ATM OCN 718: Dynamics of Moist Convective Systems, Spring 2018

Instructor: Dr. Ryan Sobash

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Class meetings: AOSS 823, Tues / Thurs, 2:30P – 3:45P

Office hours: 11a – noon, Tues / Thurs, 1403 AOSS, or by appointment

Course Goal: To understand the basics of moist convective-scale dynamical flows and environmental controls of convective organization through theory and cloud modeling.

Topics: Buoyancy, balanced vs. unbalanced flows, hydrostatic vs. non-hydrostatic motions, the origin of pressure perturbations, sounding and hodograph analysis, gravity current dynamics, instability and vertical shear impacts on convective organization, multi-cell and supercell dynamics, mesoscale convective system structure and dynamics, tornado dynamics, basics of severe weather hazard forecasting and predictability in the mid-latitudes, usage of cloud models to study convection.

Prerequisites: ATM OCN 610 / 630.

Grading: Midterm (Tentatively 6 March 2018, 33%), Final Project (33%), Homework (33%)

Homework: Approximately 6 homework assignments will be given during the course of the semester. Many of these will require using the CM1 (Cloud Model #1) cloud model, as well as assignments incorporating case studies of previous severe weather events. Homework assignments are due at the beginning of the class period on the day assigned. No credit will be given for late assignments.

Final Exam: TBD (final project will be due during finals week).

Textbook: *Mesoscale Meteorology in Midlatitudes* by P. Markowski and Y. Richardson, available on reserve in Schwerdtfeger Library (AOSS 317). Online PDFs also available through UW Library Website.

Other useful references:

Emanuel, K..: *Atmospheric Convection* (QC880.4 C64 E5 1994)

Bluestein, H.: *Severe Convective Storms and Tornadoes: Observations and Dynamics* (QC955 B58 2013)

Houze, R.: *Cloud Dynamics*

Cotton, W., G. Bryan, and S. van den Heever: *Storm and Cloud Dynamics* (QC921.6.D95 C67 2011)

Dowell, C, A., *Severe Convective Storms*, AMS Monograph (QC880.4 C64 S48 2001)