

Planet Earth HT 2012

Physics of the Atmosphere and Ocean

Lecturer – Helen Johnson (50.05, Helen.Johnson@earth.ox.ac.uk, 01865 272142)

Aim – To provide an introduction to the physics that governs the circulation of the atmosphere and ocean, and hence the Earth's climate.

Outline

1. Global energy balance
2. Forces on a rotating planet
3. Basic dynamics of the atmosphere and ocean
4. Atmospheric general circulation
5. UK weather
6. Ocean circulation – forcing and large-scale features
7. Ekman currents in the ocean
8. Wind-driven gyres
9. The Atlantic meridional overturning circulation
10. ENSO and tides

Problems – there will be two supervised problem classes during the course. Further problems are available for you to try in your own time should you wish, and will provide good preparation for the exam.

Lecture schedule – lectures and problem classes will be held on Tuesdays at 12 noon in the Elementary Lab, Thursdays at 2pm in Seminar 1, and Fridays at 12 noon in the Elementary Lab. This part of the course will involve 12 sessions beginning on Friday 5 February and ending on Thursday 1 March.

Internet – resources to support the lectures will be available at <http://www.earth.ox.ac.uk/~helenj/planetearthHT12/> and via Weblearn.

Recommended texts

- *Introduction to Physical Oceanography*, Stewart, Academic Press
is a free textbook (http://oceanworld.tamu.edu/home/course_book.htm) which covers much of the ocean material in this module and can be downloaded as a PDF.
- *Atmospheric Science: An Introductory Survey (2nd edition)*, Wallace and Hobbs, Wiley
is a good, comprehensive introduction to atmospheric science.
- *Meteorology Today; An introduction to weather, climate and the environment*, Ahrens, West Publishing Company, is also a great introduction to the meteorological course content.
- *Ocean Dynamics and the Carbon Cycle*, Williams and Follows, Cambridge
is a great new interdisciplinary oceanography resource at undergraduate level.
- *Ocean Circulation*, Open University Course Team, Pergamon Press
gives a very basic but excellent introduction to physical oceanography, including discussion of key dynamical concepts with very few mathematical details.
- *Atmosphere, Ocean and Climate Dynamics*, Marshall and Plumb, Elsevier
is a good resource for much of this module, although it is aimed at a slightly higher level.