AT 350 – Spring 2010

Introduction to Weather and Climate

Tuesday/Thursday, 1:10-2:00 PM
130 Glover
Instructor: Dr. Steven Rutledge
Department of Atmospheric Science
220 ATS Building-Foothills Campus

Text: Ahrens, Meteorology Today, 9th Edition
Office Hours: TBD

AT 350
INTRODUCTION TO WEATHER AND CLIMATE

CLASS GOALS:

- Introduce students to a variety of topics relevant to an understanding of weather, climate and related topics.
- Familiarize students with information sources regarding these topics.
- Instill a basic understanding of atmospheric processes and how they determine various atmospheric phenomena.

NOTE: We will not be learning to forecast the weather!

Syllabus

- Review course syllabus now
- Lecture topic outline and schedule are tentative and subject to revision
Expectations/Preparation

- Read book chapters before and after lecture
- Explore additional resources identified in lectures
- Web page lecture notes/viewgraphs will be helpful to have in hand before lecture
- Old exams useful for preparation for exams
- Minimum of mathematics background required

Time Scales - Terms of Reference

- **Weather**
  - The conditions at a specific location at a specific time
  - Minutes to weeks - the time period for which a specific event may be forecast
- **Diurnal**
  - The day-night cycle
  - 24 hours
  - Midnight to midnight

- **Climate**
  - The average conditions and their variability (includes extremes)
    - Seasonal
    - Annual
    - Decadal
    - Century
    - "Age - as in Ice Age
    - "Period - as in Quaternary

  "Borrowed from Geology

Spatial Terms of Reference

- **Global** - The planet as a whole
- **Planetary** - as in planetary waves
- **Hemispheric** - eg northern hemisphere
- **Zonal** - implies East-West
  - a latitude band
  - eg subtropics 20-30° lat
- **Meridional** - implies North-South along a meridian
- **Regional**
  - eg - High Plains
  - - Front Range
- **Local**
  - eg - Fort Collins
  - - DIA

- **Synoptic scale**
  - 500 to 3000 Kilometers
    - midlatitude cyclones
    - hurricanes
- **Mesoscale**
  - 20 to 200 Kilometers
    - Thunderstorms
- **Microscale**
  - centimeters to 1 Kilometer
    - In-Cloud updraft
Atmospheric Science is an INTERDISCIPLINARY SCIENCE
- astronomy
- biology
- chemistry
- geology
- mathematics
- oceanography
- physics
- sociology
- political science
- economics

Galaxies - Nurseries of Stars
- What our galaxy would look like from afar
- Our Milky Way - photo taken from our own solar system

Astronomy

Mt. St. Helen
- adding to our atmosphere’s composition in 1980

Geology
Ocean Currents

Oceanography

Coriolis Force acts to the right in the Northern Hemisphere

Physics

Tornado
Economics:
Costs and benefits of reduced greenhouse gas emissions
Tornado Damage

Lightning

El-Nino
An Example of Estimated Losses from 1982/83 El Nino Event

$8.11 Billion
Ongoing atmospheric change

Weather on the Web

Many web-based information resources are available, including

weather.unisys.com
www.nws.noaa.gov
www.weather.com
www.aos.wisc.edu/weather/index.html
www1.accuweather.com/acdeb/index
twister.sbs.ohio-state.edu/
cirrus.sprl.umich.edu/wxnet/radsat.html
www.pmel.noaa.gov
www.rap.ucar.edu/weather