

ATM 411 DYNAMIC METEOROLOGY II SPRING 2009 CLASS#: 1315

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Time: TU/TH 1:15-2:35

Office hours: TUE/TH 2:45-3:45; or see me after class for an appointment

Prerequisites for Course: A ATM410

Grading Scheme: Graded

Aim of Course:

To develop theoretical concepts that can explain and help understand observed midlatitude weather systems and their development. This will build on the work already completed in ATM 410.

Course Assessment:

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| 1. Class exam on Thursday 4 th March | 25% |
| 2. Class exam on Tuesday 27 th April | 25% |
| 3. Problem sets (will be given one week to do these) | 10% |
| 4. Final Exam on Thursday 13 ^h May (1.00pm-3.00pm) | 40% |

Text Books:

I will occasionally refer to Holton when appropriate.

Lecture Plan

1. Introduction

- 1.1 Basic structures
- 1.2 Equations

2. Vorticity and Potential Vorticity Concepts

- 2.1 Introduction
- 2.2 Quasi-geostrophic theory
- 2.3 QG Vorticity and Thermodynamic equations
- 2.4 Vorticity thinking
- 2.5 Potential Vorticity thinking (QG)
- 2.6 Use of Ertel Potential Vorticity
- 2.7 Summary of PV thinking

3. Vertical Motion

- 3.1 Introduction
- 3.2 Omega equation: Vorticity and Thermal advection form
- 3.3 Q-Vector form
- 3.4 Summary of QG theory

4. Waves and Instabilities

- 4.1 Idealised Baroclinic wave structures
- 4.2 The Eady model
- 4.3 Nonlinear Baroclinic Wave life-cycles
- 4.4 Role of Latent Heat release and Friction on Cyclone Development
- 4.5 Review of Papers/Case Studies