

## 4.2 Update on log 4.1

### Adjustments done

(17 April 2024)

*RDS requested (with focus on VDA length, linear scale, angle in degrees) error bars on VDA length, with dates connected across the spacecraft and the analytical approximation included.*

The spacecraft are still marked separately, with error bars attached. The events are connected with solid lines, using a rainbow colormap (legend somewhat provided).

### My interpretation of the ‘analytical approximation’:

To find the apparent length the particles travelled  $L$  (given as ‘VDA  $s$ ’ in text) we use

$$L = \tau v$$

where  $\tau$  is the difference between the onset detected by the spacecraft and the flare onset detected by GOES (in hrs), and the velocity is  $v = \frac{P c}{E_k + E_0}$ , calculated in au/hr. Setting  $E_0 = 938$  MeV and  $c = 7.2$  au/hr,  $E_k = (67.7, 63.2)$  MeV from the text for the Soho and Sta/b spacecraft, respectively. Rigidity (in MV) is calculated as  $P = \sqrt{E_k(E_k + 2E_0)}$ .

The result is plotted in dotted lines.

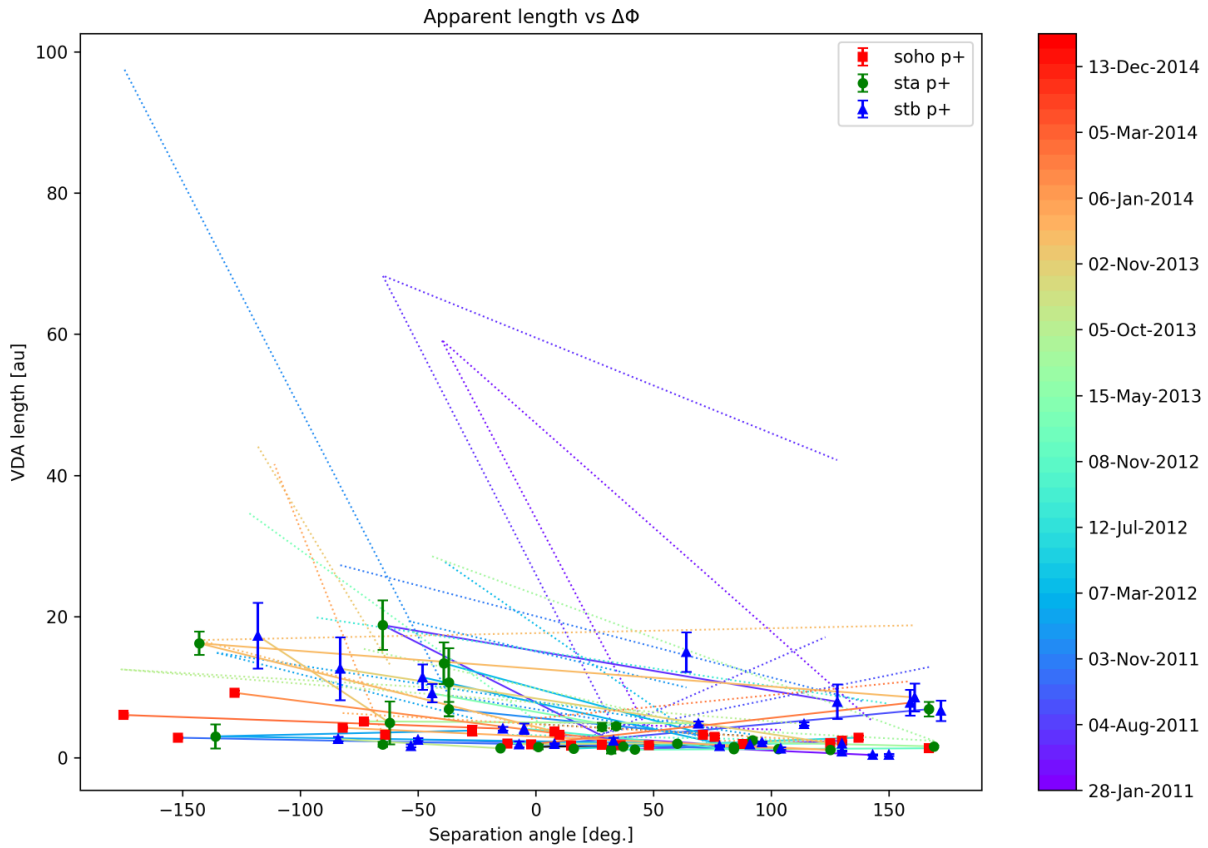


Figure 22: Updated plot from fig. 14.

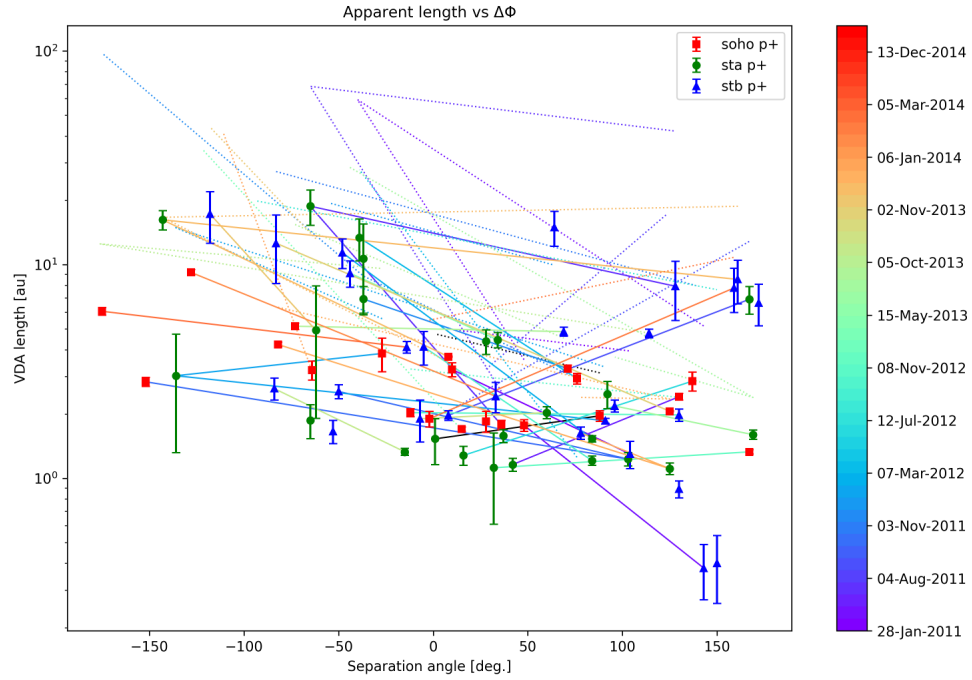


Figure 23: Simply fig. 22 in semilogy.

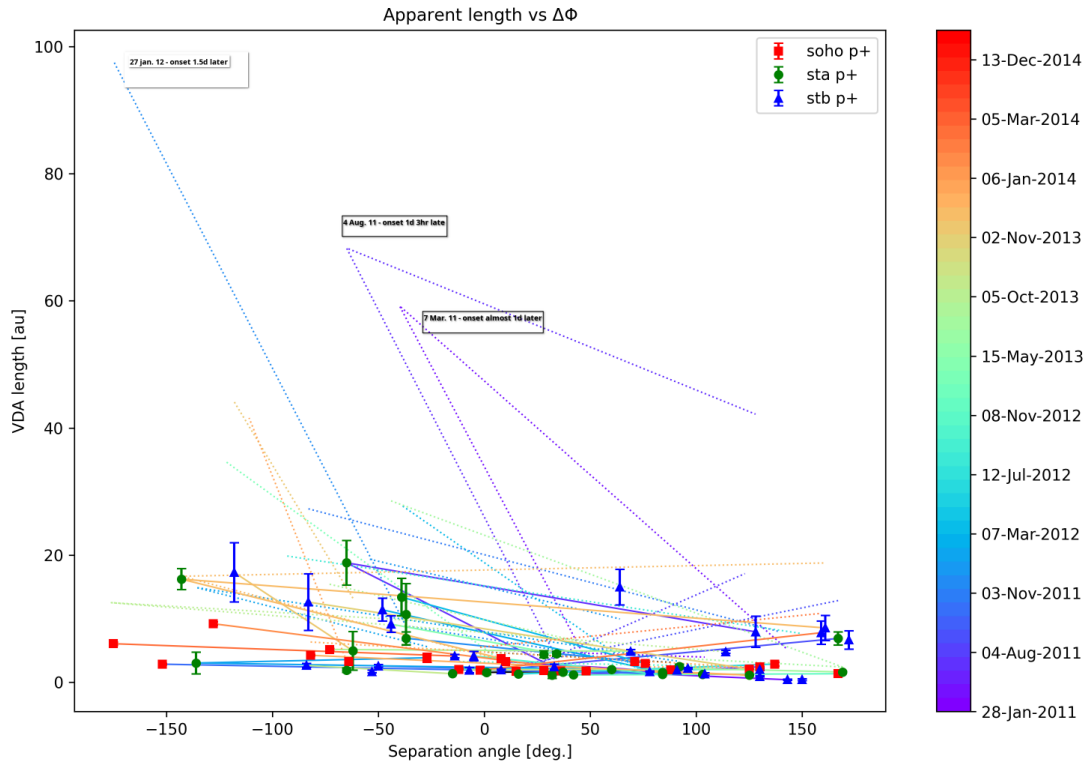


Figure 24: Annotated with error reason from from fig. 22. From the top (because the font is rather small) its 27Jan2012 - STB onset almost 2days later; 4Aug11 - STA onset 1day 2hrs later; 7Mar11 - STA onset 22hrs later.