

ATS 681A5: Upper-Air Soundings in Atmospheric Research
Spring 2018
MW, 11:00-11:50 AM, ATS Room 101 (2 credits)

Course Description and Prerequisites

This course will cover the history, design, and use of radiosondes and other sounding instruments in atmospheric science research. The course is scheduled for two 50-minute periods per week, which will nominally include one class session of lecture and one of lab, although this will vary substantially during the semester as the lab component will involve radiosonde launches that will be weather-dependent.

Prerequisite: ATS640 or ATS641 (concurrent registration with ATS641 is sufficient); or consent of the instructor

Learning Outcomes

Upon completion of this course, students will be able to:

- Explain the history and evolution of radiosonde technology of the atmospheric science and the radiosondes in atmospheric research.
- Launch radiosondes following the World Meteorological Organization's intercomparison procedures in a variety of weather conditions.
- Conduct statistical analysis of radiosonde data for quality assurance and archival purposes.

Instructor Information

Name	Dr. Russ S. Schumacher
E-mail	russ.schumacher@colostate.edu
Phone	970.491.8084
Office hours	By appointment; please send e-mail to set up time
Office location	ATS Room 413
Course websites	http://schumacher.atmos.colostate.edu/teaching/ats681_sp18/ Data and other information will be distributed in a Google Drive

Assistant instructors

Chris Slocum	christopher.slocum@colostate.edu
Paul Ciesielski	paul.ciesielski@colostate.edu

Textbook and Course Materials

There is no textbook for the course. Readings will be from journal articles and technical reports.

Grading Policies

Course grading will be based on the student's active contribution to the radiosonde launches for the intercomparison experiment (25%) and on a final research project analyzing and interpreting the collected radiosonde data (75%).

Radiosonde intercomparison experiment

A core aspect of the course will be the design and execution of a radiosonde intercomparison experiment, using two different types of radiosondes. Students will learn the appropriate procedures for radiosonde launches in accordance with WMO protocol. Approximately 20 sonde flights will be conducted over the course of the semester, in a range of weather conditions, including daytime, nighttime, clear-sky, cloudy, and precipitation. Each launch will require a subset of the students in the class to attend and coordinate the launch. As such, the lab component of the course will require flexibility in scheduling (i.e., these activities will not always take place during the specified class time.) Sign-up methods and schedule coordination will take place in the first two weeks of the semester.

Final research project

The final project in the class will involve producing one or more manuscripts and presentations describing the findings of the radiosonde data collected. More details on the format of these projects will be given in class, and will depend on the number of students enrolled and the details of the data collected during the semester.

Expectations

At least 2 hours of effort are expected to complete readings and lab assignments outside of class for each hour of class time.

Special needs

If you have special learning needs that should be accommodated in this class, please see the instructor during the first two weeks of the semester, and refer to <http://rds.colostate.edu/accommodation-process> for more information.

Copyright policy

All materials used in this class are copyrighted. These materials include but are not limited to syllabi, quizzes, exams, lab problems, in-class materials, review sheets, and additional problem sets. Because these materials are copyrighted, you do not have the right to copy the handouts, unless permission is expressly granted.

Academic Integrity and Plagiarism

Academic integrity is a crucial part of the vibrant learning community at Colorado State University and in the Department of Atmospheric Science. We expect all students to conduct their academic work with integrity, and particularly to avoid plagiarism. As commonly defined, plagiarism consists of passing off as one's own the ideas, words, writings, etc., which belong to another. In accordance with this definition, you are committing plagiarism if you copy the work of another person and turn it in as your own, even if you should have the permission of that person. Plagiarism is a violation of the University rules on academic integrity. If you plagiarize in your work you could lose credit for the plagiarized work, fail the assignment, or fail the course. Plagiarism could result in expulsion from the university. Each instance of plagiarism, classroom cheating, and other types of academic dishonesty will be addressed according to the principles published in the CSU General Catalog (see, <http://catalog.colostate.edu/general-catalog/policies/students-responsibilities/#academic-integrity>)

Tentative* Schedule for ATS681A5 (MW 11:00-11:50am)

Dates	Lecture topic	Lab topic
15, 17 January	MARTIN LUTHER KING DAY, NO CLASSES	NO CLASS MEETING THIS DAY
22, 24 January	Course overview; introduction to radiosondes	Introduction to radiosonde instruments and equipment
29, 31 January	iMet presentation (Mark Benoit)	First radiosonde launches, with Mark Benoit
5, 7 February	History of radiosonde technology (Paul Ciesielski and Wayne Schubert)	Radiosonde launches
12, 14 February	The Global Climate Observing System Reference Upper-Air Network (Holger Vömel)	Vaisala presentation (Chris Vagasky)
19, 21 February	Creating an archival dataset of field campaign radiosonde data (Paul Ciesielski)	Radiosonde launches
26, 28 February	Other sonde technologies: dropsondes (Michael Bell)	Radiosonde launches
5, 7 March	Radiosondes and severe local storms research	Radiosonde launches
12, 14 March	SPRING BREAK: NO CLASS	
19, 21 March	Radiosondes in field campaigns (TBD)	Begin data analysis; radiosonde launches
26, 28 March	Radiosonde launches	Data analysis; radiosonde launches
2, 4 April	Field trip to NCAR Earth Observing Laboratory (tentative)	Data analysis
9, 11 April	Guest lecture TBD	Data analysis
16, 18 April	Other sonde technologies	Discuss intercomparison report
23, 25 April	Radiosondes and NWP	Compile research reports
30 April, 2 May	Presentation of final research reports	Presentation and discussion of final reports
Wednesday, 9 May	FINAL EXAM PERIOD, 4:10-6:10 pm	

*Owing to the weather-dependent nature of the radiosonde launches, this schedule will need to be flexible and is subject to change.