

# ΕΜΒΙΟ- ΗΛΕΚΤΡΟΜΑΓΝΗΤΙΣΜΟΣ

## Μάθημα 3<sup>ο</sup>

Ηλιακές – γεωμαγνητικές φυσικές δραστηριότητες και  
επιδράσεις στην βιόσφαιρα

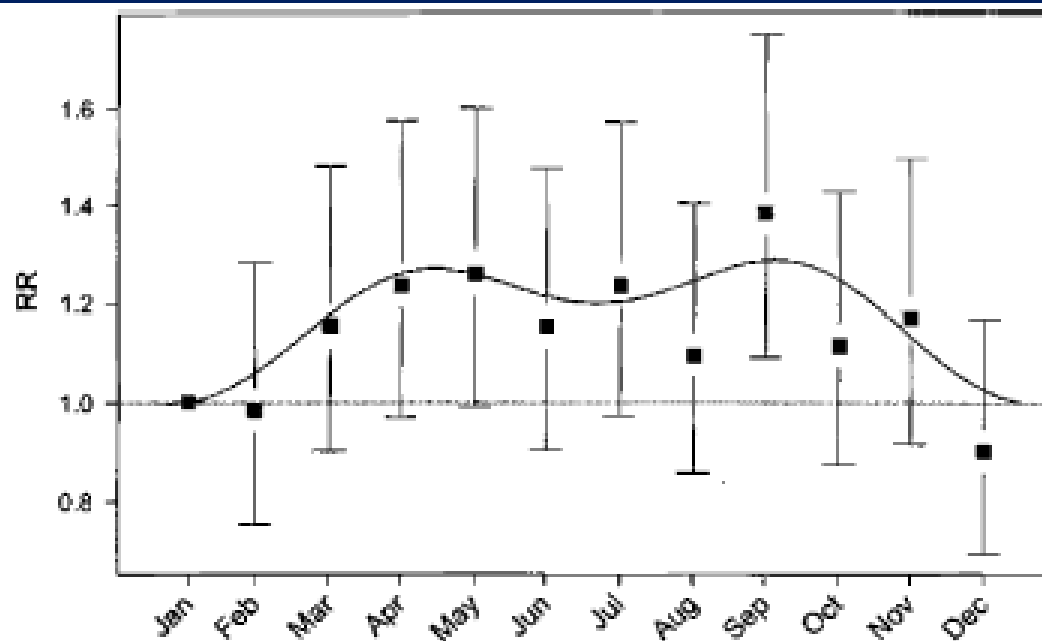


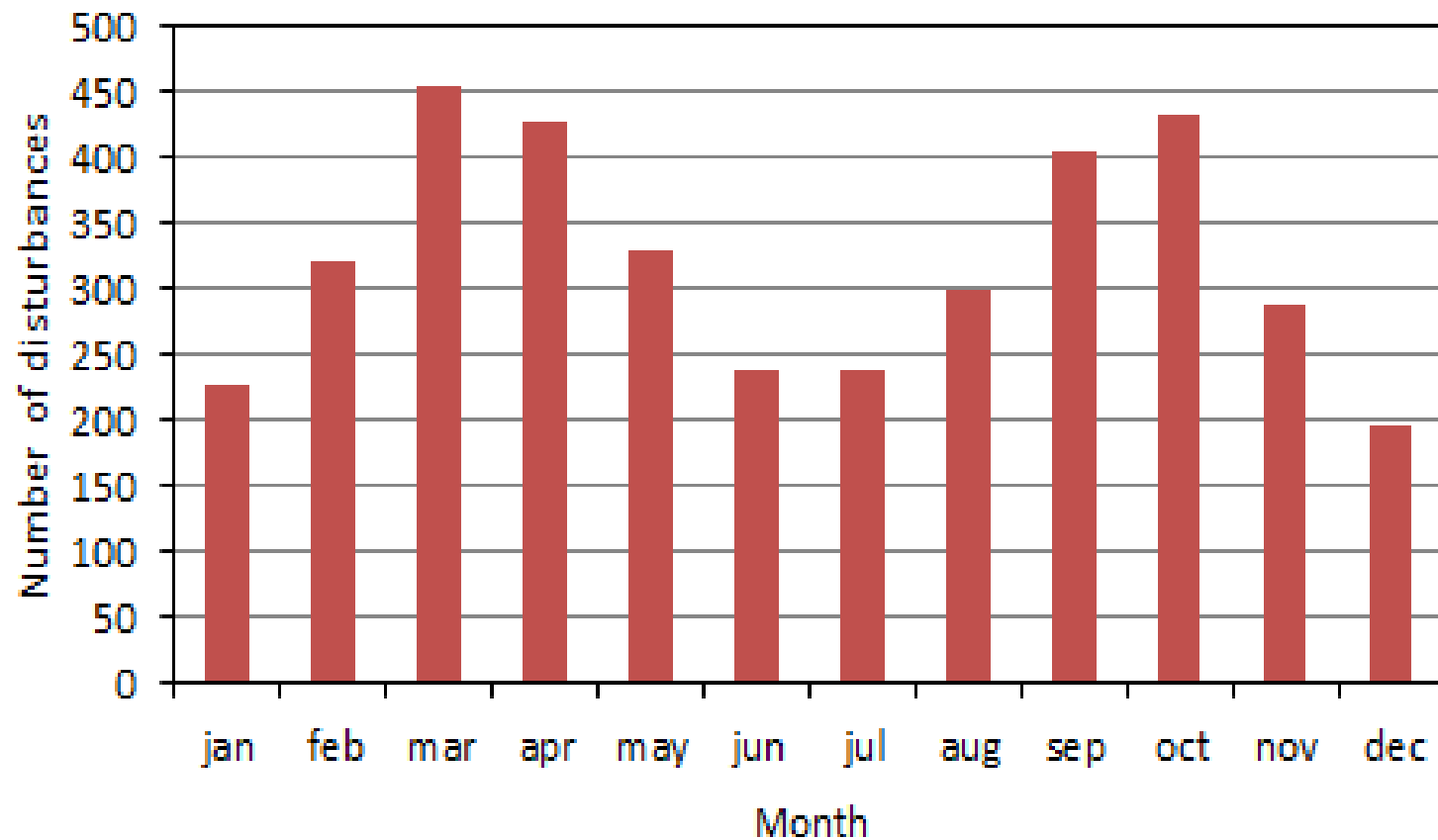
Fig. 4 Relative risk of suicide in northern Finland throughout the year from Partonen et al. (2004)

 Springer

## Solar and geomagnetic activity, extremely low frequency magnetic and electric fields and human health at the Earth's surface

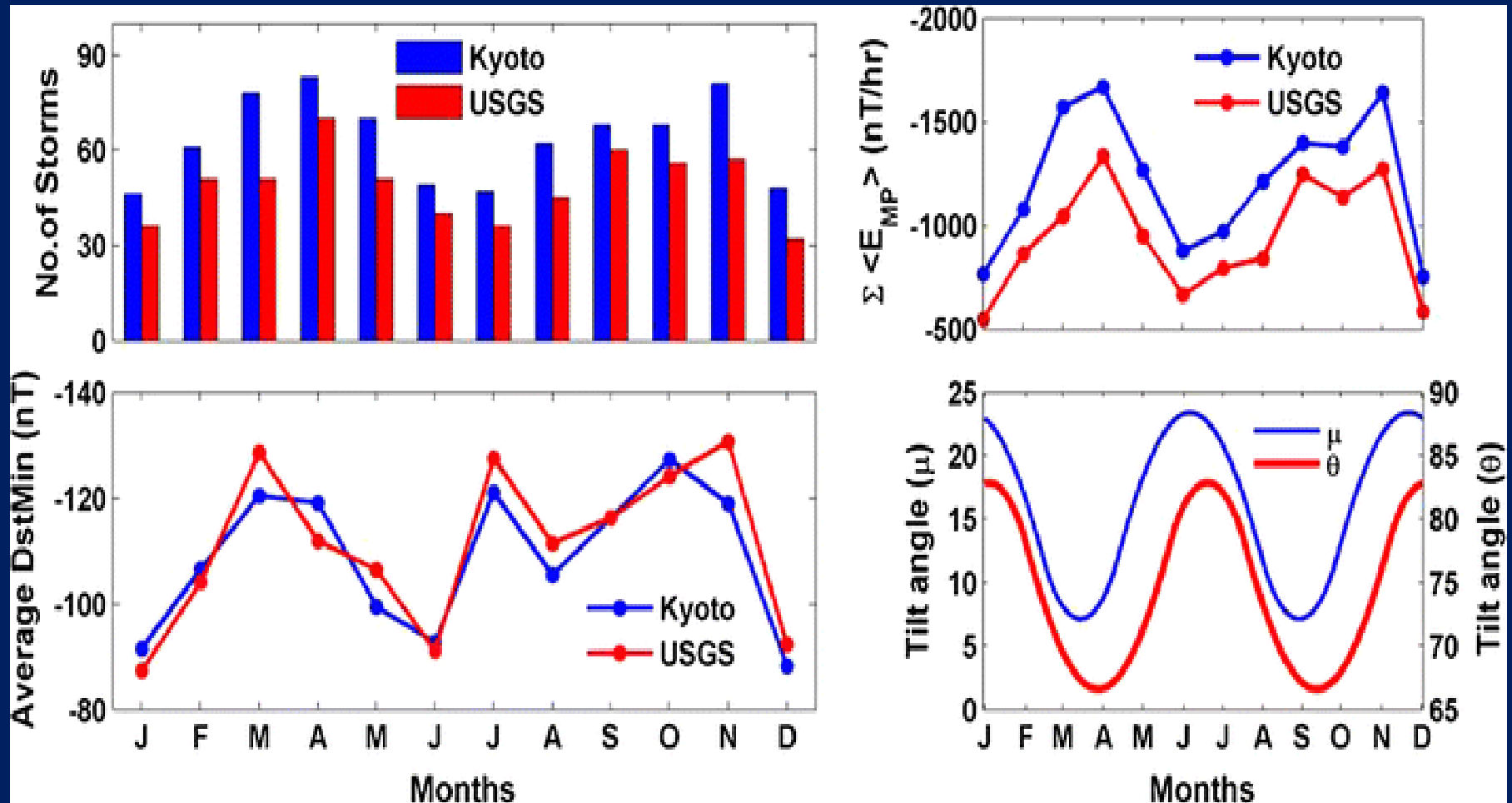
S. J. Palmer · M. J. Rycroft · M. Cermack

## Seasonal distribution of geomagnetic disturbances

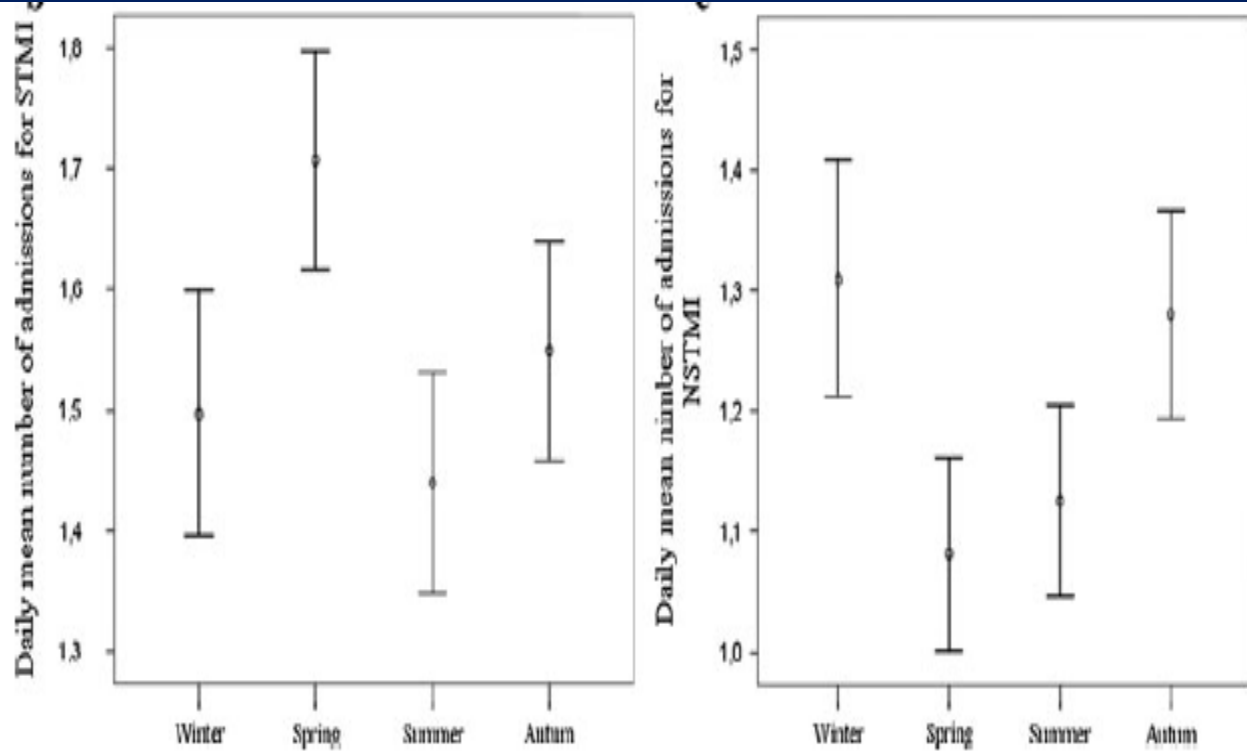


1932 to 2014

<https://www.sws.bom.gov.au/Educational/3/1/5>



Automatic selection of Dst storms and their seasonal variations in two versions of Dst in 50 years/ Balan et al. *Earth, Planets and Space*2017**69**:59



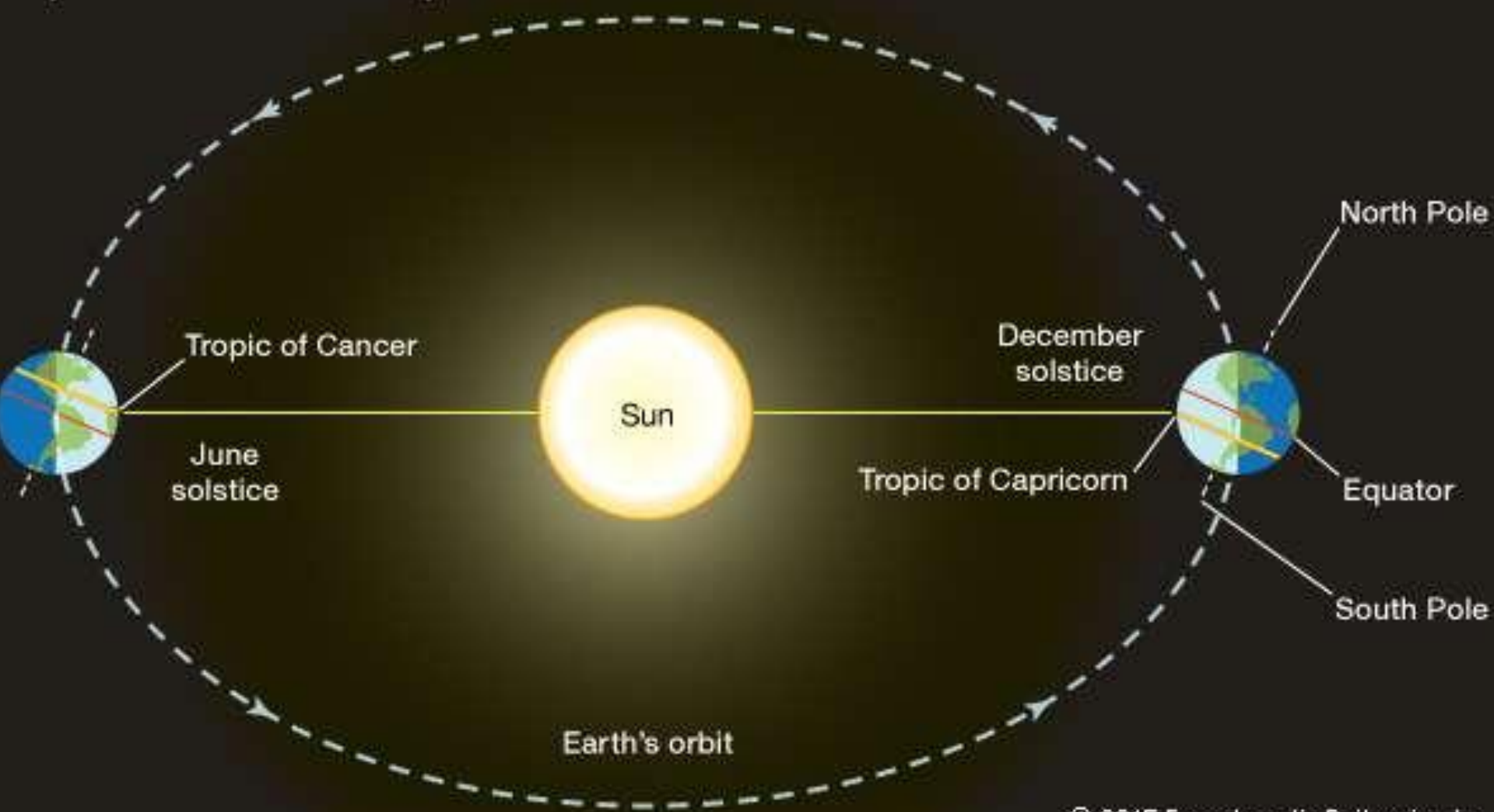
**The association between solar particle events, geomagnetic storms, and hospital admissions for myocardial infarction**

**J. Vencloviene • R. Babarskiene • R. Slapikas**

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Nat Hazards  
DOI 10.1007/s11069-012-0310-6

# Tropics of Cancer and Capricorn



**Mortality from Myocardial Infarction (Minnesota: 1968-1996)**  
Detrended data

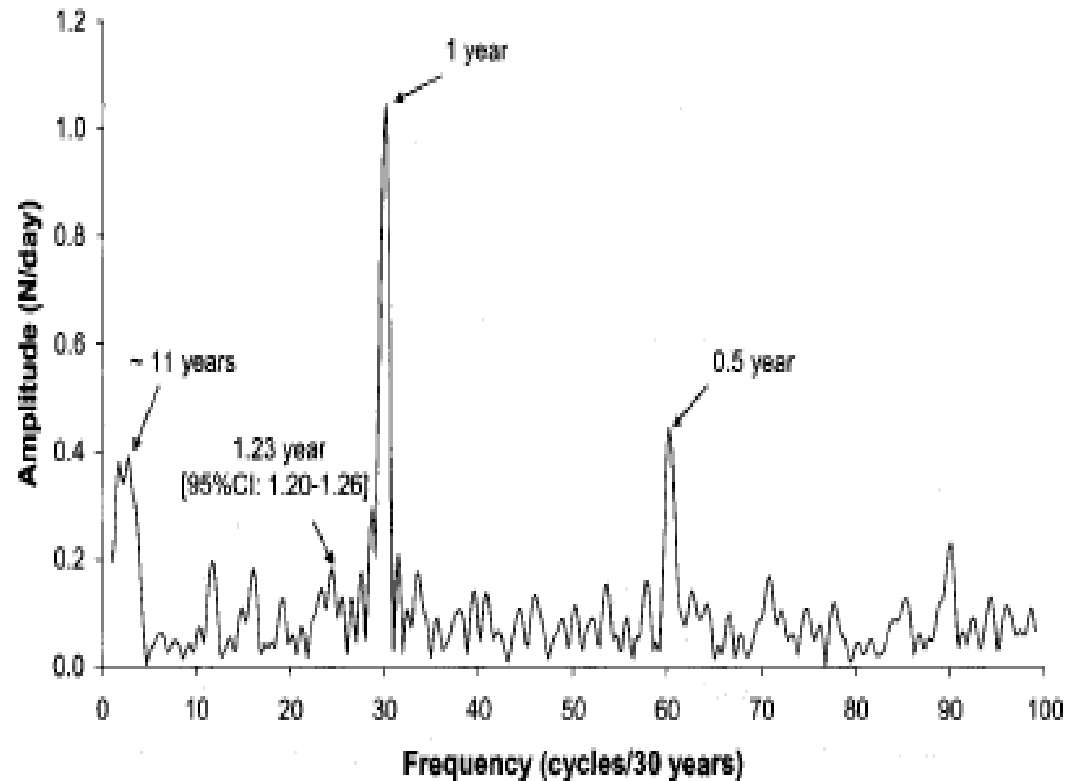


Fig. 18. Clear prominence, in a relatively long time series of myocardial infarctions, of yearly, probably climatic component over any magnetic ~11-year, 0.5-year and transyearly components, the latter with even smaller yet with a non-zero amplitude. © Halberg.

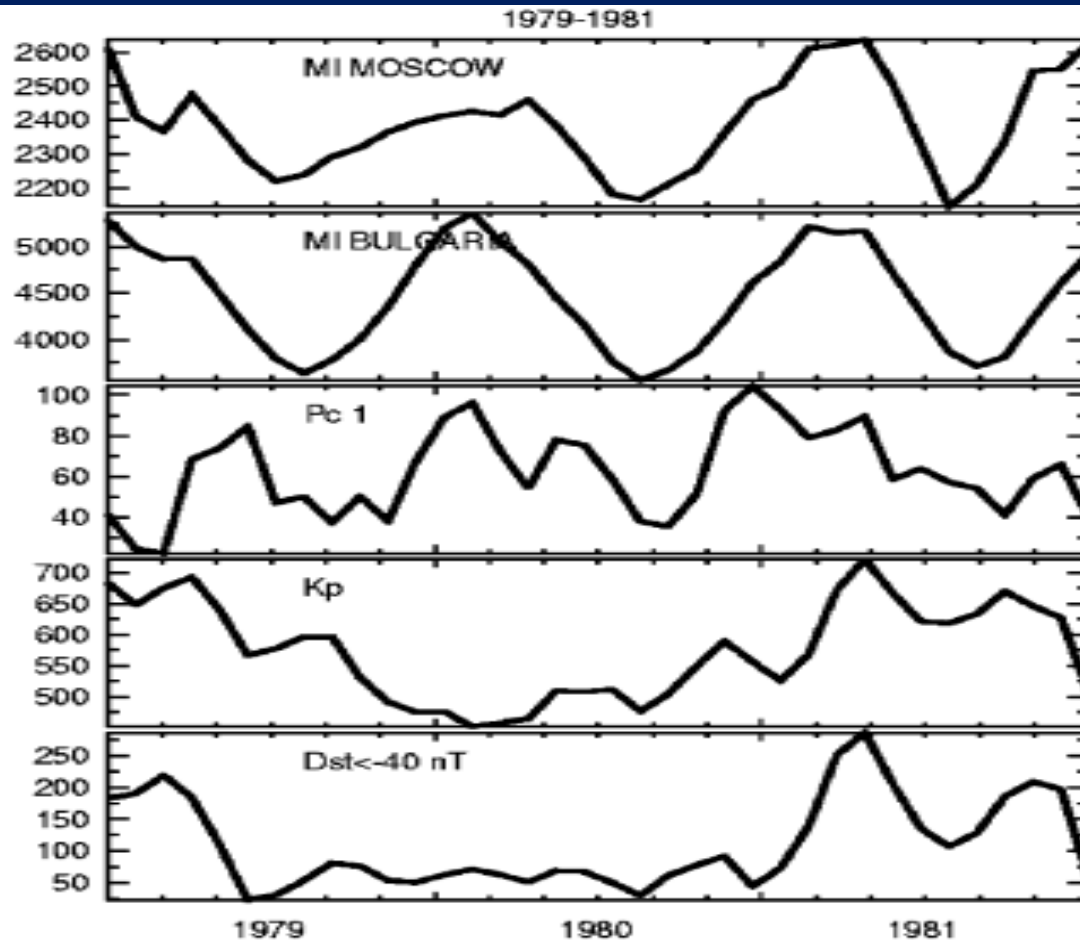


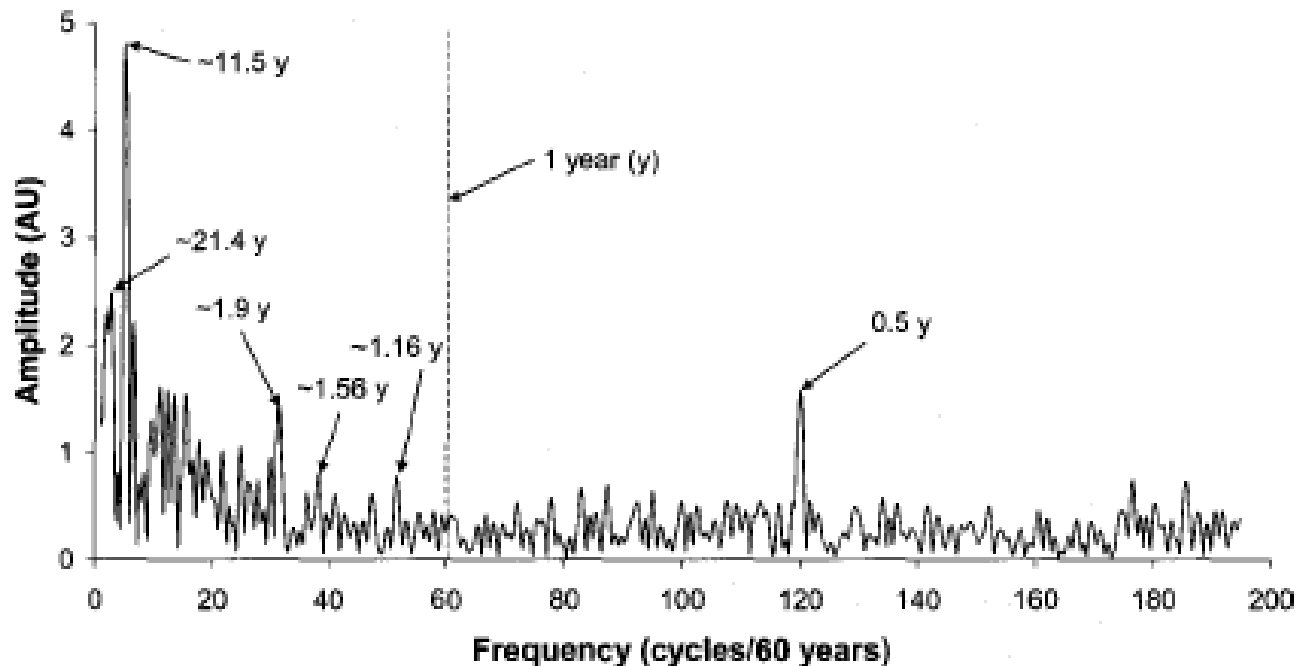
Fig. 1. The monthly myocardial infarctions (MI) ambulance data for Moscow over 3 years (1979–1981) and the MI death in Bulgaria in comparison with the monthly Pc1 activity (monthly numbers of 15-min intervals with Pc1 as it was suggested by Matveyeva et al., 2001), the monthly sum of Kp-index and hours with Dst < -40 nT. All curves have been smoothed off.

*N.G. Kleimenova et al. /*

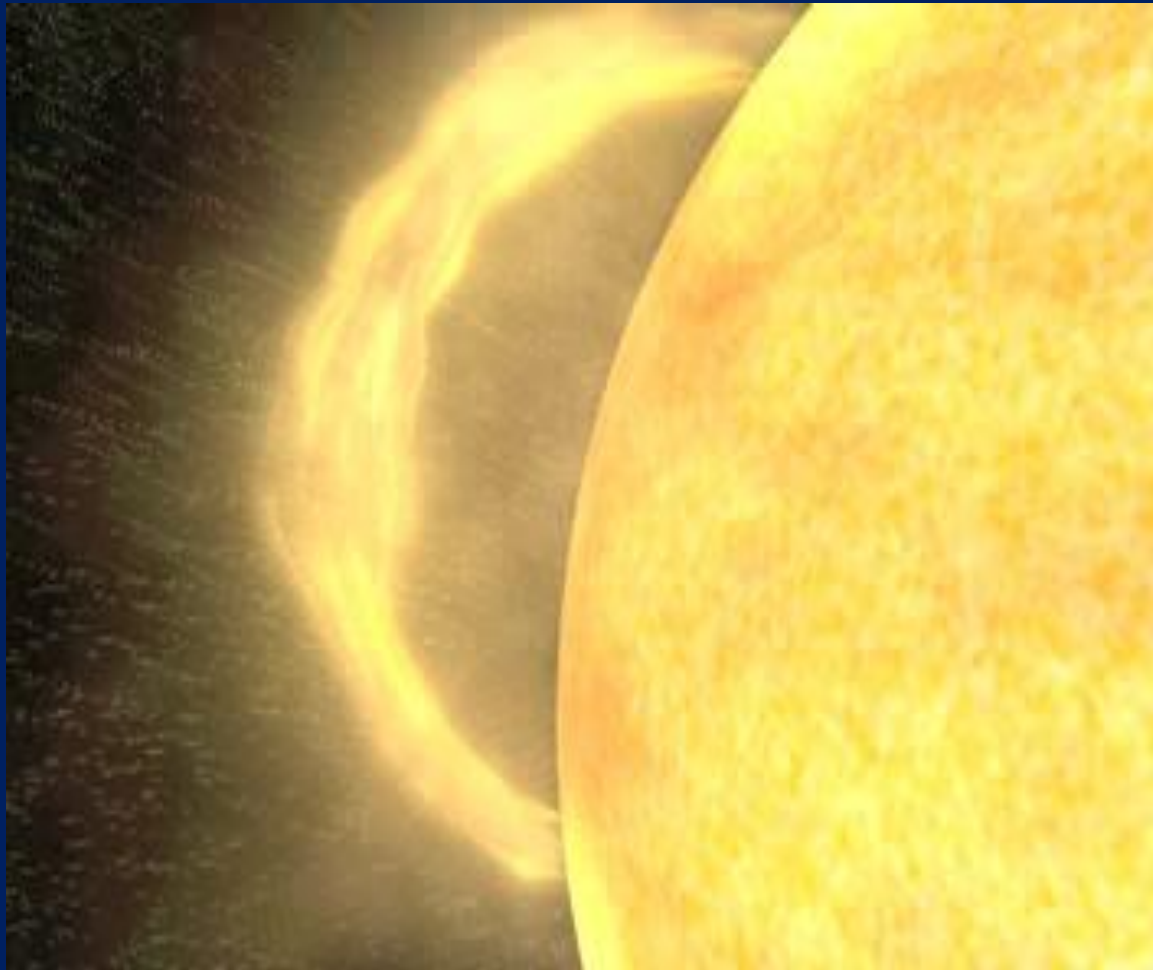
*Journal of Atmospheric and Solar-Terrestrial Physics 69 (2007) 1759–1764*

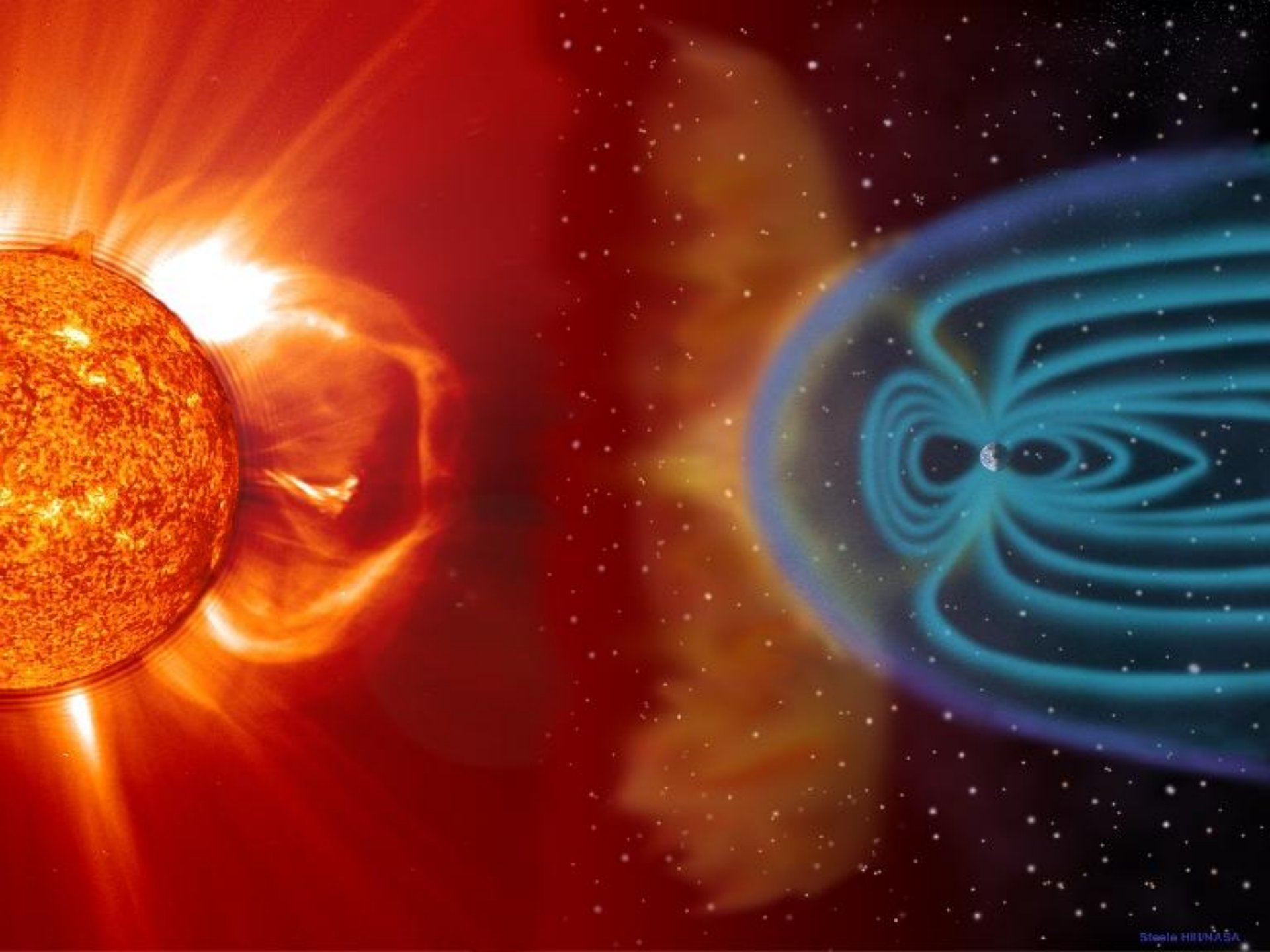


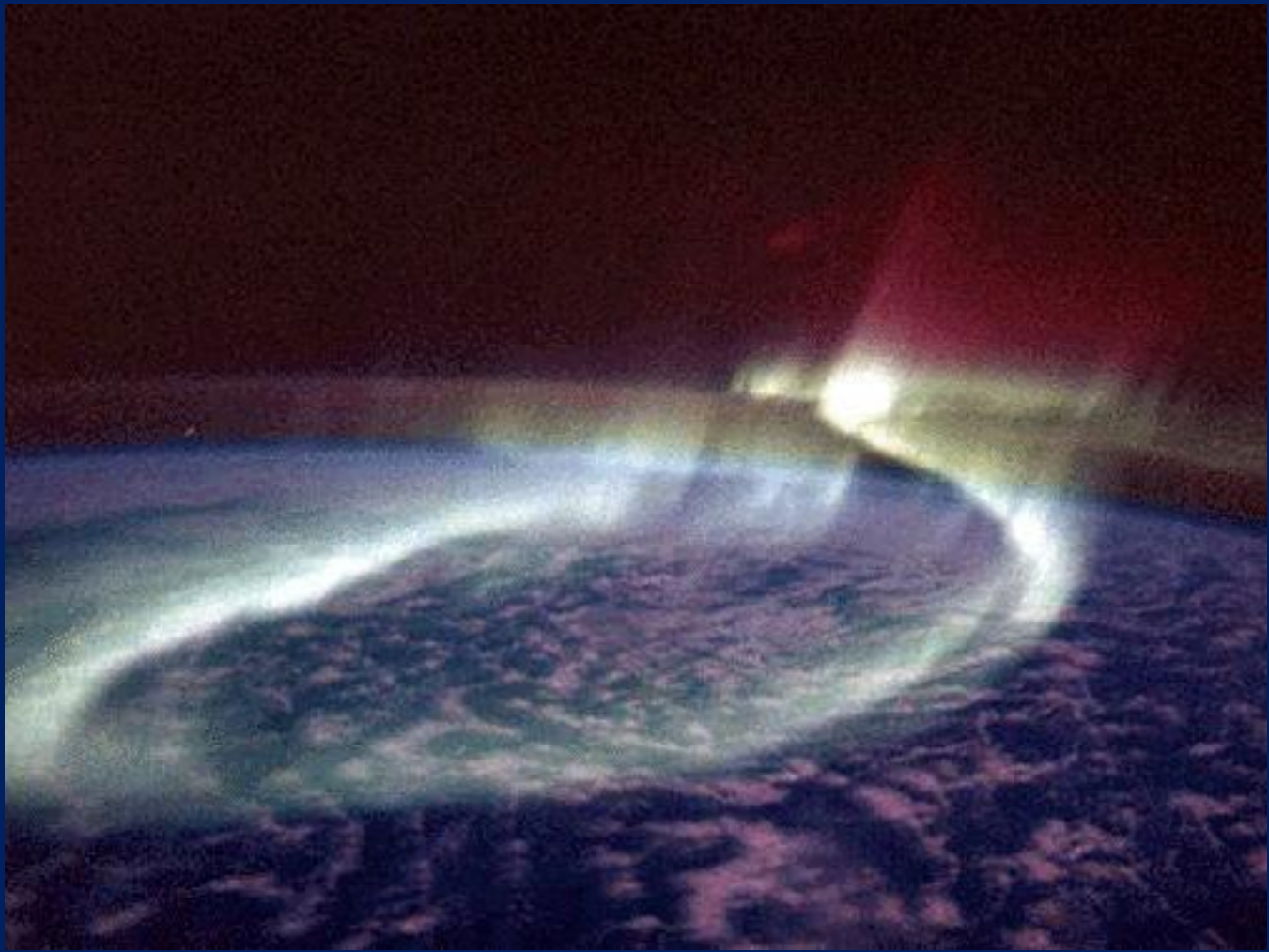
### No Yearly but Transyearly Components in the Least Squares Spectrum of Antipodal Geomagnetic Index aa (1872-1930)\*



\* and a circadidecadal (~21.4y) and most prominent circadecadal (~11.5y) and half-yearly component in span analyzed by Bartels (1932) who folded data over an idealized calendar year.







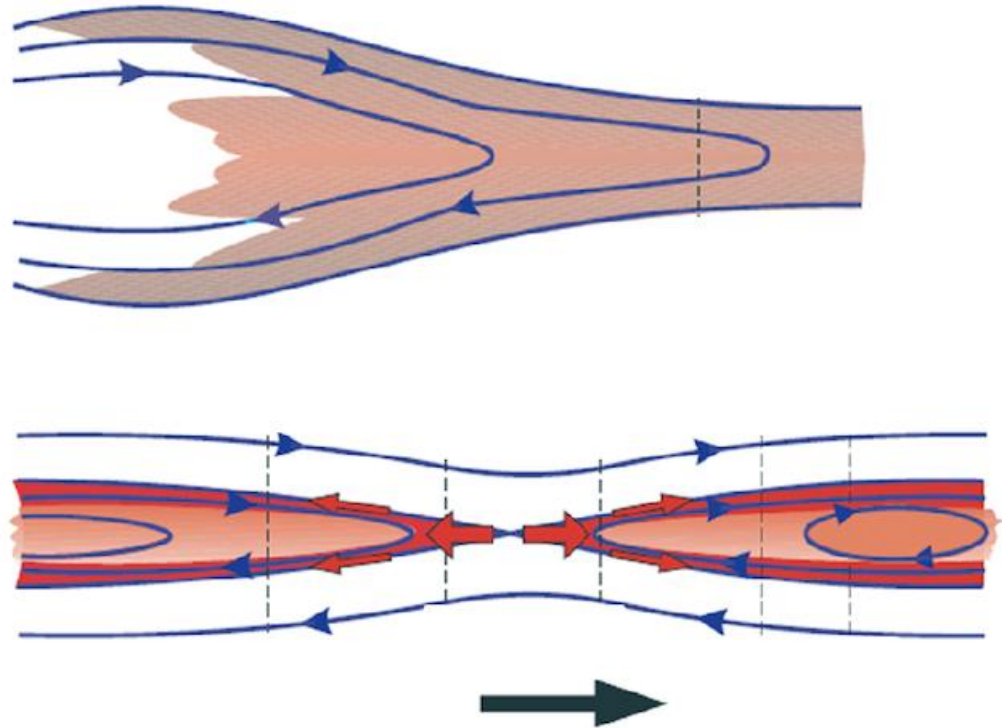
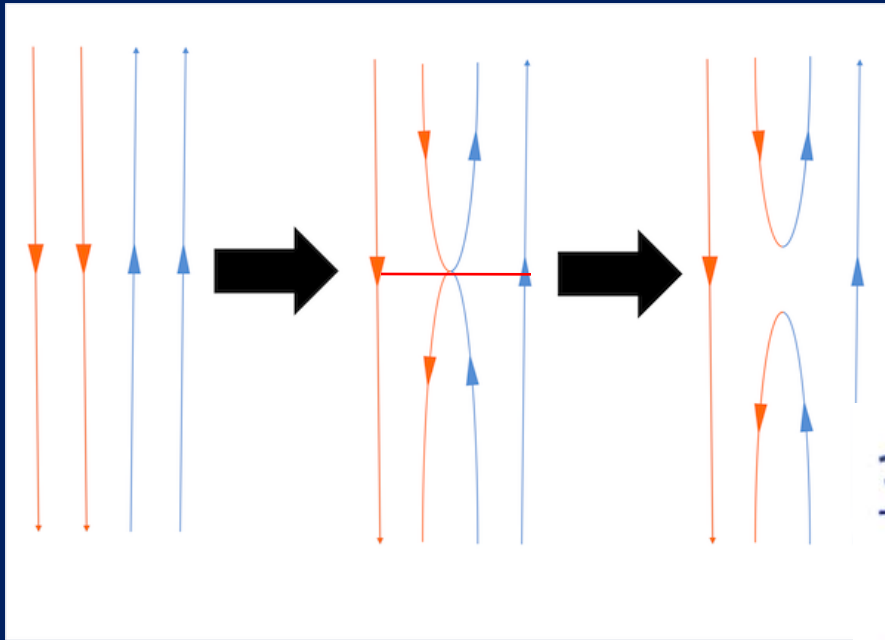




Οκτώβριος 2003: Σέλας στην Αθήνα

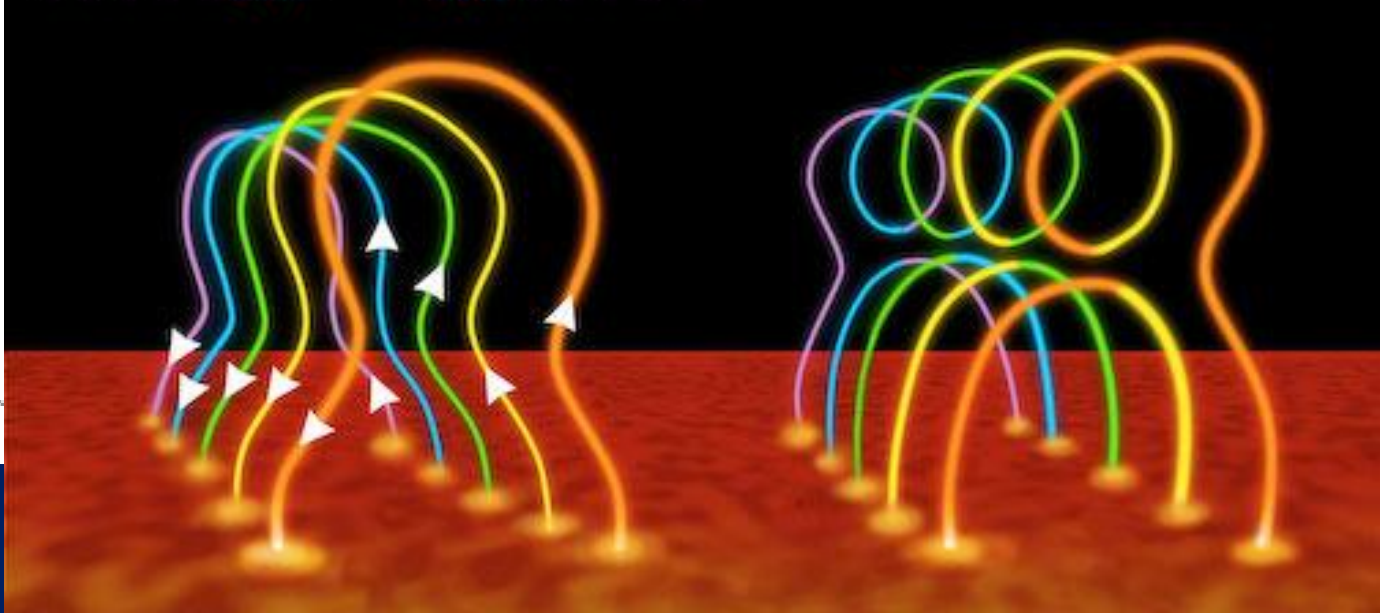
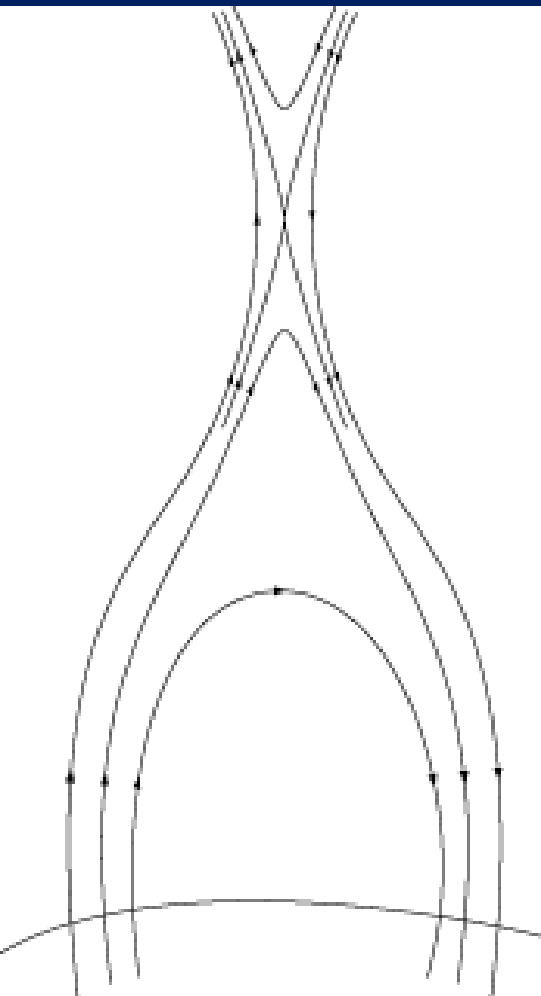


Το φαινόμενο της μαγνητικής επανασύνδεσης στο πλάσμα.  
Σύμφωνα με την Μαγνητοϋδροδυναμική-1

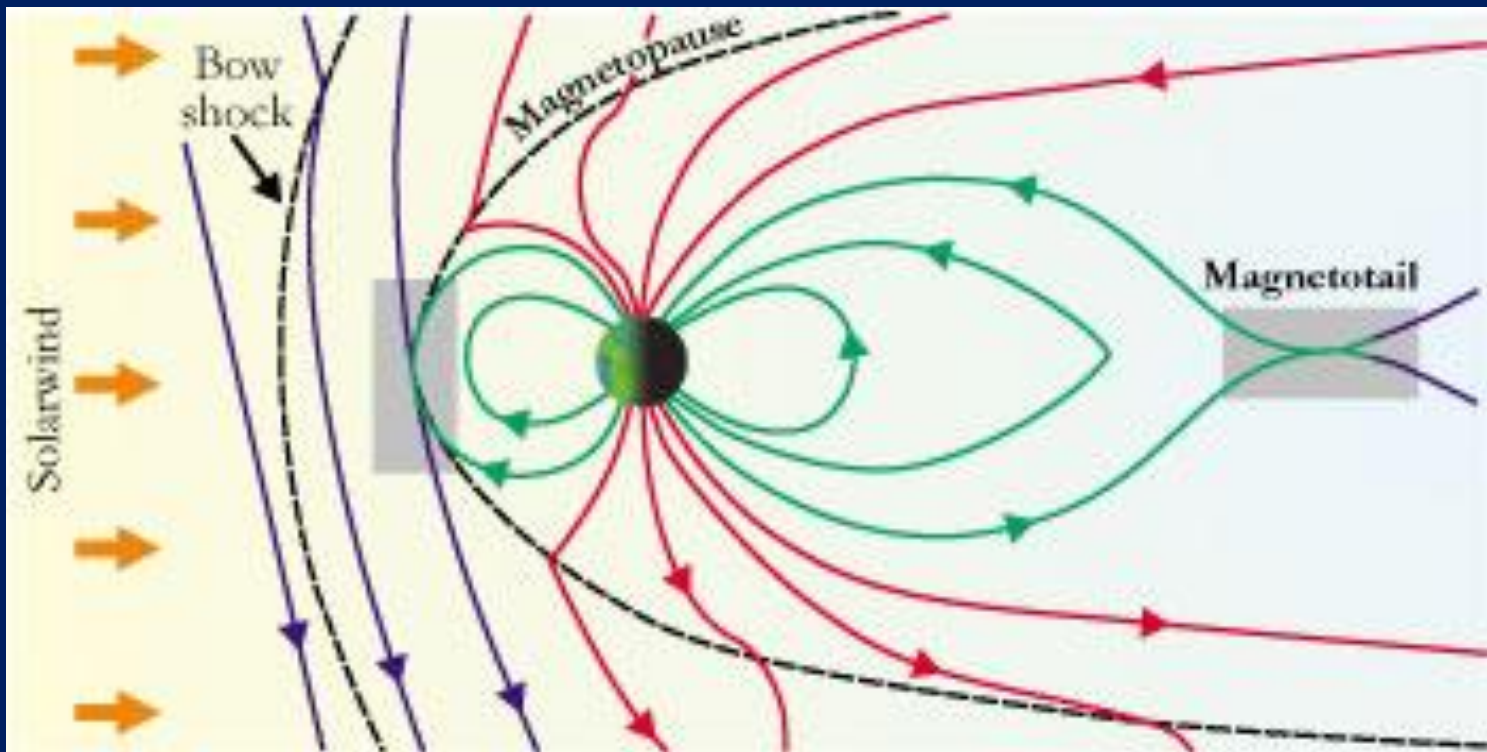




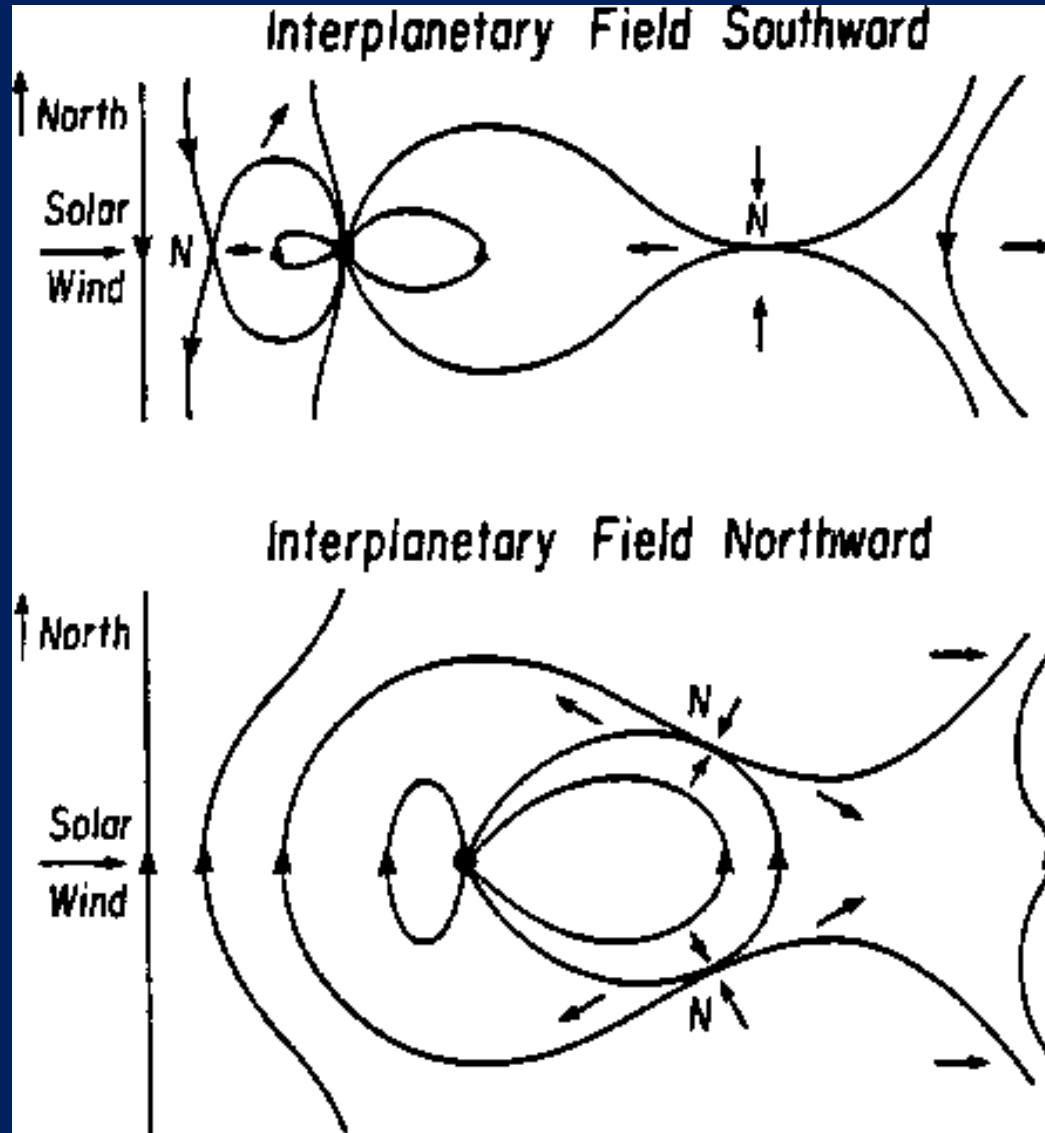
Το φαινόμενο της μαγνητικής επανασύνδεσης στο πλάσμα.  
Σύμφωνα με την Μαγνητοϋδροδυναμική-2 (Ήλιος)



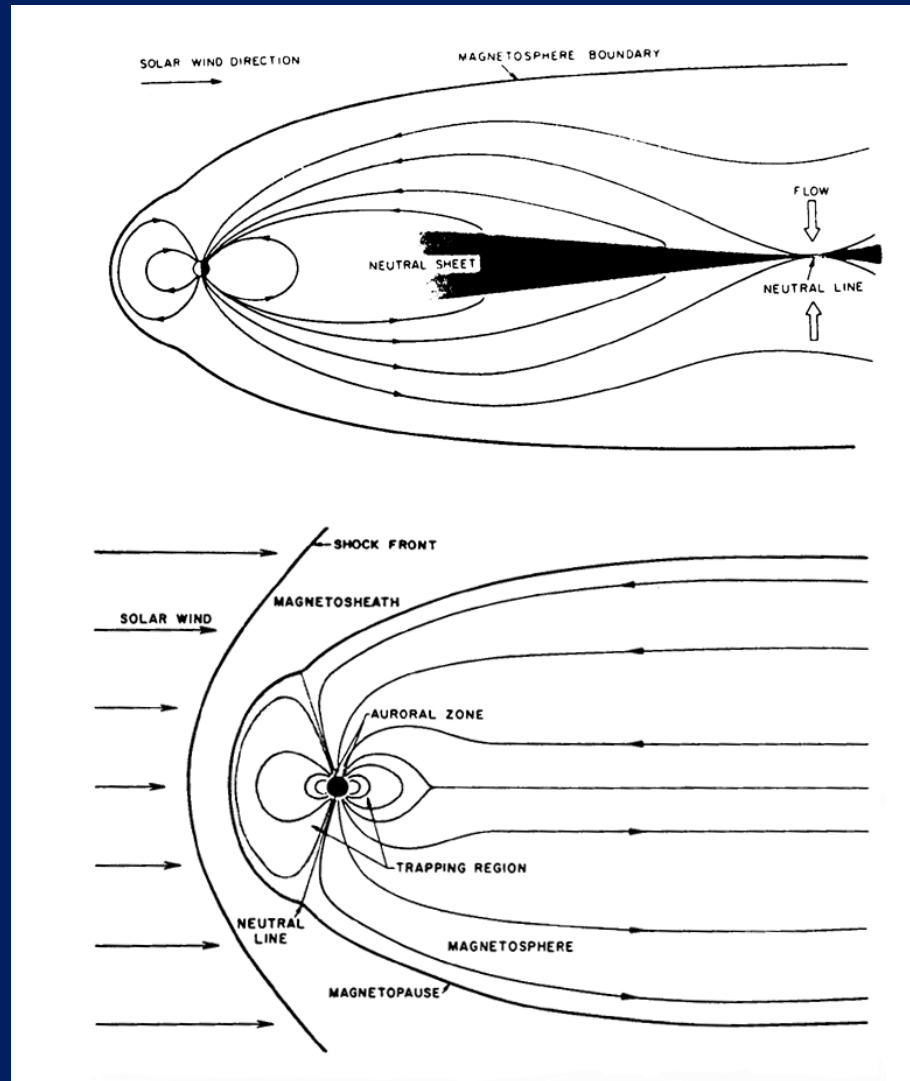
Το φαινόμενο της μαγνητικής επανασύνδεσης στο πλάσμα.  
Σύμφωνα με την Μαγνητοϋδροδυναμική-3  
(στην εμπρόσθια Γήινη μαγνητόπαυση (magnetopause)  
και στην μαγνητοουρά (magnetotail)



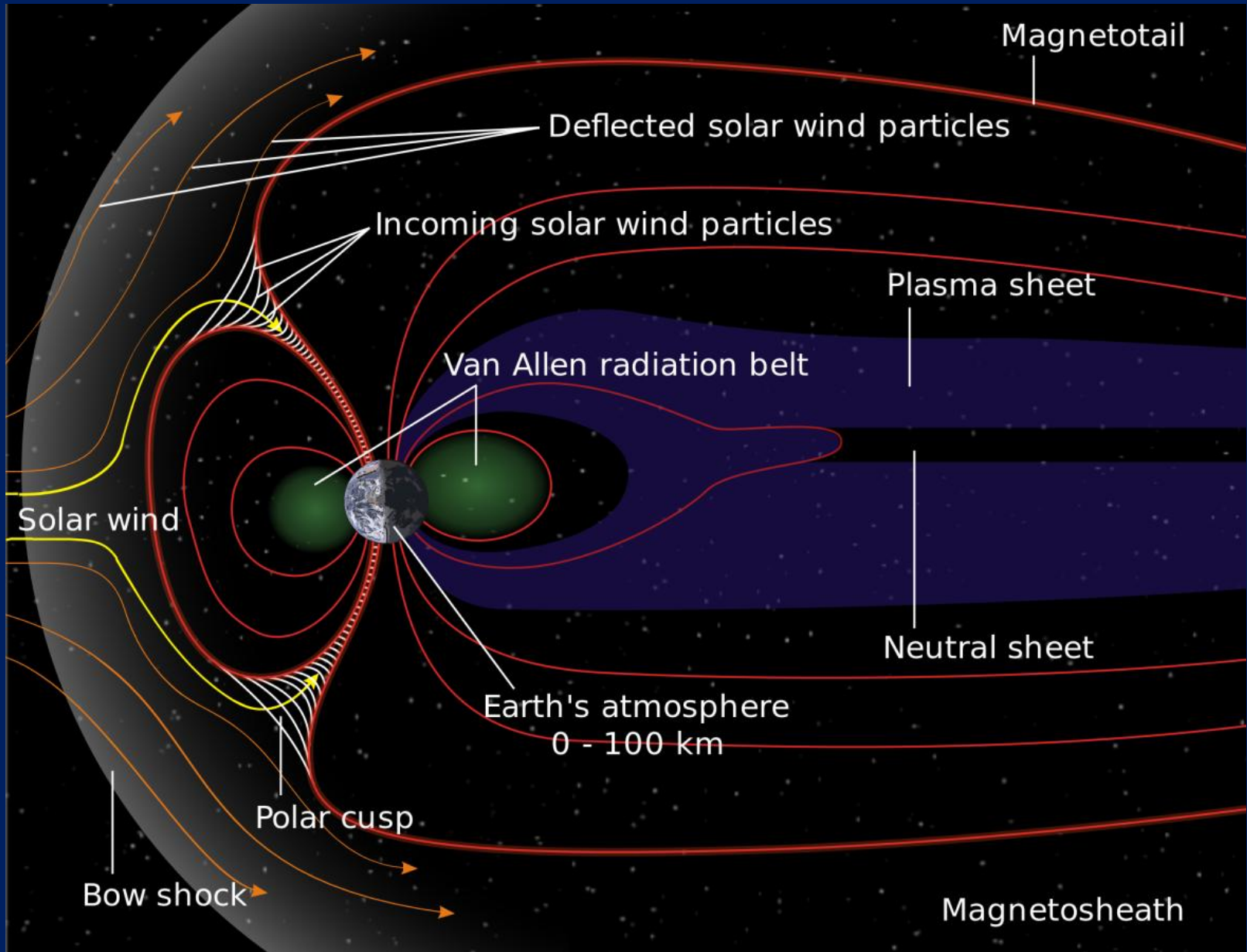
Το φαινόμενο της μαγνητικής επανασύνδεσης στο πλάσμα.  
Σύμφωνα με την Μαγνητοϋδροδυναμική-4  
(στην εμπρόσθια Γήινη μαγνητόπαυση (magnetopause)  
και στην μαγνητοουρά (magnetotail))



Το φαινόμενο της μαγνητικής επανασύνδεσης στο πλάσμα.  
Σύμφωνα με την Μαγνητοϋδροδυναμική-5  
(στην μαγνητοουρά (magnetotail))

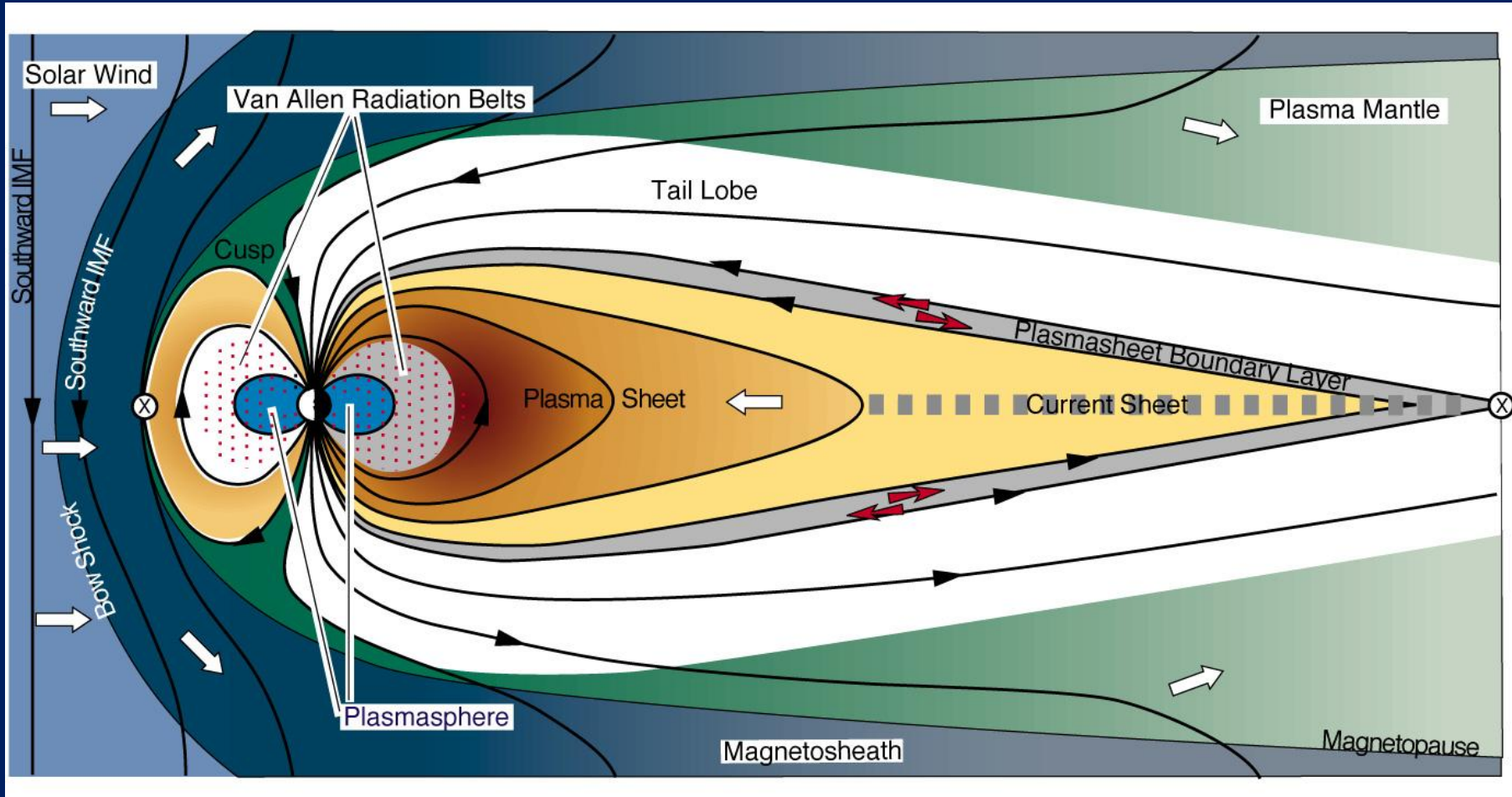


# Περιοχές της μαγνητόσφαιρας-1

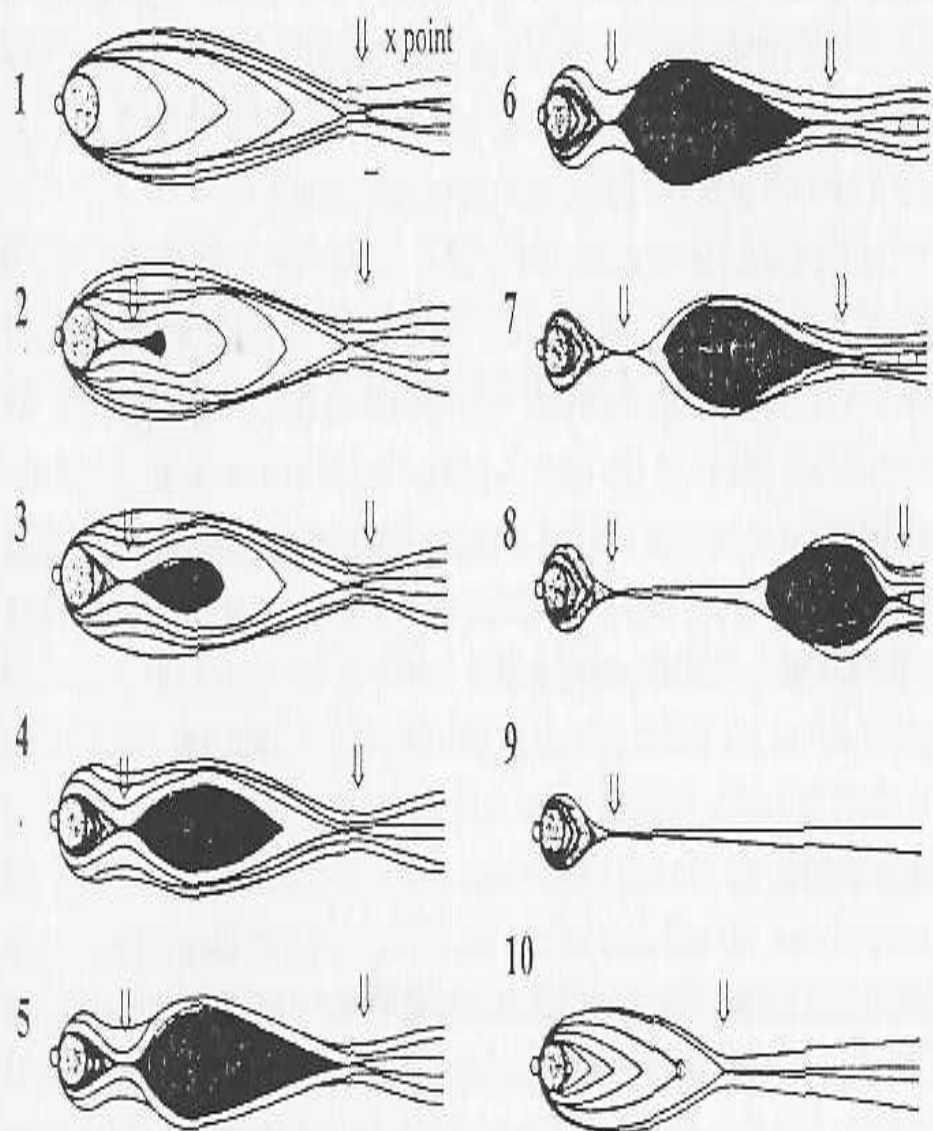


# Περιοχές της μαγνητόσφαιρας-2

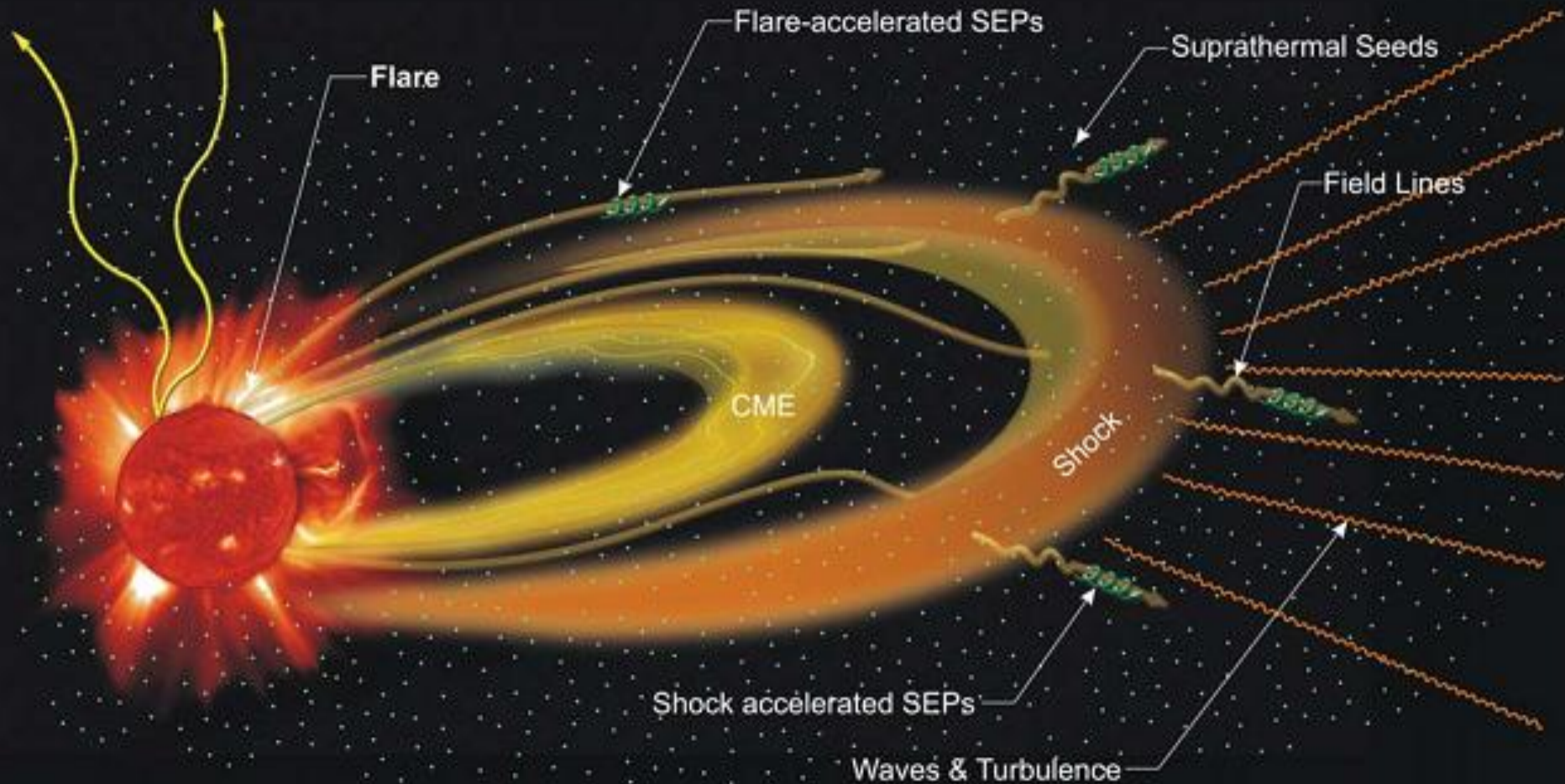
## Μαγνητική επανασύνδεση



# Μαγνητική επανασύνδεση- διαδοχικές φάσεις μαγνητικής καταιγίδας- σέλας στους πόλους

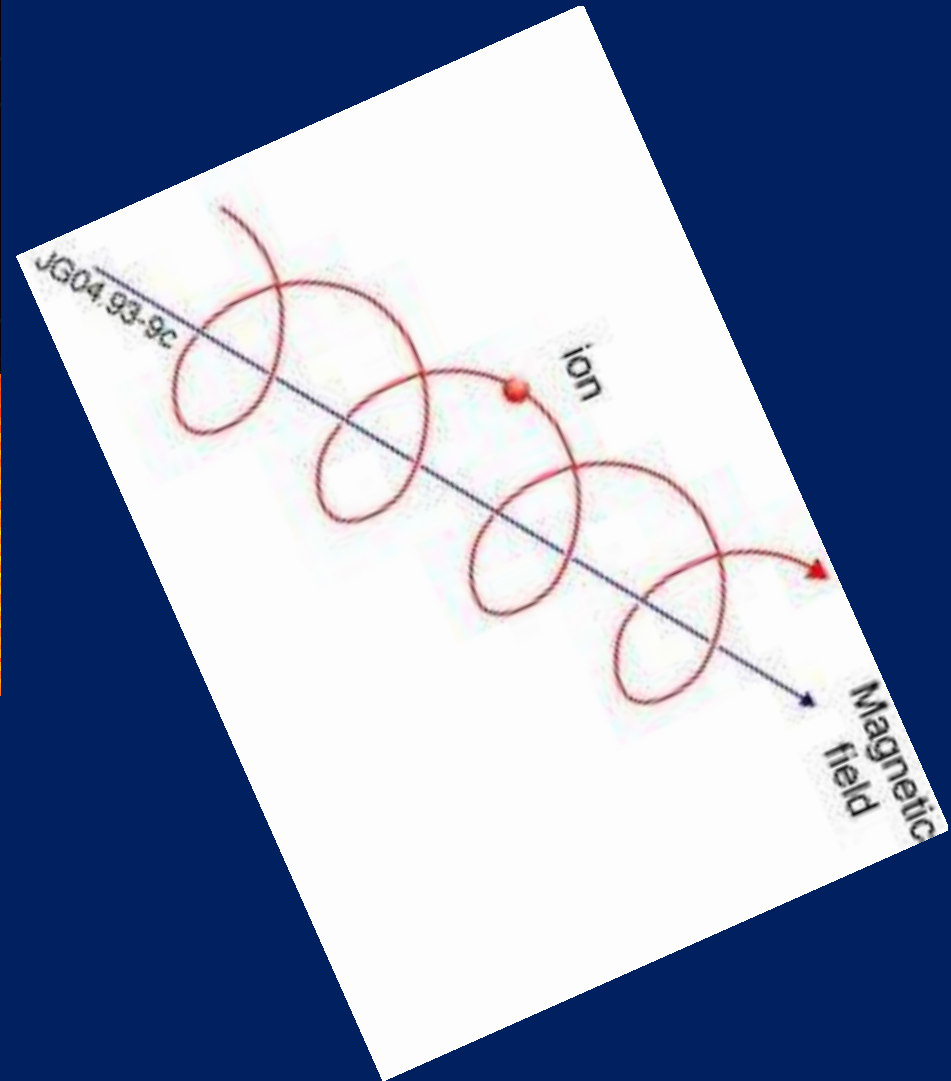
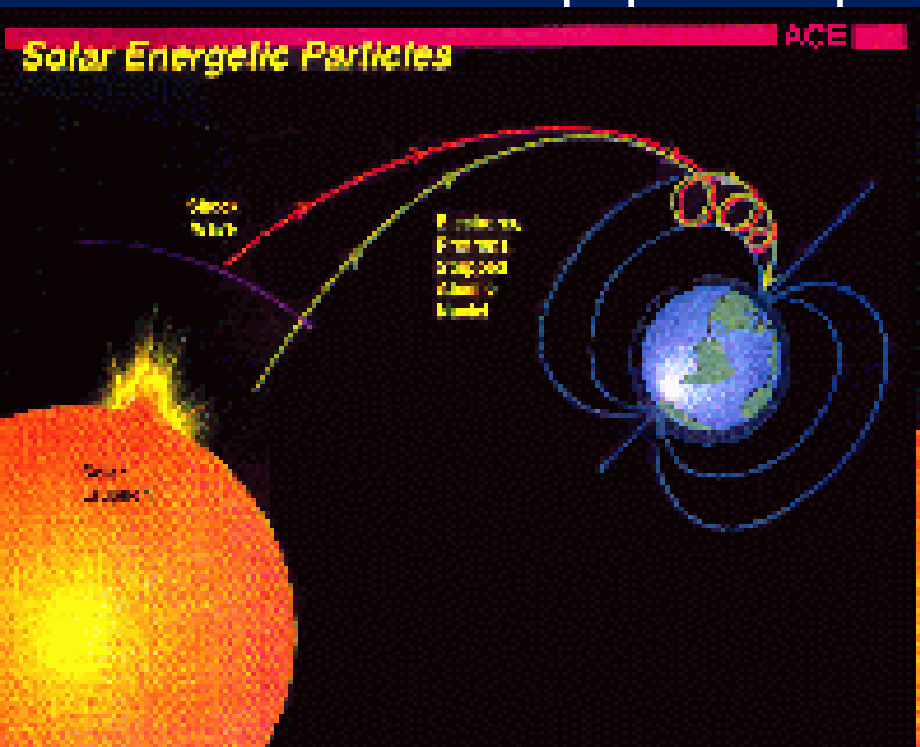


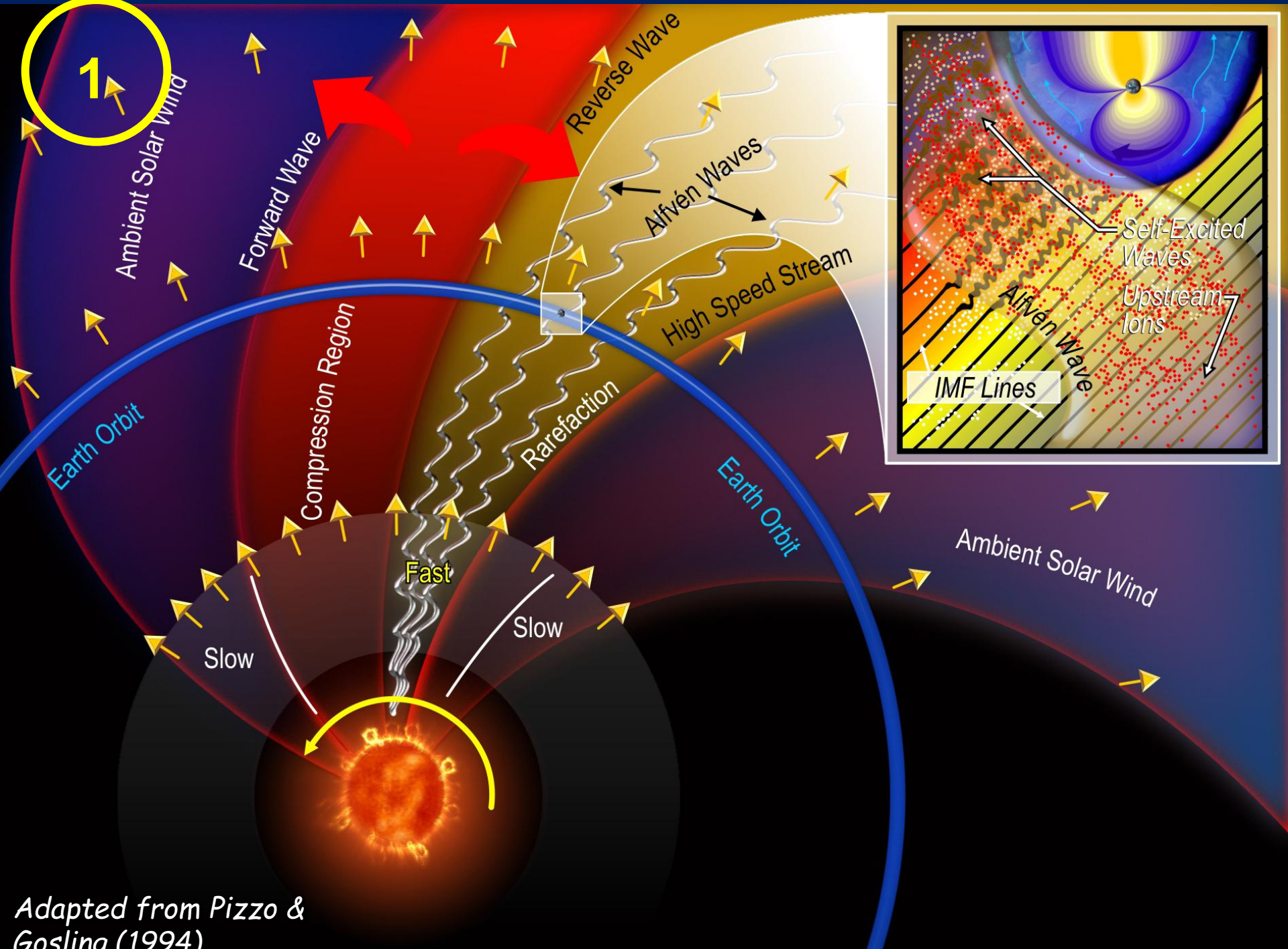
Ηλιακή έκρηξη ακολουθείται από  
Στεμματική εκπομπή μάζας  
(**CME: Coronal Mass Ejection**)





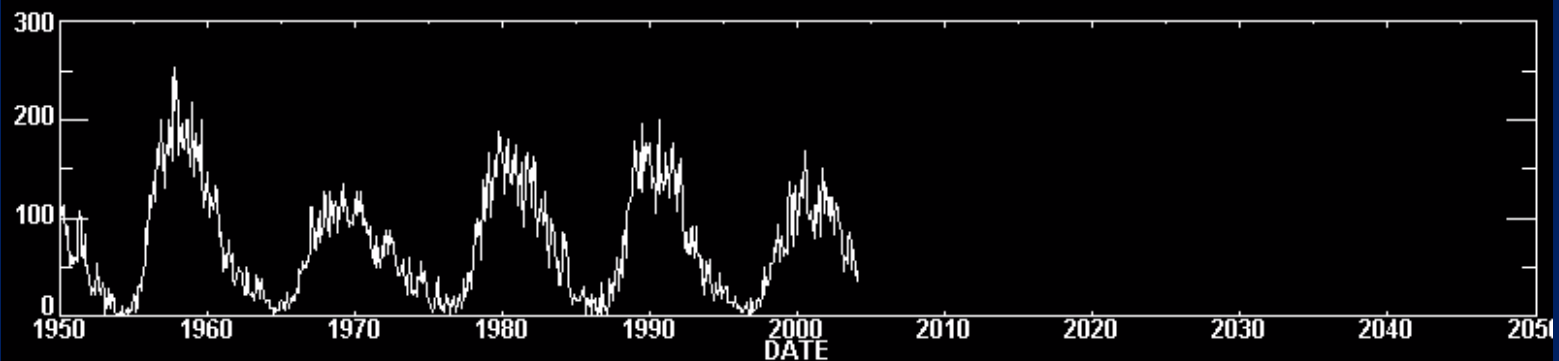
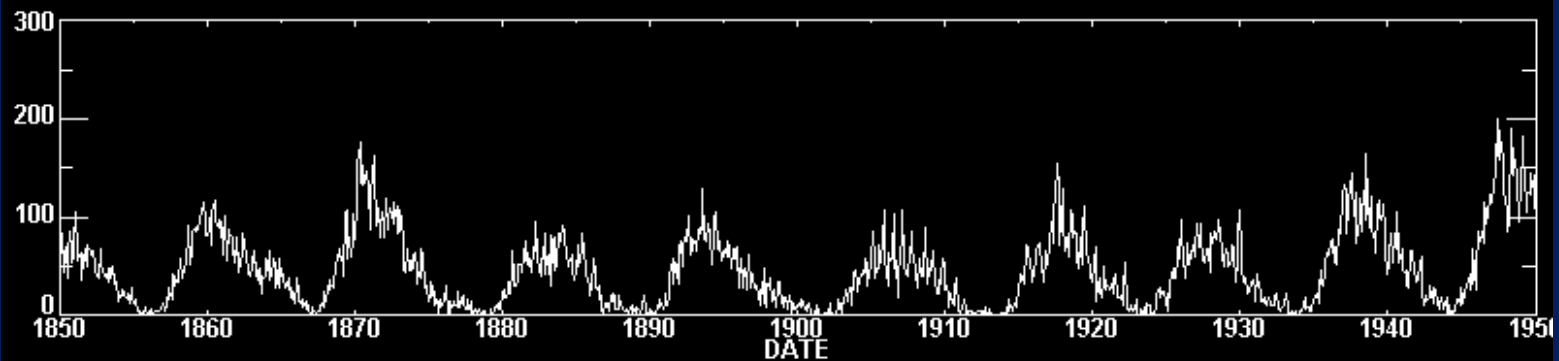
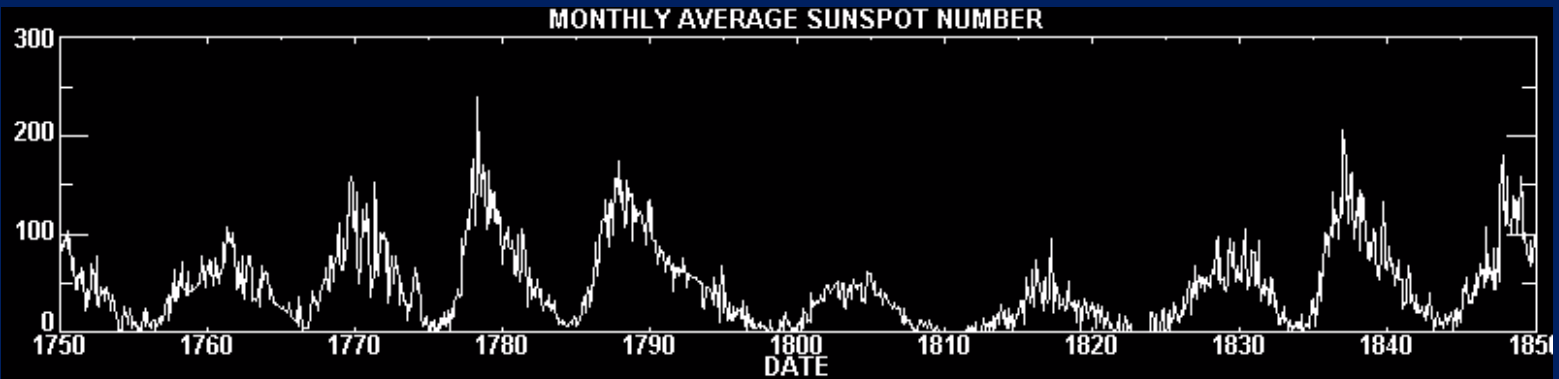
Ηλιακή έκρηξη εκπέμπει μεγάλης ενέργειας πρωτόνια και ηλεκτρόνια που είναι παρατηρητέα κοντά στη Γή μετά από μερικά / αρκετά λεπτά της ώρας





Adapted from Pizzo & Gosling (1994)

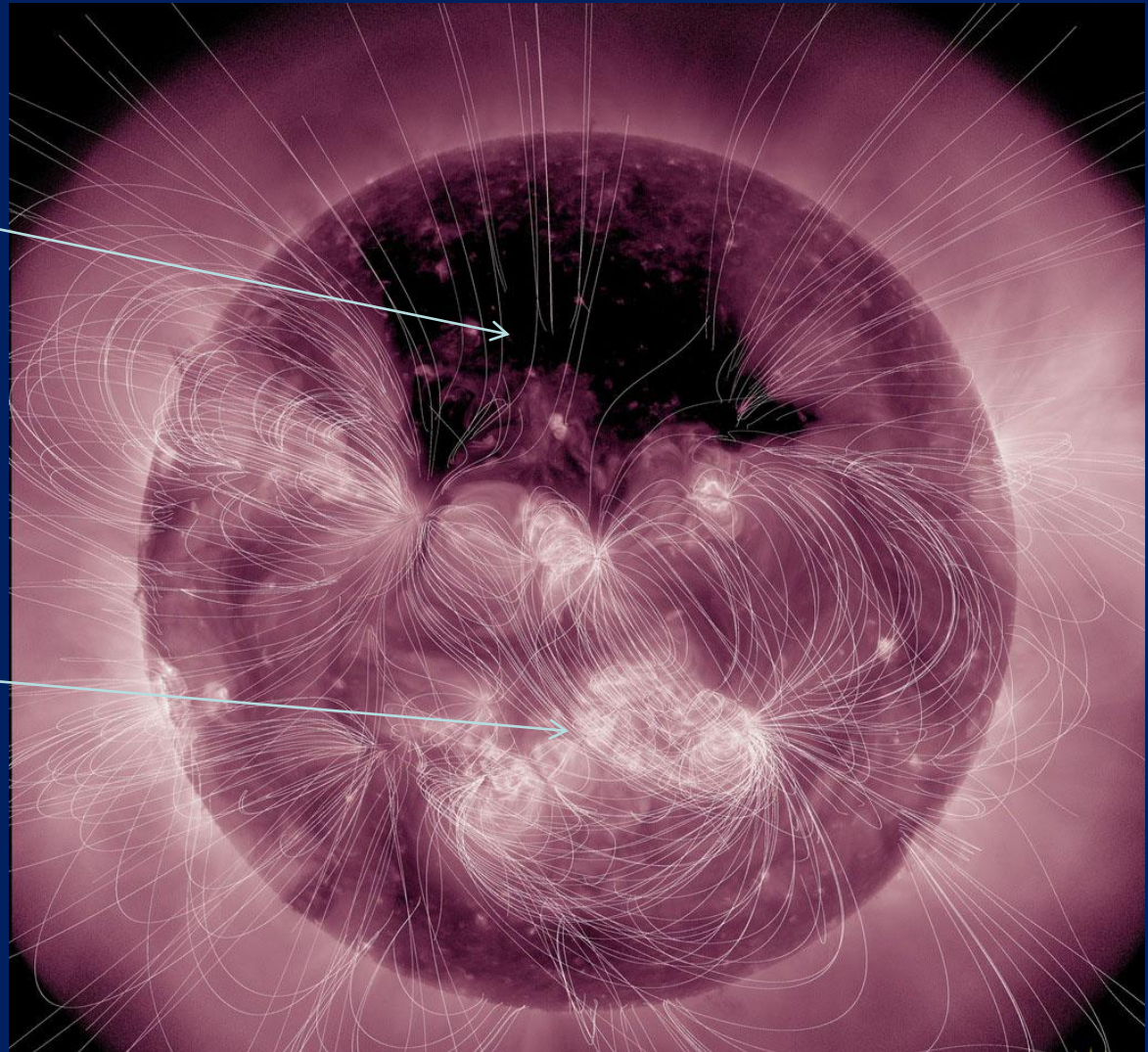
# Sunspots and the Sunspot Cycle



# CMEs and HSSs (High speed streams)

**HSSs** originate from coronal holes, where magnetic field is open.

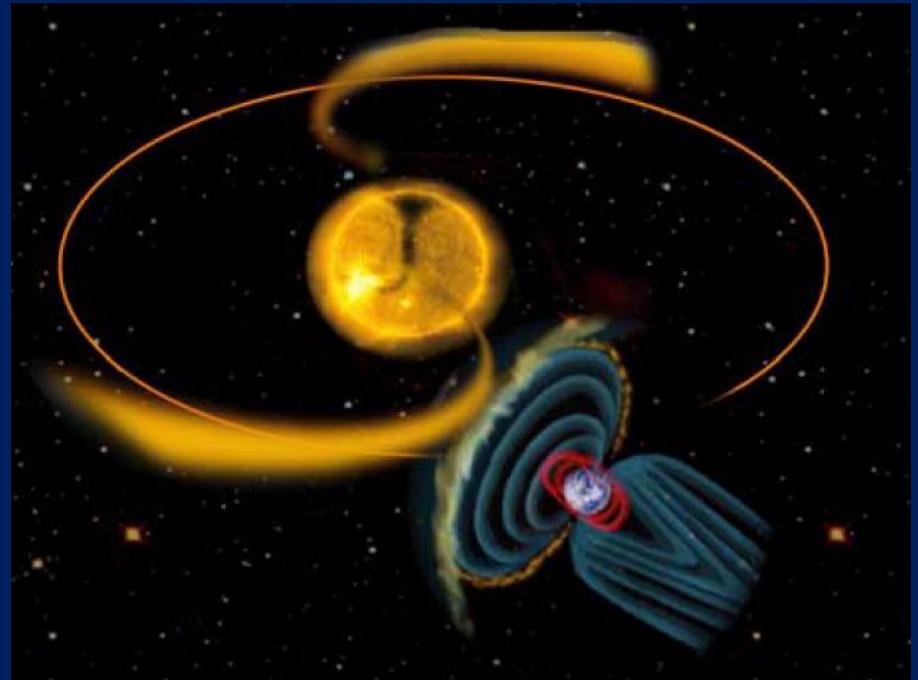
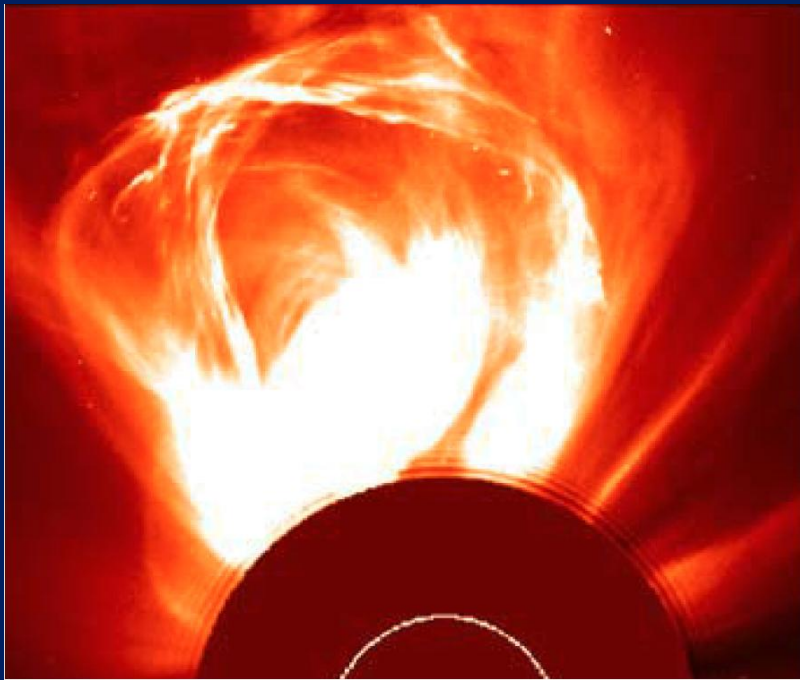
**CMEs** originate from active regions with closed magnetic loops.



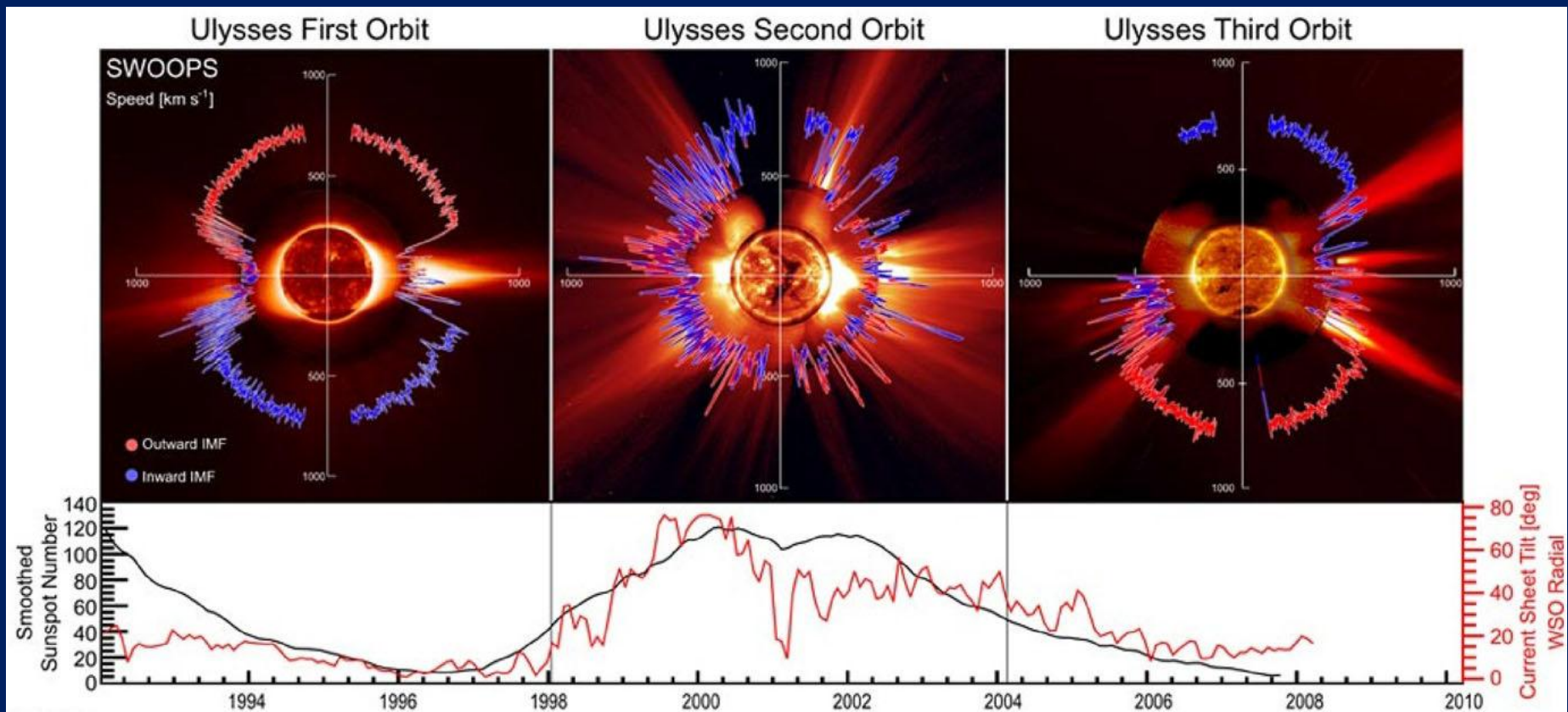
# Disturbances in Earth's magnetic field are driven mainly by **coronal mass ejections (CMEs)** and **high-speed streams (HSSs)**

CMEs are transient eruptions of plasma (protons and electrons) from the Sun

HSSs are continuous streams of fast solar wind often recurring for several solar rotations.



Η ταχύτητα του Ηλιακού ανέμου μεταβάλλεται με το ηλιακό πλάτος



# Ηλιακός κύκλος και διαφοροποίηση των γεωμαγνητικών καταιγίδων Από CME και HSSs

