

SIO 217C (Spring 2017)

V. Ramanathan & Joel Norris
SPRING 2017

Atmospheric and Climate Sciences III: Climate and Climate Change

Instructors: Ram Ramanathan 330 NHALL vram@ucsd.edu
Joel Norris 327 MESOM jnorris@ucsd.edu

Office Hours: Students are welcome to stop by our offices at any time, but we recommend checking with us ahead of time.

Grading Option: Letter grade is required for first year Climate Science graduate students. S/U is permissible for all other students.

Grading Criteria: 20% classroom discussion, 40% homework exercises, 40% final examination

Textbooks:

Global Physical Climatology by Dennis Hartmann

UCSD only: <http://www.sciencedirect.com/science/bookseries/00746142/56>

An Introduction to Dynamical Meteorology (4th Ed.) by Jim Holton

UCSD only: <http://www.sciencedirect.com/science/bookseries/00746142/88>

Climate Change and Climate Modeling by J. David Neelin

UCSD only: <http://roger.ucsd.edu/recid=b7296365~S9>

IPCC-AR5 Report

Available at <http://www.ipcc.ch/report/ar5/>

Websites:

Course: UCSD TritonEd

You should frequently check the course website for class information, discussion questions, and homework assignments.

Attendance Expectations: Students are expected to attend every class with exceptions only for illness and direct time conflicts such as out-of-town conferences.

Reading Expectations: Students are expected to read the assigned material and talk about the discussion questions with their discussion partners ahead of class.

Homework Assignments: There will be six homework assignments. Students may collaborate as long as each student submits his or her own work.

In-Class Discussion: During class time students will collaboratively work on questions and discuss answers with the instructor's guidance. It is not necessary to have mastered the material, but lack of preparation will result in a lower grade.

Books: *Global Physical Climatology* = GPC; *An Introduction to Dynamical Meteorology* = DM;
Climate Change and Climate Modeling = CCCM; IPCC-AR5 (selected chapters)

Course Topics	Reading	Date	Instructor
Atmospheric composition and vertical structure	GPC pp. 2-5, 8-10	4/03	Norris
Earth's energy balance and gaseous absorption	GPC pp.18-28; 40-48 Phys Today Article-posted	4/05	Ram
Simple greenhouse model	GPC pp. 61-72 Phys Today Article	4/10	Ram
Radiative transfer-1	GPC pp. 52-57	4/12	Norris
Radiative transfer-2		4/17	Norris
Radiative transfer-3		4/19	Norris
Pedagogical climate change models	GPC; 81-83; 337-342 Handout-Posted	4/24	Ram
Clouds	GPC pp. 63-66, 72-79	4/26	Norris
Pedagogical climate change models (cont.)	GPC pp. 27-39	5/01	Ram
Radiative imbalance	DM pp. 289-296, 370-377	5/03	Ram
Convection and equatorial tropopause	DM pp. 289-296, 370-377	5/08	Ram
Water cycle & surface flux feedbacks	GPC pp. 10-11, 115-122, 130-134	5/10	Ram
Atmospheric circulation and transport-1	GPC pp. 6-7, 15-17, 136-143, 155-168; DM pp. 380-382, 407-413	5/15	Norris
Atmospheric circulation and transport-2	GPC pp. 142-154	5/17	Norris
Tropical circulation and precipitation	DM pp. 370-383	5/22	Norris
Climate variability	GPC pp. 187-188; DM pp. 383-386; CCCM pp. 103-110, 131-142	5/24	Norris
Memorial Day	No class	5/29	
Climate forcing	IPCC-AR5; GPC pp. 229-236	5/31	Ram
Climate Feedbacks	IPCC-AR5	6/05	Ram
Observed Twentieth Century climate changes	IPCC-AR5	6/07	Ram
Final Exam		6/16	Norris