

METR 5803.900 Atmospheric Circulations Fall 2009
TR 7:00-8:30 pm NWC 5820
Dr. Michael Biggerstaff drdoppler@ou.edu
NWC 5417 phone: 325-3881

Kinematics and diagnostic dynamics of observed atmospheric circulations from the global to convective scales. This overview course is intended for graduate students who do not have a strong background in meteorology.

Prerequisite: Graduate student standing and approval of the instructor.

COURSE OVERVIEW:

INTRODUCTION: Scales of atmospheric motions; relationships between branches of meteorology. Types of observations; observing platforms.

KINEMATICS OF ATMOSPHERIC CIRCULATIONS: Geostrophic and ageostrophic wind; thermal wind; quasi- and semi- geostrophic framework.

SYNOPTIC SCALE CIRCULATIONS: Frontogenesis and kinematics of fronts; diagnostic dynamics; jet streams and upper-level fronts; cyclones and anticyclones; cyclogenesis and explosive cyclogenesis; rainbands and symmetric instability.

MESOSCALE CIRCULATIONS: Kinematics and dynamics of convective storms including convective initiation, cloud clusters, MCSs, MCCs, supercells; gravity waves; topographically forced motions; thermally driven circulations.

TROPICAL CIRCULATIONS: El-Nino and La-Nina; Walker circulation; Madden-Julian Oscillation; easterly waves; hurricanes.

GRADING

There will be two exams, one paper, and a class participation grade:

2 Exams @ 30 % each	=	60 %	FIRST EXAM IS
1 Paper @ 20 % each	=	20 %	13 October
Class participation	=	<u>20 %</u>	SECOND EXAM
		100 %	8 December
Approximately 90 to 100 %	=	A	PAPER DUE
Approximately 80 to 89 %	=	B	20 November
Approximately 70 to 79 %	=	C	
Approximately 60 to 69 %	=	D	
Below 69 %	=	F	

USEFUL TEXTS

Holton, James R. (1979) *An introduction to dynamics meteorology*.

Wallace, John M. and P. V. Hobbs, (1977). *Atmospheric Science: An introductory survey*.

Newton, C. and E. O. Holopainen (1990): *Extratropical cyclones: The Erik Palmén memorial volume*. Amer. Meteor. Soc.

Ray, P. S. (1986): *Mesoscale meteorology and forecasting*. Amer. Meteor. Soc.

Atkinson, B. K. (1981): *Meso-scale Atmospheric Circulations*. Academic Press.

Bluestein, H. B. (1992): *Synoptic-dynamic meteorology in Midlatitudes. Volume I. Principles of kinematics and dynamics.* Oxford University Press.

Bluestein, H. B. (1993): *Synoptic-dynamic meteorology in Midlatitudes. Volume II. Observations and theory of weather systems.* Oxford University Press.

Carlson, T. N. (1991): *Mid-latitude weather systems.* HarperCollins Academic.

Gill, A. E. (1982): *Atmosphere-Ocean Dynamics.* Academic Press.

Houze, R. A. Jr. (1993): *Cloud Dynamics.* Academic Press.

Additionally, several journal papers will be discussed.