Transequatorial Loops Index (TL-index) for Space Weather?

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Outline

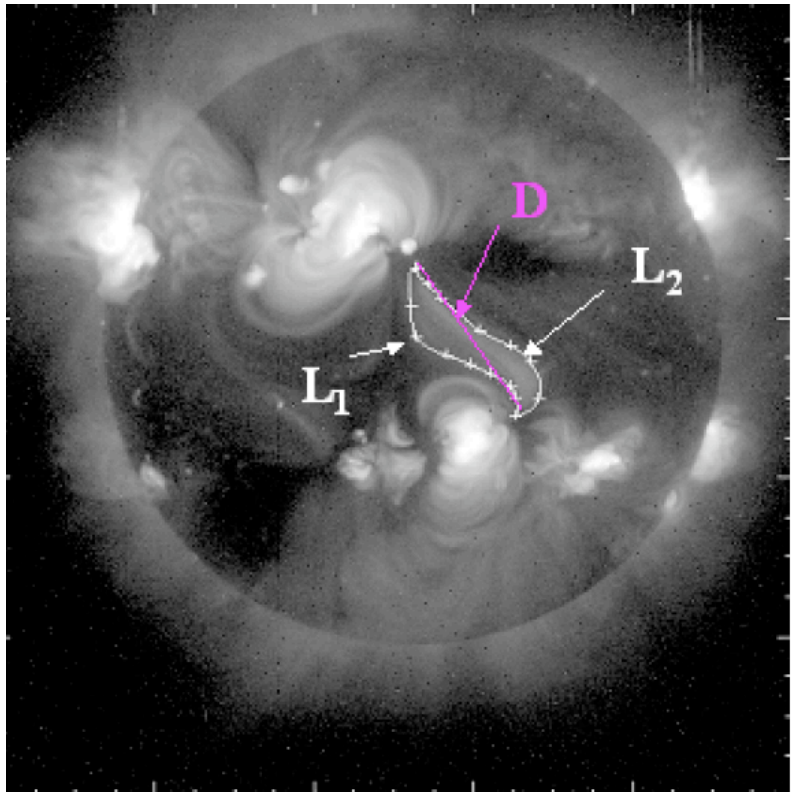
To study:

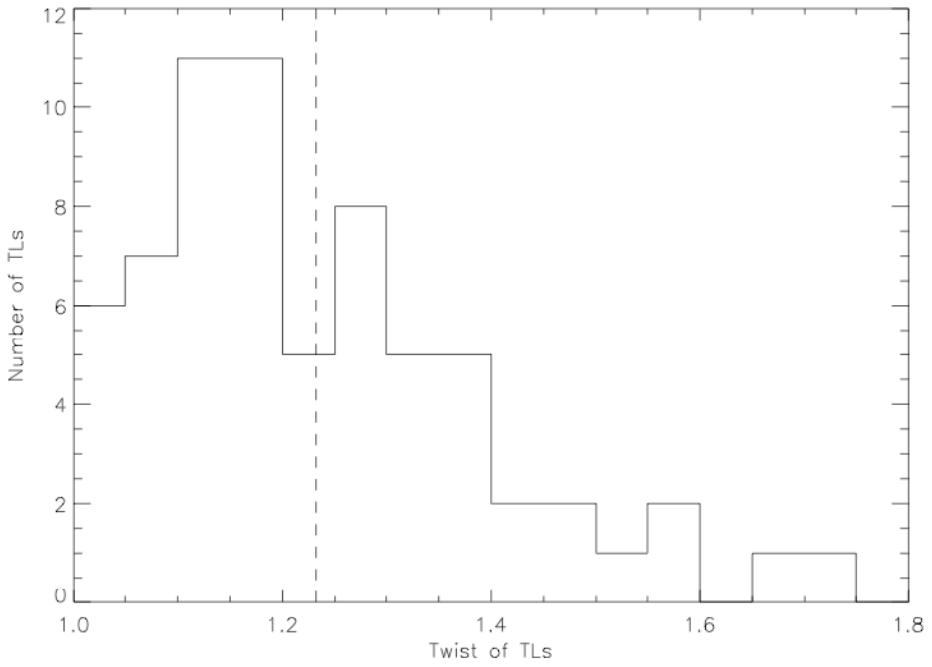
- The relationship between the twist value of transequatorial loops (TL) and flares
- The evolution of TL and the related CME
- The variation of TL length

Data set

- Yohkoh SXT data set from 1991 to 2001

Twist value of TL



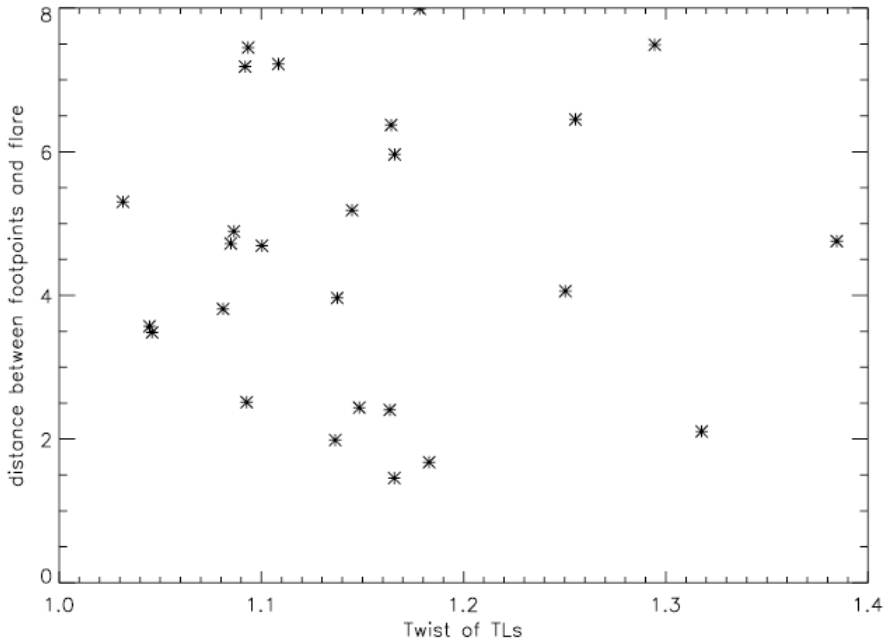


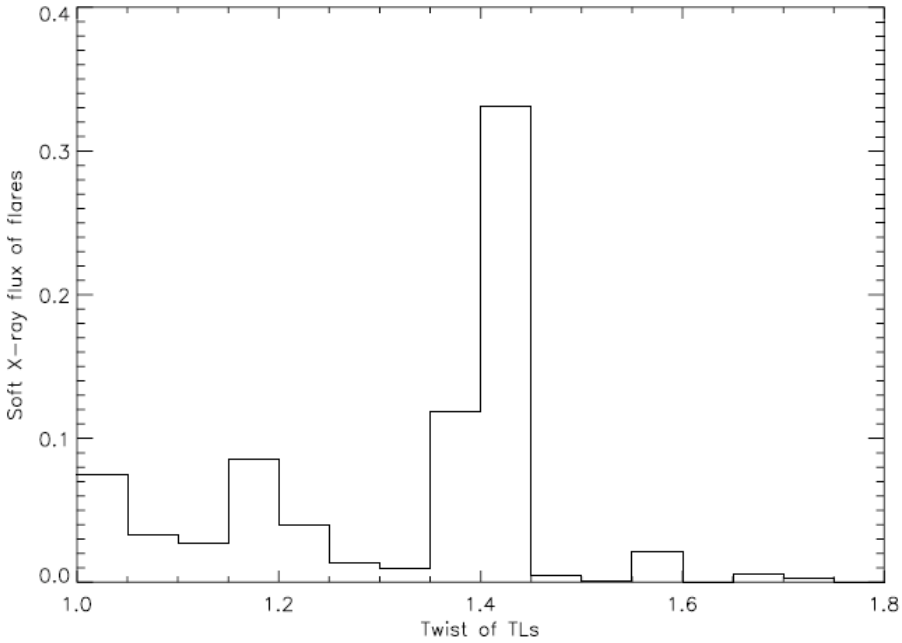
$Tw=(L_1+L_2)/2D$

Distribution of twist value

Chen,J., Lundstedt, H., Zhang,H. J.asr.2009.10.005

Relation between the twist value and flare





Relation between twist value and distance of flare and TL-footpoint

Relation between the twist value and GOES soft X-ray flare flux

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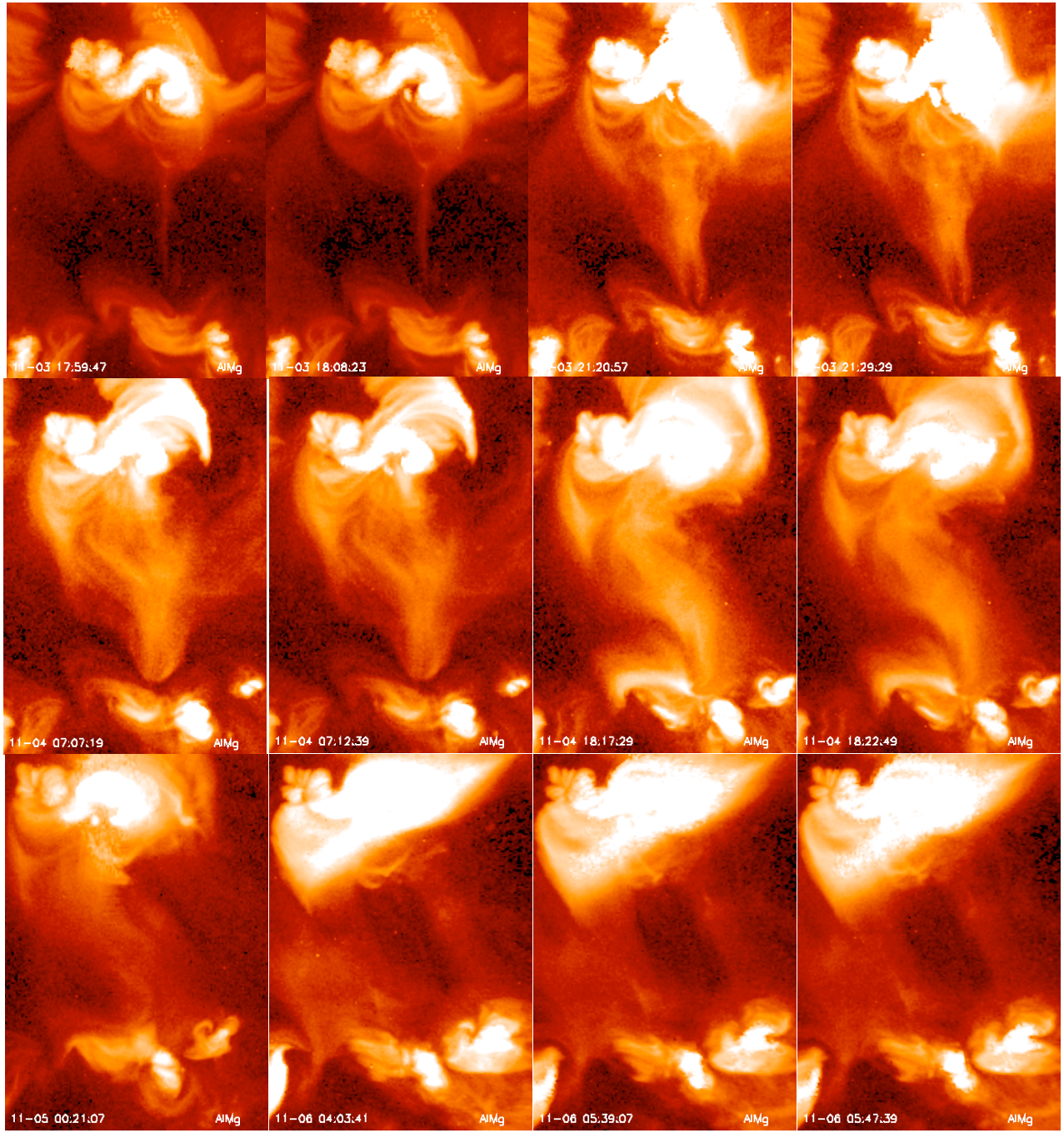
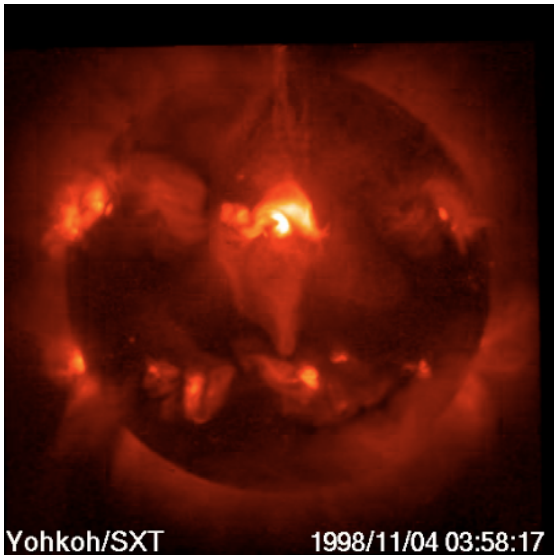
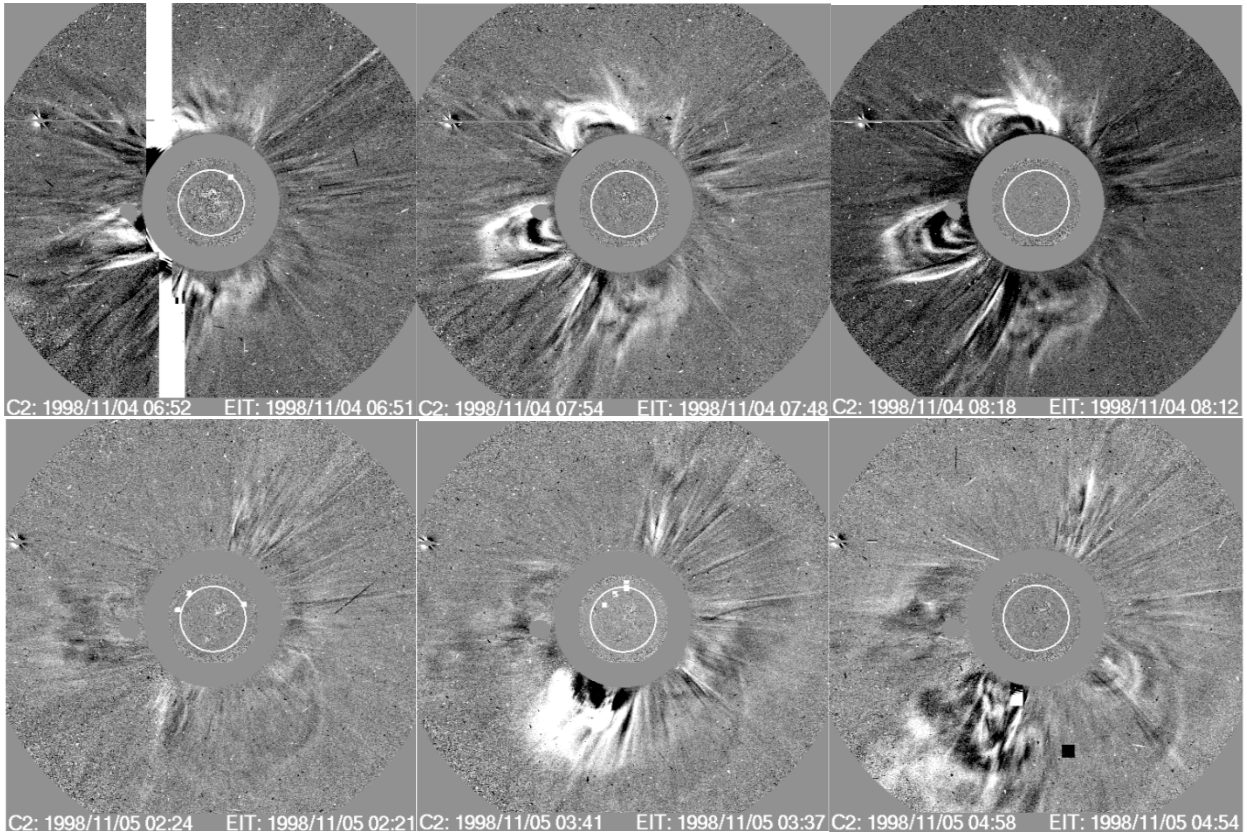
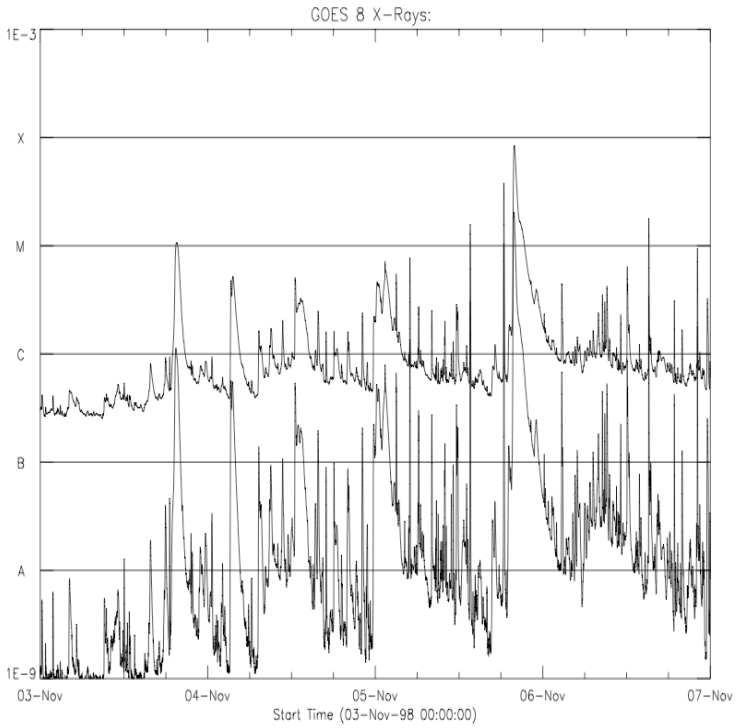
The evolution of TL in Nov. 1998





Solar activity related with the TL

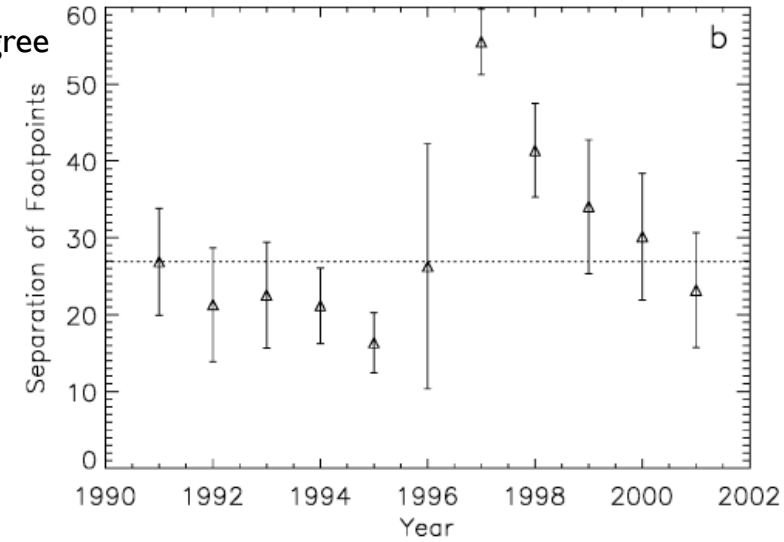




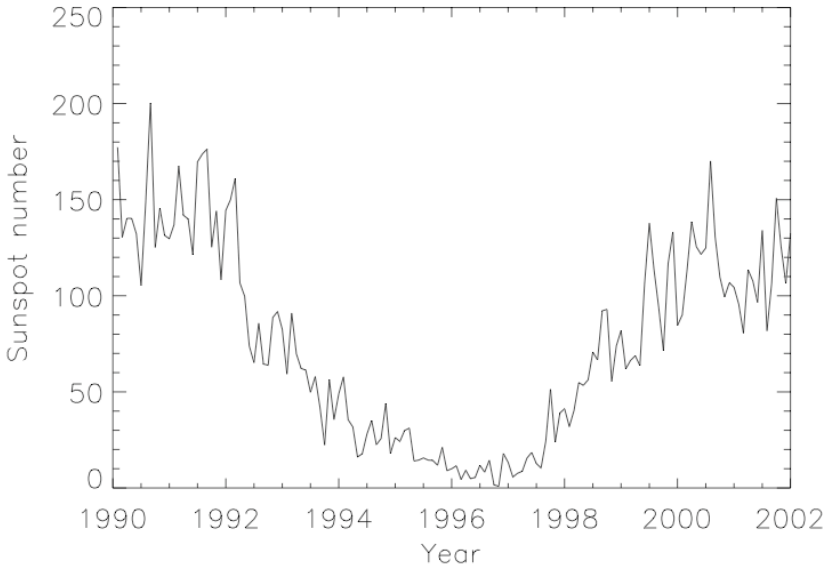
Variation of TL length over solar cycles

Unit is degree

D



Chen, J., Bao, S. and Zhang, H. 2006, Solar Physics. 235, 281-294



Summary and discussion

- The twist value of the TL has a weak relation with the flare flux. There is no clear correlation between the twist value and the distance between the footpoint of TL and location of flare in the corresponding active region.
- The evolution of TL and its' relation with CME need to be studied further.
- The averages of TL length vary with solar cycle.