

Mesoscale Meteorology

Spring 2018

Lecturer

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Assistant (homework grading)

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Textbooks

1. Mesoscale Dynamics, 2007, Y.-L. Lin, Cambridge University Press, 630 pp.
2. Cloud Dynamics, 2nd edition, 2014, R. A. Houze, Jr., Academic Press, 496 pp.

References

1. Mesoscale Meteorology in Midlatitudes, 2010, P. Markowski and Y. Richardson, Wiley-Blackwell, 407 pp.
2. Mesoscale Meteorology and Forecasting, 1986, P. S. Ray, Ed., American Meteorological Society, 793 pp.
3. Dynamics in Atmospheric Physics, 1990, R. S. Lindzen, Cambridge University Press, 310 pp.
Chapters 8 and 10: Internal Gravity Waves
4. An Introduction to Atmospheric Gravity Waves, 2002, C. J. Nappo, Academic Press, 276 pp.
5. Atmospheric Convection, 1994, K. A. Emanuel, Oxford University Press, 580 pp.
6. Storm and Cloud Dynamics, 2nd edition, 2011, W. R. Cotton, G. H. Bryan, and S. C. van den Heever, Academic Press, 809 pp.
7. Advances in Geophysics, 1979, Vol. 21, Academic Press. The Influence of Mountains on the Atmosphere, R. B. Smith.
8. Topographic Effects in Stratified Flows, 1995, P. G. Baines, Cambridge University Press, 482 pp.
9. Hydrodynamic Stability, 1981, P. G. Drazin and W. H. Reid, Cambridge University Press, 527 pp.

Grading

mid-term exam: 30%

final exam: 30%

homework: 40%

Lecture Contents

Overview

Governing equations and approximations

Some theorems for stratified flows

Atmospheric gravity waves

Orographically forced flows

Thermally forced flows

Mesoscale convective systems