Solar Physics

Counsel: Tuesday & Thursday 11:30 - 13:00

Office: Room 532 in Bldg. of the College of Applied Sciences

Homepage: //solardynamicslab.khu.ac.kr/~magara

Goals:

- Understand solar interior
- Understand solar convection
- Understand solar rotation
- Understand local magnetism (sunspot magnetic field)
- Understand global magnetism (solar magnetic cycle)

Lecture characteristics:

Theory: 80%, Practical Training: 20%

Instruction method:

Discussion, Presentation, Audi-visual Education

Evaluation method:

Mid-term Exam... 30%, Final Exam... 30%, Homework/Report... 30%, Attendance... 10%

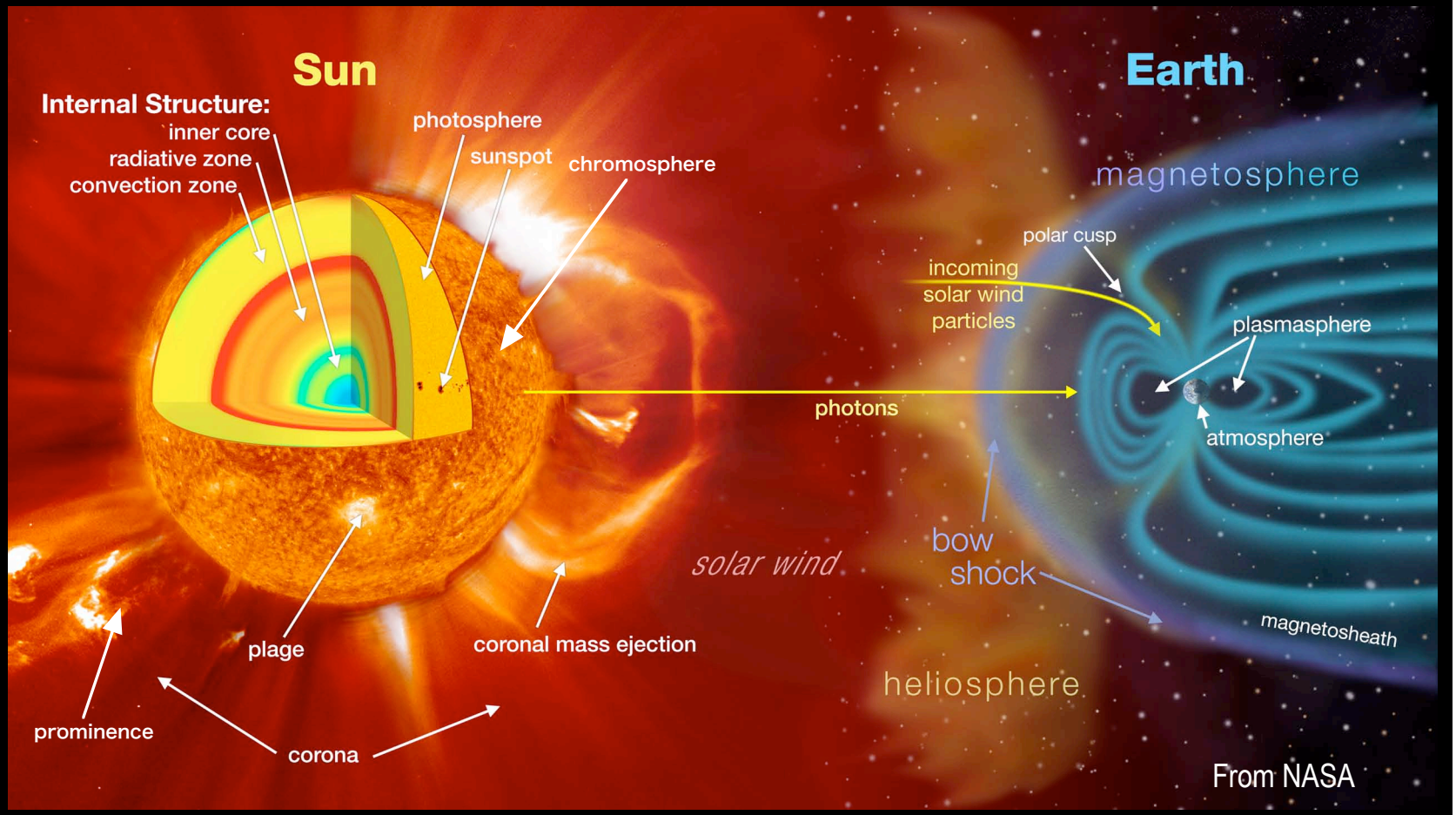
Textbooks:

- The Sun: An Introduction (Michael Stix, Springer, 2004, 9783540207412)
- Solar Magnetohydrodynamics (E.R. Priest, D. Reidel Publishing Company, 1984, 9789027718334)
- Plasma Physics (Peter Andrew Sturrock, Cambridge University Press, 1994, 9780521448109)
- Gas dynamics (Frank H. Shu, Univ Science Books, 1992, 9780935702651)

Assignment:

Each student should submit a report, in addition to taking mid-term and fina exams.

Sun–Earth system



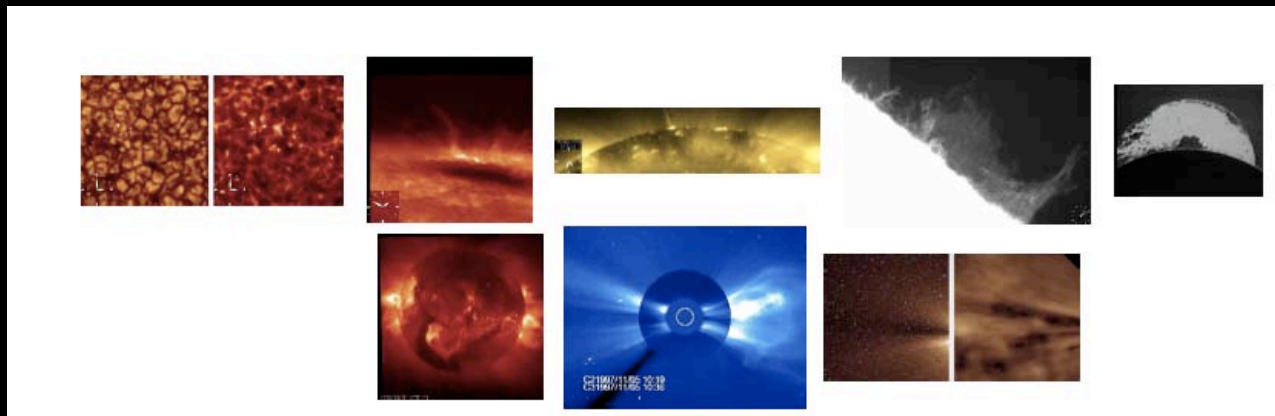
When, where, and how do solar dynamic phenomena occur? => **solar physics**

When, where, and how do solar dynamic phenomena affect the Earth? => **space weather**

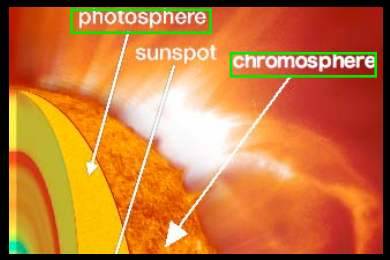
Although the Sun looks uniform and steady…

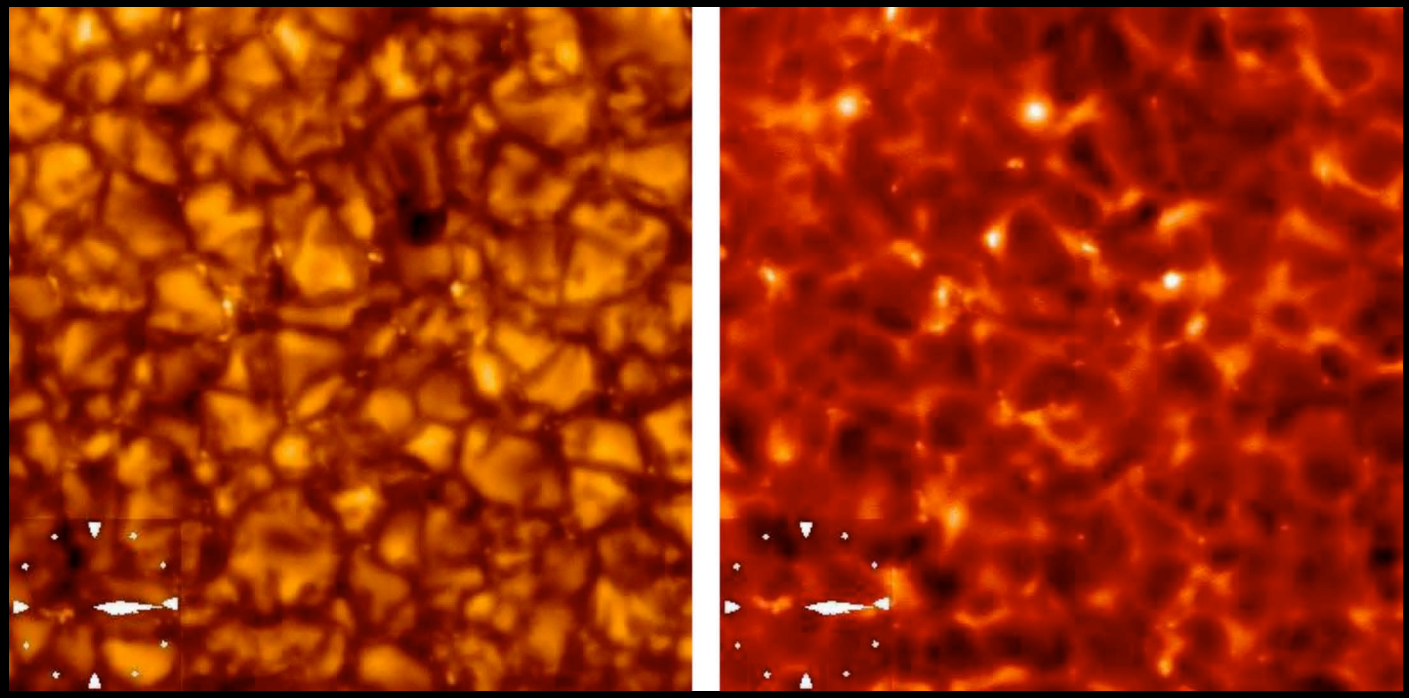
Dynamic Sun I

(short time-scale phenomena: ~ hours)



Granulation: small-scale motion in a solar surface (photosphere & chromosphere)

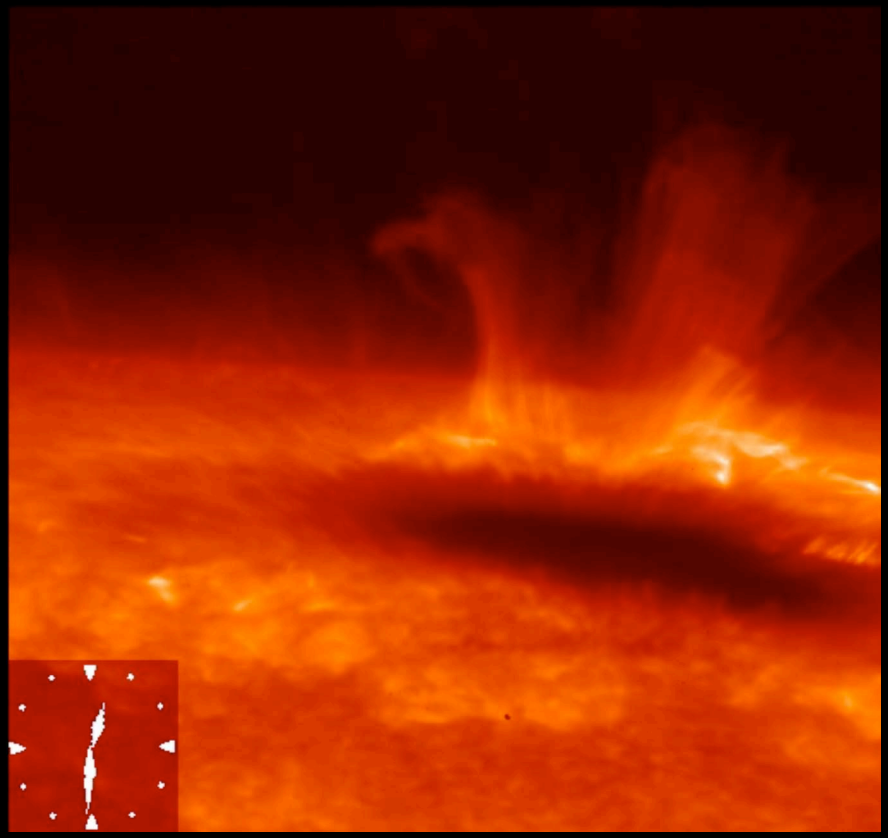


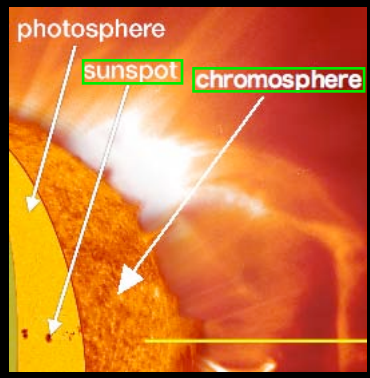


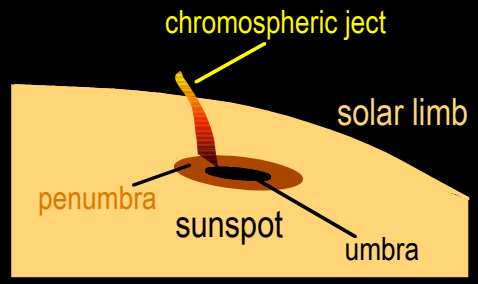
photosphere | low chromosphere

Granulation observed in G-band (left; CH line, 430 nm) and Ca II H (right; 396 nm)
(*Hinode*)

Chromospheric jet at a sunspot







Sunspot observed in Ca II H (396 nm)
(*Hinode*)