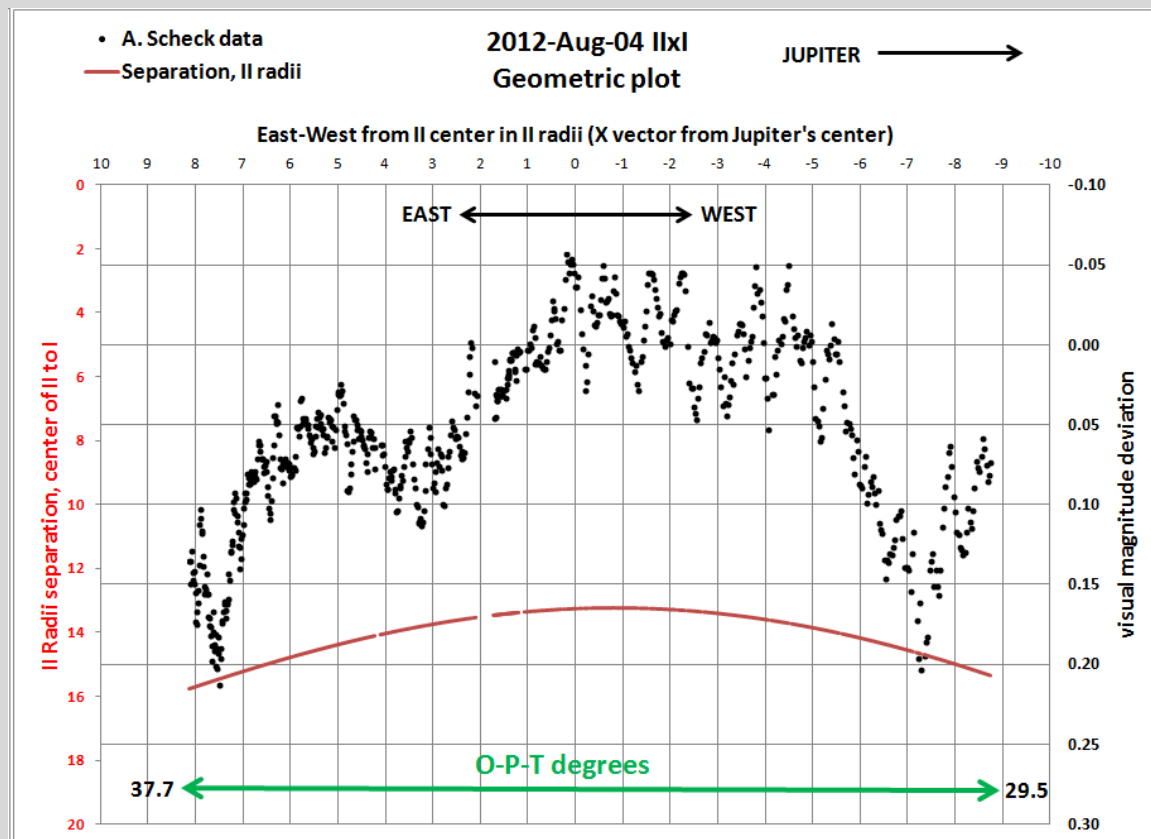


JEE2013 Special Events Discussion

Grabbing Europa by the horns!

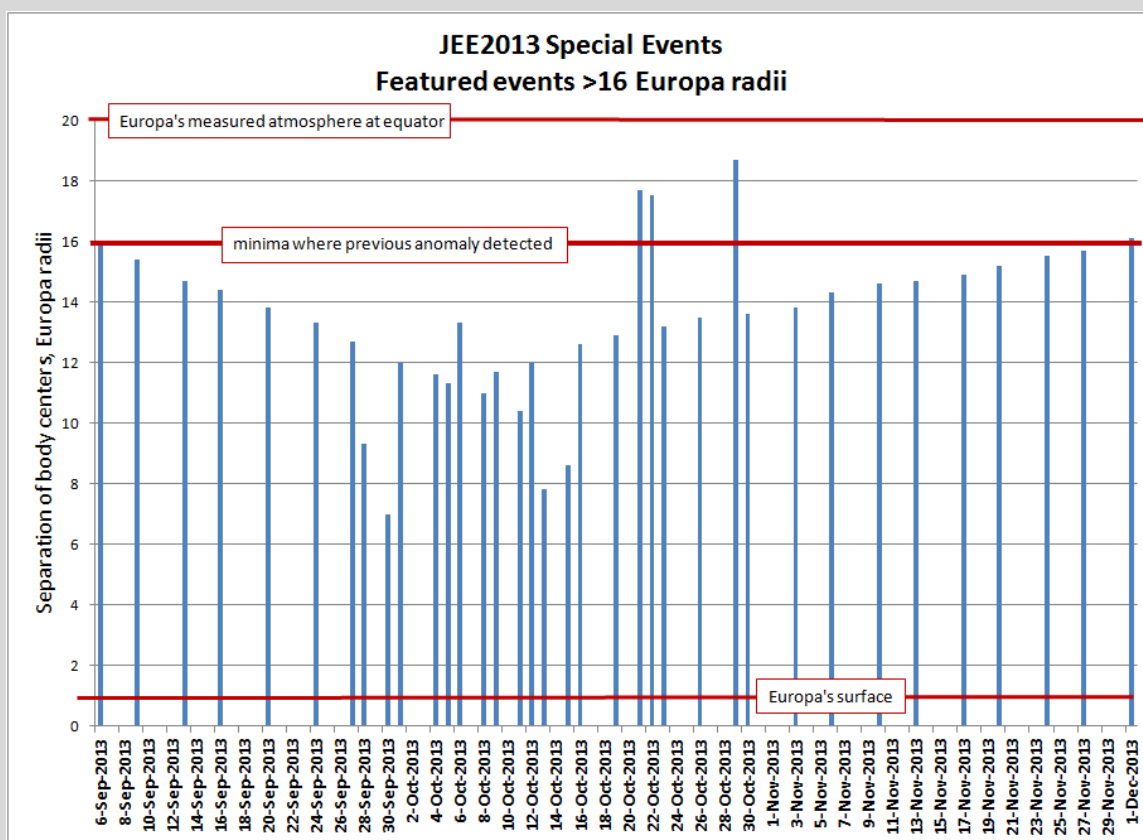
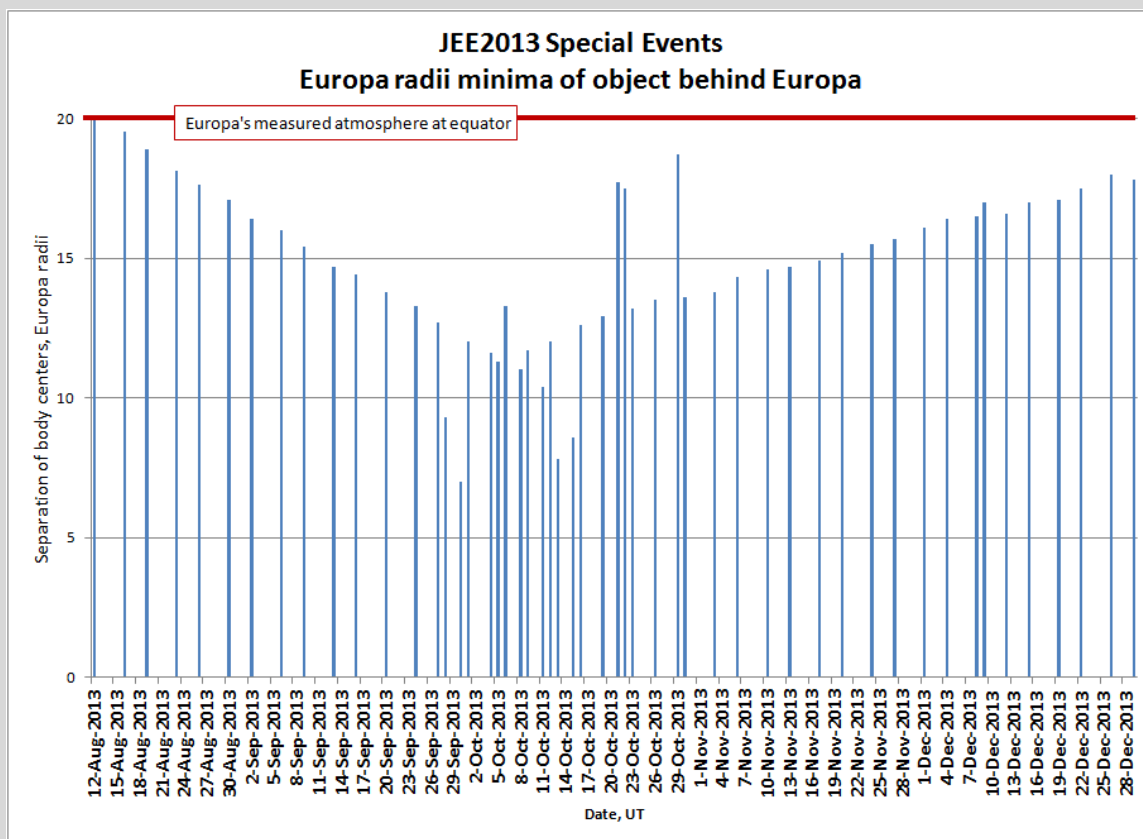
Early results from the JEE2012 Observing Campaign yielded a surprising new anomaly. While still classified as an anomaly, it is surprisingly repeatable and so far also appears symmetrical. I will propose that by the end of the JEE2013 Campaign this feature will be well defined and no longer classified as an anomaly.

The anomaly for the lack of a better term is horn like spikes in the photometric lightcurve when Europa is in front of a probing light source. In the plot below from 2012-Aug-04 UT we examine A. Scheck's extinction geo-photometric lightcurve where Europa passed in front of Io line of sight, and Io got within about 13 Europa radii separation from Europa's body center. When plotting the lightcurve we see that at ± 7.5 Europa radii a drop of intensity of Io lasted several minutes and at several tenths of a magnitude at the unfiltered wavelengths. To date no real explanation for these dips has been solidly proven. The current controversial working model is that the flux tubes that connect each major Jovian moon to Jupiter is sweeping or attracting dust into dense clumps that are causing brief but deep extinction of light passing through the dust clumps. (I would further propose the zebra pattern at 0 to about -5 Europa radii are also caused by magnetic flux lines bunching up dust). To date we have about five lightcurves that show these "horns" in the photometric lightcurve.



We previously measured detectable extinction out to 20 Europa radii for Europa at its equator. August 2013 through the end of 2013 offer an exciting opportunity to resolve this anomaly as a total of 55 events occur where Europa is in front of a probing lightsource that passes within the 20 Europa radii boundary. Of those conjunctions 39 of those pass within 16 Europa radii where the 2012-Aug-04 A. Scheck lightcurve was taken.

The closest minima will be only 7 Europa radii (thus 6 Europa radii from Europa's surface), very convenient given that we are still a full year away from that start of the Jovian Mutual Event Season when the moon orbit's are edge on enough to cause occultations.



It would be very beneficial to have enough global coverage to get most, if not all of these conjunctions captured photometrically. Even if only half of these are acquired the opportunity exists to then trace out the anomaly from near Europa's surface to 20 Europa radii and eventually beyond. Given the short duration of these dips it is highly recommended that photometric data be acquired through either video camera imaging, or with continually streaming images from a standard CCD in a video like mode. The full width half max of these dips are on the order of a few minutes. So taking a single CCD image every 5ish minutes cadence would likely result in one completely missing the trend. The JEE effort has officially adopted the [Imaging Source DMK 21AU618.AS](#) USB video camera as the most inexpensive video camera with the highest spectral sensitivity, ease of use, and highest photographic resolution. This camera will enable our future efforts of Saturn Extinction Events and other yet to be identified venues. If you already own a Watec or other video camera that allows you to manually control your exposures to prevent target objects from being over or under exposed then you are set for proper equipment. Visit the [Observing Tips JEE page](#) or ask questions on our [JEE Talk Yahoo Discussion Group](#) if you need help planning observations:

Please download the [Special Events Zip file](#) to get this discussion and predictions and mark your observing calendars for those events that occur in your time zone.

Clear Skies!

Scotty