

CONVECTIVE CLOUDS AND STORMS
METR 6223
Fall 2010

Tues., Thurs. 10-11:15 AM NWC 5930
(make-up classes to be scheduled, at 9:00 AM Tues. and Thurs., if possible, in a room to be identified later)

Instructor: Dr. Howie "Cb" Bluestein
NWC 5351 (far northwest corner on 5th floor)
Office phone: 325-3006
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Office hours: Tues., Thurs., 2:00 - 3:30 PM (tentative schedule)
Office hours may be cancelled if there is a severe-thunderstorm outbreak (or a threat of the aforementioned).
Other times by appointment please!

Text (recommended, but not required): *Atmospheric Convection* by K. A. Emanuel, Oxford Univ. Press

• The instructor is in the process of writing a textbook on the material included in this course. Notes will not be provided because they are in draft form, but the class lectures will follow some of the material to be included in the book. Please take good notes! Relevant journal articles will be referenced.

Texts (supplemental): *Cloud Dynamics* by R. A. Houze, Jr., Academic Press (new text out of print), *Synoptic-Dynamic Meteorology in Midlatitudes* (Vol. II) by H. Bluestein, Oxford Univ. Press, *Tornado Alley: Monster Storms of the Great Plains* by H. Bluestein, Oxford Univ. Press

Selected recent journal articles (supplemental; may be accessed via the AMS publications website) at <http://journals.ametsoc.org/search/advanced>

Download course materials at: <http://weather.ou.edu/~hblue/metr6223>

Prerequisites: METR 5113 (Advanced Atmospheric Dynamics I or equivalent).

Course outline:

1. Basic dynamics of convection
 - a. Buoyancy
 - b. Boussinesq approximation
 - c. Anelastic approximation
 - d. Vorticity generation and diagnosis of the pressure field
2. Local convection

- a. Similarity theory
- b. Plumes
- c. Thermals
- 3. “Global” convection
 - a. Rayleigh convection
 - b. Rotational effects
 - c. Effects of linear shear
- 4. Precipitating convection: Observations and theory
 - a. Ordinary cells, including density currents
 - b. Supercells
 - c. Mesoscale convective systems (including squall lines, bow echoes)
- 5. Tornadoes
 - a. Observations
 - b. Dynamics: structure and tornadogenesis

Grades: 2 quizzes (50% each)

There will be problem sets designed to help you learn the material. These problem sets will be graded qualitatively and used to determine borderline grades.

Note: Any student in this course who has a disability that may prevent him/her from fully demonstrating his/her abilities should contact the instructor personally as soon as possible so the instructor can discuss accommodations necessary to ensure full participation and facilitate the student’s educational opportunity.