

METEOROLOGY 512

Synoptic Applications of Dynamic Meteorology (3 credits)

(also listed as "Advanced Meteorological Analysis")

Syllabus

Fall Semester, 2006

Time/Place

Mondays and Fridays, 1:25-2:15 PM, 6th floor of Walker Building
Wednesdays, 1:25-2:15 PM, 119 EES Building

Instructor

Prof. Paul Markowski, 520 Walker, email: pmarkowski@psu.edu, phone (work): 865-0478, web:
<http://www.meteo.psu.edu/~marko>

Office Hours

Mondays and Wednesdays, 2:30 - 3:30 PM, or by appointment

Optional Texts

Mid-Latitude Weather Systems by T.N. Carlson

Synoptic-Dynamic Meteorology in Midlatitudes, Volume I, Principles of Kinematics and Dynamics,
by H. Bluestein

*Synoptic-Dynamic Meteorology in Midlatitudes, Volume II, Observations and Theory of Weather
Systems*, by H. Bluestein.

The Life Cycles of Extratropical Cyclones, edited by M. Shapiro and S. Gronas (available from the
AMS)

Grading Policy

Students will be evaluated by way of two exams. The first exam will be administered from 7-9 pm on Wednesday, 18 October. The second exam (non-cumulative) will be held during the university-scheduled final exam period (this is announced around mid-October). The exams will comprise 70% of the grade, with the better of your two scores being worth 40% and the lesser of your two scores being worth 30%.

Homework assignments occasionally will be given. These will be worth 15%. There will be a final project assigned as well, probably sometime in early November. This will be due at the end of the semester and will be worth 15%.

Tentative List of Topics

Quasigeostrophic theory revisited: role of diabatic heating; effective static stability; effects of variations in static stability. Alternative formulations of omega equation and height-tendency equation: Trenberth formulation; Q vectors; P vectors; C vectors; quasigeostrophic potential vorticity. Observations of surface and middle-upper tropospheric fronts. Frontogenesis (including vector form of frontogenesis function). Geostrophic momentum approximation. Sawyer-Eliassen equation. Semigeostrophic equations.