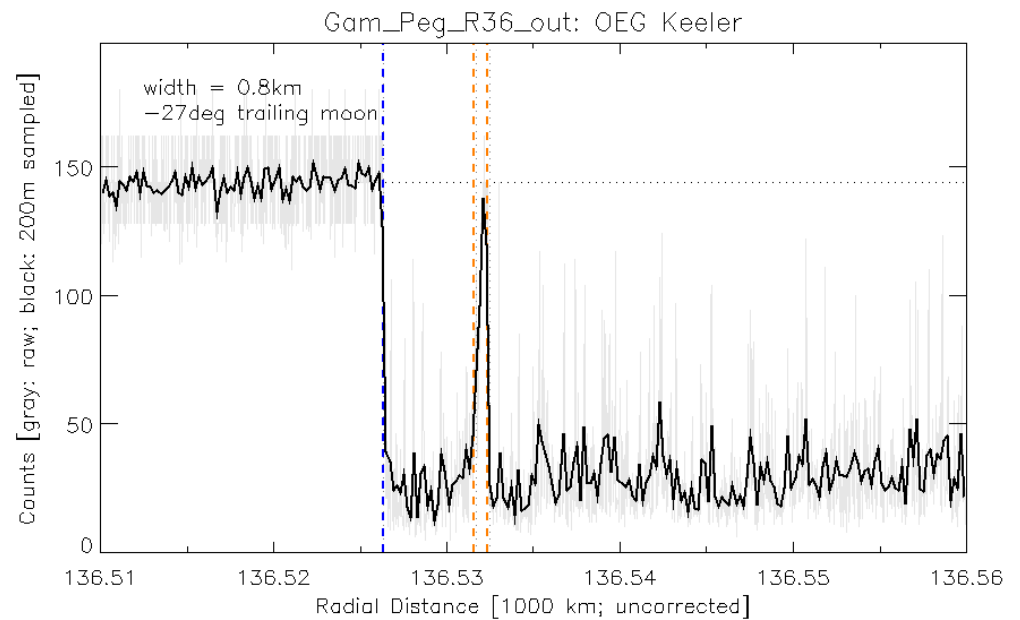
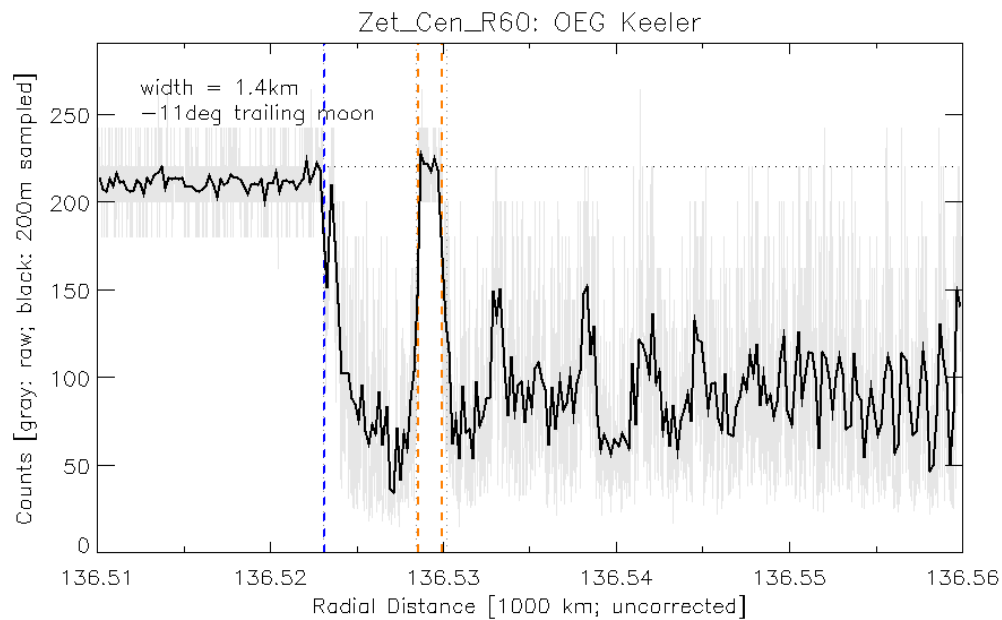
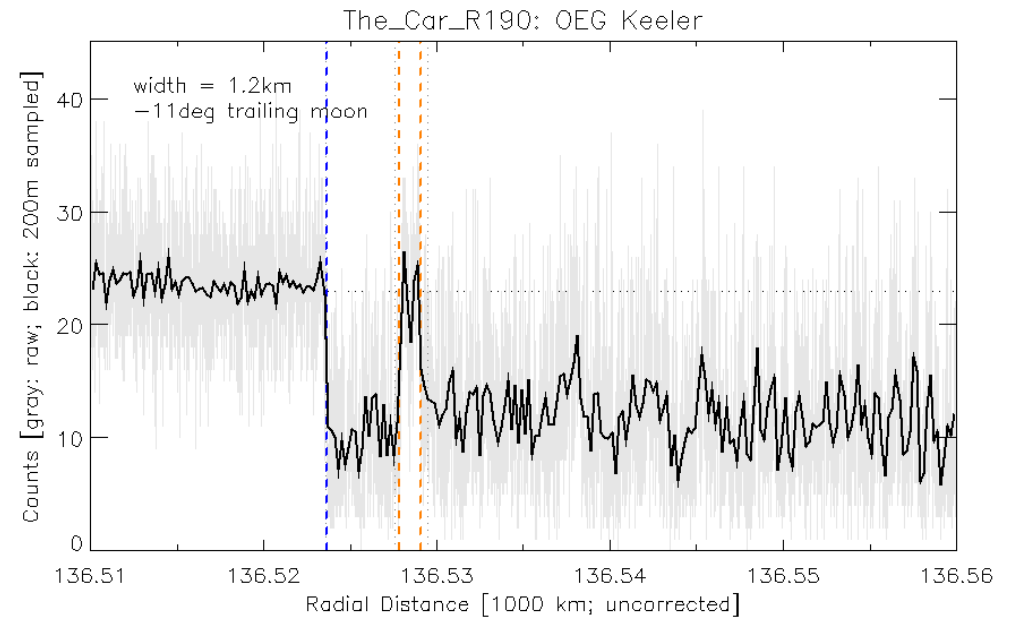
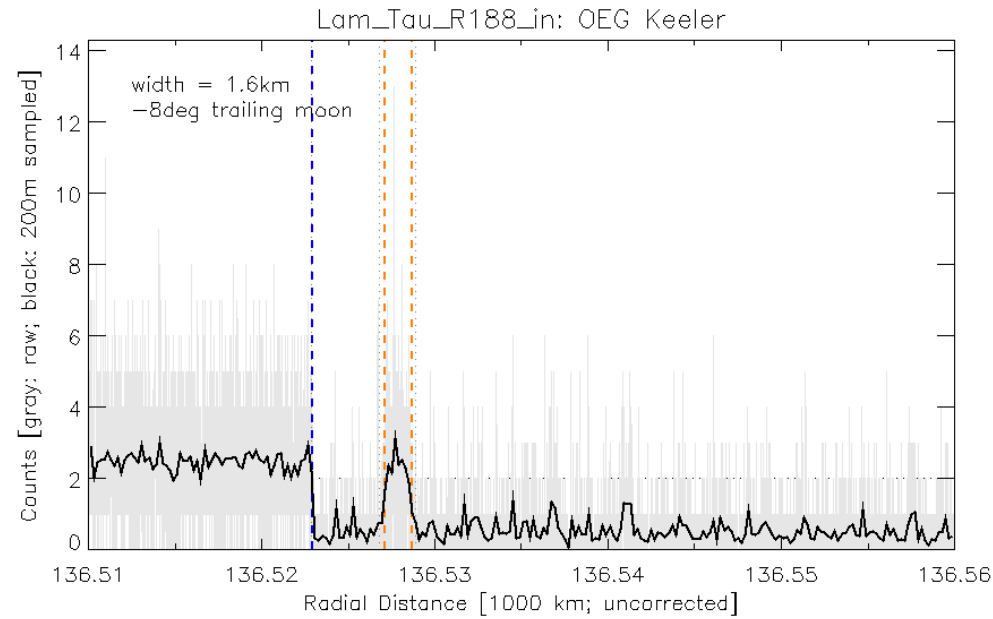
(for qualitative optical depth invert vertical axis)



OEG Keeler (examples)

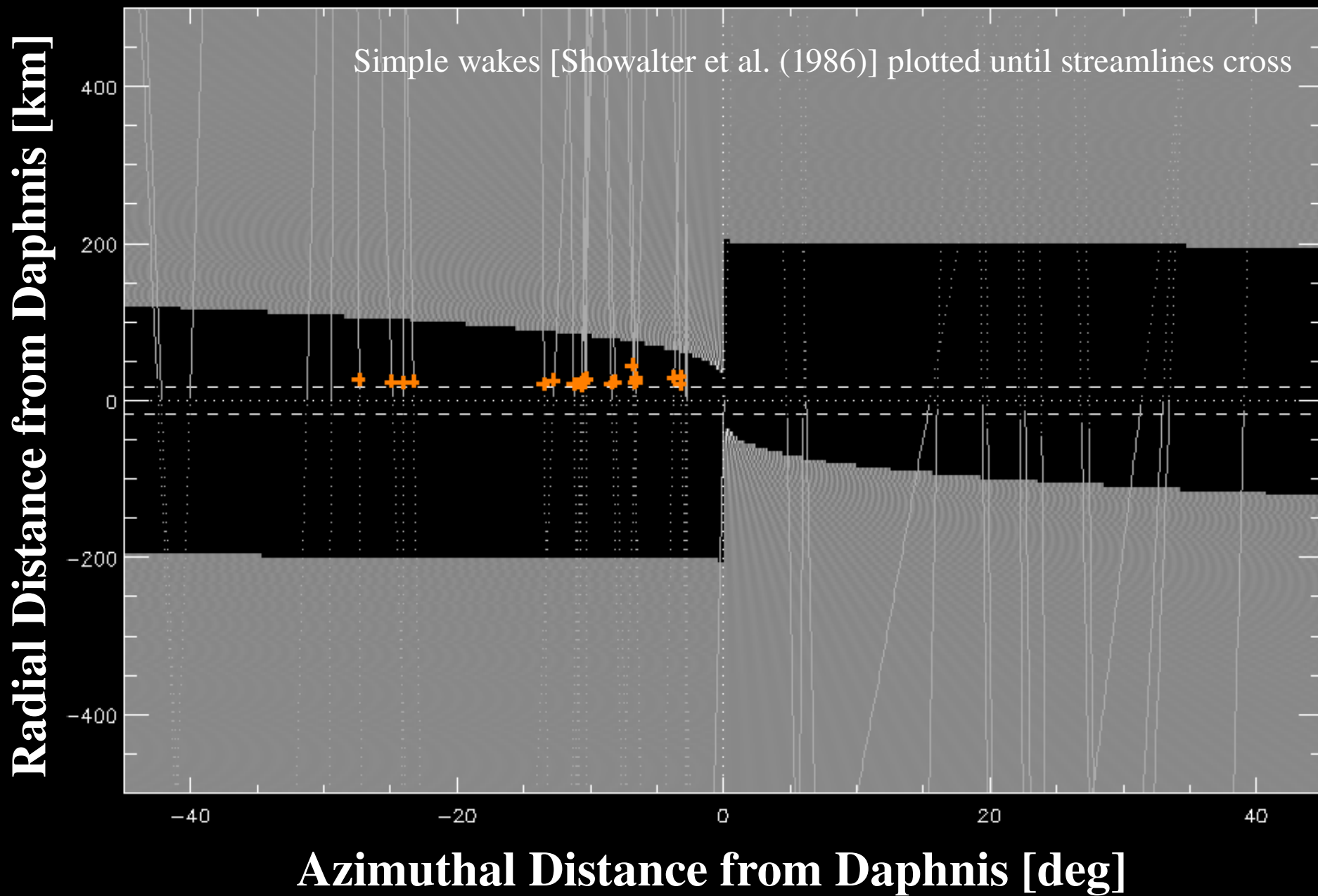


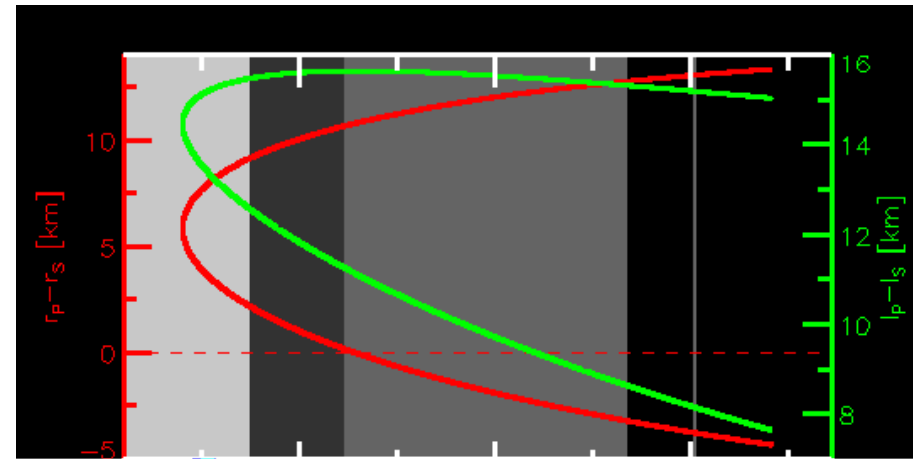
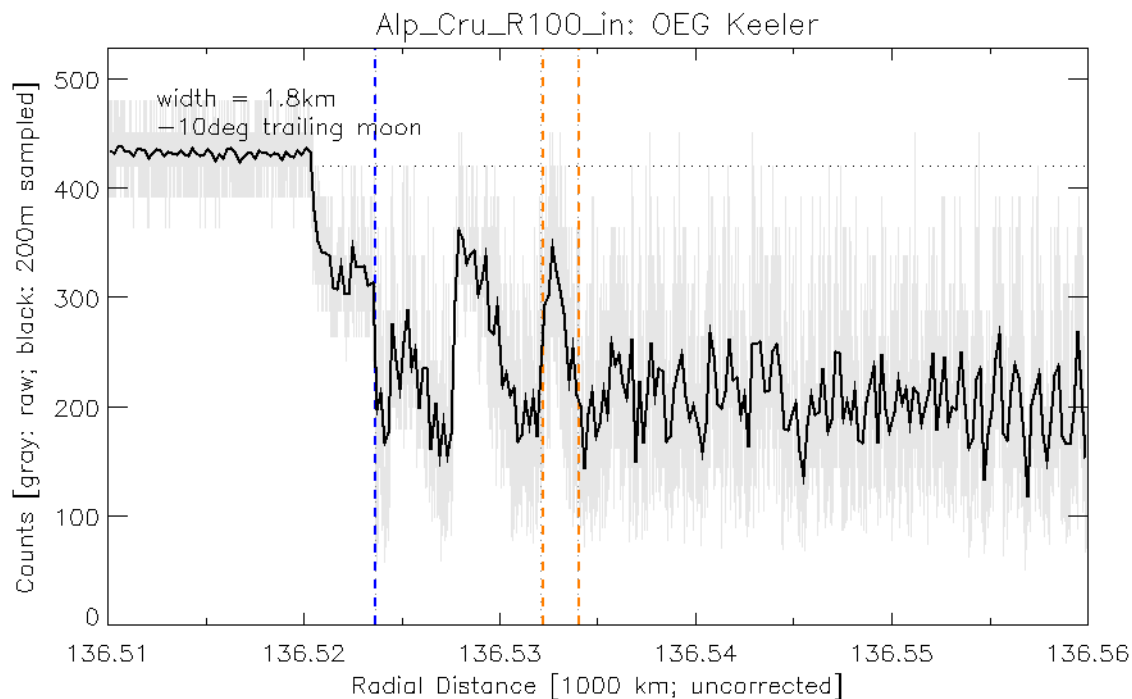
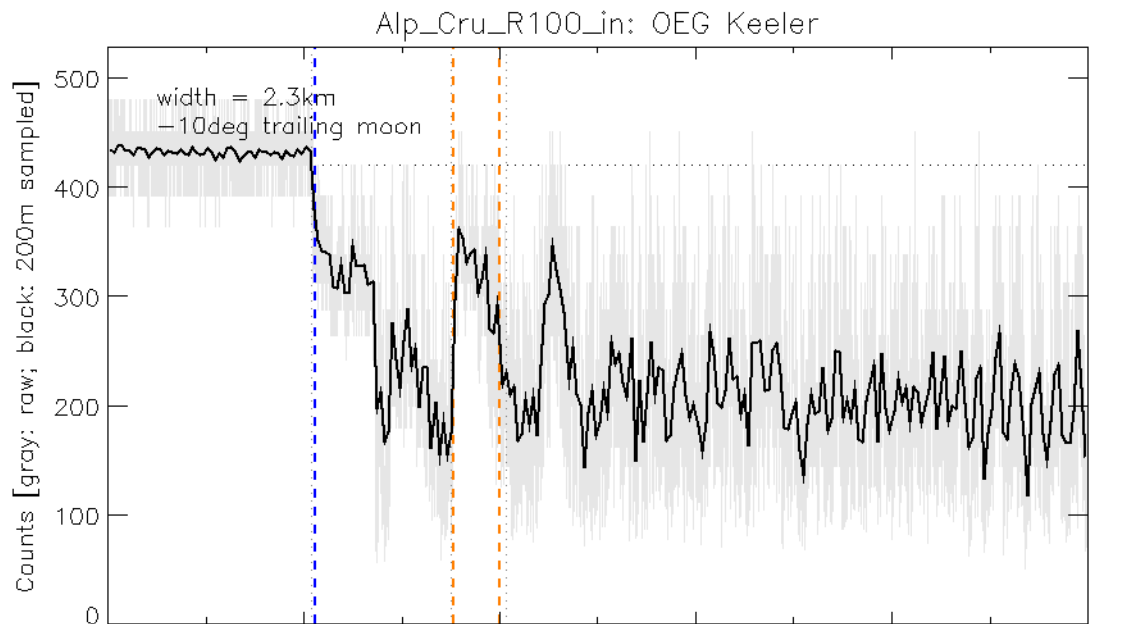
OEG Keeler (examples)



Occultation Tracks across Keeler Gap (Daphnis)

Feature location marked by orange crosses





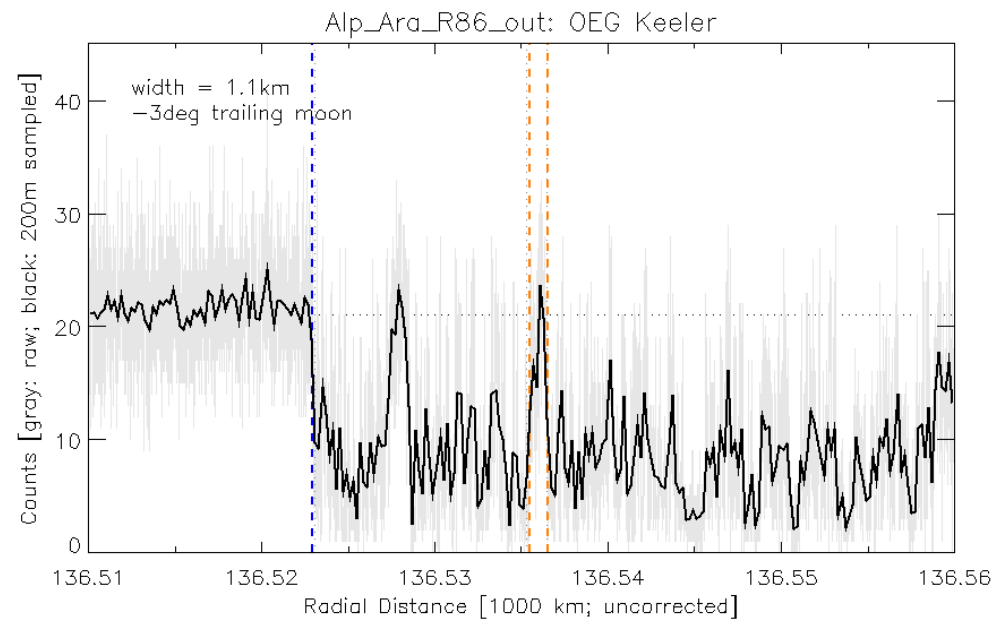
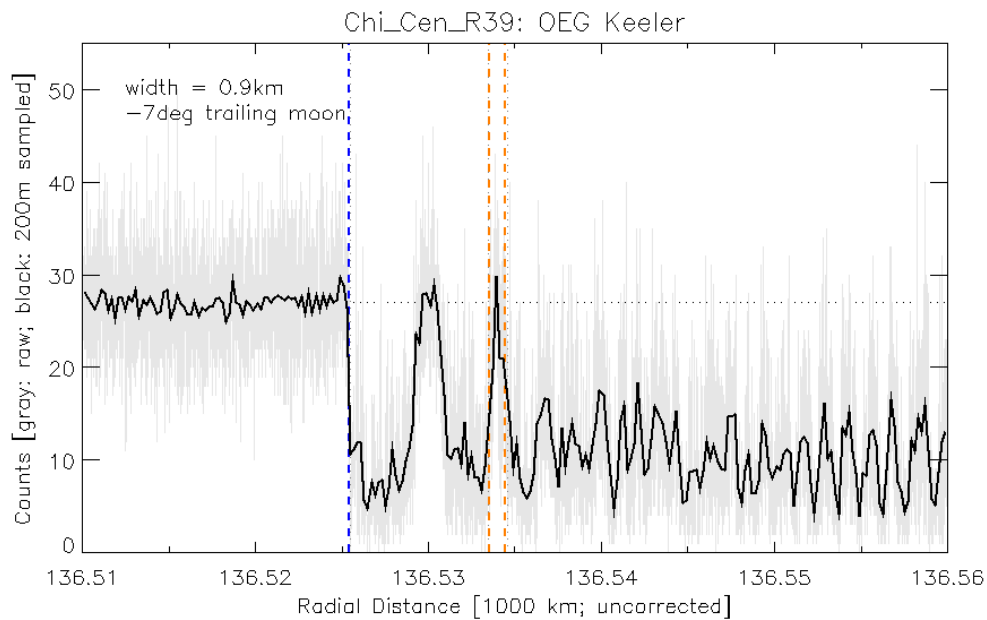
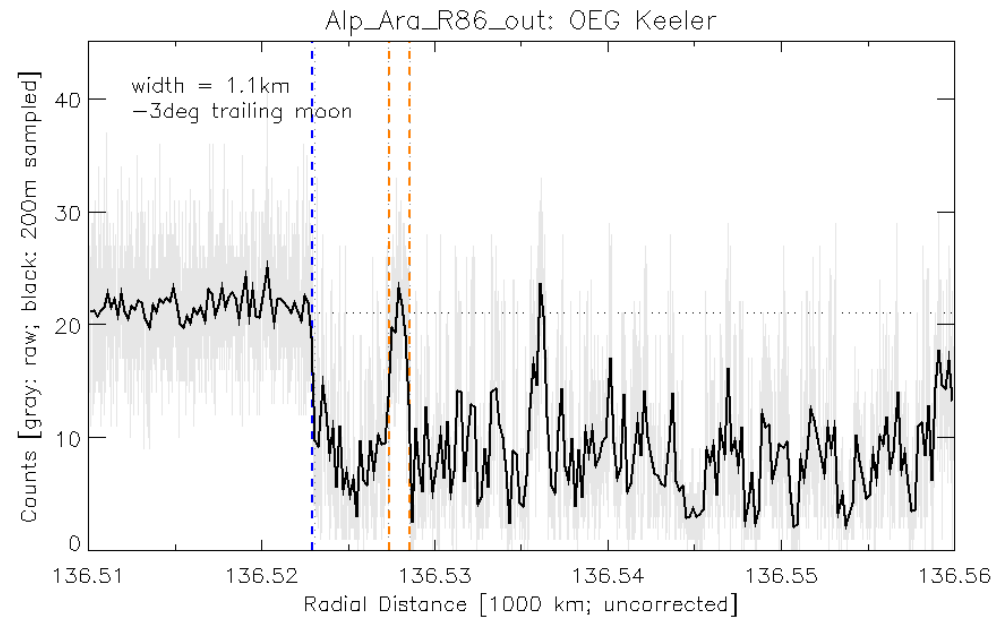
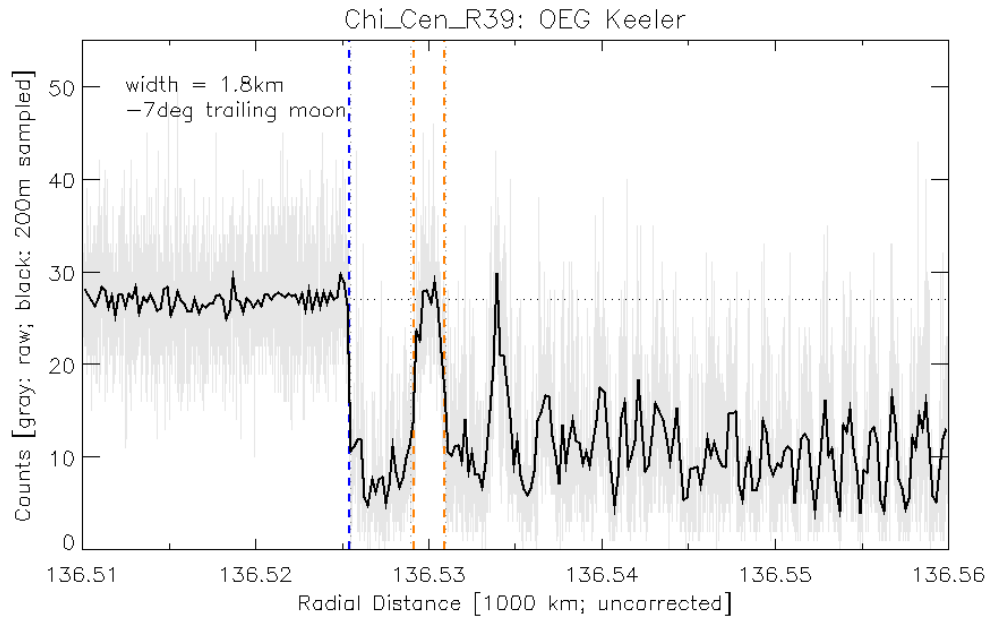
Double Star occultation

separation about 3km in
radial and 9km in azimuth

morphology is changing

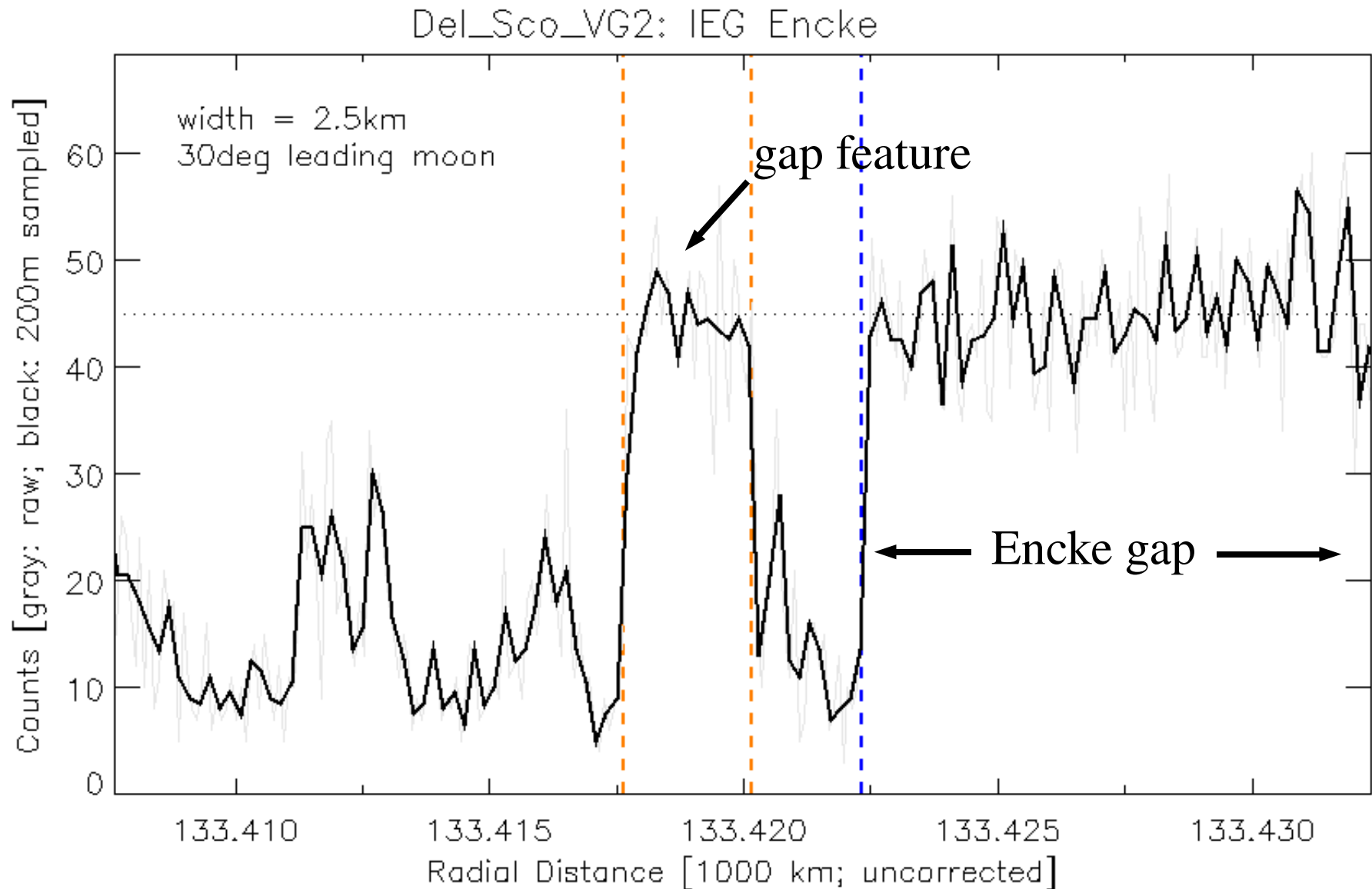
suggests a 1:5 aspect ratio for
an individual feature with a
length of about 10km

OEG Keeler (examples of multiples)

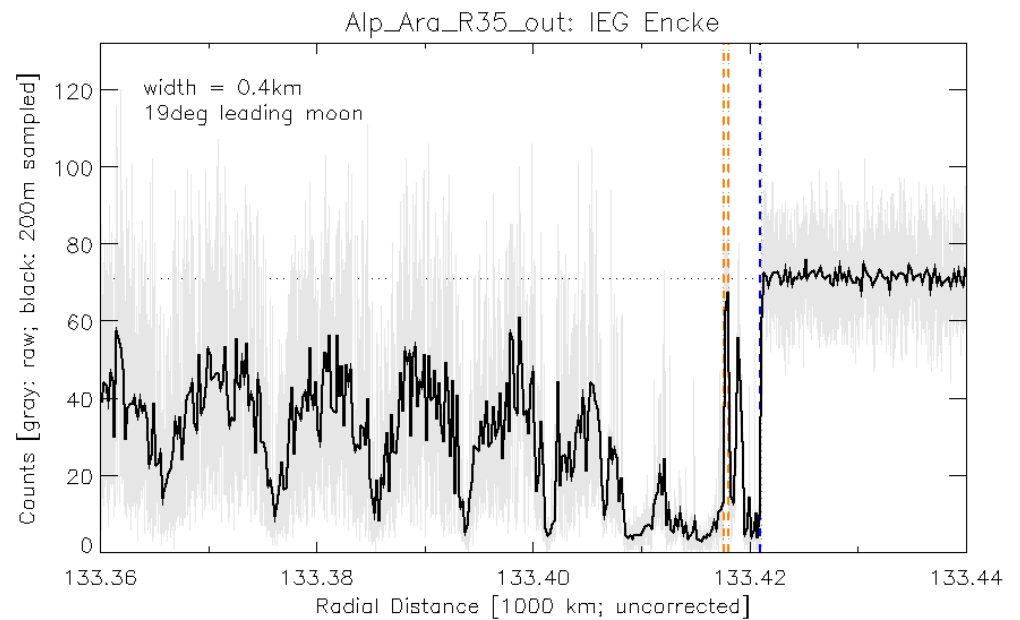
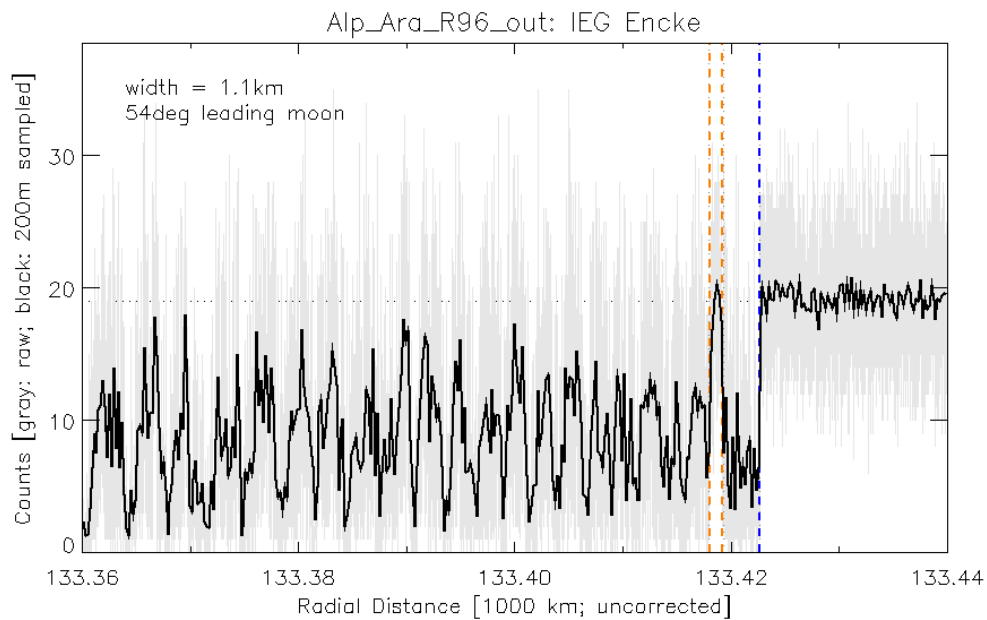
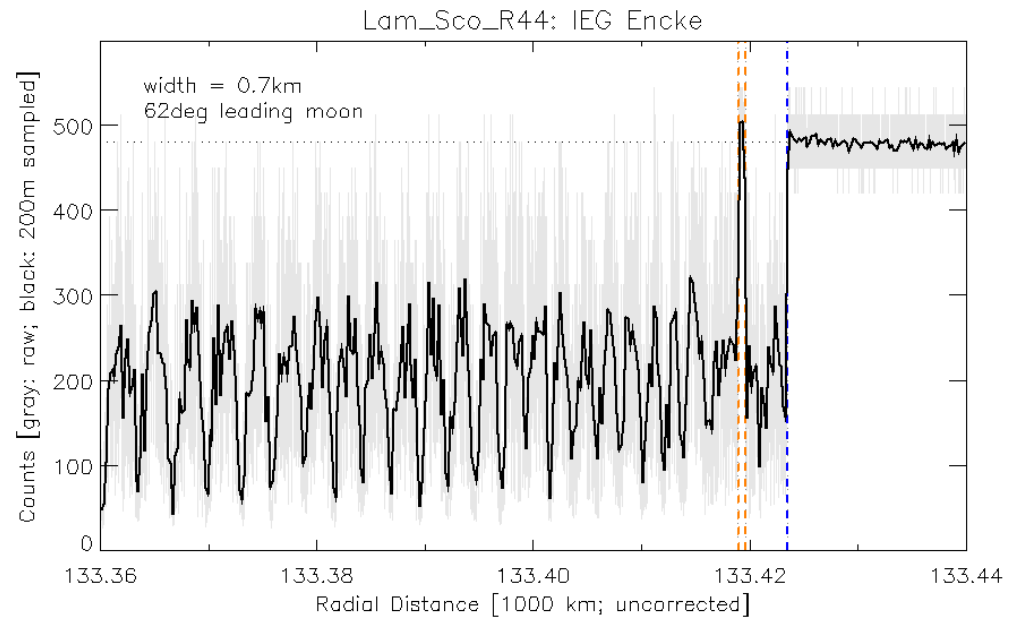
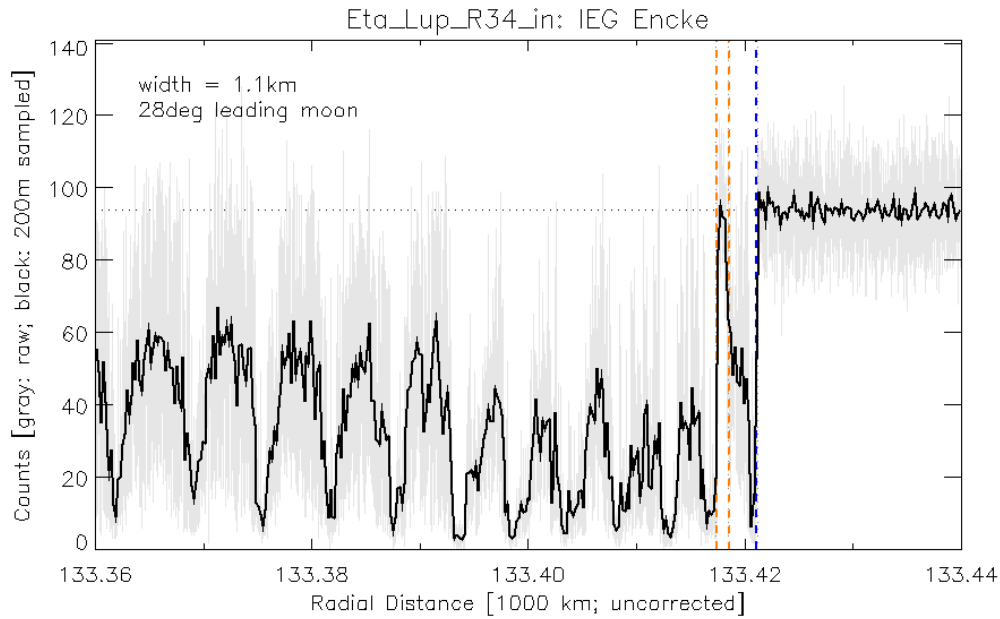


Example Occultation across Encke Gap (Pan)

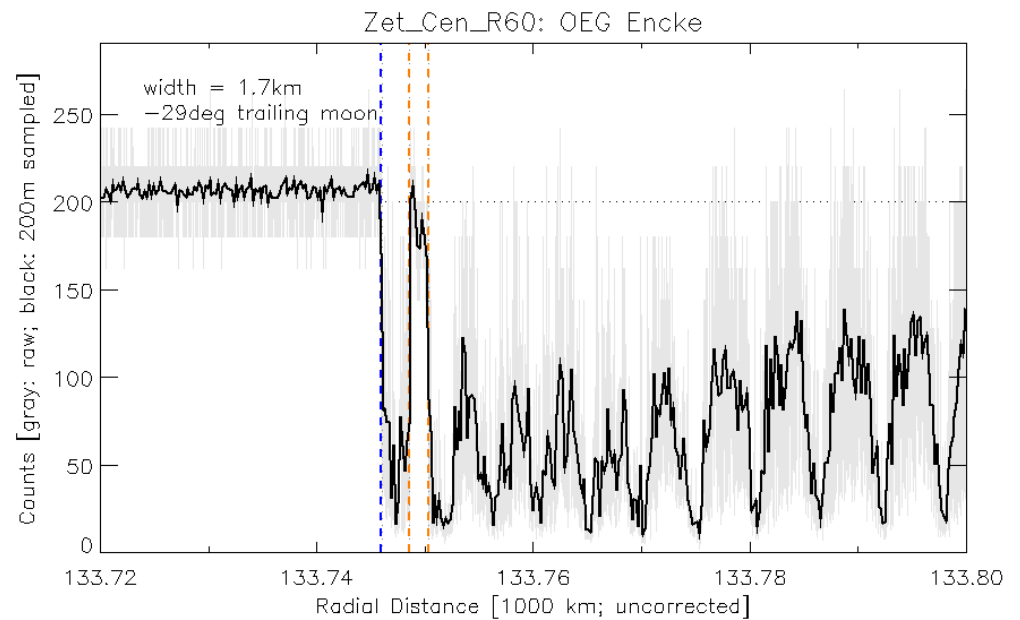
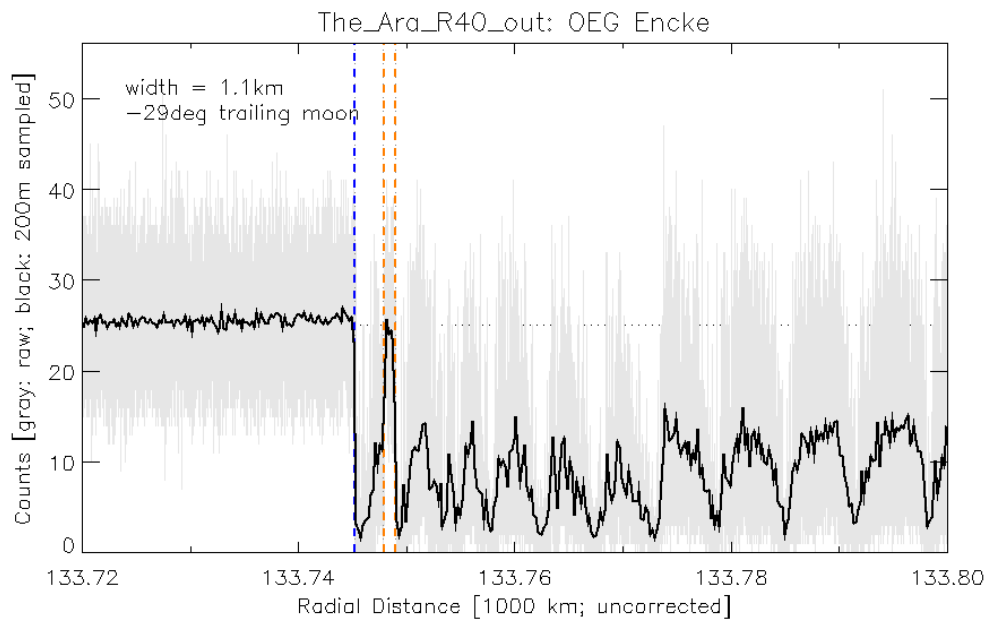
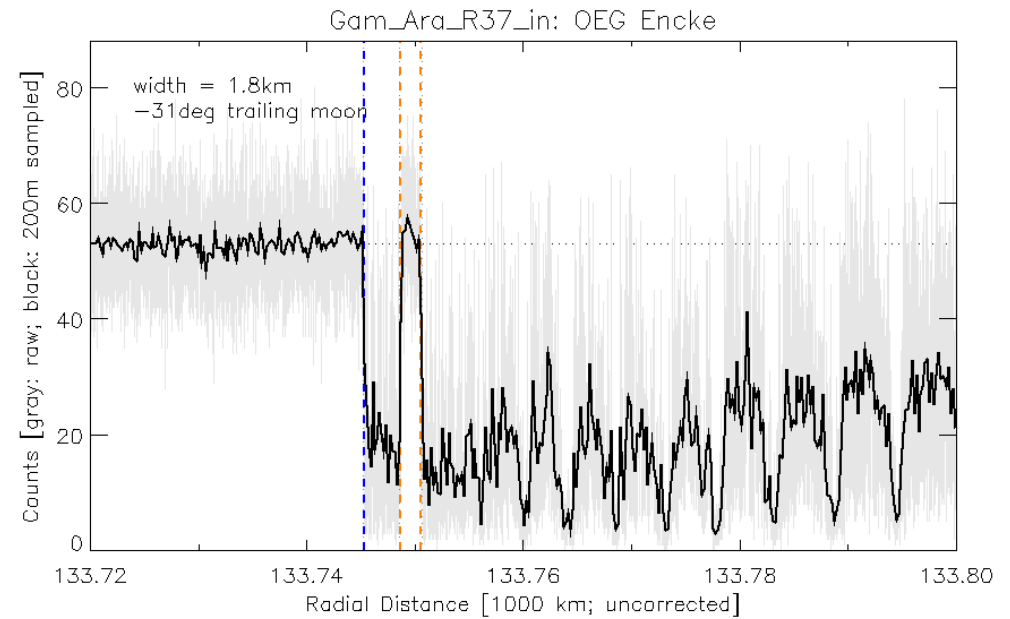
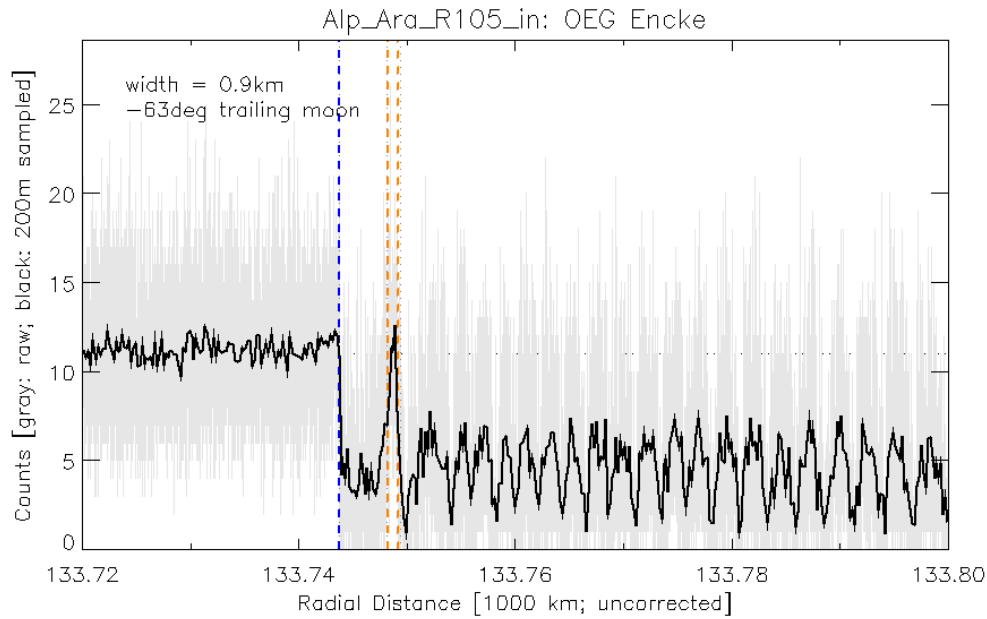
(for qualitative optical depth invert vertical axis)



IEG Encke (examples)

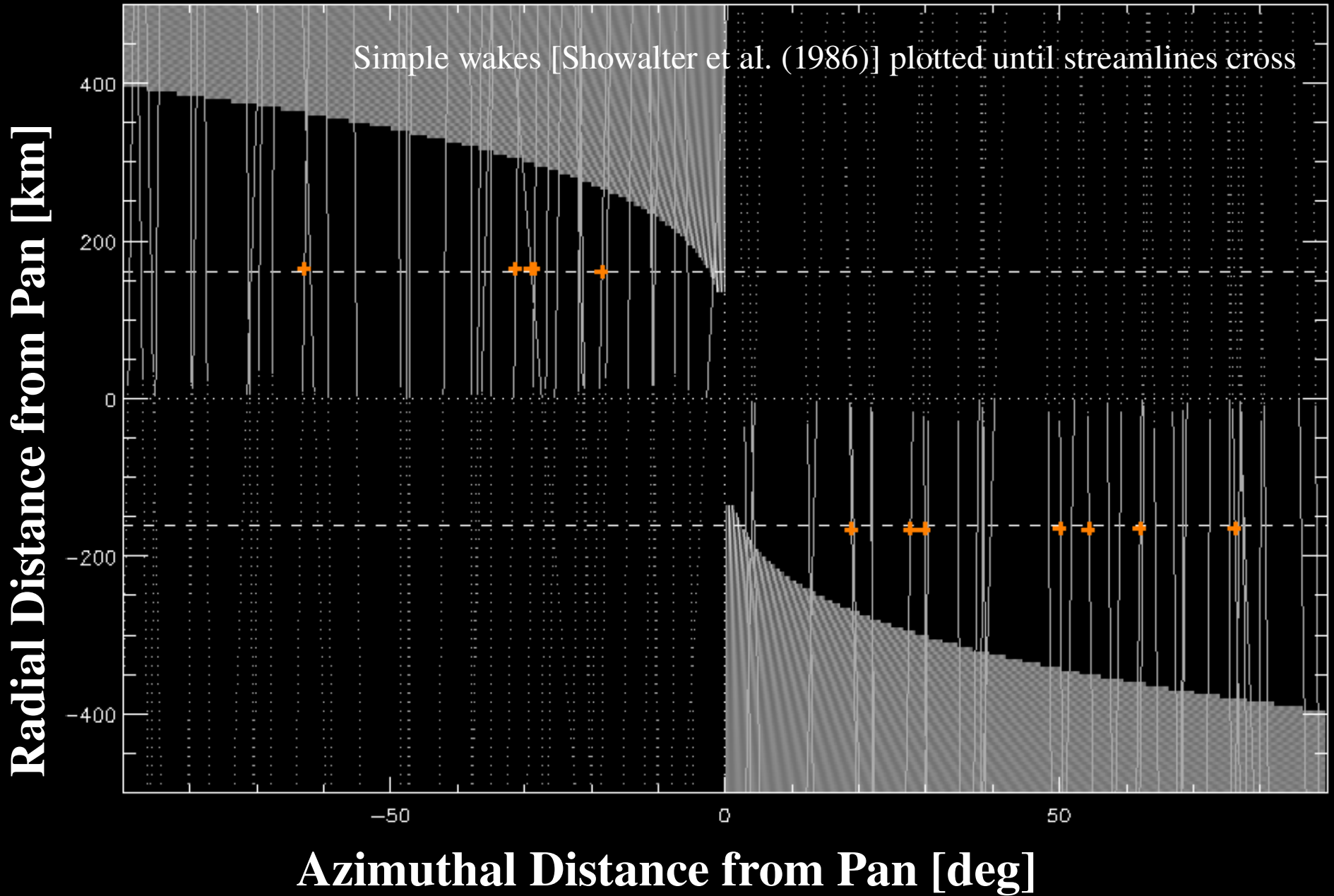


OEG Encke (examples)

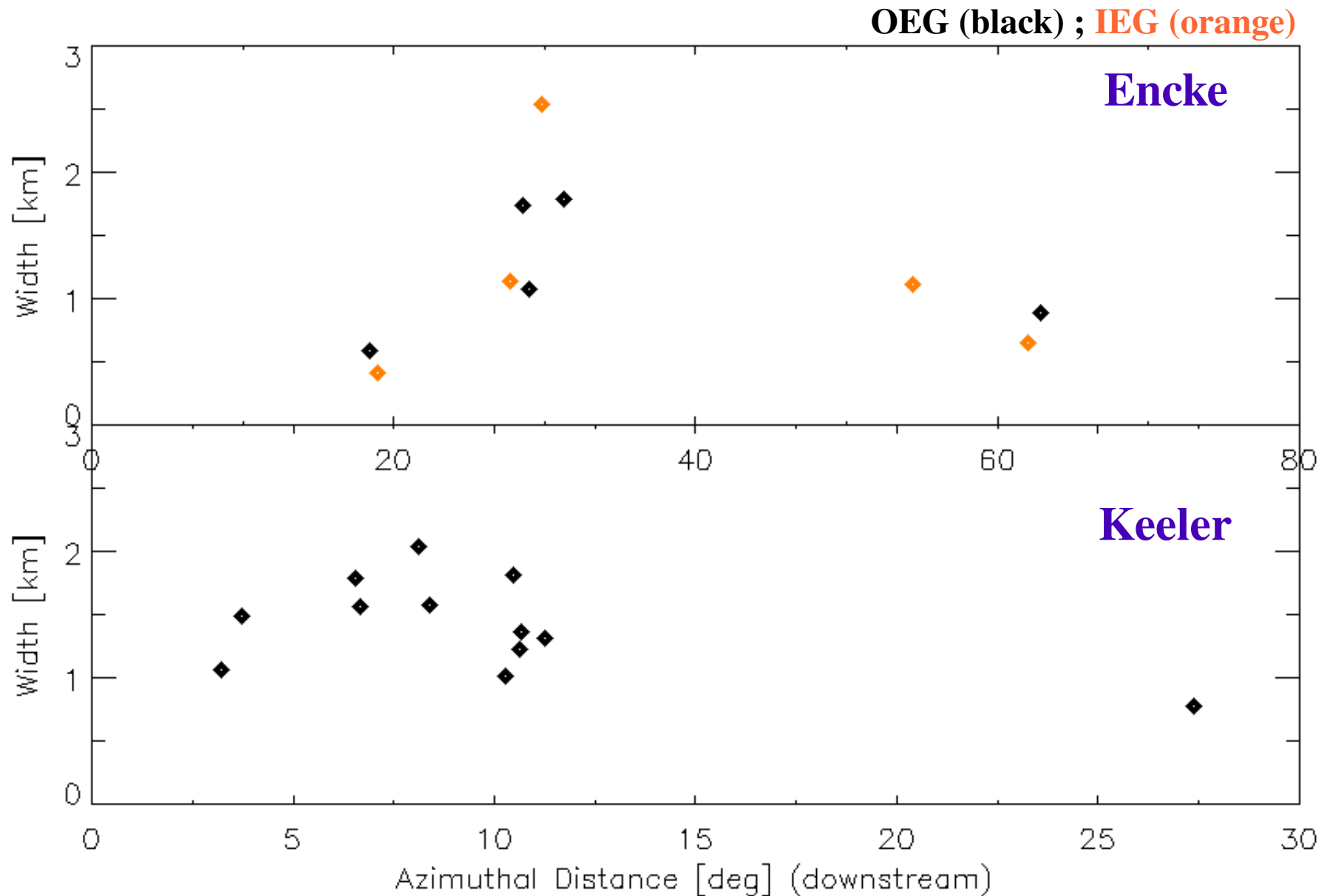


Occultation Tracks across Encke Gap (Pan)

Feature location marked by orange crosses



Feature Width: Encke and Keeler Gap



Summary

- Gap/depletion features of 1-3km width seen within few km at the Keeler and Encke gap edges
- Features may be multiple and may exhibit substructure
- *Features located consistently downstream of respective moon*
- Features are NOT found at IEG Keeler

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- Single, corotating gap?
- Population of individual structures with lifetimes on the order of 100 days?
- Edge undulations, sheared and folded onto themselves rather than damped?
- Connection to whisps?