课程名（Coursename）  
The Earth system and Climate Change  
  
课程代码（Coursenumber）  
I2  
  
课程对象（Audience）  
Graduates  
  
开课教师（Teacher）  
Prof. H. Elderfield and others  
  
学期（Semester）  
  
课程描述（Description）  
This course looks at climate change from the perspective of past climates on a range of time scales as recorded in archives, compared with modern climate. Issues covered include non linearities in the climate system, glaciological instabilities and the role of the carbon cycle in controlling atmospheric CO2, past ocean circulation. The course is designed to complement the material covered in Course I1 Atmospheric Chemistry and Global Change, although either course can be taken independently. The course will be lectured and examined in a way which assumes no prior knowledge for those taking the course. Examination questions will be based on both core and specialist lectures.  
Core lectures (12)  
Introduction to climate records on tectonic, orbital and sub-orbital timecales. Records from marine, ice-core, speleothem, corals and other archives Forcing and dynamics of atmosphere and ocean circulation. Processes of climate variability, El Ni˜no, tele-connection, atmosphere and ocean coupling. Use of proxies in palaeoceanography. Past ocean circulation. Gateways. The carbon cycle and CO2. Glacial-interglacial CO2. Carbonate cycles and ocean acidification. Earth System Science models. Non-linearities (“tipping points”) in the climate system. Deglaciations, orbital shortcomings and internal feedbacks. The abrupt change paradigm. Glaciological instabilities. Flow of glaciers and ice sheets. Observing and modelling the ice-bed interface, Modelling the growth and decay of large ice sheets  
Specialist lectures  
Human-climate interactions (Prof. David Hodell, Earth Sciences)  
Carbon-temperature feedbacks and anthropogenic CO2. (Prof. Peter Cox, University of Exeter) To be confirmed  
Carbon sequestration (Prof. Mike Bickle, Earth Sciences)  
  
课时信息（Totalhours）  
  
教参信息（Textbookinfo）  
1 Coming Climate Crisis? Consider the Past, Beware the Big Fix by Claire L. Parkinson (Hardcover - May 16, 2010)  
ISBN-13: 978-0742556157  
世界各地拥有馆藏的图书馆（OCLC）:215  
2 Confronting Climate Change: Strategies for Energy Research and Development by Committee on Alternative Energy Research and Development Strategies, Energy Engineering Board, Commission on Engineering and Technical Systems, and National Research Council (Paperback - Jan. 1, 1990)  
ISBN-13: 978-0309043472  
3 Changing Climates, Earth Systems and Society (International Year of Planet Earth) by John Dodson (Hardcover - Aug. 29, 2010)  
ISBN-13: 978-9048187157  
世界各地拥有馆藏的图书馆（OCLC）:4  
4 Global Change and the Earth System: A Planet Under Pressure (Global Change - The IGBP Series) by Will Steffen, Regina Angelina Sanderson, Peter D. Tyson, and Jill Jäger (Hardcover - Oct. 6, 2005)  
ISBN-13: 978-3540265948  
世界各地拥有馆藏的图书馆（OCLC）:194  
5 Designing Greenhouse Gas Reduction and Regulatory Systems (Climate Change and Its Causes, Effects and Prediction Series) by Sonja Enden (Paperback - July 29, 2009)  
ISBN-13: 978-1607411956  
世界各地拥有馆藏的图书馆（OCLC）:14  
6 High-Arctic Ecosystem Dynamics in a Changing Climate, Volume 40 (Advances in Ecological Research) by Hans Meltofte, Torben R. Christensen, Bo Elberling, and Mads C. Forchhammer (Hardcover - May 29, 2008)  
ISBN-13: 978-0123736659  
世界各地拥有馆藏的图书馆（OCLC）:63  
7 The Global Climate System: Patterns, Processes, and Teleconnections by Howard A. Bridgman and John E. Oliver (Hardcover - Sept. 25, 2006)  
ISBN-13: 978-0521826426  
世界各地拥有馆藏的图书馆（OCLC）:252  
8 Global Geodetic Observing System: Meeting the Requirements of a Global Society on a Changing Planet in 2020 by Hans-Peter Plag and Michael Pearlman (Hardcover - Aug. 7, 2009)  
ISBN-13: 978-3642026867  
世界各地拥有馆藏的图书馆（OCLC）:24  
9 Climate Variations, Climate Change, and Water Resources Engineering by Jurgen Garbrecht and Thomas Piechota (Paperback - Dec. 1, 2005)  
ISBN-13: 978-0784408247  
世界各地拥有馆藏的图书馆（OCLC）:167  
10 Lightning in the Tropics: From a Source of Fire to a Monitoring System of Climatic Changes (Climate Change and Its Causes, Effects and Prediction Series) by Osmar Pinto (Hardcover - Oct. 2009)  
ISBN-13: 978-1607417644  
世界各地拥有馆藏的图书馆（OCLC）:27