# What is all about this course?
This course covers theories and applications of radar and satellite remote sensing technology. Applications of radar dual-polarization technology will also be studied. Prerequisites: ATMS 251, 261; PHYS 222.

## Who is the instructor?
Dr. Huo-Jin (Alex) Huang, RRO 236B 232-5157 (O)
Dept. of Atmospheric Sciences, UNCA
e-mail: ahuang@unca.edu
http://blizzard.atms.unca.edu/ahuang

## Office Hours:
Monday, Tuesday, Thursday, 2:00 — 3:00 pm.
(or by appointment, but walk-in is always welcome)

## Textbooks:

## What is the structure of the course?
- PowerPoint Lectures
- In-class discussion/group work
- Homework assignments
- One 10-min in-class presentation
- One scientific paper/poster

## When and Where do we meet?
3:15 – 4:30 pm, Tuesday, Thursday
RRO 238

## How will you be graded?
- Assignments: 30%;
- One Presentation: 10%;
- One Scientific paper/poster: 15%;
- Mid-term Test: 20%;
- Final Exam: 20%;
- Classroom participation: 5%.

## Grade Scale (100%)
- A ≥ 93: A–: 92.5-90;
- B+: 89.5-87; B: 86.5-83; B–: 82.5-80;
- C+: 79.5-77; C: 76.5-73; C–: 72.5-70;
- D+: 69.5-67; D: 66.5-60; F: ≤ 59.5.

## How can you succeed in this course?
- Come to Classes
- Do your homework
- Read materials
- Complete MetEd modules
- Talk to Instructor
- Ask questions
- Form a study group
- Think, review, connect
- Be healthy
- Check out Moodle daily!

## The best way to contact the instructor?
By e-mail to ahuang@unca.edu
# ATMS 315 Course Outline

<table>
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<td>RR 10, TV 5, TV 6, FF 6</td>
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<td>RR 10, TV 5, TV 6, FF 6</td>
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<td>Final Exam, 11:30 am – 2:00 pm</td>
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**Student Learning Outcomes:** Upon completing this course successfully, you should be able to:

- Comprehend basic radar and satellite technology;
- Understand radar principle and radiation theory;
- Recognize the capabilities and limitations of radar and satellite technology;
- Describe and interpret the weather systems and phenomena as observed by radar and satellite;
- Apply radar and satellite data and images for weather analysis and forecast; and
- Present a scientific presentation and complete a scientific research paper.

**Special Remarks:** Class attendance is strongly recommended. You are solely responsible for the consequences due to your absence. No make-up quizzes/tests will be given. An exception may be granted for uncontrollable circumstances and medical reasons. You have to consult with the instructor at your earliest convenience for exceptions. A **significant** reduction of your score on your late assignments and make-up quizzes/tests may be applied. You will receive an F for the semester if you miss more than 5 class periods without any justifiable and excusable reasons. No operational electronic devices are allowed during the class period unless you are permitted to use them.

**Academic Integrity:** Individual honesty and responsibility are expected, and academic integrity is enforced. Any act of plagiarism or cheating is academic dishonesty. A person who knowingly assists another in cheating is likewise guilty of cheating. According to the instructor’s view of the gravity of the offense, a student may be punished by a failing grade or a grade of zero for the assignment or test, or a failing grade in the course. If it seems warranted, the instructor may also recommend to the Provost dismissal or other serious university sanction. Please review the procedures outlined in Section 8.3 of the UNCA Faculty Handbook ([http://www3.unca.edu/aa/handbook/8.htm](http://www3.unca.edu/aa/handbook/8.htm)) that relate to academic dishonesty.

**Office of Academic Accessibility**

UNC-Asheville values the diversity of our student body as a strength and a critical component of our dynamic community. Students with disabilities or temporary injuries/conditions may require accommodations due to barriers in the structure of facilities, course design, technology used for curricular purposes, or other campus resources.

Students who experience a barrier to full access to this class should let the professor know, and/or make an appointment to meet with the Office of Academic Accessibility as soon as possible. To make an appointment, call 828.232.5050; email [academicaccess@unca.edu](mailto:academicaccess@unca.edu); use this link [https://uncaoaintake.youcanbook.me/](https://uncaoaintake.youcanbook.me/); or drop by the Academic Accessibility Office, room 005 in the One Stop suite (lower level of Ramsey Library). Learn more about the process of registering, and the services available through the Office of Academic Accessibility here: [https://oaa.unca.edu/](https://oaa.unca.edu/)

While students may disclose disability at any point in the semester, students who receive Letters of Accommodation are strongly encouraged to request, obtain and present these to their professors as early in the semester as possible so that accommodations can be made in a timely manner. It is the student’s responsibility to follow this process each semester. timely manner. It is the student’s responsibility to follow this process each semester.
Sexual Harassment and Misconduct

All members of the University community are expected to engage in conduct that contributes to the culture of integrity and honor upon which the University of North Carolina at Asheville is grounded. Acts of sexual misconduct, sexual harassment, dating violence, domestic violence and stalking jeopardize the health and welfare of our campus community and the larger community as a whole and will not be tolerated. The University has established procedures for preventing and investigating allegations of sexual misconduct, sexual harassment, dating violence, domestic violence and stalking that are compliant with Title IX federal regulations. To learn more about these procedures or to report an incident of sexual misconduct, go to titleix.unca.edu. Students may also report incidents to an instructor, faculty or staff member, who are required by law to notify the Title IX Office.

Understanding Academic Alerts

Faculty at UNC Asheville are encouraged to use the university’s Academic Alert (AA) system. The purpose of this system is to communicate with students about their progress in courses. Academic Alerts can reflect that a student’s performance is satisfactory at the time the alert is submitted or they can indicate concerns (e.g., academic difficulty, attendance problems, or other concerns). Professors use the AA system because they are invested in student success and want to encourage open conversations about how students can improve their performance. When a faculty member submits an alert that expresses a concern, the student receives an email from Academic Advising notifying them of the alert and subsequent registration hold on their account. To clear the hold, the student must complete an online Response Form included in the alert e-mail. The student’s responses will be shared with the instructor and advising staff. If a student receives three or more alerts, they will need to meet with an advisor by scheduling an appointment using the online appointment service at advising.unca.edu and select ‘Academic Alert Appointment’ as the type of appointment. The professor may also request to meet with the student to discuss the alert. It is in the student’s best interest to complete the alert process quickly, as students who do so are more likely to earn credit for the course. Failure to complete the alert process means the student won’t be able to register for the next semester's classes until they have submitted the required form and completed any requested meeting requirements. Questions about the alert system can be directed to Anne Marie Roberts (amrober1@unca.edu) in the Academic Success Center.

Writing Center

The University Writing Center (UWC) supports writers in one-on-one sessions with student writing consultants. Consultants can help writers decipher a prompt, organize ideas, document sources, and revise prose. When you visit the UWC, bring a copy of your assignment, any writing or notes you may have, and the sources you are working with. To make an appointment, visit writingcenter.unca.edu and click on "Schedule an Appointment."

Disclaimer: This syllabus is the contract between the instructor and students. Most information will not be changed. However, the schedule may be altered due to unforeseeable circumstances upon the agreement between the instructor and students.
Printed References

Chapter 8 Precipitation Measurements and Chapter 9 Observations of Winds, Storms, and Related Phenomena.

Real time Satellite and Radar Images Websites

GOES Image Viewer:  https://www.star.nesdis.noaa.gov/GOES/index.php
Real time satellite images:  http://www.ssec.wisc.edu/data/geo/
GOES & Himawari images browser  http://rammb-slider.cira.colostate.edu/
GOES Satellite Imagery at NASA/MSFC:  http://weather.msfc.nasa.gov/GOES/
Colorado State University RAMMB:  http://rammb.cira.colostate.edu/ramisdis/online/goes-16.asp

National Radar Mosaic:  http://radar.weather.gov/ridge/Conus/
Radar Coded Message (RCM) summary charts:  http://www.aviationweather.gov/radar
Real time radar (dual-pol) images:  http://weather.cod.edu/buildmap/nexrad_build.php

Videos

http://www.youtube.com/watch?v=KdKouCnhvPs  (introduction to NEXRAD, 8 min, 2009)
http://www.nssl.noaa.gov/news/video/dualpol/  (General intro to dual-pol radar, 4 min, 2011)
http://www.youtube.com/watch?v=Ir3g-9svRtc  (Two orbits, one earth video, 1.5 min, 2014)
http://www.meted.ucar.edu/npoess/microwave_topics/clouds_precip_water_vapor/npoess_3orbits.htm  (POES orbits)
http://www.youtube.com/watch?v=y_jM_BxQGvE  (polar orbits, 1 min)
http://www.youtube.com/watch?v=m2GY8OVd78  (satellite images of 2013, 8 min)
https://www.youtube.com/watch?v=i4mBYyBNULk  (satellite images of 2015, 8 min)
https://www.youtube.com/watch?v=9YAXEHLNhY  (satellite images of 2017, 10.47 min)
https://www.youtube.com/watch?v=wVRbeGc_6zM  (satellite images of 2018, 10.08 min)
http://www.youtube.com/watch?v=V9n3nZlG8E  (introduction to METOSAT, 2012, 7 min)
http://www.youtube.com/watch?v=P5_GIAOCHyE  (planet earth seen from space, 20 min, 2011)
http://www.youtube.com/watch?v=Q2zpmHQHTXsM  (4 min, tiros-1, history, 2010)
http://www.youtube.com/watch?v=9MAjBrZxH1s&list=PLVVMmdcOd0L-BGlqy9UD126QcGsN5gP8k&index=32  (TRMM, 3 min)
http://www.youtube.com/watch?v=a1FHqplKhVC&index=36&list=PLVVMmdcOd0L-BGlqy9UD126QcGsN5gP8k  (GOES-14, 3.5 min)
http://www.youtube.com/watch?v=friUEqlkpaw&index=95&list=PLVVMmdcOd0L-BGlqy9UD126QcGsN5gP8k  (GOES-R, 2.5 min, 2013)
https://www.youtube.com/watch?v=6mt8_QsNu8E  (GOES-R mission by COMET, 4 min)
https://www.youtube.com/watch?v=ttoHhnBwukU  (what is GOES-R? 3 min)
https://www.youtube.com/watch?v=xRjRfo3jrlA  (GOES-17, 4.50 min)
http://www.youtube.com/watch?v=J1nQFsCEXQc&index=181&list=PLVVMmdcOd0L-BGlqy9UD126QcGsN5gP8k  (2012 weather, US sat radar images, 12 min)
Online Training and Learning Sites

On Radar Meteorology:
http://www.srh.noaa.gov/jetstream/doppler/doppler_intro.htm (Introduction to Doppler Radar)
http://www.wdwb.noaa.gov/courses/dualpol/trainingaid/index.htm (WDTB dual-pol training aid)
http://www.wdwb.noaa.gov/courses/dualpol/outreach/non-mets-intro/player.html (WDTB dual-pol training aid)
http://www.wdwb.noaa.gov/courses/dloc/topic5/Lesson23/player.html (Dual-pol rainfall estimates learning aid)
http://www.cimms.ou.edu/~schuur/radar.html (Dual-pol research)
http://cimms.ou.edu/~kscharf/pol/ (Polarimetric radar case studies)
http://www.nssl.noaa.gov/tools/radar/ (NSSL radar research)
http://www.nssl.noaa.gov/tools/radar/mpar/ (MPAR info and videos)
http://www.nssl.noaa.gov/wrf/ (NSSL WRF forecast)
http://www.srh.noaa.gov/jetstream/doppler/doppler_intro.htm (Practical materials about Doppler radar)
http://wdwb.noaa.gov/courses/dualpol/SOTM/Mar2013/player.html (Dual-pol, non-precipitation echoes)
http://radarmet.atmos.colostate.edu/AT741/papers/index.html (Colorado State Univ. AT 471 Radar Meteorology)
http://faculty.fiu.edu/~hajian/MET4410_5412/MET4410_5412.html (Florida International Univ. MET 4410 Radar and Satellite Meteorology)

On Satellite Meteorology:
http://library.ssec.wisc.edu/timeline/ (History of Satellites)
http://goes.gsfc.nasa.gov/text/goesnew.html (History of GOES)
http://cimss.ssec.wisc.edu/goes/misc/ww/ww_tutorial.html (Water vapor images tutorial)
http://cimss.ssec.wisc.edu/satmet/index.html (Satellite meteorology for Grades 7-12, but informative)
http://cimss.ssec.wisc.edu/goes/blog/ (Satellite images blog site)
http://www.star.nesdis.noaa.gov/smcd/emb/f/index.php (Star satellite rainfall estimates, SCaMPR)
http://www2010.atmos.uiuc.edu/Gh/guides/rs/home.xml (Basic reference for radar and satellite meteorology)
http://www.nesdis.noaa.gov/wrf/ (Official NESDIA/NOAA site)
http://www.goes-r.gov/org/docs/GOES_trainingbrief_March2012.pdf (GOES-R)
http://earthobservatory.nasa.gov/ (Interesting satellite Images)
http://gpm.nasa.gov/education/ (Global precipitation measurement, educational materials)
http://www.eumetsat.int/website/home/Satellites/CurrentSatellites/Meteosat/index.html (eumetsat)
http://rammb.cira.colostate.edu/training/visit/links_and_tutorials/ (VISIT online training site)
http://rammb.cira.colostate.edu/ramsdis/online/goes-west_goes-east.asp (Online learning about GOES)
http://www.fas.org/irp/imint/docs/rst/Front/tofc.html (Extensive satellite information, including Landsat)
http://www.class.ngdc.noaa.gov/saa/products/welcome;jsessionid=C143C11A1568E7E9A575F10681DA199B (CLASS)
http://www.n2yo.com/?s=33591 (Real-time satellite tracking interactive site with satellite data, please don’t pay attention to the ads)
http://rammb.cira.colostate.edu/training/visit/training_sessions/water_vapor_channel_satellite_imagery/ Water Vapor Channel Satellite Imagery
http://rammb.cira.colostate.edu/training/visit/training_sessions/water_vapor_imagery_analysis_for_severe_weather/ Water Vapor Imagery Analysis for Severe Weather
http://rammb.cira.colostate.edu/training/visit/training_sessions/water_vapor_imagery_and_pv_analysis/ Water Vapor Imagery and PV Analysis
Useful COMET MetED MODULES on Observations, Charting, and Analysis

NOTE: You are required to register for MetED online (https://www.meted.ucar.edu/) so you can access the modules, the registration is FREE. You are asked to study these modules during the semester and to report what you have learned from these modules.

Weather Observing Fundamentals
Languages: English
Publish Date: 2014-03-11
Skill Level: 1
Completion Time: 2.00 - 3.00 h
Topics: Oceanography, Marine Meteorology, Other

Weather Observing Fundamentals provides guidance for U.S. Navy Aerographer's Mates, Quartermasters, and civilian observers tasked with taking and reporting routine, special, and synoptic observations. Although the focus of this lesson is on shipboard observations, much of ... Read more »

Introduction to Meteorological Charting
Languages: English
Publish Date: 2015-07-23
Skill Level: 0
Completion Time: 0.50 - 0.75 h
Topics: Other

This lesson provides a brief overview of surface and upper-air data and how these data are plotted on meteorological charts. The content introduces various charting and reporting techniques, including station models, contour analyses, streamlines, and upper air maps. ... Read more »

Pressure Gradient Force
Languages: English, Spanish
Publish Date: 2013-03-12
Skill Level: 1
Completion Time: 0.25 h
Topics: Other

This module is a learning object on a foundational aspect of dynamic meteorology, the pressure gradient force. As a learning object, it is meant to supplement other teaching material in a course by elucidating a specific concept. The horizontal pressure gradient force is ... Read more »

Skew-T Mastery
Languages: English, Spanish
Publish Date: 2006-10-04
Last Updated: 2014-04-11
Skill Level: 2
Completion Time: 7.00 - 8.00 h
Topics: Convective Weather, Mesoscale Meteorology, Other

Meteorologists typically examine atmospheric soundings in the course of preparing a weather forecast. The skew-T / log-P diagram provides the preferred method for analyzing these soundings. This module comprehensively examines the use of the skew-T diagram. It explores ... Read more »
Tephigram Mastery
Languages: English, French, Spanish
Publish Date: 2013-04-24
Skill Level: 2
Completion Time: 7.00 - 8.00 h
Topics: Convective Weather, Mesoscale Meteorology, Other

Since the advent of rawinsonde observations, thermodynamic diagrams have been used by meteorologists to analyze sounding data in the course of preparing their weather forecasts. This module comprehensively examines the use of the tephigram, widely used for over 60 years by...

Read more »

Skywarn Spotter Convective Basics
Languages: English
Publish Date: 2011-04-22
Skill Level: 0
Completion Time: 1.00 - 1.25 h
Topics: Convective Weather, Other

The "SKYWARN® Spotter Convective Basics" module will guide users to a basic understanding of convective storms. Through three different scenarios, you will cover reporting and proper communication of local storm reports to the National Weather Service (NWS), personal...

Read more »

Topics in Dynamic Meteorology: Thermal Wind
Languages: English, Spanish
Publish Date: 2012-03-20
Last Updated On: 2014-07-02
Skill Level: 1
Completion Time: 1.25 - 1.50 h
Topics: Other

This module explores the dynamic links between temperature, pressure, and wind in the atmosphere. The qualitative description of the relationships is augmented with "Math Sidebars" that provide a quantitative treatment. Numerous applications to climatology and forecasting...

Read more »

Quasi-geostrophic Vorticity Equation
Languages: English, Spanish
Publish Date: 2014-03-30
Last Updated On: 2014-03-30
Skill Level: 3
Completion Time: 0.25 h
Topics: Other

This learning object/widget is designed for upper-level undergraduates or forecaster interns who want to apply their knowledge of the Quasi-geostrophic Vorticity Equation to forecast situations. The interactivity helps users see how each variable interacts within the...

Read more »

Quasi-geostrophic Omega Equation
Languages: English, Spanish
Publish Date: 2014-06-30
Last Updated On: 2011-06-29
Skill Level: 3
Completion Time: 0.25 h
Topics: Other

This learning object/widget is designed for upper-level undergraduates or forecaster interns who want to apply their knowledge of the Quasi-geostrophic Omega Equation to forecast situations. The interactivity helps users see how each variable interacts within the equation...

Read more »
Useful COMET MetED MODULES on Radar and Satellite Meteorology

NOTE: You are required to register for MetED online (https://www.meted.ucar.edu/) so you can access the modules, the registration is FREE. You are asked to study these modules during the semester and to report what you have learned from these modules.

Weather Radar Fundamentals
Languages: English, Spanish, French
Publish Date: 2012-03-21
Skill Level:
Completion Time: 2.00 - 3.00 h
Topics:
Radar Meteorology

This 2-hour module presents the fundamental principles of Doppler weather radar operation and how to interpret common weather phenomena using radar imagery. This is accomplished via conceptual animations and many interactive radar examples in which the user can practice... Read more »

Introduction to Tropical Meteorology, 2nd Edition, Chapter 2: Tropical Remote Sensing Applications
Languages: English, Spanish
Publish Date: 2010-12-22
Last Updated On: 2016-03-04
Skill Level:
Completion Time: 1.00 - 1.25 h
Topics:
Radar Meteorology, Satellite Meteorology, Tropical/Hurricanes

This chapter covers remote sensing, the primary method of observing weather and climate across the global tropics. Learners will become familiar with the scientific basis and applications of radar and satellite remote sensing from examples in which clouds and precipitation... Read more »

Radar Signatures for Severe Convective Weather
Languages: English
Publish Date: 2010-12-22
Skill Level:
Completion Time: 1.25 - 1.50 h
Topics:
Convective Weather, Radar Meteorology

This resource is intended for use as a job aid by operational weather forecasters in live warning situations and as a reference tool to better understand some aspects of severe thunderstorm warning events. Thumbnail images show typical representatives for sixteen radar... Read more »
Precipitation Estimates, Part 1: Measurement

Languages: English, Spanish, French
Publish Date: 2009-06-03
Last Updated On: 2016-08-30
Skill Level: 1
Completion Time: 1.25 - 1.50 h
Topics:
Hydrology/Flooding, QPF/QPE (Precip), Radar Meteorology

This is part one of a two-module series on estimation of observed precipitation. Through use of rich illustrations, animations, and interactions, this module provides an overview of the science of precipitation estimation using various measuring platforms. First, we define ... Read more »

Precipitation Estimates, Part 2: Analysis

Languages: English
Publish Date: 2010-01-19
Skill Level: 2
Completion Time: 1.25 - 1.50 h
Topics:
Hydrology/Flooding, QPF/QPE (Precip), Radar Meteorology

This is part two of a two-module series on estimation of observed precipitation. Through the use of rich illustrations, animations, and interactions, this module provides an introduction to the science behind successful application of the products and tools available ... Read more »
Remote Sensing Using Satellites, 2nd Edition

Languages: English, Spanish
Publish Date: 2012-09-18
Skill Level: 0
Completion Time: 1.25 - 1.50 h
Topics:
Satellite Meteorology,
Tropical/Hurricanes

The second edition of the popular "Remote Sensing Using Satellites" module updates imagery of recent hurricanes as well as other phenomena from more recent satellites. The suggested audience for this module is high school and undergraduate students. Learn about remote... Read more »

Basics of Visible and Infrared Remote Sensing

Languages: English, Spanish, French
Publish Date: 2014-02-05
Skill Level: 1
Completion Time: 1.50 - 2.00 h
Topics:
Satellite Meteorology

This lesson presents the scientific and technical basis for using visible and infrared satellite imagery so forecasters can make optimal use of it for observing and forecasting the behaviour of the atmosphere. The concepts and capabilities presented are common to most... Read more »

Satellite Meteorology: Introduction to Using the GOES Sounder

Languages: English, Spanish
Publish Date: 2006-12-05
Skill Level: 2
Completion Time: .75 - 1.00 h
Topics:
Satellite Meteorology

This module, adapted for the Web from the CD-ROM released in 1998, reviews GOES sounder characteristics, data products, and applications concurrent with the GOES I(8)-P satellites. Topics covered include the electromagnetic spectrum and sounder channel selection, weighting... Read more »

GOES-R ABI: Next Generation Satellite Imaging

Languages: English, Spanish
Publish Date: 2013-02-19
Skill Level: 1
Completion Time: 1.00 - 1.25 h
Topics:
Satellite Meteorology

This extension of the COMET module "GOES-R: Benefits of Next Generation Environmental Monitoring" focuses on the ABI instrument, the satellite's 16-channel imager. With increased spectral coverage, greater spatial resolution, more frequent imaging, and improved image... Read more »
GOES-R ABI: Next Generation Satellite Imaging
This extension of the COMET module "GOES-R: Benefits of Next Generation Environmental Monitoring" focuses on the ABI instrument, the satellite's 16-channel imager. With increased spectral coverage, greater spatial resolution, more frequent imaging, and improved image ...

GOES-R GLM: Introduction to the Geostationary Lightning Mapper
This extension of the COMET module "GOES-R: Benefits of Next Generation Environmental Monitoring" focuses on the Geostationary Lightning Mapper (GLM) instrument, the satellite's lightning mapper. The GLM will provide continuous lightning measurements over a large ...

GOES-R Geostationary Lightning Mapper (GLM) North America Examples
The Geostationary Lightning Mapper (GLM) aboard the GOES-R series satellites provides continuous lightning detection from space, giving forecasters a unique tool to monitor developing thunderstorms. This 45 minute lesson introduces learners to the benefits of using GLM ...

Basic Satellite Imagery Interpretation
This lesson teaches the basics of satellite image interpretation to forecasters, meteorology students, and other interested learners, with an emphasis on the African region. It begins by briefly describing visible, infrared, and water vapour channels, as well as RGBs and ...

Skills: 1
Completion Time: 1.25 - 1.50 h
Topics: Convective Weather, Fog and Low Status, Satellite Meteorology, Tropical/Hurricanes, Winter Weather

Skill Level: 1
Completion Time: 1.00 h
Topics: Satellite Meteorology

Skill Level: 1
Completion Time: 1.00 h
Topics: Satellite Meteorology

Skill Level: 1
Completion Time: 1.00 h
Topics: Satellite Meteorology

Skill Level: 1
Completion Time: 1.00 h
Topics: Satellite Meteorology
Forecasting Sensible Weather from Water Vapour Imagery

Languages: English, French
Publish Date: 2016-03-29
Skill Level: 5
Completion Time: 1.00 - 1.25 h
Topics:
- Mesoscale Meteorology, Other
- Satellite Meteorology

Forecasting nowcasting at the synoptic scale is rapidly being replaced by the numerical weather prediction models. However, there are plenty of opportunities for you as a forecaster to improve on those forecasts with simple comparisons of water vapour hand analyses and ... Read more »

Satellite Feature Identification: Conveyor Belts

Languages: English, French, Spanish, German
Publish Date: 2014-03-18
Last Updated On: 2017-02-13
Skill Level: 2
Completion Time: .50 - .75 h
Topics:
- Satellite Meteorology

Conveyor belts highlight important atmospheric processes that can be advantageous for making forecasts. They can be used for identifying general temperature patterns, defining the extent of cloud cover, predicting moisture return, evaluating stability, forecasting wind ... Read more »

Satellite Feature Identification: Inferring Three Dimensions from Water Vapour Imagery

Languages: English, French, Spanish
Publish Date: 2013-06-25
Last Updated On: 2013-05-22
Skill Level: 2
Completion Time: .50 - .75 h
Topics:
- Satellite Meteorology

We think in three-dimensional space and a fourth dimension, time. Therefore, we should think about the atmosphere in similar terms. However, we are often stuck with two-dimensional maps. Water vapor imagery can help us break out of that flatland and move to more ... Read more »

Microwave Remote Sensing: Clouds, Precipitation, and Water Vapor

Languages: English, Spanish
Publish Date: 2006-10-06
Skill Level: 2
Completion Time: 1.00 - 1.25 h
Topics:
- Hydrology/Flooding, QPF/QPE (Precip), Satellite Meteorology, Tropical/Hurricanes

This module provides an introduction to polar-orbiting-satellite-based microwave remote sensing products that depict moisture and precipitation in the atmosphere. The module begins with definitions and descriptions of total precipitable water and cloud liquid water ... Read more »
GOES-R Series Faculty Virtual Course: Tropical Cyclones
Languages: English
Publisher Date: 2017-09-08
Skill Level: 1
Completion Time: .25 - .50 h
Topics:
Satellite Meteorology, Tropical/Hurricanes

In this webinar recording, Andrea Schumacher demonstrates the GOES-R series’ new capabilities for real-time tropical cyclone analysis and monitoring, which will contribute significantly to improved hurricane track and intensity forecasts. The GOES-16 imager will provide ...
Read more »

Satellite Feature Identification: Cyclogenesis
Languages: English, Spanish, French
Publisher Date: 2012-08-17
Last Updated On: 2015-07-02
Skill Level: 1
Completion Time: .50 - .75 h
Topics:
Satellite Meteorology

This lesson, Satellite Feature Identification: Cyclogenesis, uses water vapor satellite imagery to present a satellite perspective of basic features associated with the formation and development of extratropical cyclones. First, through an initial case study, the precursor ...
Read more »

MJO, Equatorial Waves, and Tropical Cyclogenesis
Languages: English, Spanish
Publisher Date: 2012-11-13
Last Updated On: 2014-07-02
Skill Level: 2
Completion Time: .75 - 1.00 h
Topics:
Convective Weather, Tropical/Hurricanes

This case study focuses on monitoring of the MJO and equatorial waves and their role in tropical cyclogenesis. Learners will use conceptual models to understand the structure of the MJO and equatorial waves. They will identify and monitor those circulations using ...
Read more »

Cours sur l’interprétation de l’imagerie satellitaire de vapeur d’eau
Languages: French, English
Time to Complete: 3-5 hrs
Topics:
Winter Weather, Satellite Meteorology

Ce cours à progression autocontrolee introduit le concept de puissance de la pensee dynamique. Afin d’appliquer ce mode de pensee a l’atmosphere en temps reel est un defi, meme pour les scientifiques les plus aguerris. Ce cours constitue la premiere etape ...
Read more »