

# COSIS: em busca do passado do SOL ... na ajuda ao futuro

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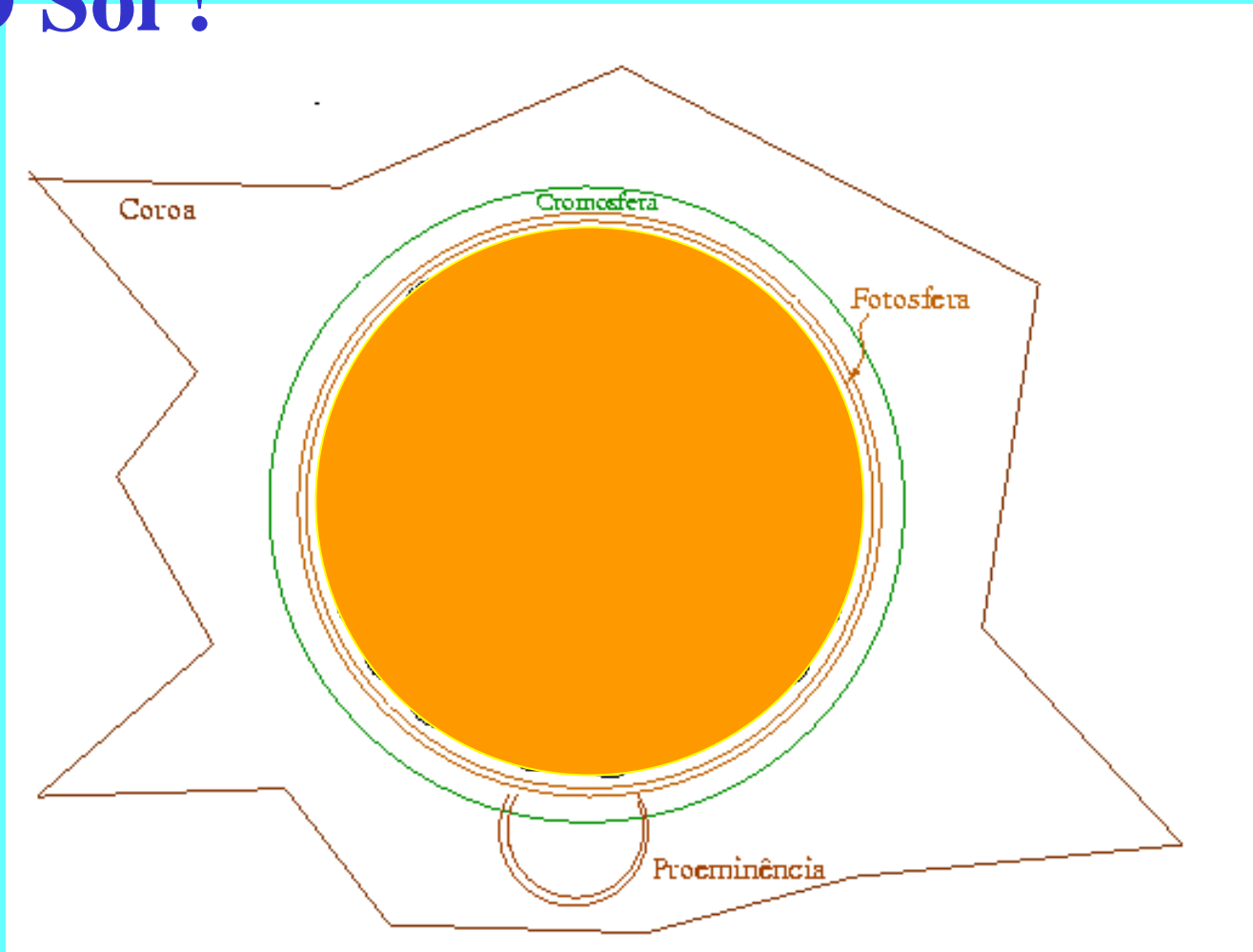


## RESUMO

- O personagem principal: o SOL
- A história recente do Sol: a matéria prima
- COSIS: um projecto interdisciplinar
  - E depois ?



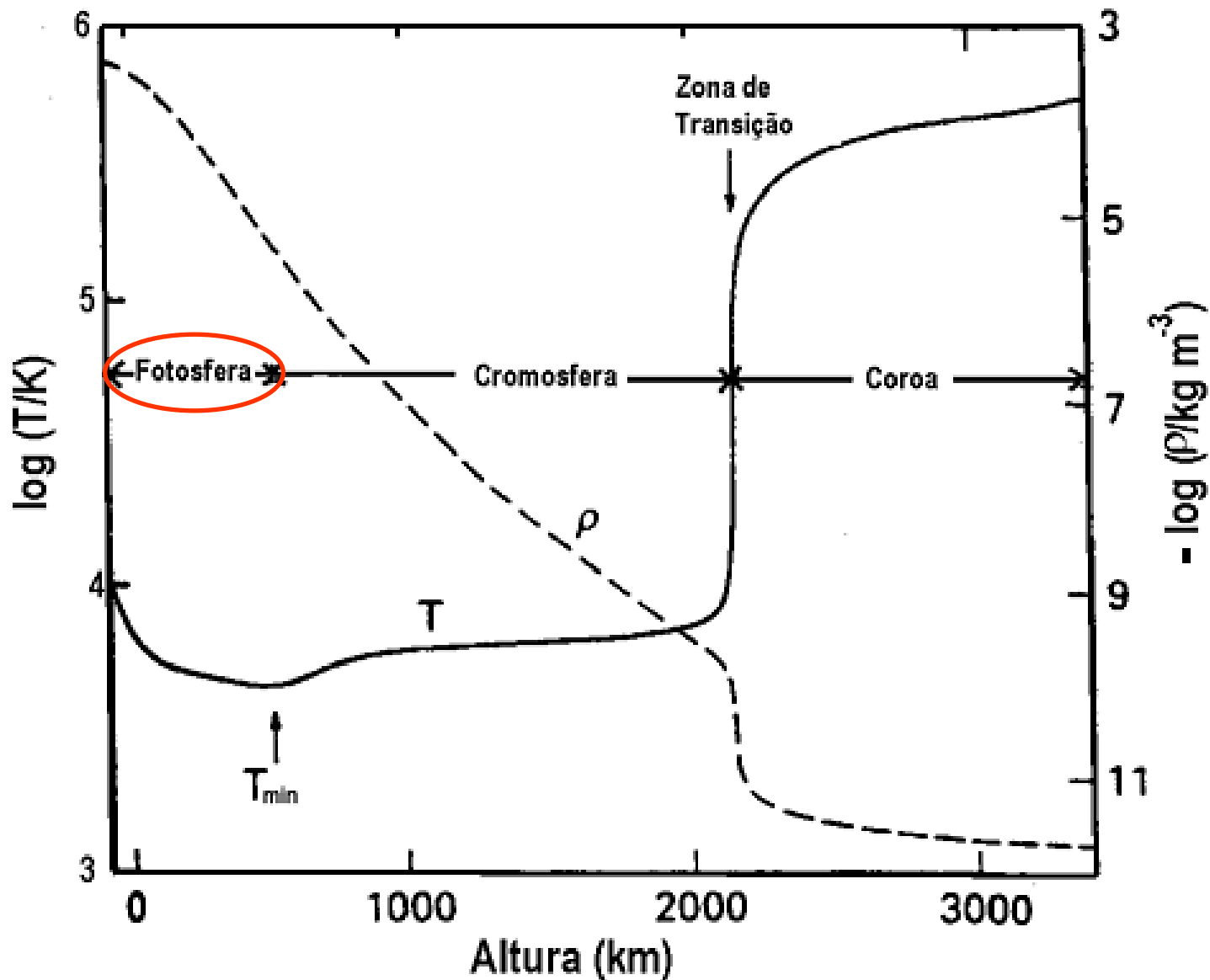
# O Sol !



Crédito: Kepler et al.

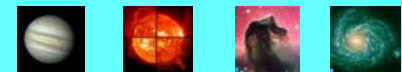
O reino do campo magnético



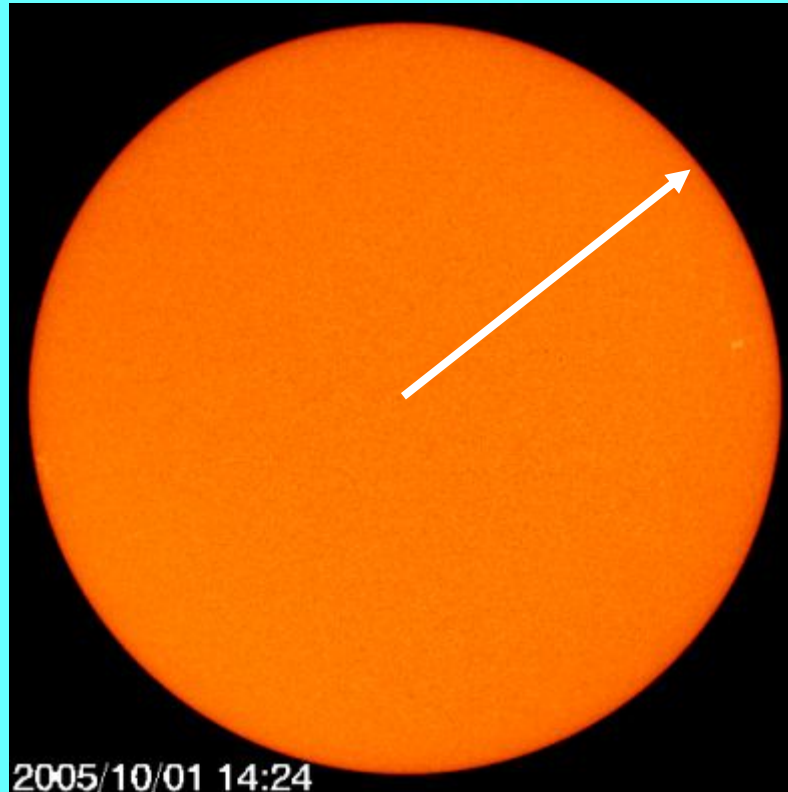


km

1



# A Fotosfera



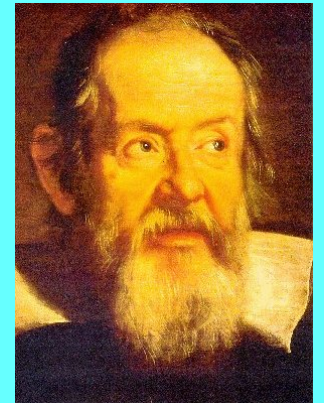
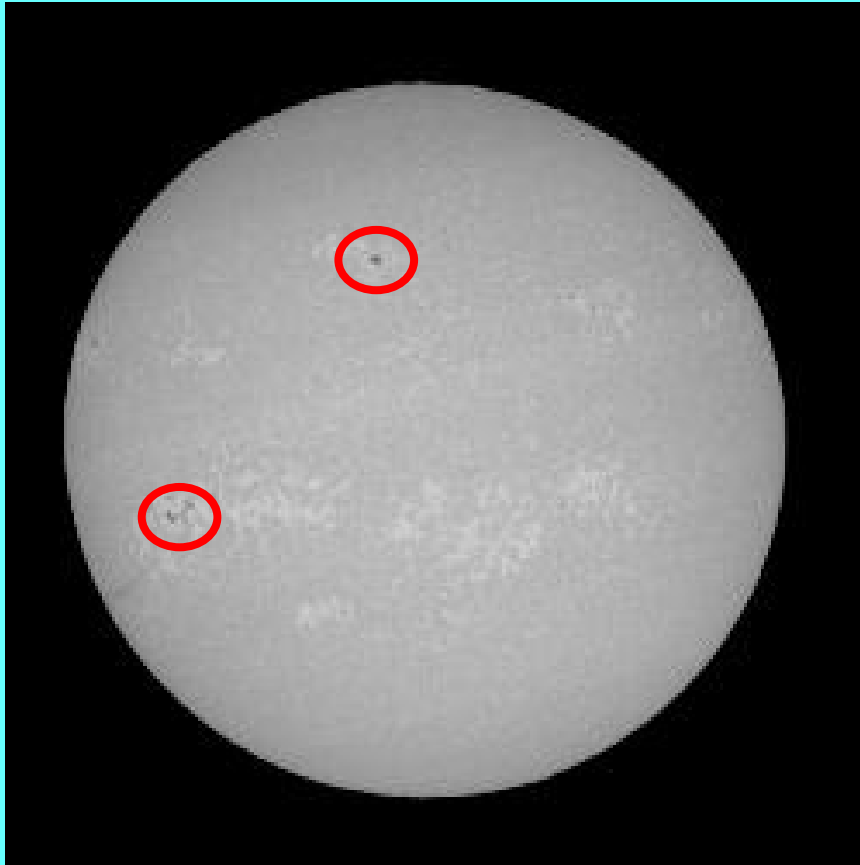
Raio = 690 000 km



Crédito: SOHO/NASA



# A Fotosfera

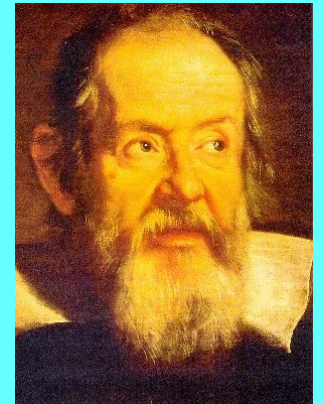
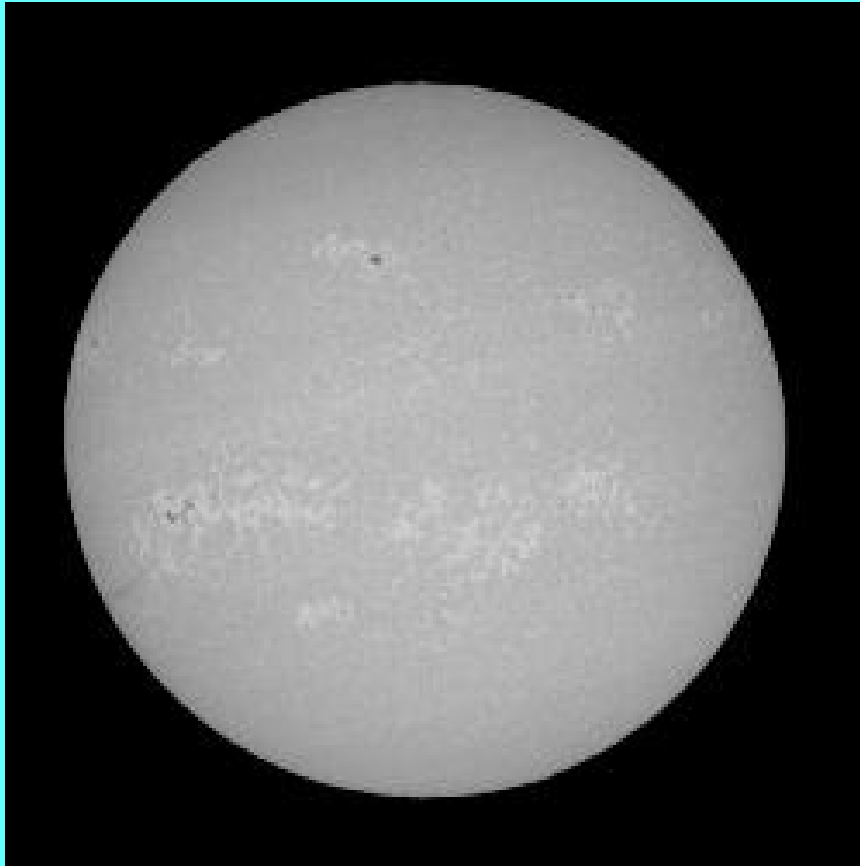


Manchas solares

Crédito: Garcia  
(OAUC)



# A Fotosfera



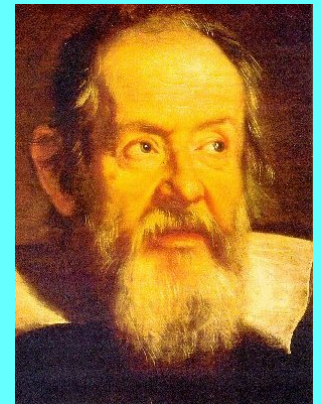
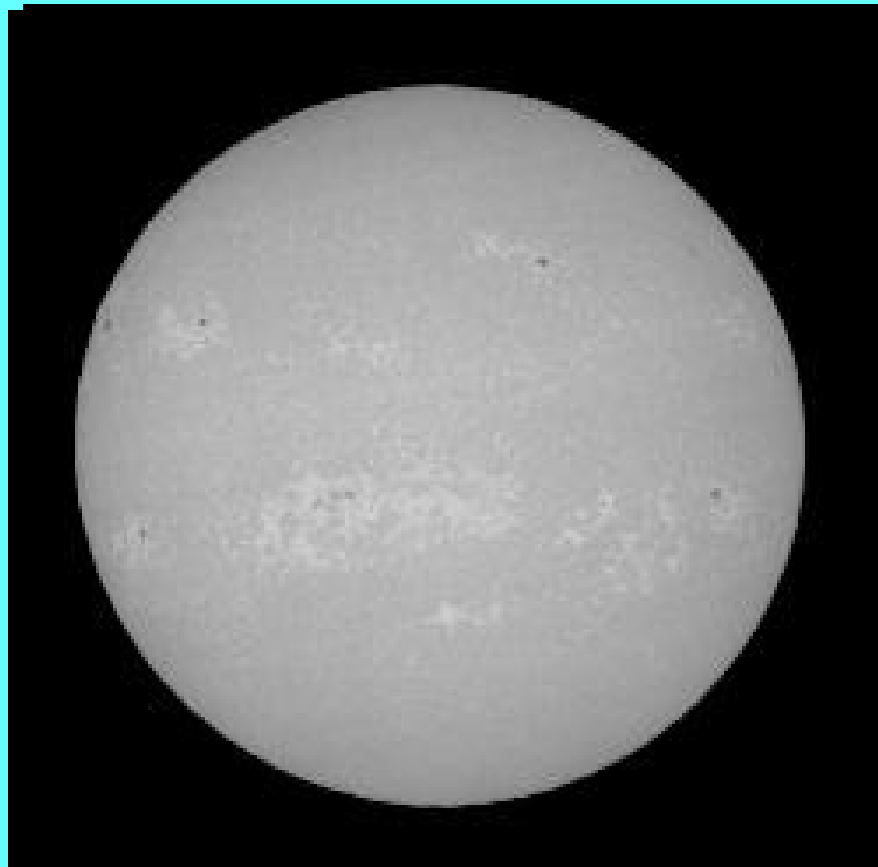
12 Jan 2000

Crédito: Garcia  
(OAUC)

Manchas solares



# A Fotosfera



14 Jan 2000

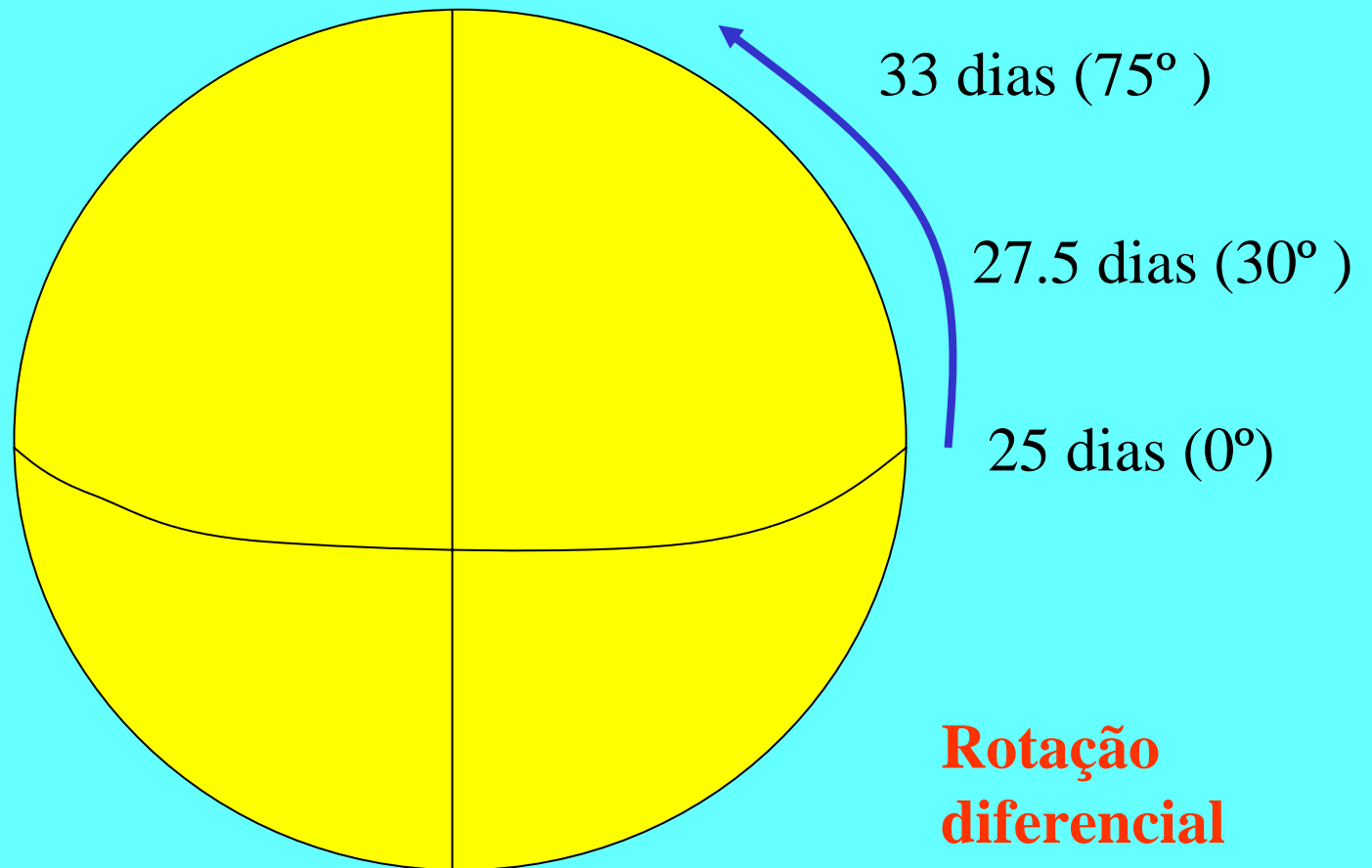
Crédito: Garcia  
(OAUC)

Manchas solares

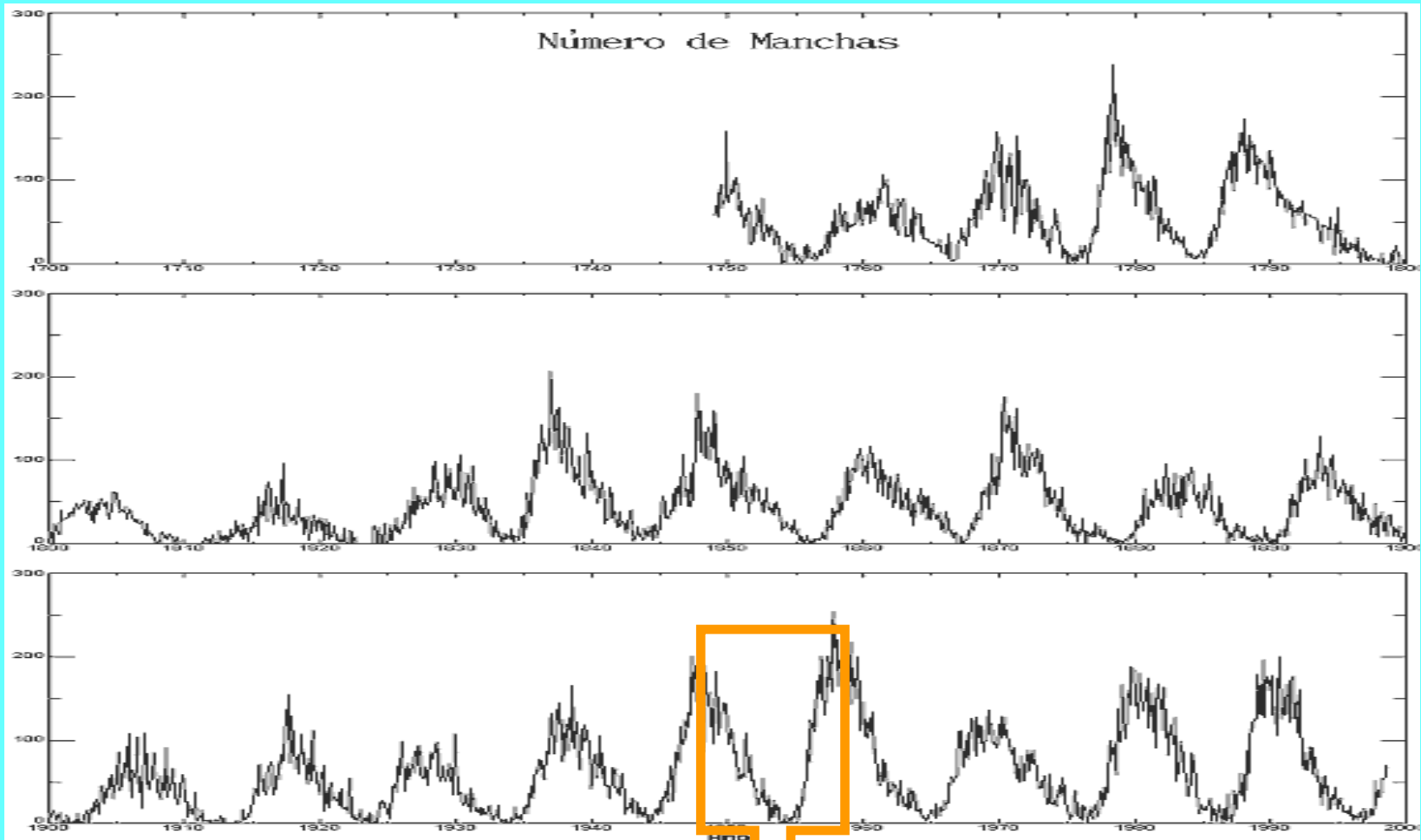




# A Fotosfera



# A Fotosfera

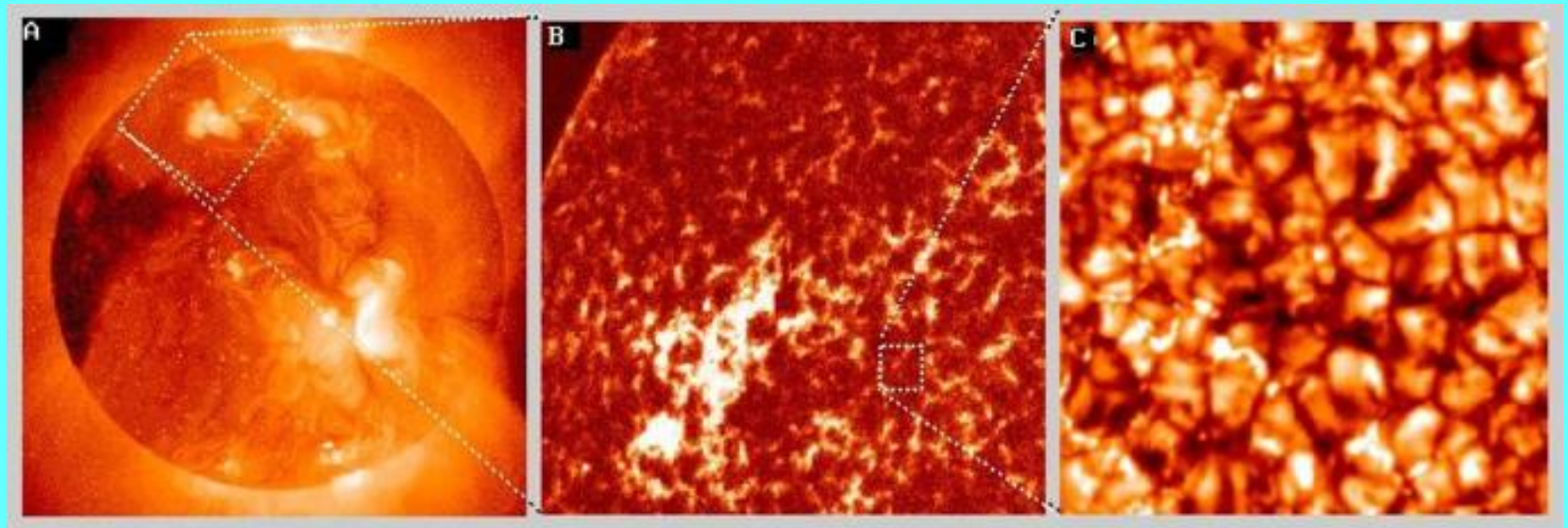


Crédito: Kepler et al.

11 anos

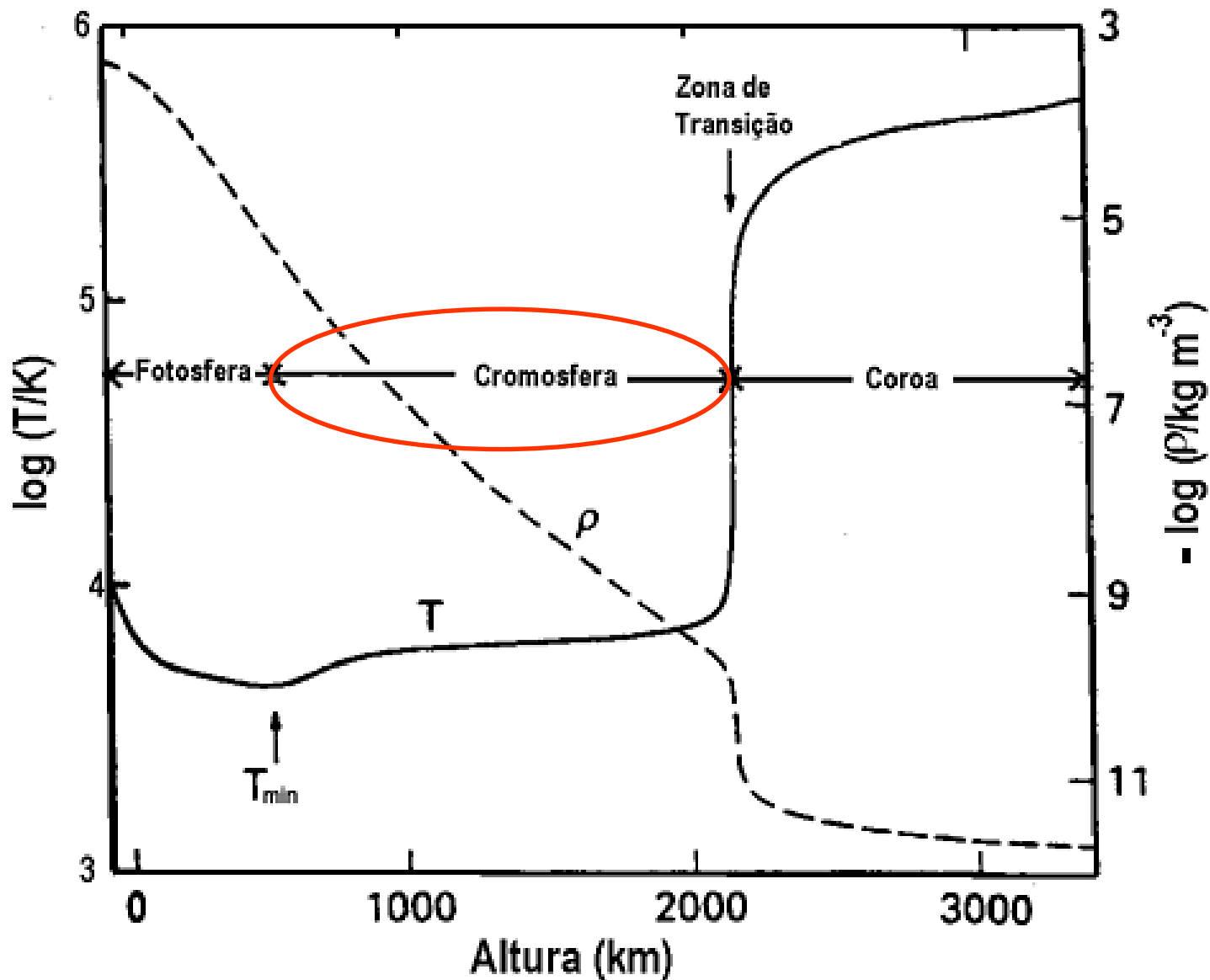


# A Fotosfera



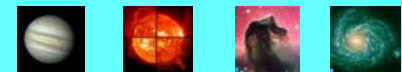
Crédito: Kepler et al.



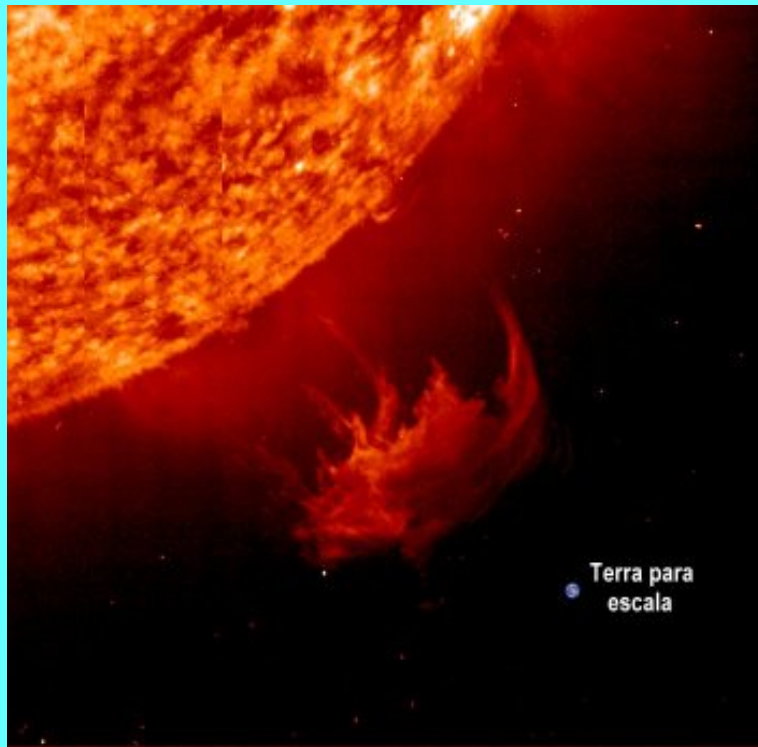


km

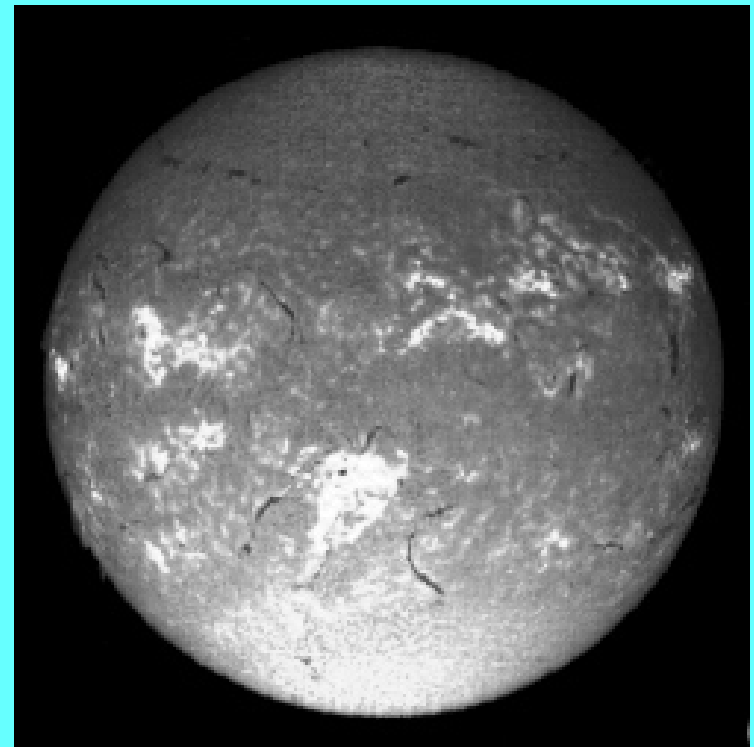
m



# A Cromosfera



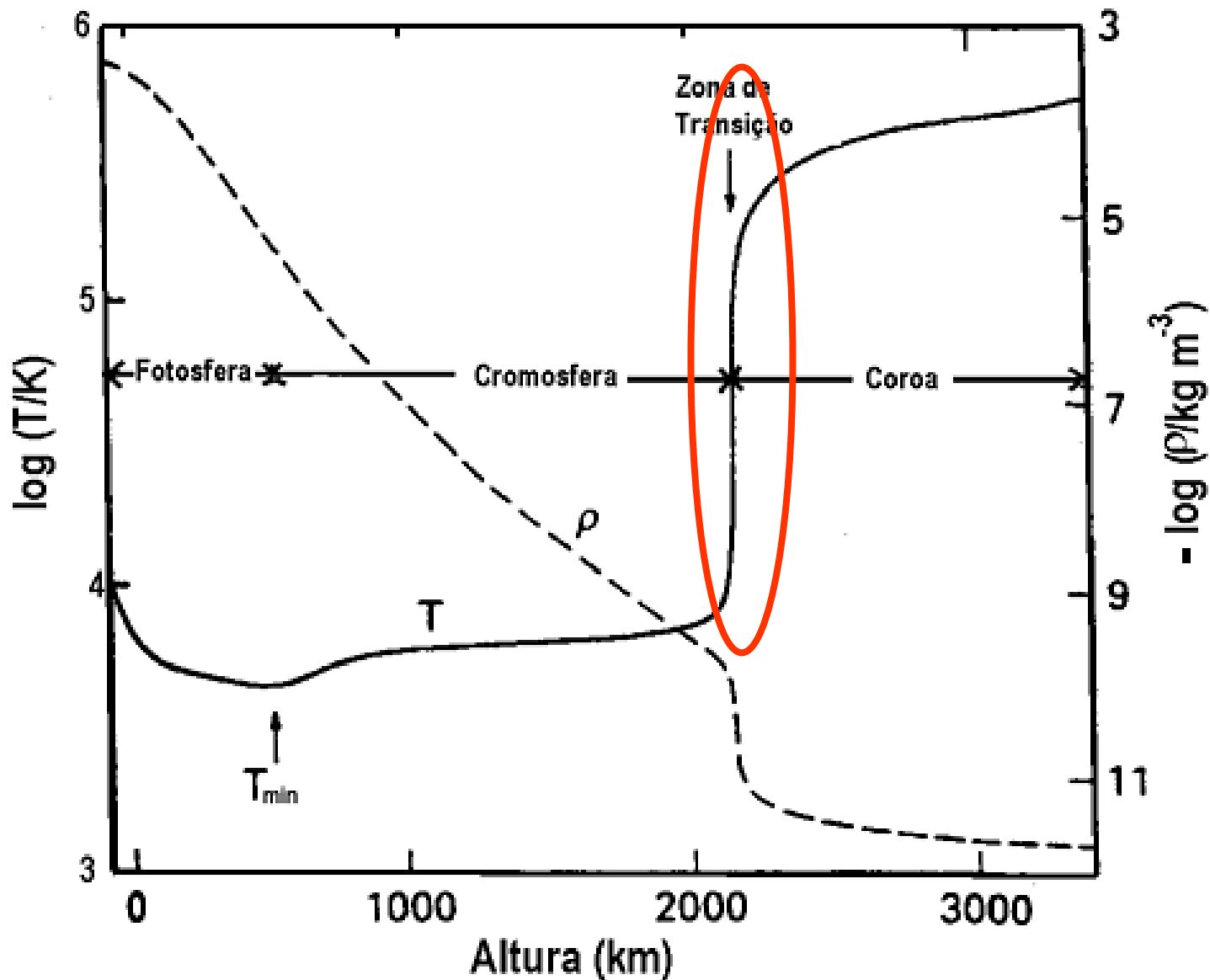
Crédito: NASA



19 Set 2000

Crédito: Garcia  
(OAUC)





km

km



# A Coroa

$T \sim 2000000 \text{ } ^\circ\text{C}$

100000 km



$T \sim 40000 \text{ } ^\circ\text{C}$

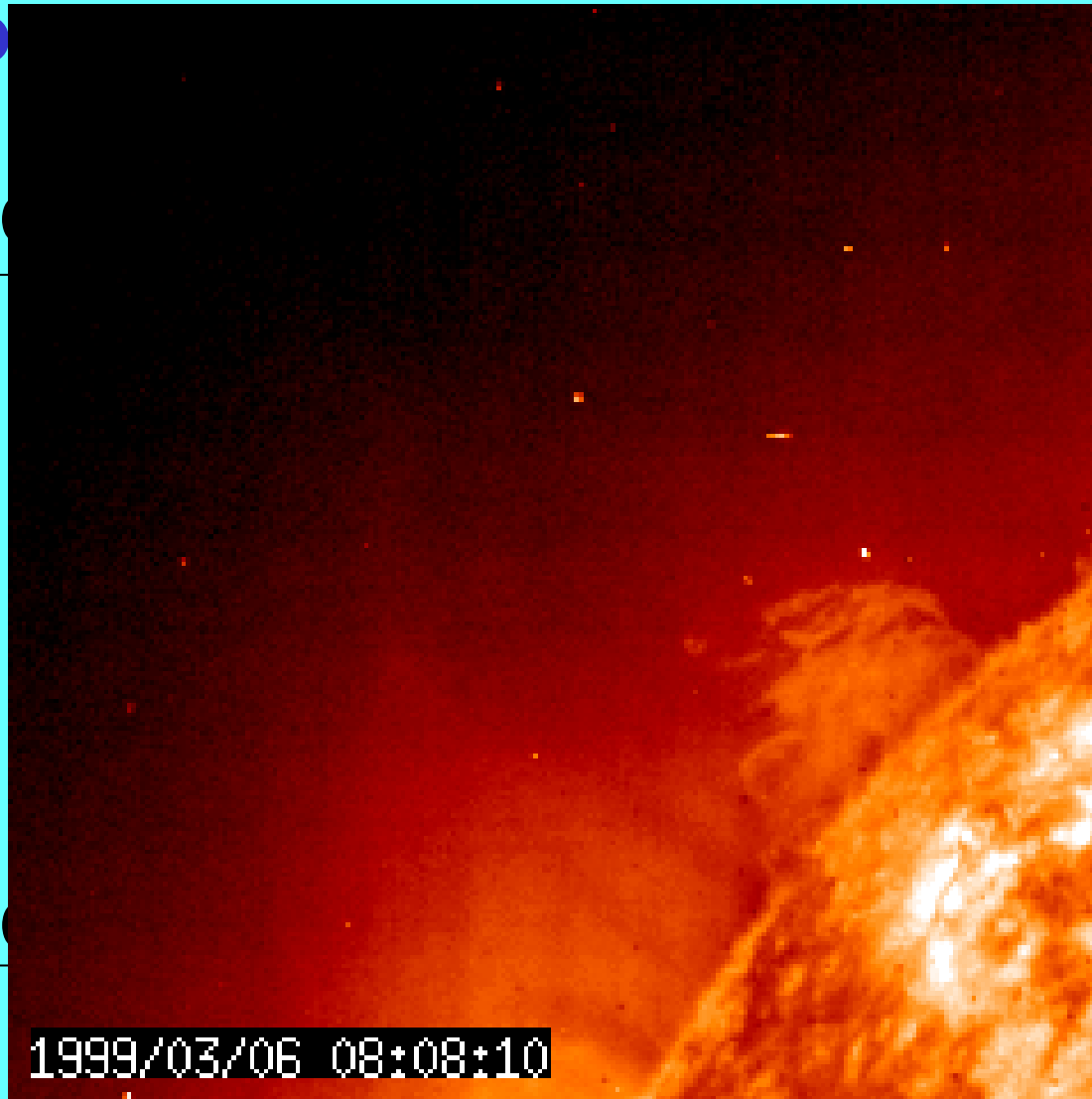
2000 km



# A Co

T ~ 200

T ~ 400



100000 km

2000 km

1999/03/06 08:08:10





# A Coroa

$T \sim 1000000 \text{ } ^\circ\text{C}$

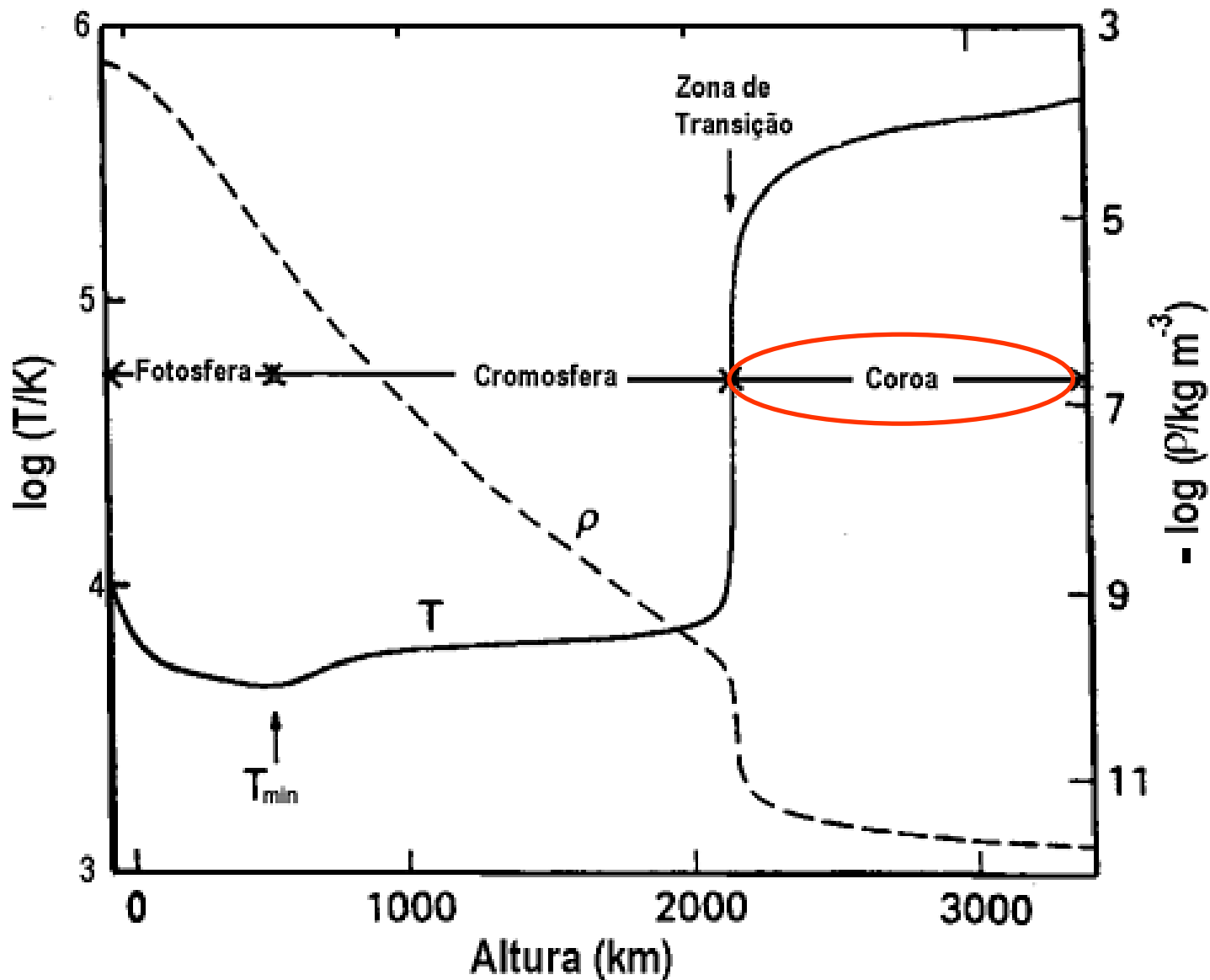
100000 km



$T \sim 4000 \text{ } ^\circ\text{C}$

2000 km





km

km

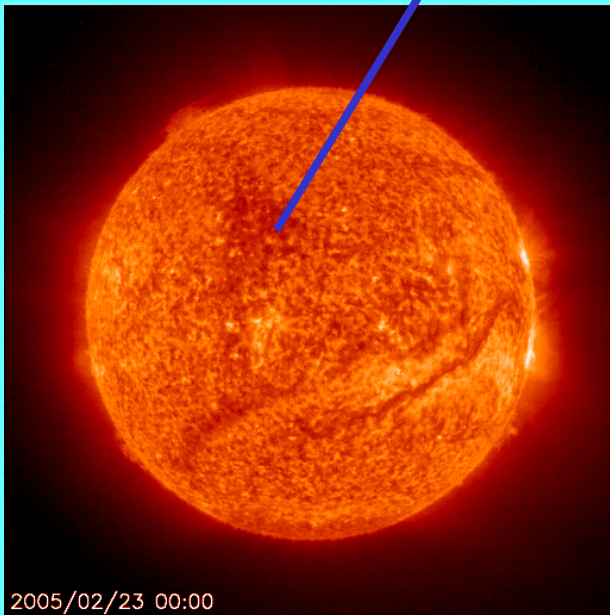
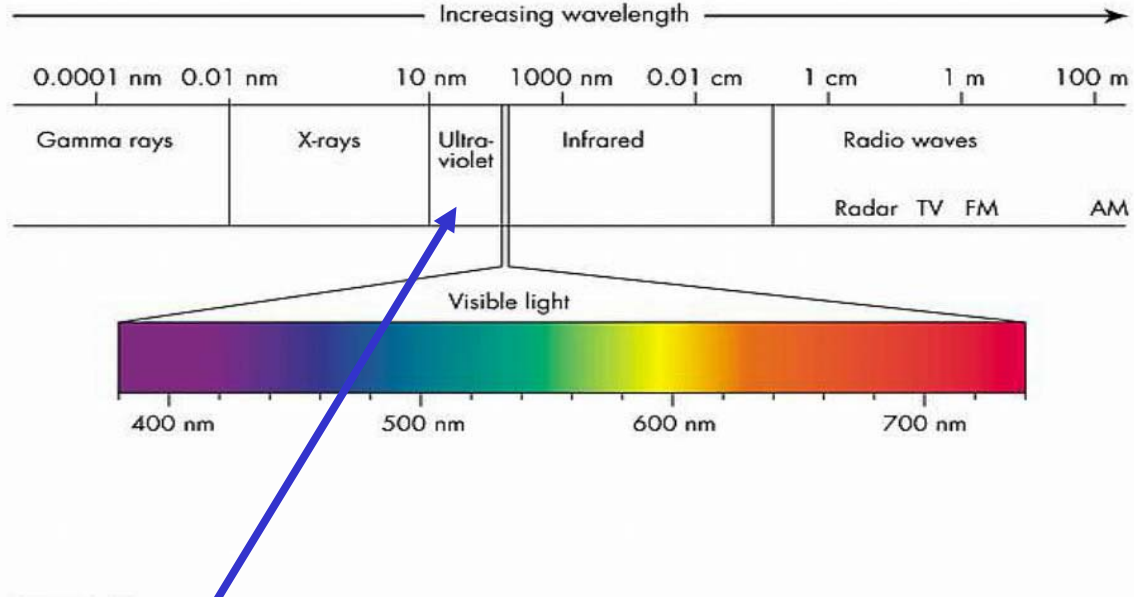
Crédito: Kepler et al.



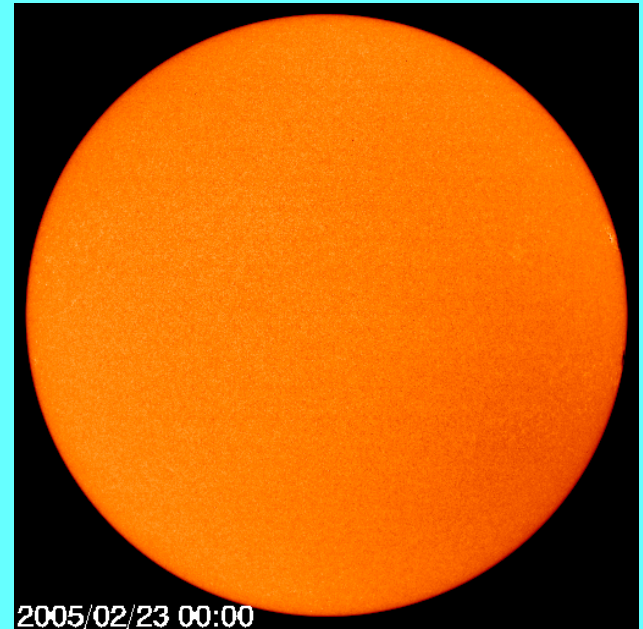
# O Sol às cores



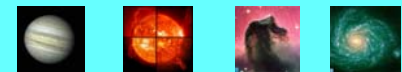
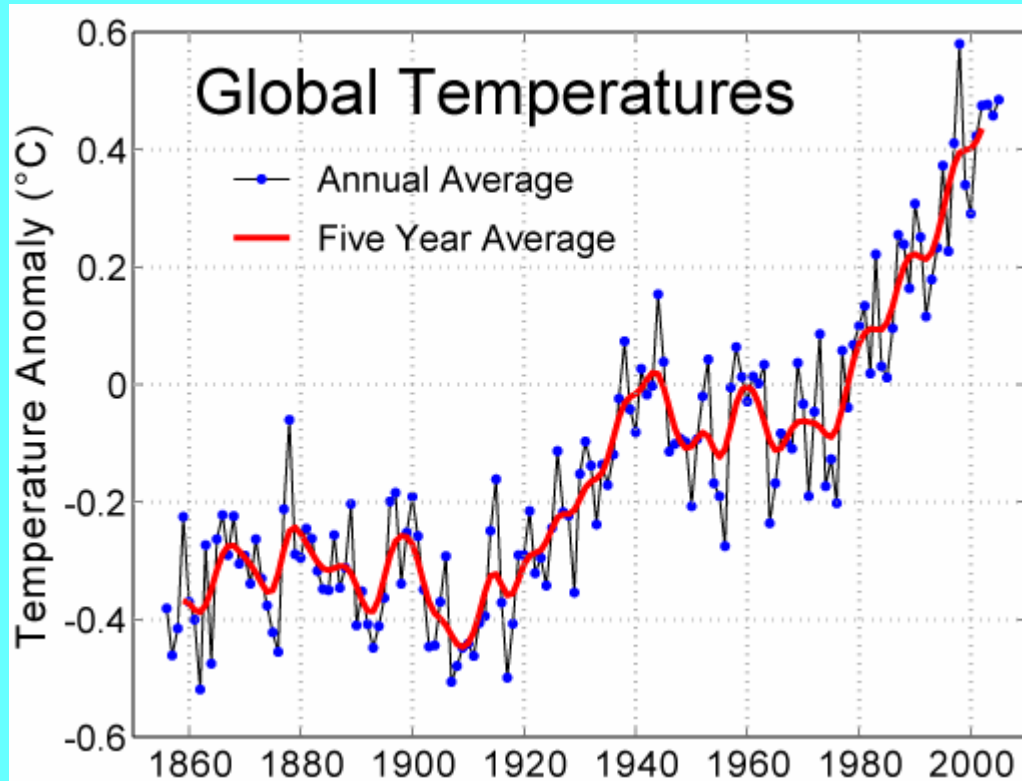
O Sc



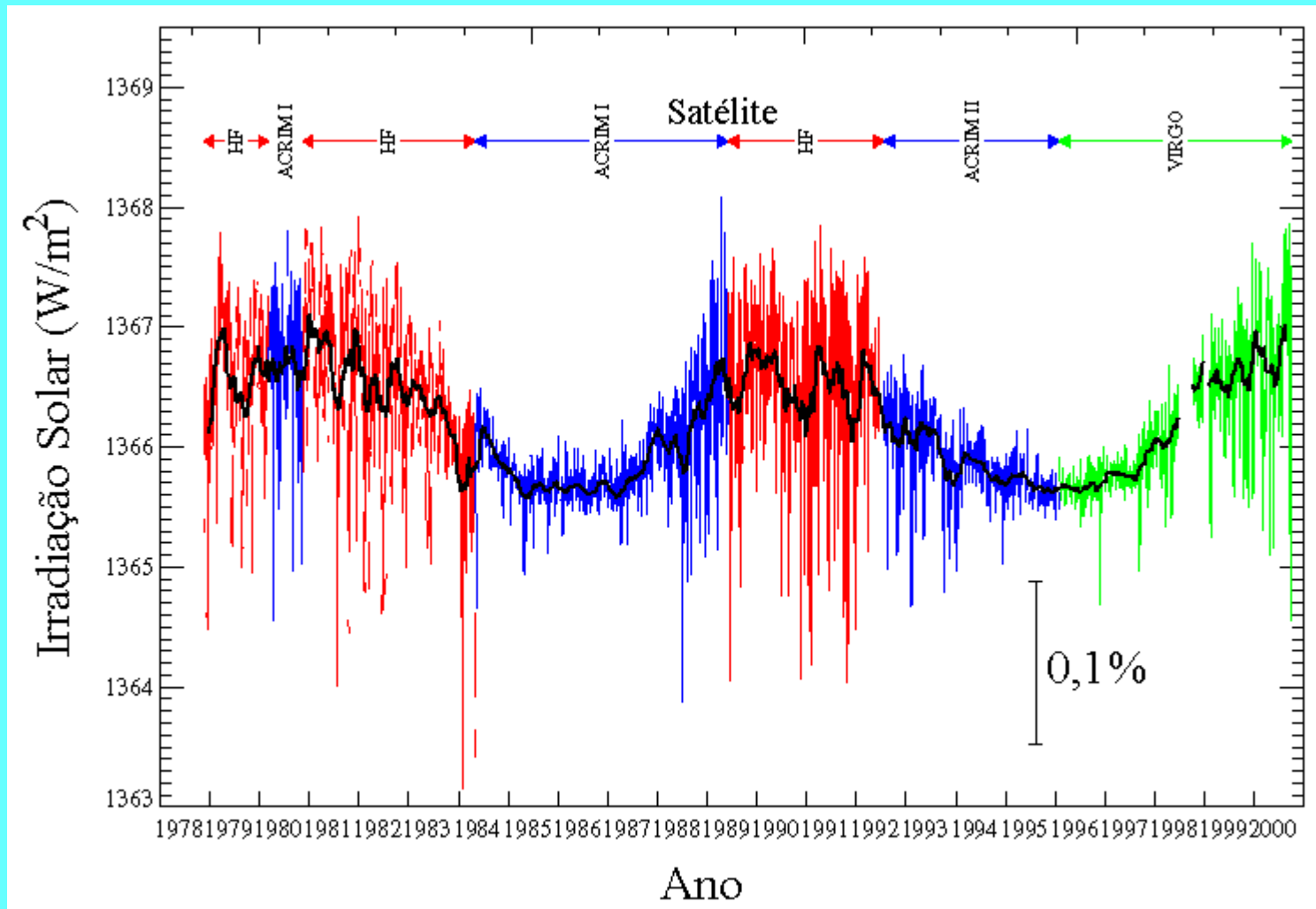
ESA/SOHO



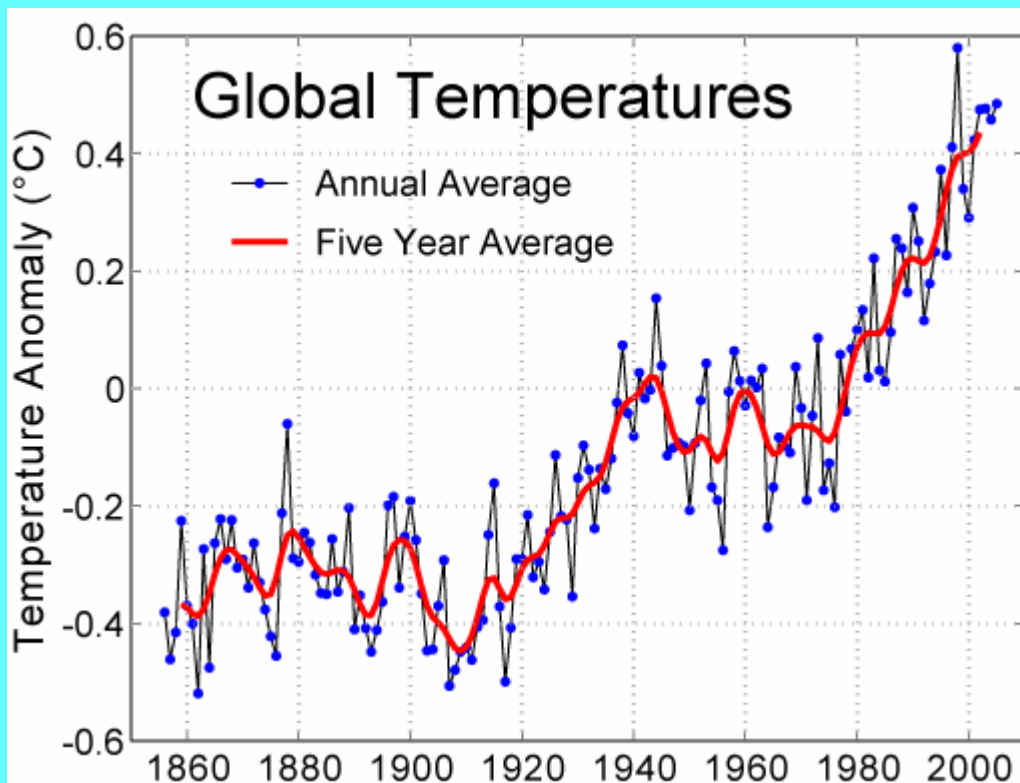
# E a Terra ?



# E a Terra ?



# E a Terra ?

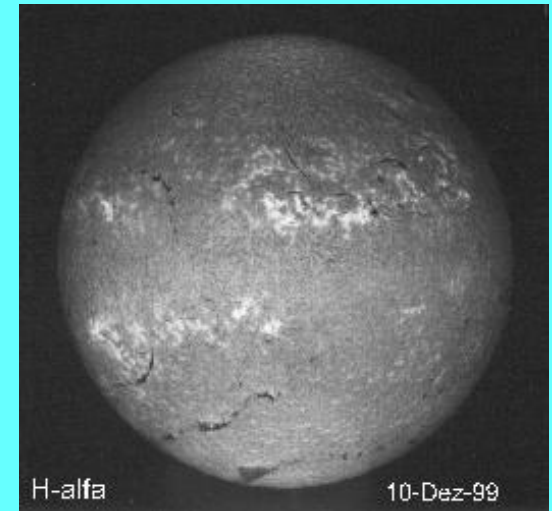
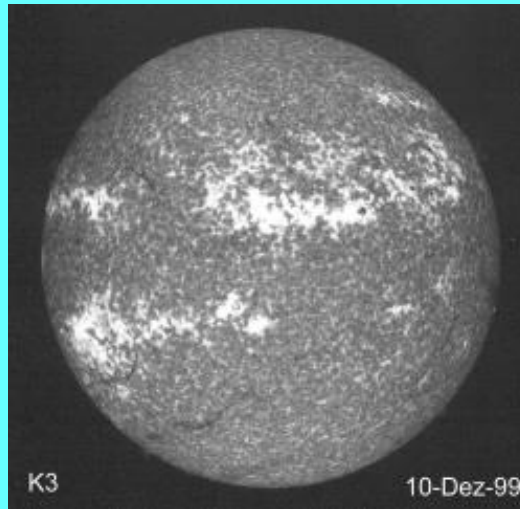
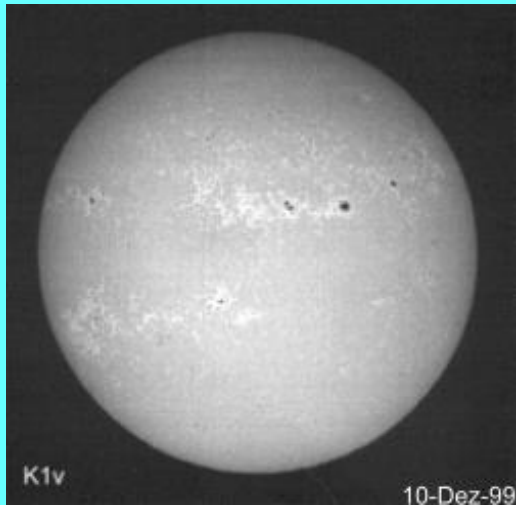


**A contribuição do Sol para o problema do aquecimento global da Terra**

(3 de Março 2007 – Semana Cultural)



# A matéria prima !



Crédito: Garcia (OAUC)



30000 imagens  
deste 1926





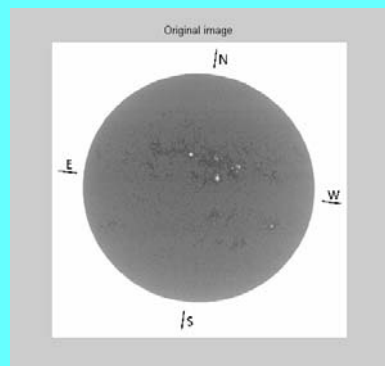
# A base de dados !

<http://tangerine.mat.uc.pt/novo/observatorio/site/index.html>

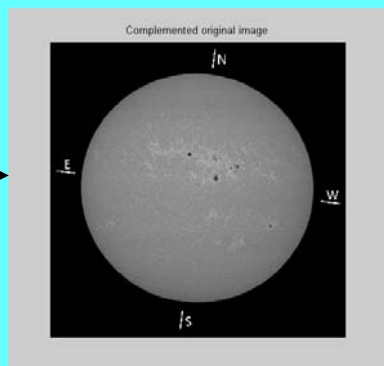


# Coimbra Solar Information System

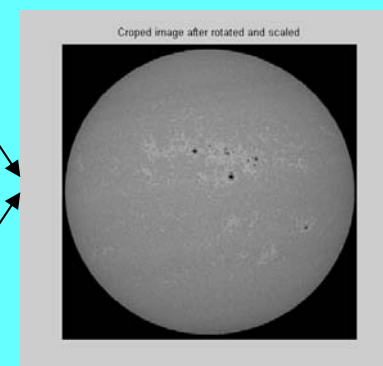
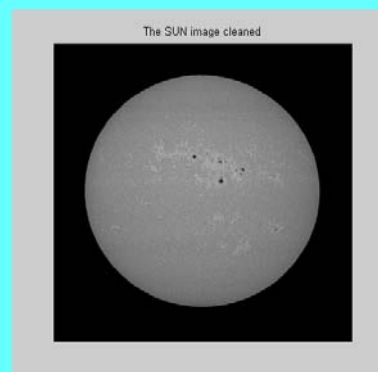
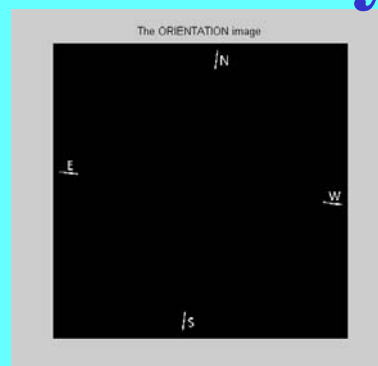
Exemplo para detecção



Negativo

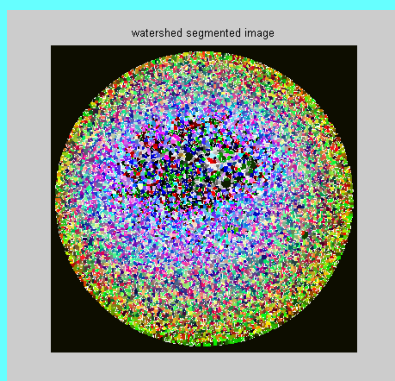


Positivo

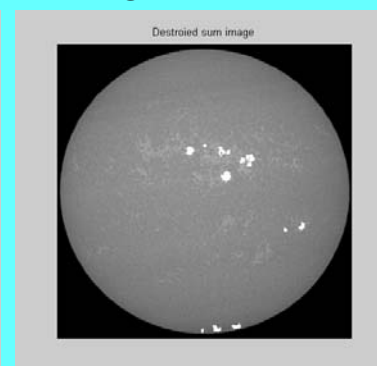


Centragem, rodada e normalizada

Separação: eixos imagem

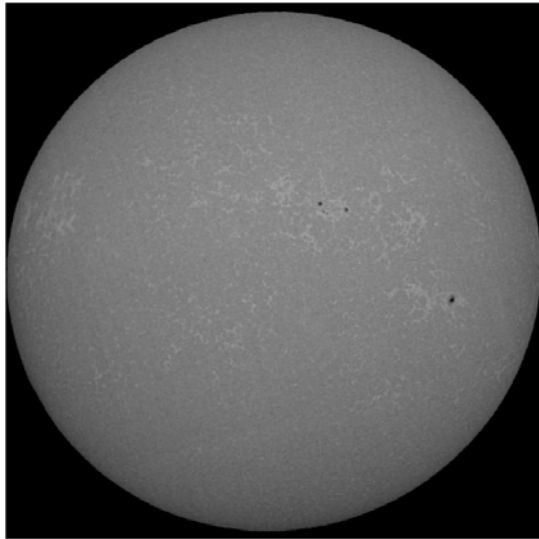


“Watershed segmentation”

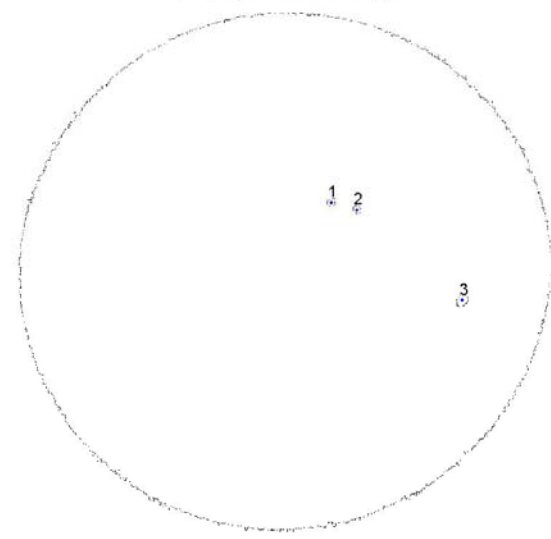


Detecção de grupos de manchas

Original Image



Sunspots plus Centroids Image



02-06-1981

# Interface COSIS/Página WEB

Cosis . Coimbra Observatory Solar Information System

About

Initial Date:

dd-mm-yyyy or dd/mm/yyyy

Initial Hour:

UT

End Date:

dd-mm-yyyy or dd/mm/yyyy

End Hour:

UT

Number of sunspots:

X coordinates:

Image Area Selection

Y coordinates:

Image Area Selection

Area of sunspot:

Default Pixels



from

to

from

to

from

to

from

to

Pixels

\*Millionths of the solar hemisphere

Reset

Search

OBSERVATÓRIO ASTRONÓMICO  
DA UNIVERSIDADE DE COIMBRA

CA<sup>3</sup>

Soft Computing and Autonomous Agents

Sponsored By:



A finalizar em Dezembro de 2006

# Coimbra Solar Information System

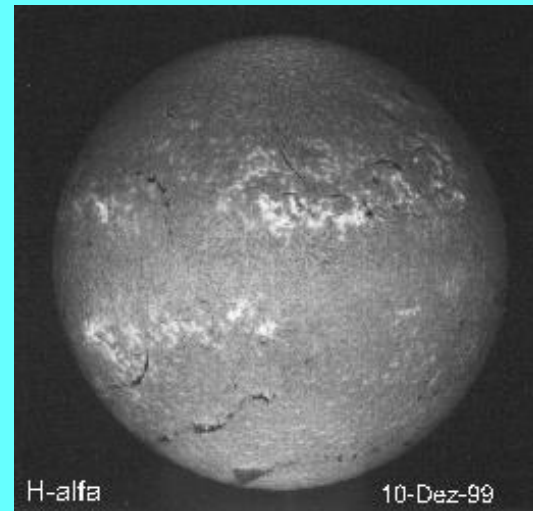
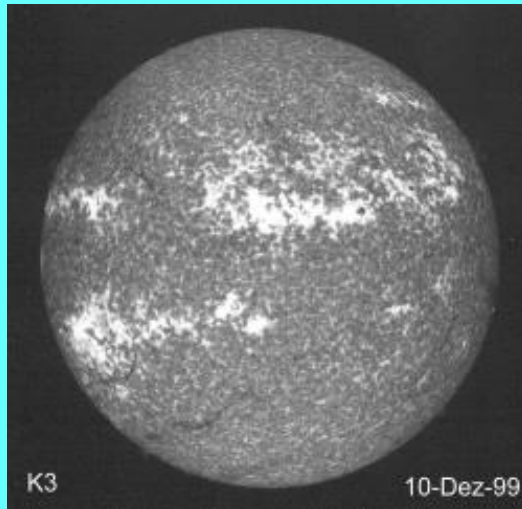
(POCI/CTE/-AST/58333/2004)

**Uma colaboração entre Observatório de Coimbra , Santa Clara, and UNINOVA-CA3, Campus FCT-UNL**

- João Fernandes, OAUC, Coimbra
- Rita Almeida Ribeiro, UNINOVA, Caparica
- José Manuel Fonseca, UNINOVA, Caparica
- Ivan Dorotovič, OAUC, Coimbra and UNINOVA, Caparica;  
SCO, Hurbanovo, Eslováquia

# COSIS: e depois ...

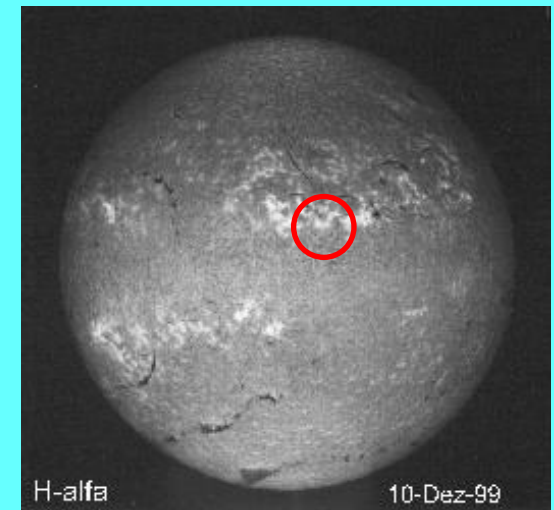
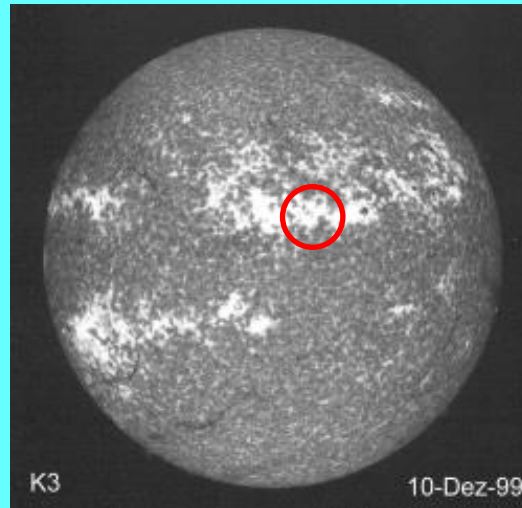
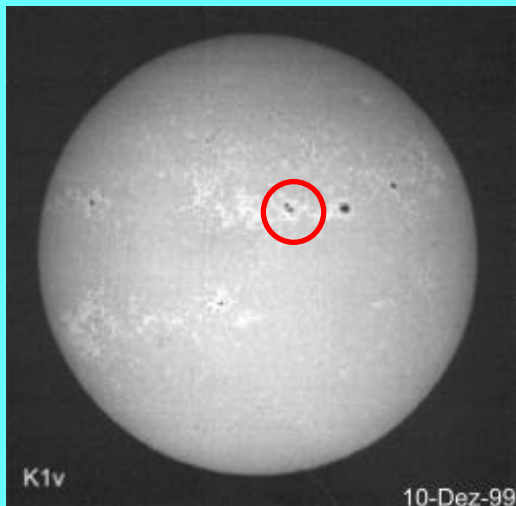
... + imagens (K3 e H-alpha)



... + outras bases de dados mundiais

- Observatório de Paris (Paris)
- Solar Web Browser (Bélgica)

# COSIS: e depois ... (o grande desafio !)



**SISTEMA DE INFORMAÇÃO ... HELIOGRÁFICA**

# Para saber mais ....

**Site oficial do COSIS**

[http://www2.uninova.pt/ca3/en/project\\_COSIS.htm](http://www2.uninova.pt/ca3/en/project_COSIS.htm)

**Reportagem no euronews**

**Física Solar, Universe**

**Para perguntas e interesse .... [jmfern@mat.uc.pt](mailto:jmfern@mat.uc.pt)**