UTJECAJ SUNČEVE AKTIVNOSTI NA ZEMLJU

Bojan Vršnak

Opservatorij Hvar

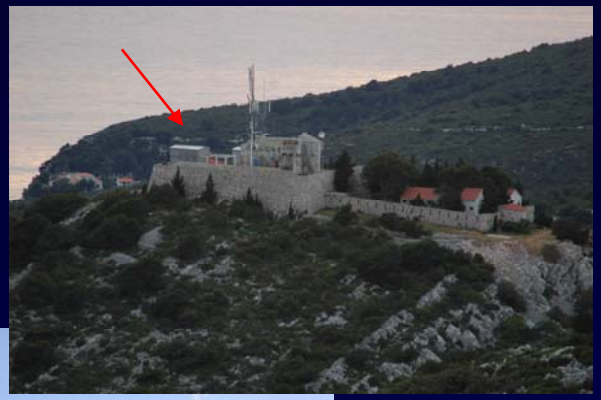
Geodetski fakultet Sveučilišta u Zagrebu

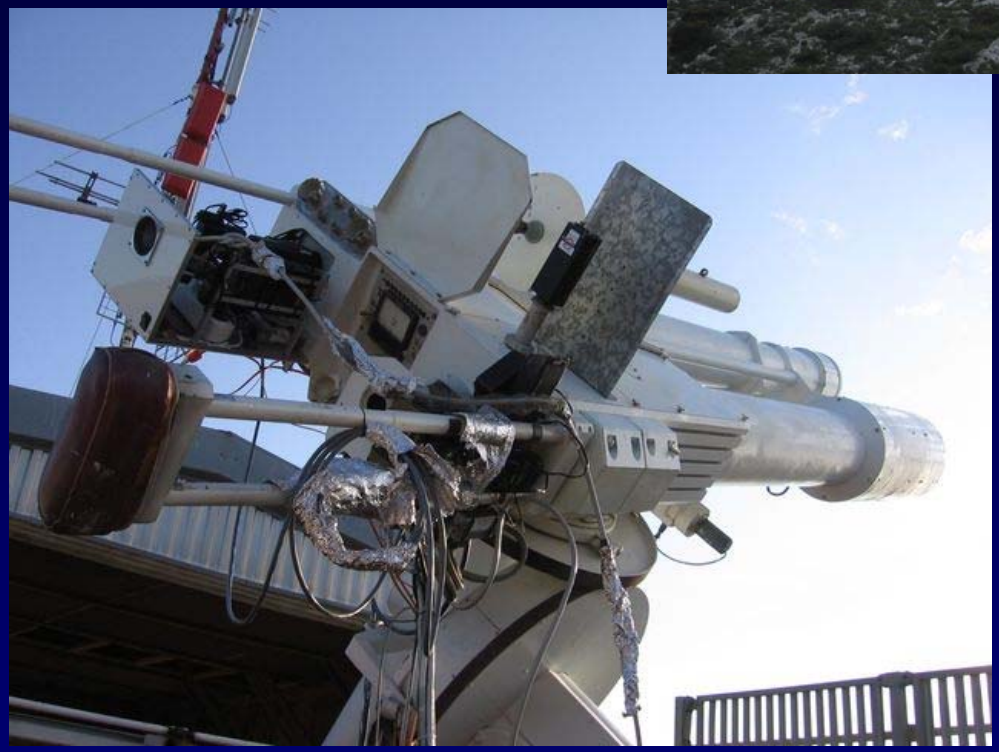
HRZZ-IP-11-2013 6212-SOLSTEL

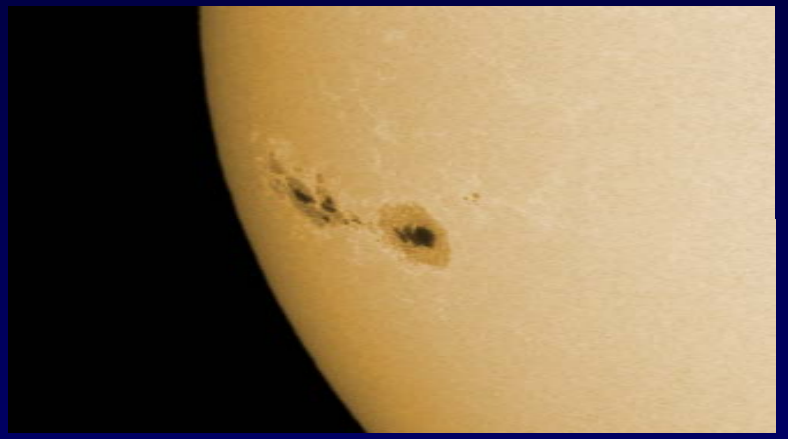
"Solar and Stellar Variability"

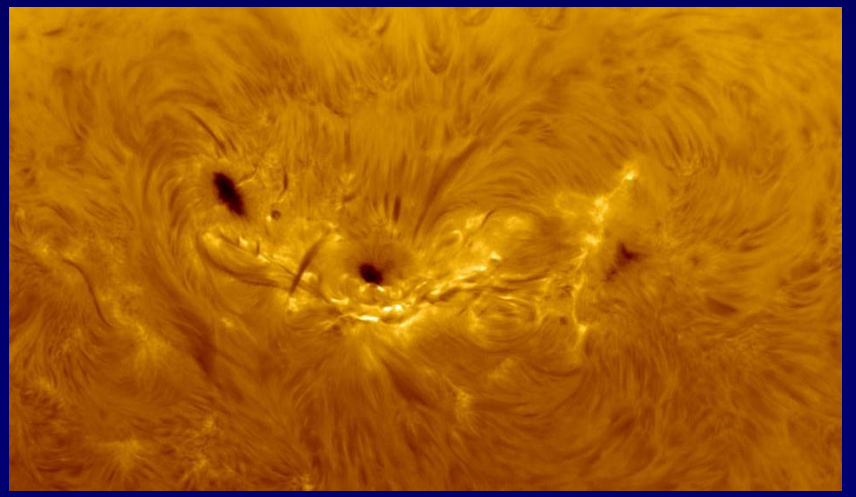
Opservatorij Hvar / Geodetski fakultet

Hvarski solarni teleskop

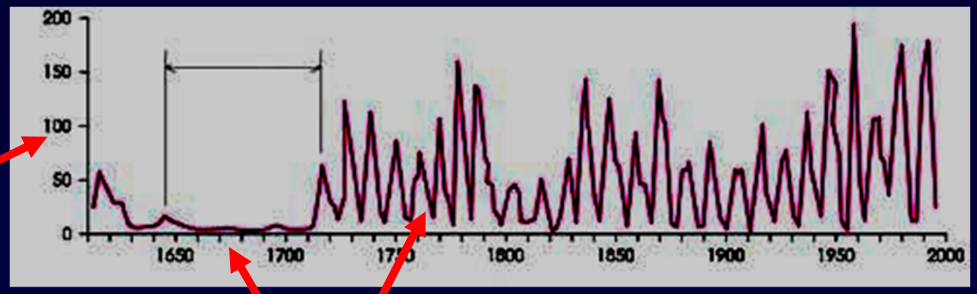








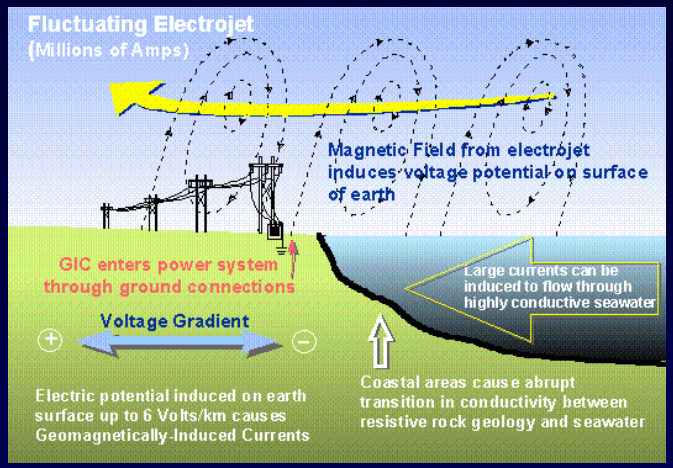
Malo povijesti



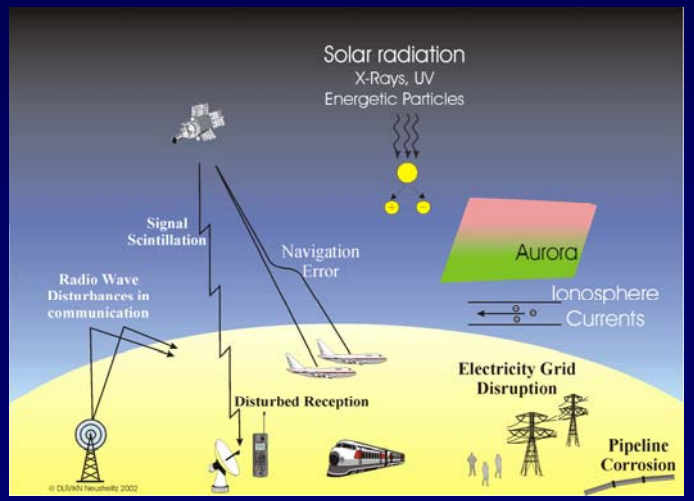
- Rudolf Wolf
  (1848, “Wolfov broj”)
- Heinrich Schwabe (1843, 11-god. Sunčev ciklus)
- Edward Sabine (1852, geomagnetski poremećaji, aurora)
- Richard Carrington (1859, “Carrington/Hodges event”)
- Annie+Walter Maunder (1894, “Maunderov minimum” ~1645-1715)

- Christian Birkeland (1908, globalne “Birkelandove struje”, aurora, Sunce-Zemlja, Sunčev vjetar)
- II. svjetski rat

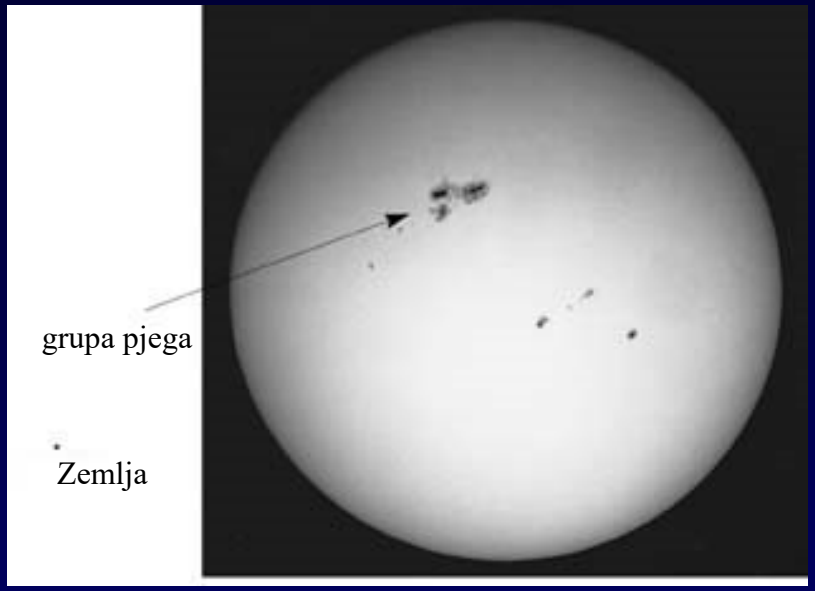
- 1950 “Space Weather”
- 1957 (“International Geophysical Year”, IGY)
- Quebec 1998

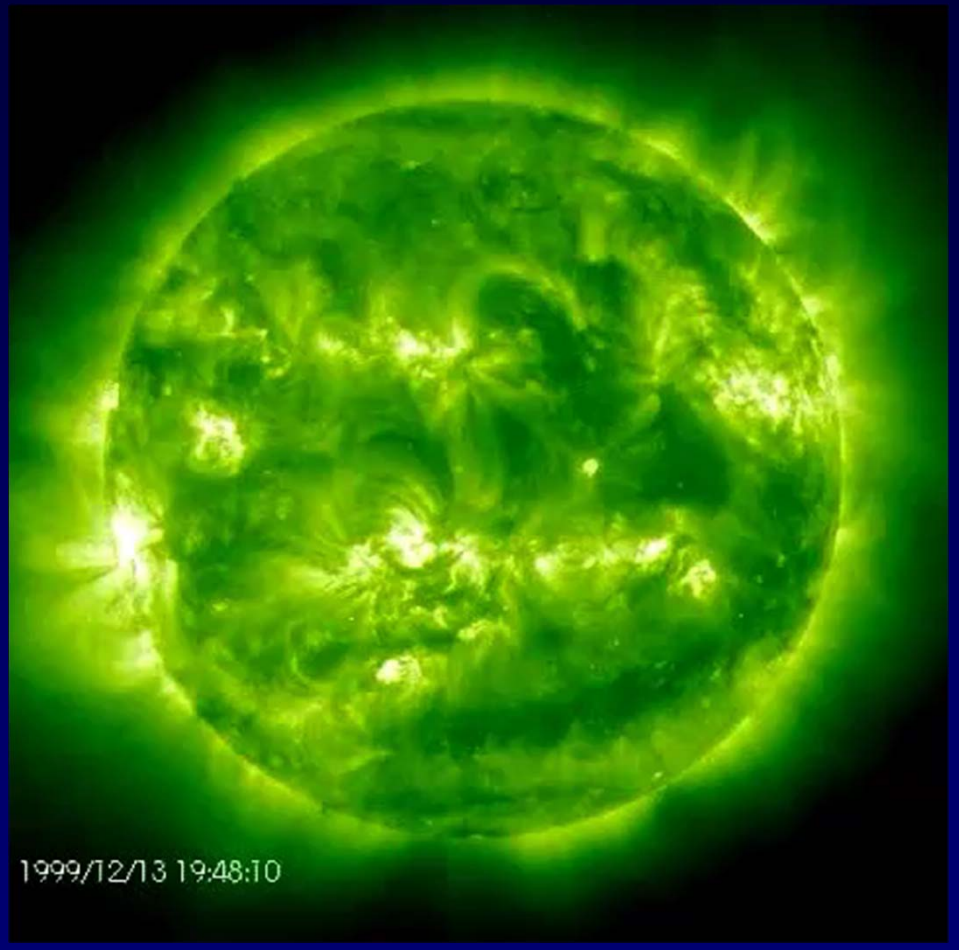


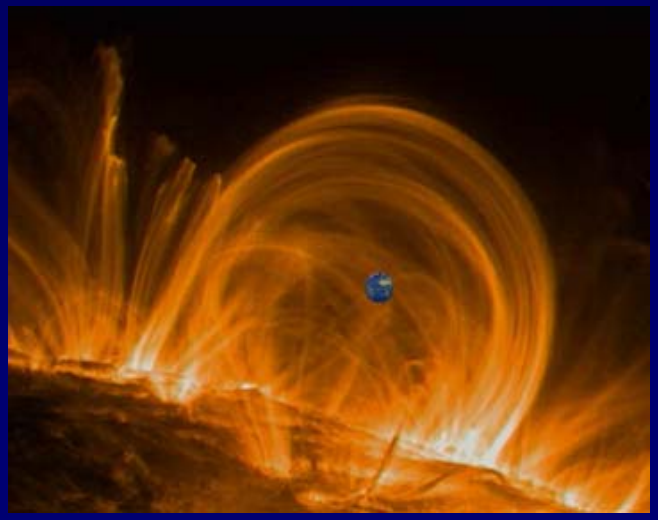
Polarna svjetlost u Slavoniji, s nimio M. Karakaš, 20. studenog 2003.



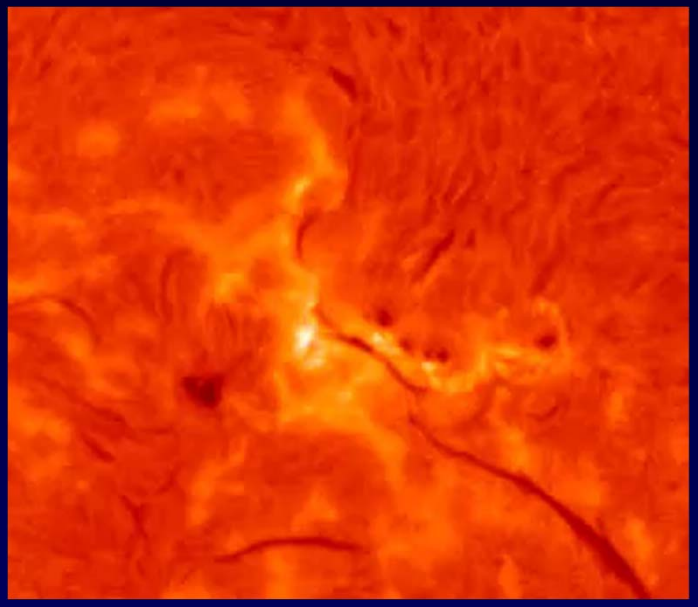
Sunčeva aktivnost

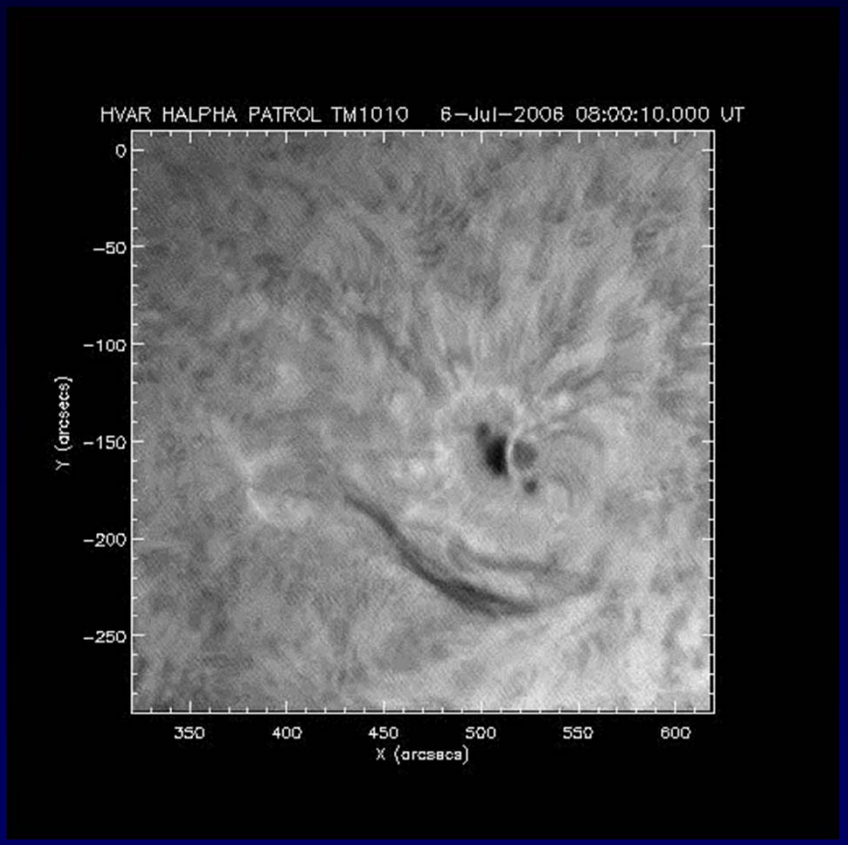


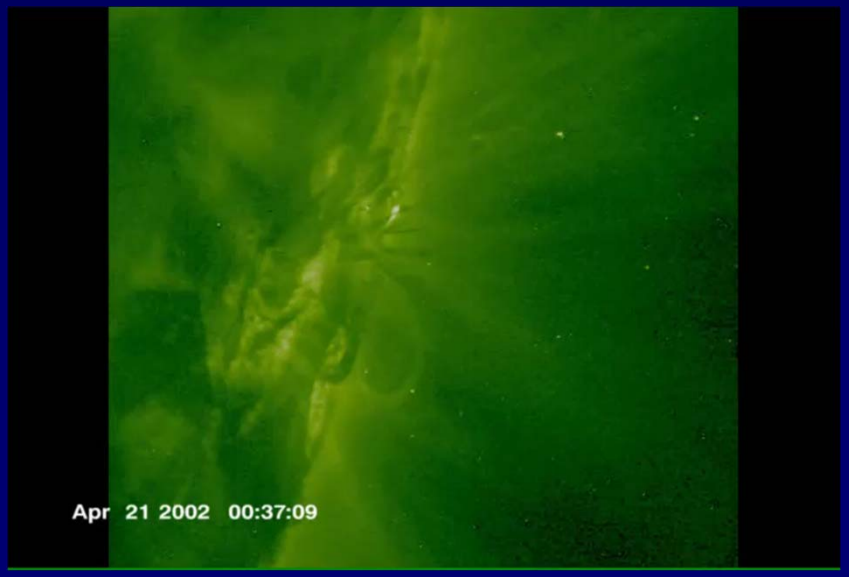




Sunčevi bljeskovi

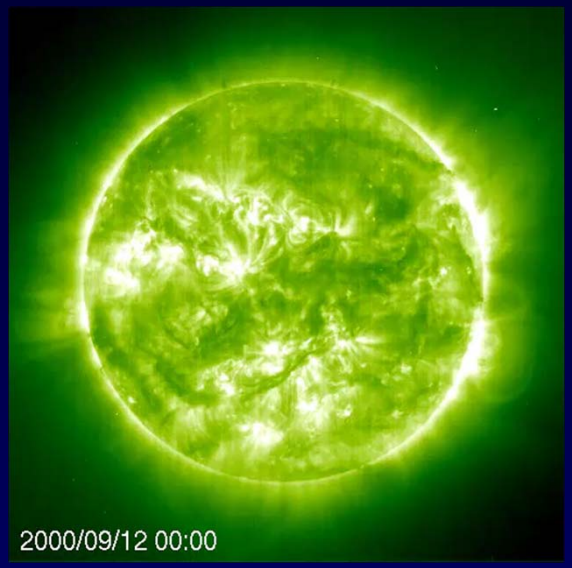


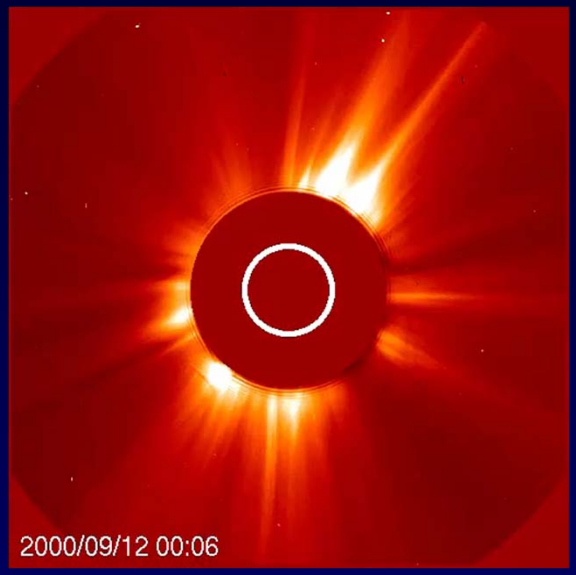


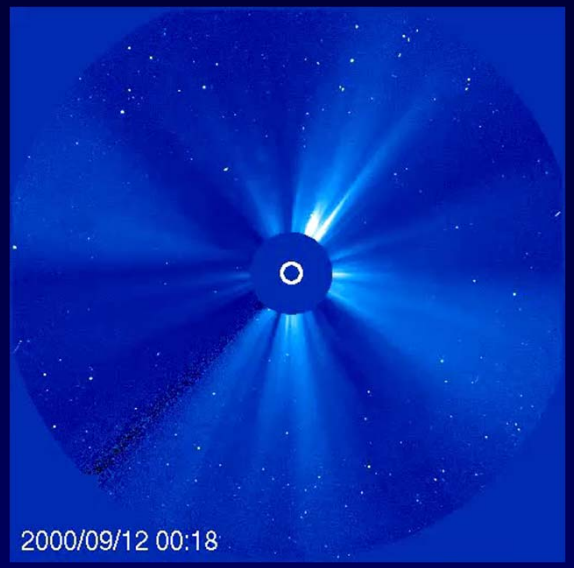


- 40 milijuna K
- snopovi čestica
- EUV i X zračenje
- provable radio zračenja

Sunčeve erupcije (koronini izbačaji)

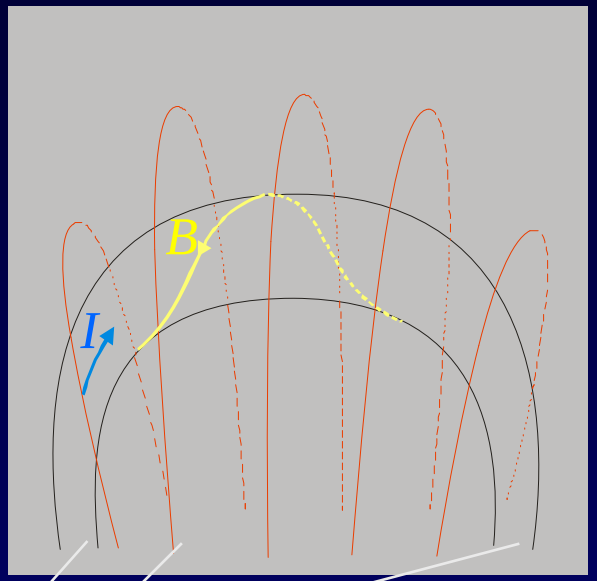




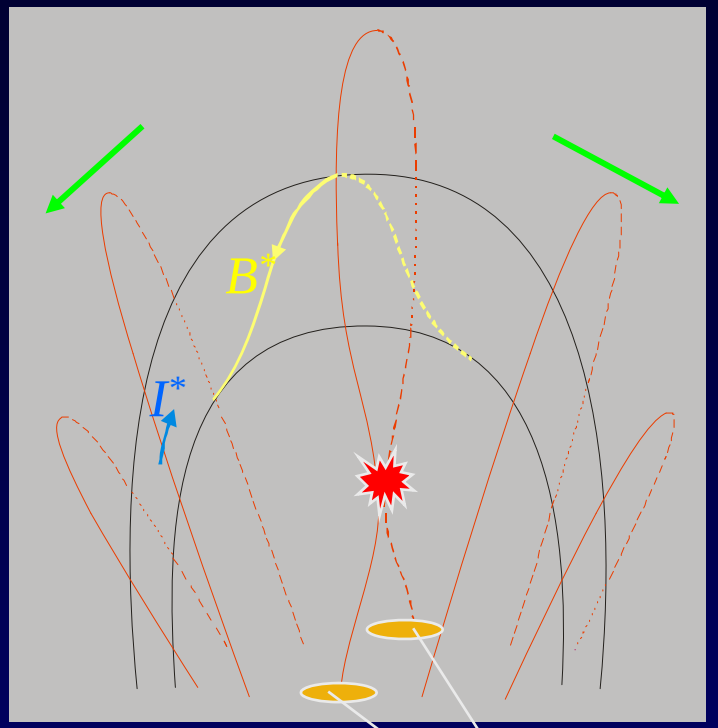


brzina = 1000 km/s
masa = nekoliko milijardi tona
energija = 100 milijardi A-bombi

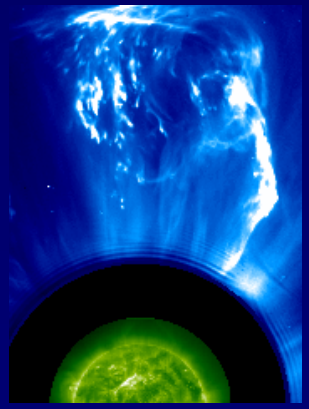
3-D flux-rope modeli



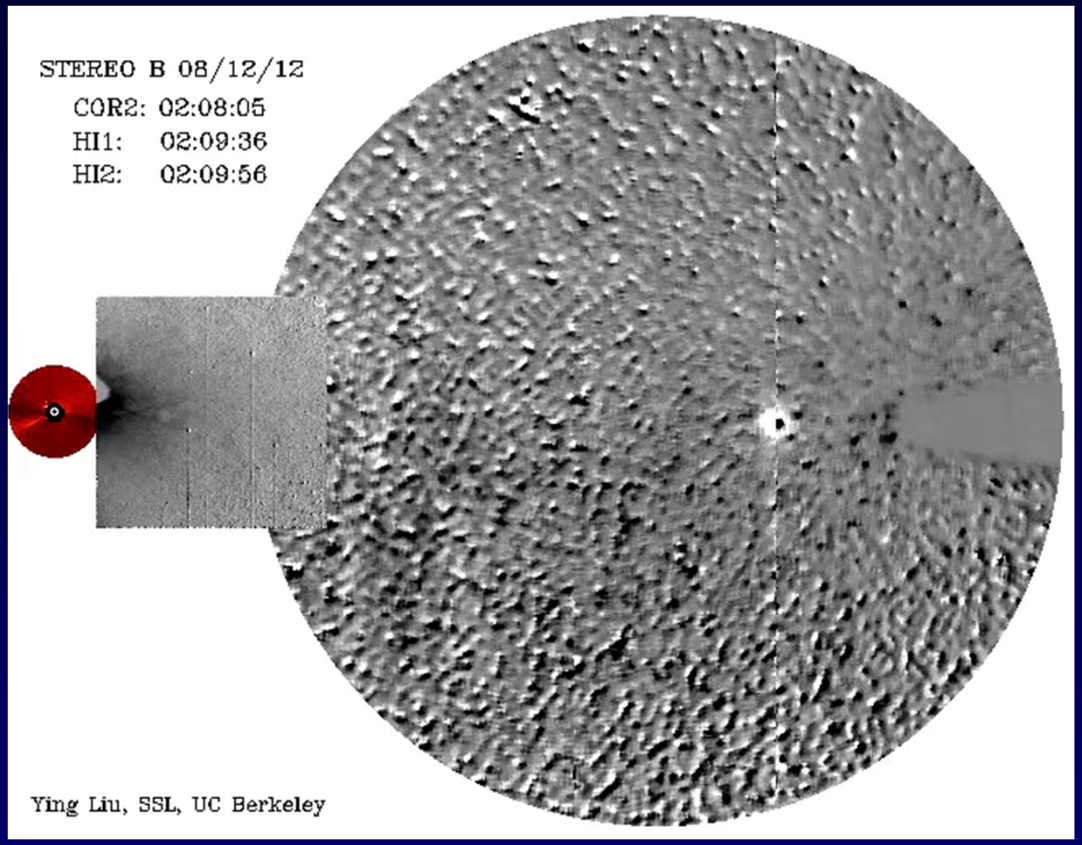
"line-tying"



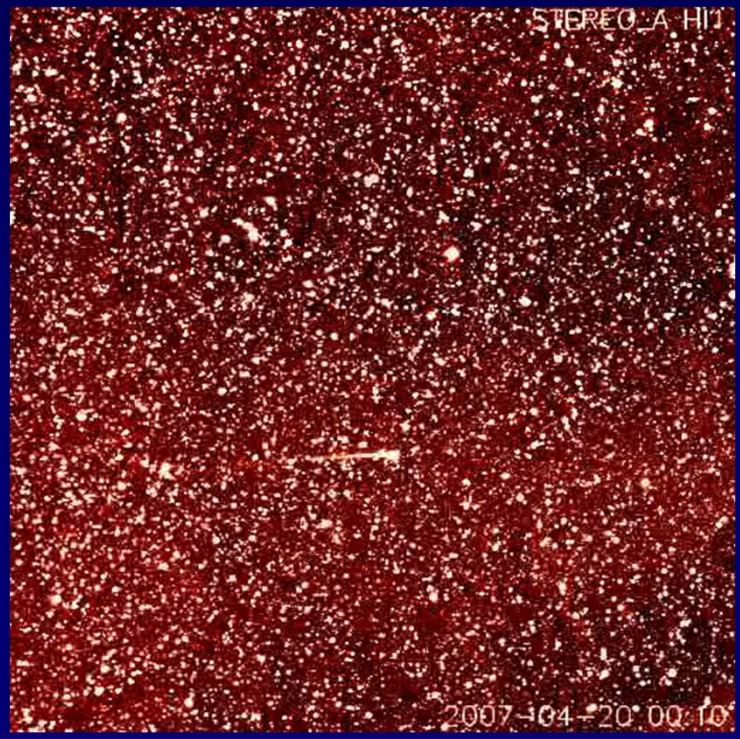
HXR, Ha



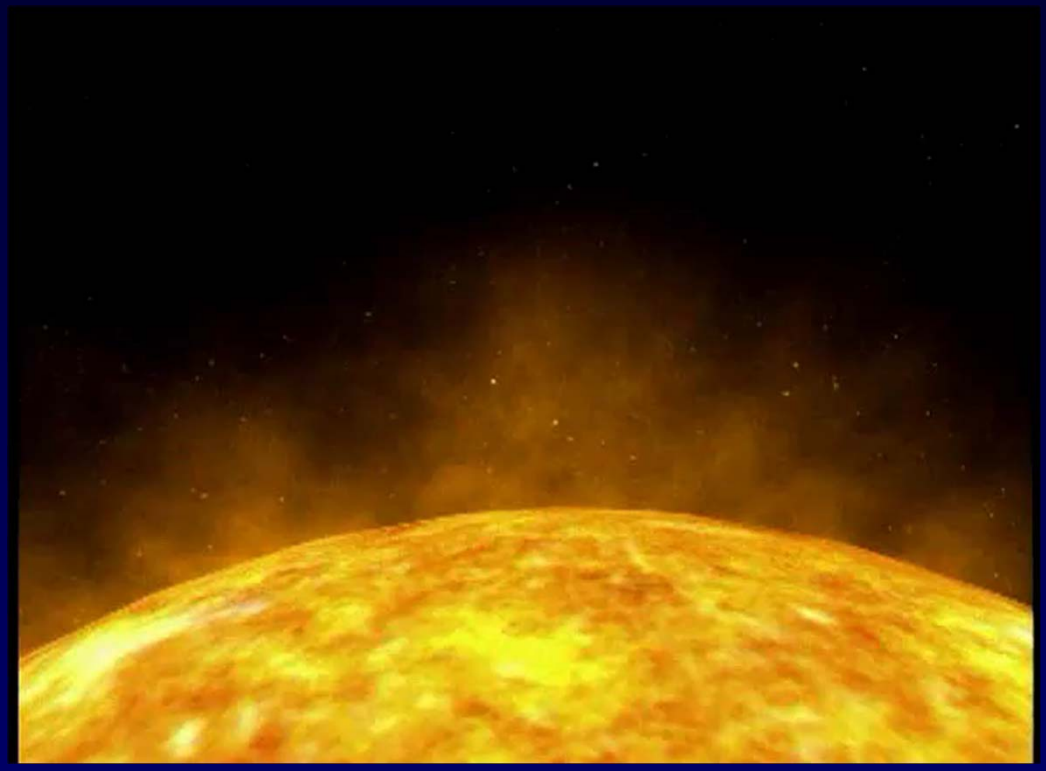
Mouschovias & Poland, 1978, ApJ 220, 675
Anzer & Pneuman, 1982, SPh 79, 1
Chen, J. 1989, ApJ 338, 453
Vrsnak, B. 1990, SPh 129, 295
Chen, J., Krall, J.: 2003, JGR 108, 1410
....

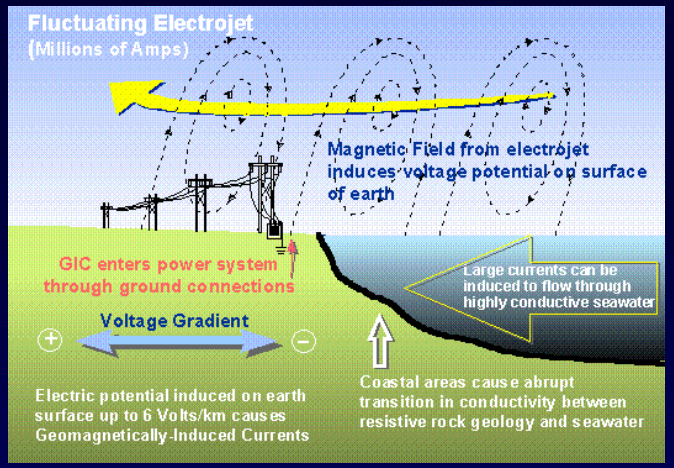


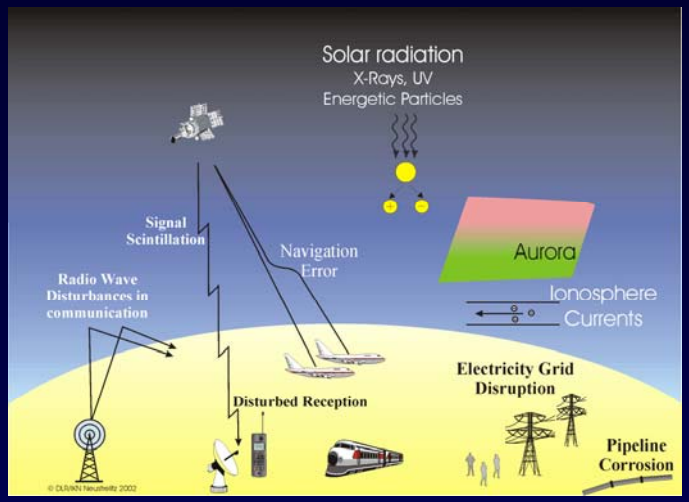
"Drag-based model"

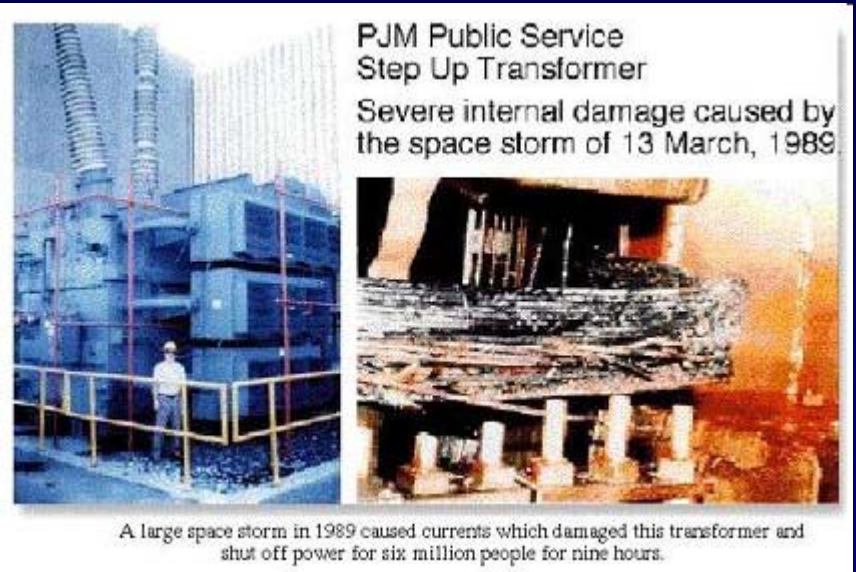


Utjecaja Sunčeve aktivnosti na Zemlju



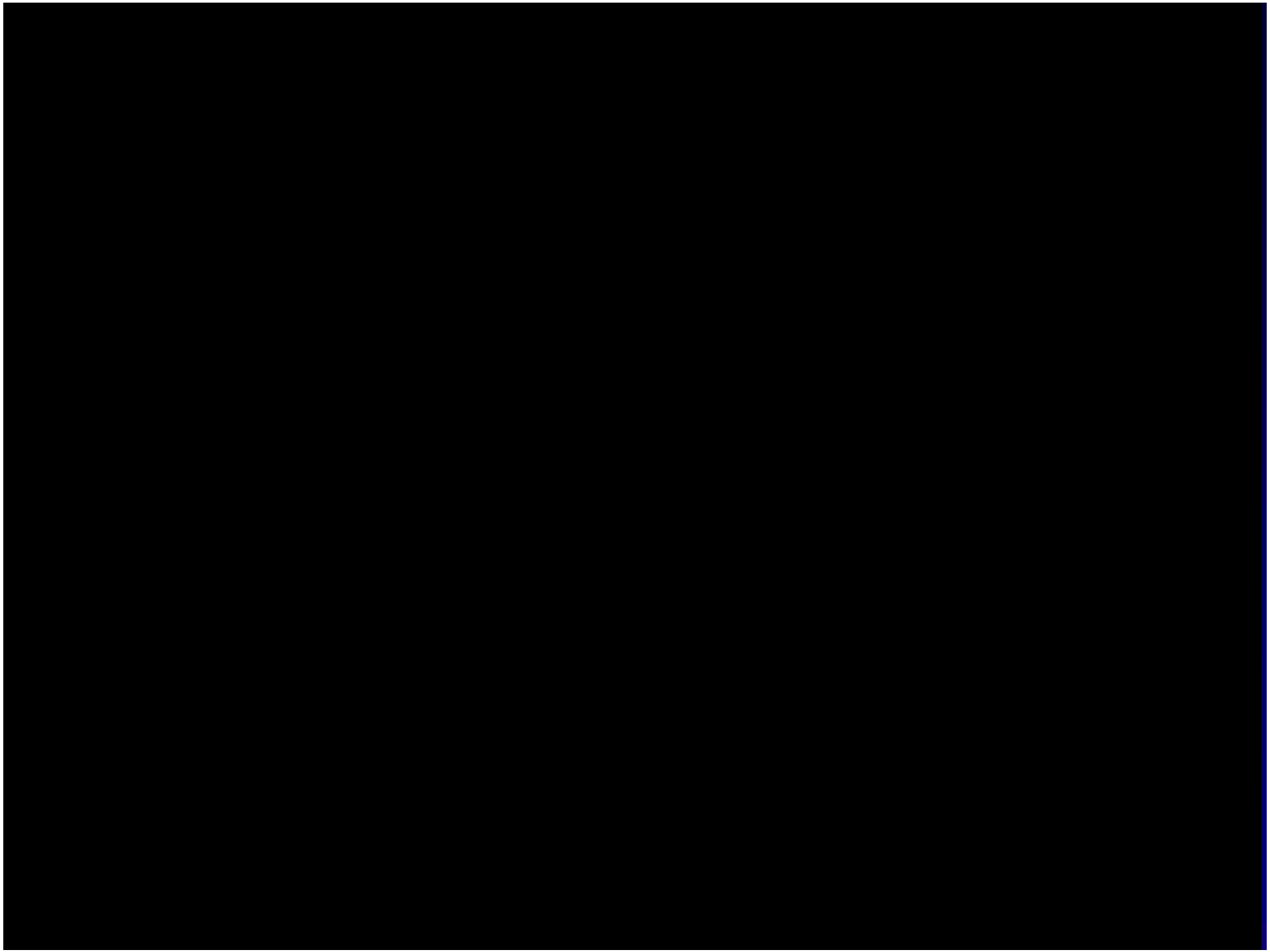




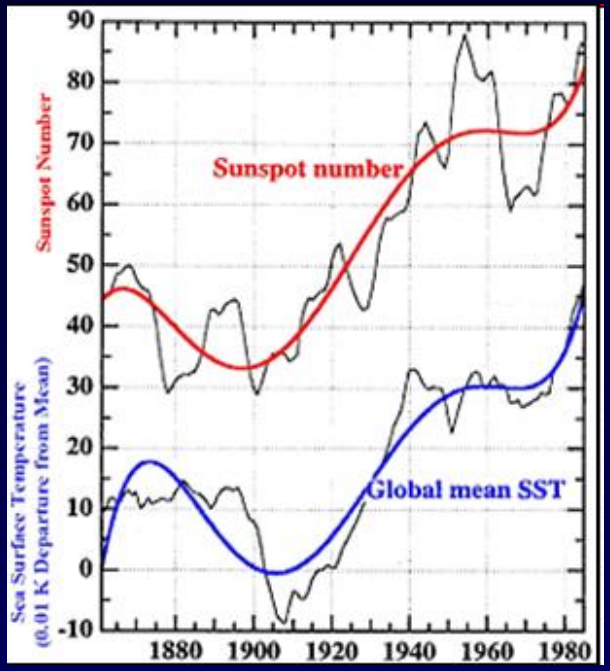


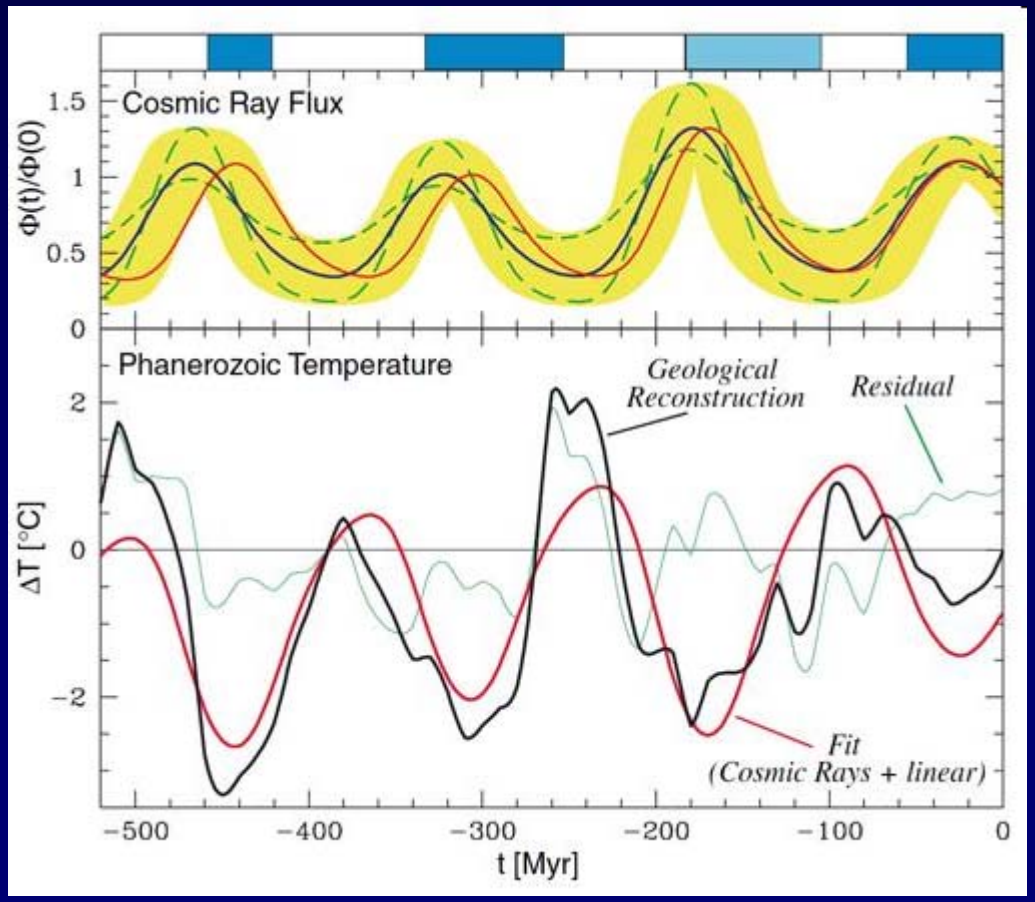
Polarna svjetlost u Slavoniji, s nimio M. Karakaš, 20. studenog 2003.

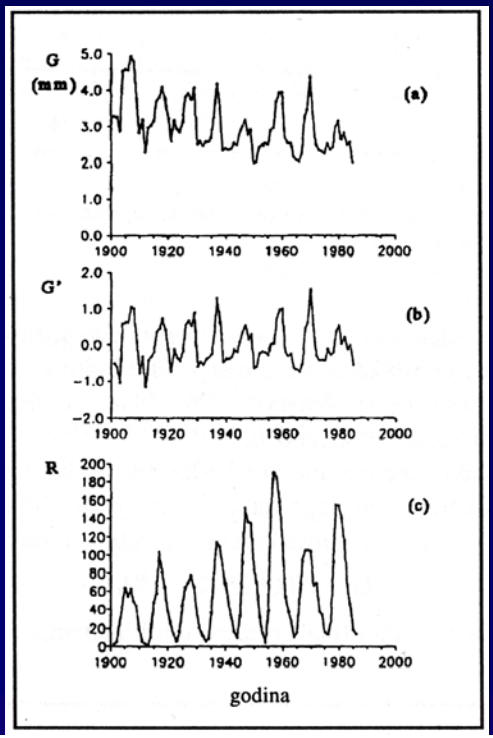
HVALA NA PAŽNJI !

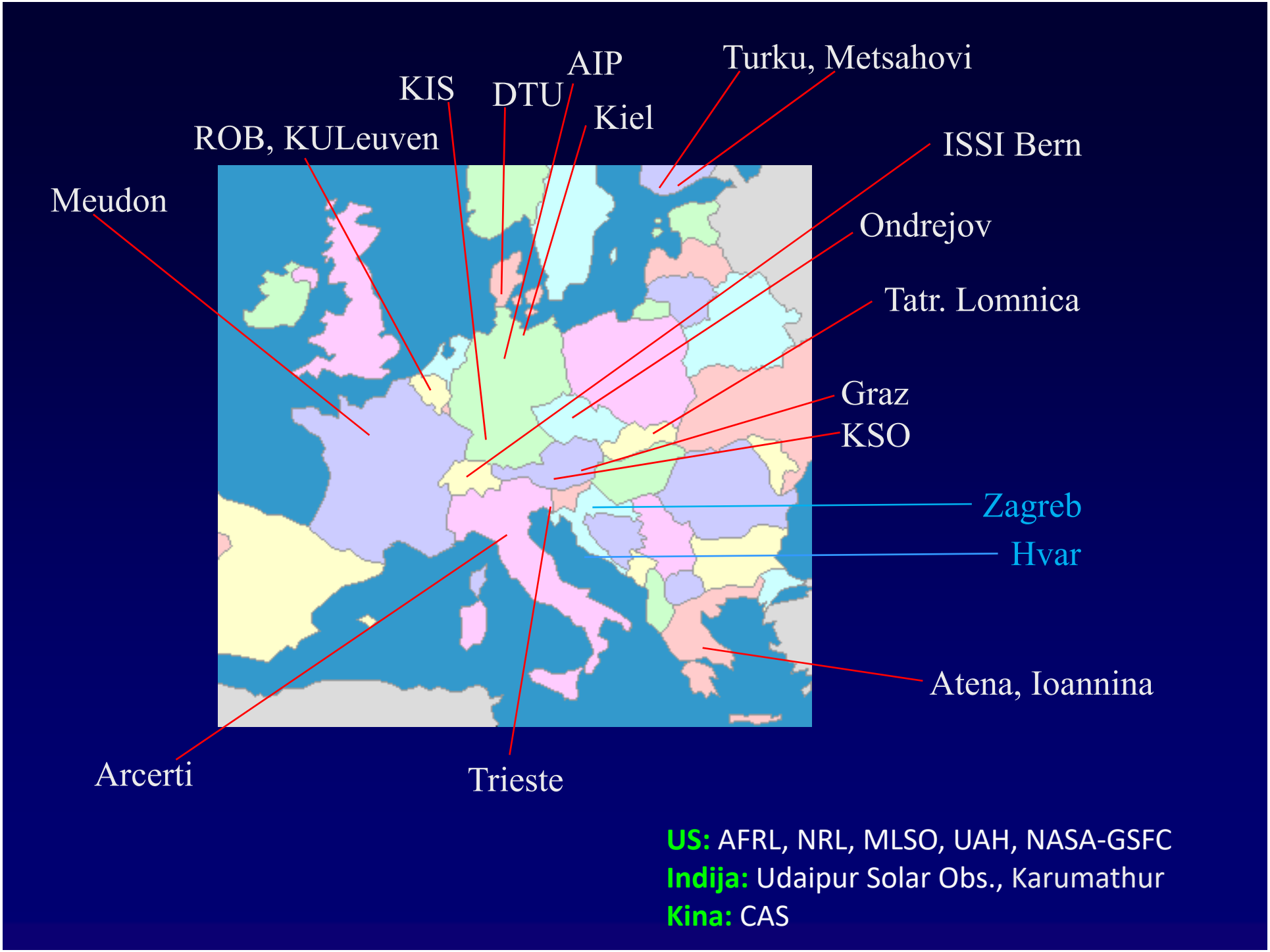


Utjecaj Sunčeve aktivnosti na klimu








AIP
Turku, Metsahovi
KIS
DTU
Kiel
ROB, KULeuven
ISSI Bern
Meudon
Ondrejov
Tatr. Lomnica
Graz
KSO
Zagreb
Hvar
Atena, Ioannina
Arcerti
Trieste
US: AFRL, NRL, MLSO, UAH, NASA-GSFC
Indija: Udaipur Solar Obs., Karumathur
Kina: CAS





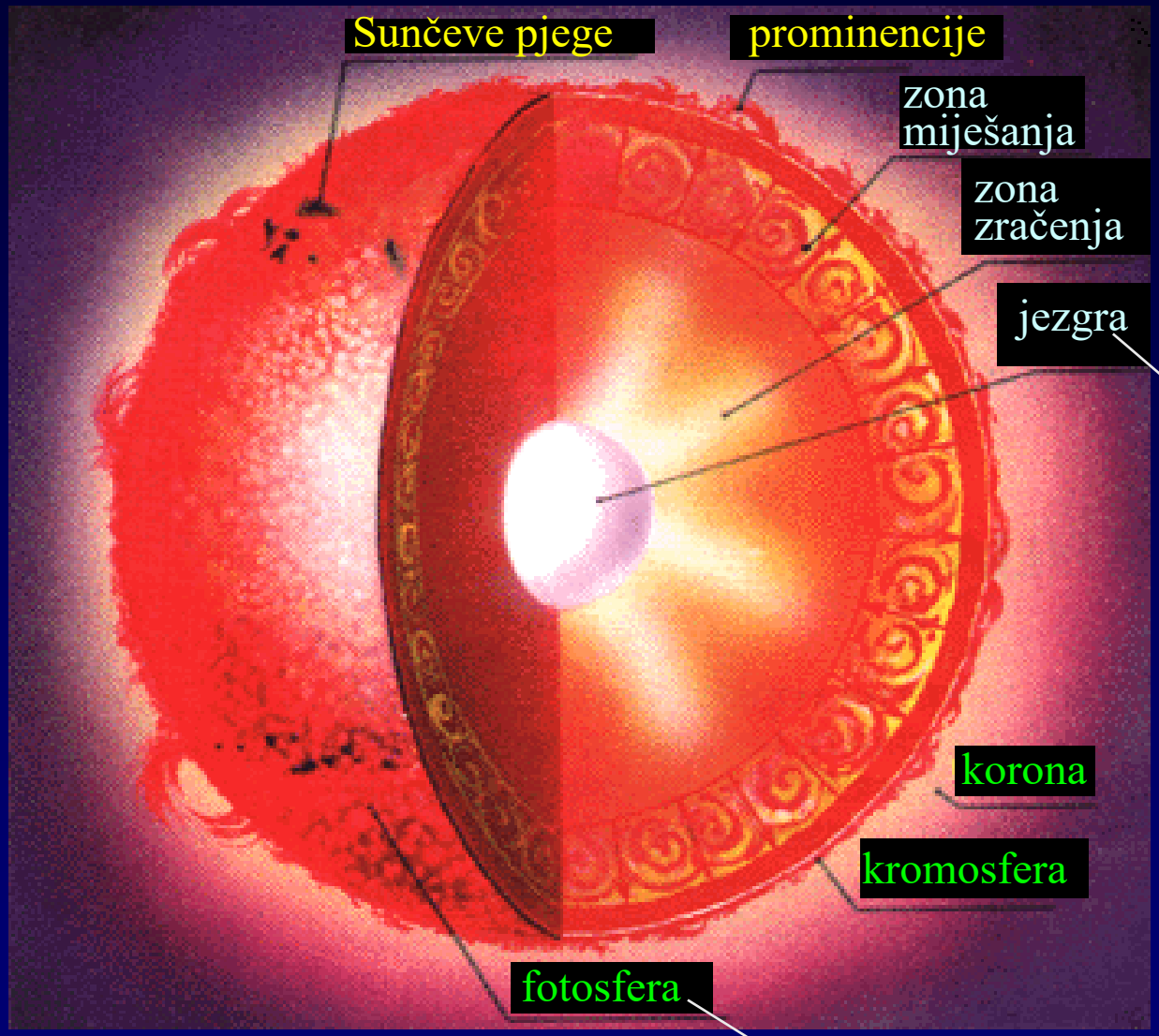








Struktura Sunca



91% = vodik
9% = helij
ostalo = 0.1%

15 milijuna K
gustoća =150xH_2O
(1 L = 150 kg)

4H -> He
(600 milijuna tona / s)

Sunce = zvijezda