



# **GOES and GOES-R<sup>+</sup> Satellite Meteorology Education Activities and Resources**

Focus on Resources from MetEd, VISIT, SHyMet, and  
CIRA's WMO Virtual Lab Activities

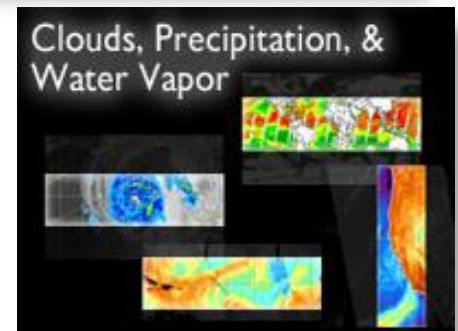


# Highlights from COMET's Satellite Meteorology Education Resources



# Freely available online Training Modules from COMET that are Relevant to GOES and GOES-R+

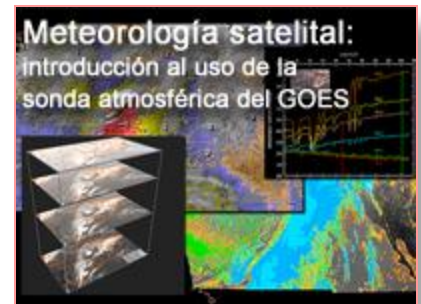
- Atmospheric Dust (NEW!)
  - Creating Meteorological Products from Satellite Data
  - Dynamic Feature Identification: The Satellite Palette
  - Forecasting Dust Storms, Version 2
  - Satellite Meteorology: GOES Channel Selection, Version 2 (NEW!)
    - Available in English and Spanish!
  - GOES-R: Benefits of Next-Generation Environmental Monitoring
    - Available in English and Spanish!
  - Introduction to Tropical Meteorology, 2<sup>nd</sup> Ed.:  
Chapter on Tropical Remote Sensing Applications
  - Monitoring the Climate System with Satellites (NEW!)
  - Multispectral Satellite Applications: Monitoring the Wildland Fire Cycle
  - Multispectral Satellite Applications: RGB Products Explained
  - Recognition and Impact of Vorticity Maxima and Minima in Satellite Imagery
  - Remote Sensing Using Satellites, 2<sup>nd</sup> Ed. (coming soon)
  - Satellite Feature Identification: Atmospheric Rivers (NEW!)
  - Satellite Feature Identification: Blocking Patterns
  - Satellite Feature Identification: Deformation Zone Analysis
  - Satellite Feature Identification: Deformation Zone Diagnosis
  - Satellite Feature Identification: Deformation Zone Distribution
  - Satellite Feature Identification: Ring of Fire
  - Satellite Meteorology: Introduction to Using the GOES Sounder
- All available on demand at <http://meted.ucar.edu/topics/modules/satellite>



# COMET's Spanish Modules Relevant to GOES and GOES-R<sup>+</sup>

## Español

- GOES-R: beneficios de la observación ambiental de próxima generación
- Meteorología satelital: Selección de canales del GOES, vers. 2
- Cenizas volcánicas: Herramientas de observación y modelos de dispersión
- Introducción a la meteorología tropical, versión 2, Capítulo 2: Aplicaciones de percepción remota en los trópicos
- Identificación satelital de estructuras: arco de convección
- Identificación satelital de estructuras: patrones de bloqueo
- Aplicaciones satelitales multiespectrales: explicación de los reales RGB
- Máximos de vorticidad y estructuras en coma
- Análisis de zonas de deformación
- Taller regional de entrenamiento satelital de la OMM
- Pronóstico de tormentas de polvo, versión 2
- Creación de productos meteorológicos a partir de observaciones satelitales
- Aplicaciones satelitales multiespectrales: el ciclo de vida de los incendios en zonas despobladas
- Meteorología satelital: introducción al uso de la sonda atmosférica del GOES



**All available for free, on demand at <http://meted.ucar.edu/topics/modules/satellite>**

Select, Spanish in the languages field

# COMET French Modules Relevant to GOES and GOES-R<sup>+</sup>

## Français

- Identification des éléments satellitaires: L'arc de convection
- Identification des caractéristiques satellitaires: Situations de blocage
- Analyse d'une zone de déformation
- Diagnostic d'une zone de déformation
- L'élaboration de produits météorologique à partir de données satellitaires
- Maximums de tourbillon et configurations en virgule
- Minimums de tourbillon et configurations en virgule miroir

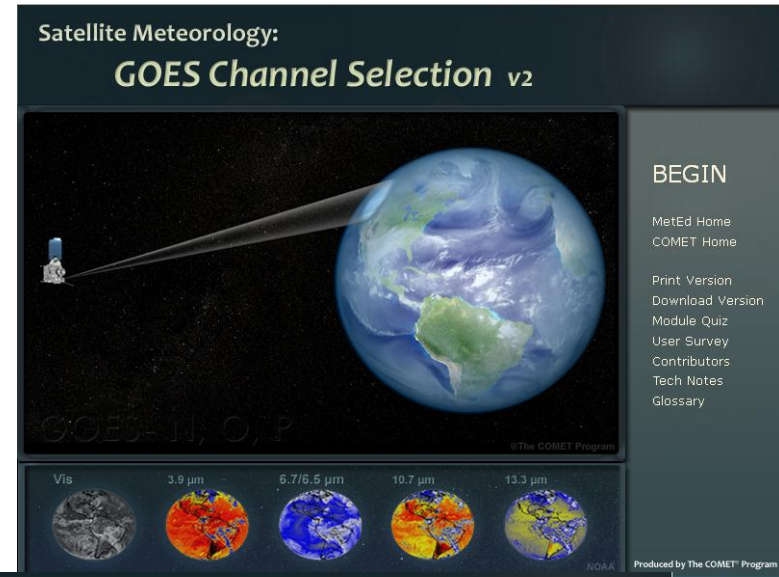


**All available for free, on demand at <http://meted.ucar.edu/topics/modules/satellite>**

Select, French in the languages field

# GOES Channel Selection, 2<sup>nd</sup> Ed. Most Popular GOES-related Module

- Includes examples and reviews imager channels and their use
- Improvements to GOES-N/O/P (13/14/15)
  - 13.3  $\mu\text{m}$  CO<sub>2</sub> channel (GOES-14 & -15)
  - Vis channel spectral response
  - Radiometric performance
  - Pixel geolocation
  - Battery storage for shortened data outages – shorter fall and spring eclipse periods
- ~1.5 hours long
- Available in [English](#) and [Spanish](#)





# Example from GOES Channel Selection, 2<sup>nd</sup> Edition

**GOES Channel Selection v2**  
Produced by The COMET<sup>®</sup> Program

**Introduction**

- Visible
- Shortwave Infrared
- Water Vapor (GOES 12-15)
- Longwave Infrared
- "Dirty" Window (12  $\mu\text{m}$  on GOES 8-11)
- Carbon Dioxide (GOES 12-15)
- GOES-13, 14, 15 Improvements
- Module Summary
- Cloud Type Table
- Channels Concept Map

Switch to Text

HOME  
PRINT VERSION  
QUIZ  
GLOSSARY  
SURVEY

**Introduction** 0:18 0:51

**Visible**

**3.9  $\mu\text{m}$  Shortwave IR**

**6.5  $\mu\text{m}$  Water Vapor**

**10.7  $\mu\text{m}$  IR Window**

**12.0  $\mu\text{m}$  Dirty Window (GOES 8-11)**

**13.3  $\mu\text{m}$  CO<sub>2</sub> (GOES 12-15)**

30 -10 -55 C

NOAA / CIMSS

PREVIOUS NEXT

Each imager channel has its own section with information on both specifications and usage guidance

# GOES Channel Selection, 2<sup>nd</sup> Edition

## GOES-13, 14, 15 Improvements

**GOES Channel Selection v2**

Produced by The COMET<sup>®</sup> Program

- Introduction
- Visible
- Shortwave Infrared
- Water Vapor (GOES 12-15)
- Longwave Infrared
- "Dirty" Window (12  $\mu\text{m}$  on GOES 8-11)
- Carbon Dioxide (GOES 12-15)
- GOES-13, 14, 15 Improvements**
- No Spring and Fall Eclipse Outages
- Pixel Geolocation
- Radiometric Image Quality
- CO<sub>2</sub>/13.3  $\mu\text{m}$  Channel Resolution (GOES-14,15)
- Summary
- Module Summary
- Cloud Type Table
- Channels Concept Map

Switch to Text

HOME

**No Spring and Fall Eclipse Outages**

GOES-13 Imaging During Eclipse: 10.7  $\mu\text{m}$  Channel  
15-min Imagery 0315 UTC to 0730 UTC 12 Sep 2006

30-minute gap

30-minute gap

NOAA / CIIRA

PREVIOUS NEXT

Highlighting the new chapter on GOES 13, 14, & 15

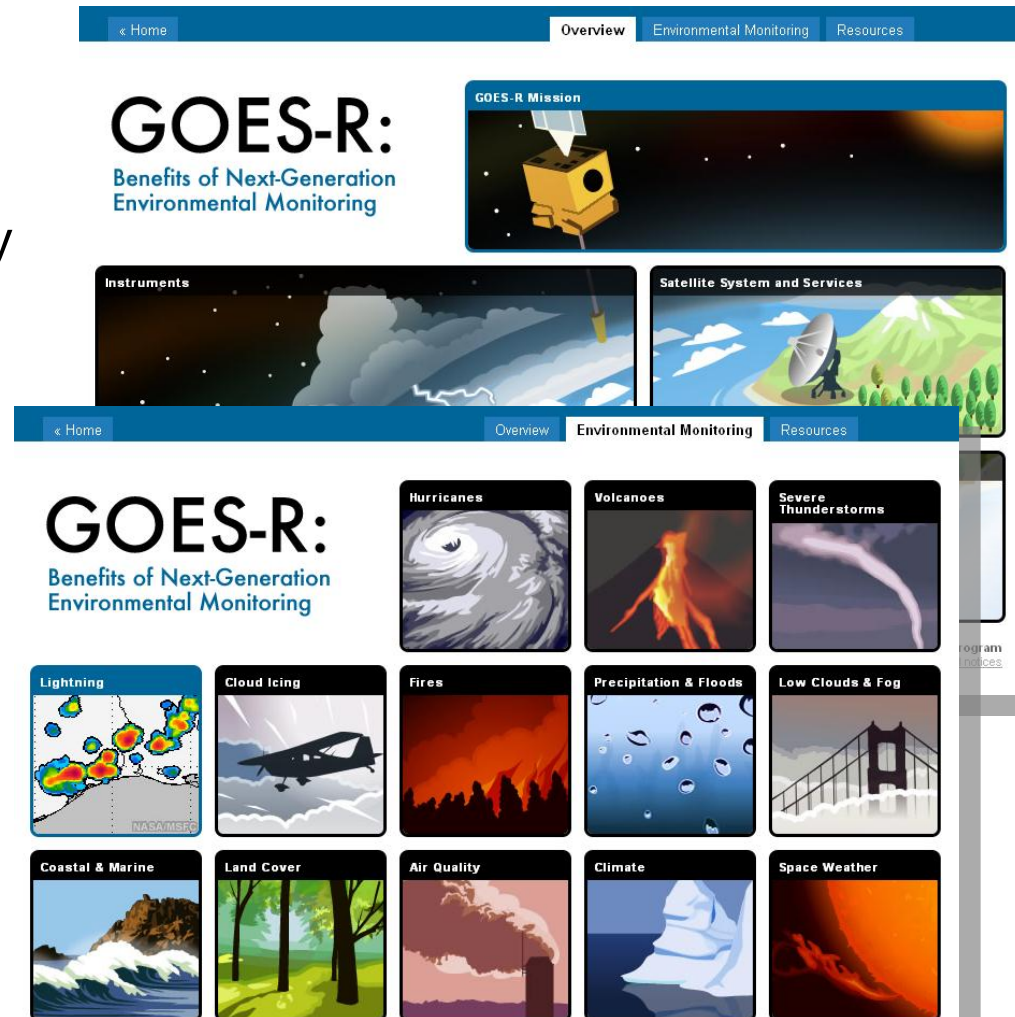


# GOES-R: Benefits of Next-Generation Environmental Monitoring Module

- Includes 3 sections: *Overview*, *Environmental Monitoring*, & *Resources*
- GOES-R benefits and the ability to monitor 13 unique hazards and phenomena

Each mini-movie includes:

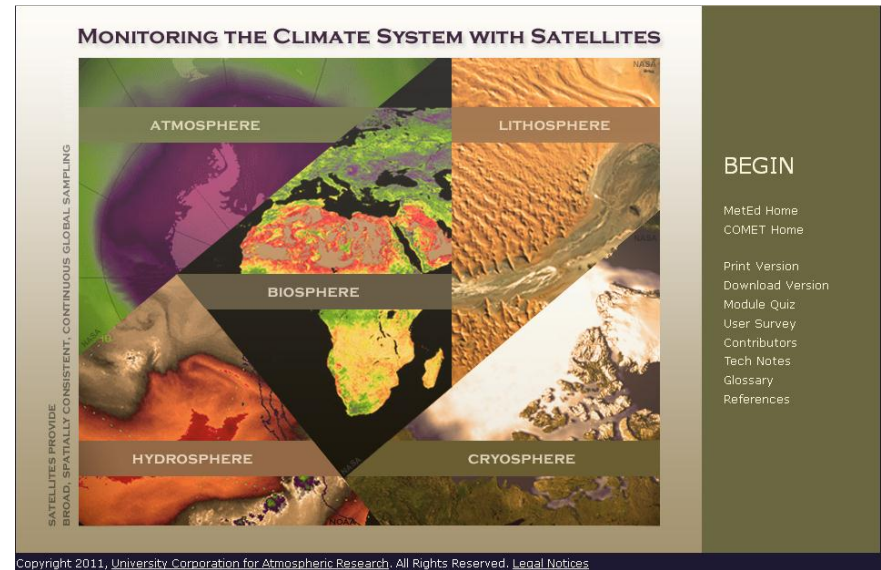
- Background and Needs (general public)
- Capabilities and Benefits (decision makers)
- Technical Improvements (forecasters)
- Published Dec. 2008, 1 hour long
- Available in [English](#) and [Spanish!](#)



The screenshot displays the GOES-R website interface. At the top, there are navigation tabs for "Home", "Overview", "Environmental Monitoring", and "Resources". The main heading reads "GOES-R: Benefits of Next-Generation Environmental Monitoring". Below this, there are two featured sections: "GOES-R Mission" showing a satellite in space, and "Satellite System and Services" showing a ground station antenna. A second set of navigation tabs is visible below these sections. The main content area features a grid of 13 hazard categories, each with a representative image: Hurricanes, Volcanoes, Severe Thunderstorms, Lightning, Cloud Icing, Fires, Precipitation & Floods, Low Clouds & Fog, Coastal & Marine, Land Cover, Air Quality, Climate, and Space Weather.

# Monitoring the Climate System with Satellites Module

- Satellite role in observing key atmospheric elements and features
- Monitoring Essential Climate Variables (ESVs)
- Explore events and climate cycles at different scales (seasonal to long-term)
- Satellite contributions to improving understanding, monitoring, and prediction capability
- Challenges and needs
- Importance of international coordination



- **Published January 2012**
- **1.5 to 2 hours long**

[Link to the module...](#)

#### 2.0 Overview

##### CHAPTER MENU

##### 2.0 Overview

###### Learning objectives

##### 2.1 Introduction to Remote Sensing

##### 2.2 Weather Radar in the Tropics

##### 2.3 Satellite Detection of Water Vapor

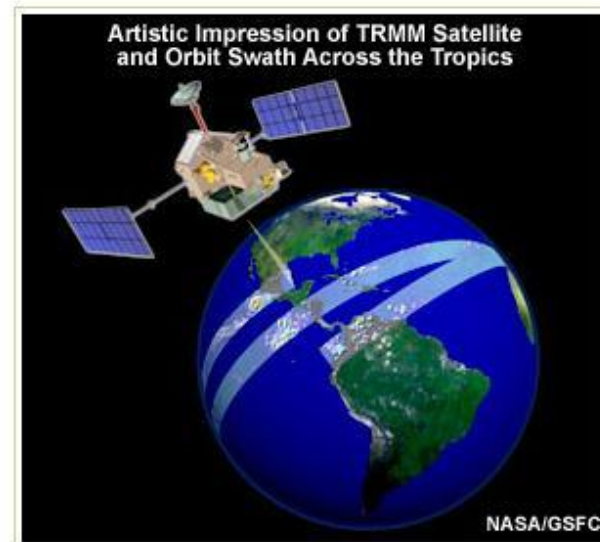
##### 2.4 Satellite Soundings

##### 2.5 Satellite Detection of Clouds and Precipitation

##### 2.6. Lightning Detection from Space

##### 2.7 Scatterometry

This chapter focuses on remote sensing—the primary method of observing weather and climate across the global tropics. We will explore how remote sensing is used and examine the types of information that it provides over formerly data-void regions. For example, recent airborne and spaceborne radar images show the detailed structure of tropical cyclones, helping us better understand intensity changes. Satellite microwave sensors are providing surface wind velocity over the oceans. Dust and volcanic ash tracking, measurement of ocean, soil and land surface help in hazard mitigation. We will also explore the use of non-meteorological satellites for meteorological purposes.



##### ONLINE CHAPTER

View [full chapter in order](#) or individual sections listed in the menu to the left

Available in [English](#) and [Spanish](#)



# Dynamic Feature Identification: The Satellite Palette –

**Dynamic Feature Identification:  
The Satellite Palette**

Currently available topics in the **Dynamic Feature Identification** series.

| English   | Français  |
|---|---|
| <a href="#">Introduction to the Satellite Palette</a>   | <a href="#">Minimums de tourbillon et configurations en virgule miroir</a> <ul style="list-style-type: none"><li>• <a href="#">Quiz</a></li></ul> |
| <a href="#">The "Ten" Commandments of the Satellite Palette</a>   | <a href="#">Maximums de tourbillon et configurations en virgule</a> <ul style="list-style-type: none"><li>• <a href="#">Quiz</a></li></ul>        |
| <a href="#">Vorticity Maxima and Comma Patterns</a> <ul style="list-style-type: none"><li>• <a href="#">Quiz Link</a></li></ul>     | <a href="#">Analyse d'une zone de déformation</a> <ul style="list-style-type: none"><li>• <a href="#">Quiz</a></li></ul>                          |
| <a href="#">Vorticity Minima and Anticomma Patterns</a> <ul style="list-style-type: none"><li>• <a href="#">Quiz Link</a></li></ul> | <a href="#">Diagnostic d'une zone de déformation</a> <ul style="list-style-type: none"><li>• <a href="#">Quiz</a></li></ul>                       |
| <a href="#">Deformation Zone Analysis</a> <ul style="list-style-type: none"><li>• <a href="#">Quiz Link</a></li></ul>               | <a href="#">Situations de blocage</a> <ul style="list-style-type: none"><li>• <a href="#">Quiz</a></li></ul>                                      |
| <a href="#">Deformation Zone Diagnosis</a> <ul style="list-style-type: none"><li>• <a href="#">Quiz Link</a></li></ul>              | <a href="#">L'arc de convection</a> <ul style="list-style-type: none"><li>• <a href="#">Quiz</a></li></ul>  |
| <a href="#">Deformation Zone Distribution</a> <ul style="list-style-type: none"><li>• <a href="#">Quiz Link</a></li></ul>           |   |
| <a href="#">Ring of Fire</a> <ul style="list-style-type: none"><li>• <a href="#">Quiz Link</a></li></ul>                            | <b>Español</b>  |
| <a href="#">Blocking Patterns</a> <ul style="list-style-type: none"><li>• <a href="#">Quiz Link</a></li></ul>                       | <a href="#">Análisis de zonas de deformación</a> <ul style="list-style-type: none"><li>• <a href="#">Prueba</a></li></ul>                         |
| <a href="#">Atmospheric Rivers</a> <ul style="list-style-type: none"><li>• <a href="#">Quiz Link</a></li></ul>                      | <a href="#">Máximos de vorticidad y estructuras en coma</a> <ul style="list-style-type: none"><li>• <a href="#">Prueba</a></li></ul>              |
|   | <a href="#">Patrones de bloqueo</a> <ul style="list-style-type: none"><li>• <a href="#">Prueba</a></li></ul>                                      |
|   | <a href="#">Arco de convección</a> <ul style="list-style-type: none"><li>• <a href="#">Prueba</a></li></ul>                                       |

**NEW!**

## Satellite Feature Identification: Blocking Patterns



## Satellite Feature Identification: Ring of Fire



- Coming next: Short Waves and Cyclogenesis

[Link to Dynamic Feature Identification: Satellite Palette interface...](#)



# Volcanic Ash: Observation Tools and Dispersion Models Module

- Example of satellite training *embedded* in other training modules
- Module includes tools and techniques for identifying and forecasting volcanic ash transport
  - Strengths & weaknesses
- Use satellite, radar, observations, and model output to identify and help forecast ash transport, and produce forecast products

[Link to module...](#)



- **Visible imagery**
- **Thermal IR imagery**
- **Shortwave IR imagery**
- **False-color imagery**
- **Split-window imagery**
- **Principal component imagery**
- **SW IR Reflectance product**
- **SO2 product**



# Another Resource: The ESRC: Environmental Satellite Resource Center

[www.meted.ucar.edu/esrc](http://www.meted.ucar.edu/esrc)

The screenshot shows the ESRC website interface. At the top left is the ESRC logo, which includes a satellite icon and the text "ESRC environmental satellite resource center". To the right of the logo are language links for "Español" and "English", and buttons for "COMET" and "MetEd". Below the logo is a navigation menu with links for "search", "about ESRC", "send your comments", "submit a resource", "edit your resource submissions", and "help". The main content area features a heading "The Environmental Satellite Resource Center provides..." followed by a description of the center's mission and a "more info" link. Below this are three search options: "Basic search" with a text input field and a "search" button, "Categorical search (click to expand / collapse)", and "Guided keyword search (click to expand / collapse)". At the bottom of the page, there is a footer with the text "ESRC Version 2.0 | Copyright 2008-2010, University Corporation for Atmospheric Research. All Rights Reserved. Legal Notices".



# Simple FREE Registration Required to Access Modules

English Español

# MetEd

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...and required to access our educational materials. Once registered, you'll have access to hundreds of hours of quality content, all available free for non-commercial use.

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All fields labeled with (\*) are required.

I am at least age 13\*

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In order to better serve our users and sponsors, access to our online materials requires registration. To learn more about registering or to get help with common questions about our site, please visit our FAQs.

[Go](#)



# Highlights from VISIT including SHyMet and other Education Activities





# Virtual Institute for Satellite Integration and Training



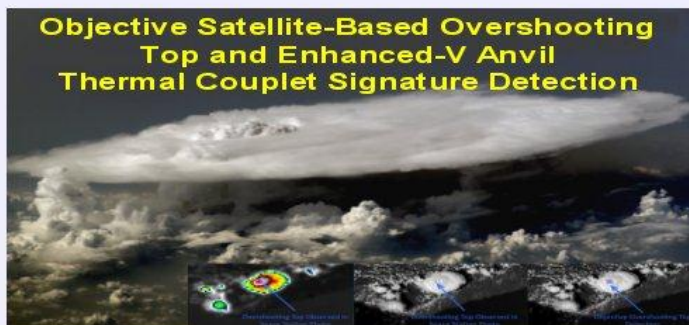
rammb.cira.colostate.edu/training/visit/

## VISIT

## Virtual Institute for Satellite Integration Training

### VISIT Home

- VISIT Home
- Training Sessions
- Training Calendar
- Blog Sites
- VISIT Satellite Chat
- The VISIT Program
- VISIT People
- VISIT FAQ
- Links / Tutorials
- RAMSDIS Online
- VISIT Training DVD



VISIT is a joint effort involving NOAA-NESDIS Cooperative Institutes, the National Environmental Satellite Data and Information Service (NESDIS), and the National Weather Service (NWS). The primary mission of VISIT is to accelerate the transfer of research results based on atmospheric remote sensing data into NWS operations using distance education techniques.



Teletraining Calendar, Signup and Installation

NEW What's New?





# Virtual Institute for Satellite Integration and Training



## VISIT

### New Training Sessions

These are VISIT training sessions that have debuted within the last 2 years.

- [VISIT Home](#)
- [Training Sessions](#)
- [Training Calendar](#)
- [Blog Sites](#)
- [VISIT Satellite Chat](#)
- [The VISIT Program](#)
- [VISIT People](#)
- [VISIT FAQ](#)
- [Links / Tutorials](#)
- [RAMSDIS Online](#)
- [VISIT Training DVD](#)

- VISIT Satellite Chat (presented monthly since February 2012)
- GOES-15 Becomes GOES-West (December 2011)
- Volcanoes and Volcanic Ash Part 2 (March 2011)
- Objective Satellite-Based Overshooting Top and Enhanced-V Anvil Thermal Couplet Signature Detection (February 2011)
- Synthetic Imagery in Forecasting Severe Weather (February 2011)
- Synthetic Imagery in Forecasting Orographic Cirrus (January 2011)
- Morphed TPW Detection (December 2010)
- Regional Satellite Cloud Composites from GOES (December 2010)
- Volcanoes and Volcanic Ash Part 1 (December 2010)
- The UW NearCasting Product (August 2010)
- ASCAT Winds (August 2010)
- Water Vapor Imagery Analysis for Severe Thunderstorm Forecasting (July 2010)
- An Overview of Tropical Cyclone Track Guidance Models used by NHC (July 2010)
- An Overview of Tropical Cyclone Intensity Guidance Models used by NHC (July 2010)
- Ensemble Tropical Rainfall Potential (eTRaP) (June 2010)
- The UW Convective Initiation Product (June 2010)
- POES and AVHRR Satellite Data in AWIPS (May 2010)
- Basic Satellite Interpretation in the Tropics (December 2009)





**VISIT**



University of Wisconsin-Madison Space Science and Engineering Center  
**Cooperative Institute for  
Meteorological Satellite Studies**

## Satellite Hydrology and Meteorology (SHyMet)

A new course dedicated to operational satellite meteorology

### Main Objective

To prepare National Oceanic and Atmospheric Administration (NOAA) and National Weather Service (NWS) users for the latest polar orbiting and geostationary satellite data and products in the warning and forecast programs with direct links to Government Performance Results Act (GPRA) goals.

Completes end-to-end program cycle for space-based remote sensing as part of NOAA's Strategic Plan for an Integrated Global Environmental Observation and Data Management System and Global Earth Observation System of Systems (GEOSS).

A comprehensive Satellite Hydrology and Meteorology (SHyMet) Course is being developed to pull together existing, new, and updated satellite training materials into a structured course. The course will cover basic principles of satellite imaging and sounding, channels and products, identification of atmospheric and surface phenomena, and the integration of meteorological analysis with satellite observations and products into the weather forecasting and warning process. It will also include advanced topics on identification of atmospheric and surface phenomena with associated case examples. The expanded course will consist of a combination of web-based instruction and teletraining. The teletraining will be met by utilizing the already established Virtual Institute for Satellite Integration Training ([VISIT](#)) program.

A key aspect of this satellite-training program will be the linkage of new data, products, and forecasting techniques developed by NOAA's joint centers (such as the Joint Center for Satellite Data Assimilation (JCSDA), the Short-term Prediction Research and Transition Center (SPoRT) and the many NWS National Centers) and cooperative institutes such as CIRA and Cooperative Institute for Meteorological Satellite Studies (CIMSS) to the NWS.

- [SHyMet Home](#)
- [All SHyMet Modules](#)
  - [Intern Course](#)
  - [Forecaster Course](#)
  - [Tropical Course](#)
  - [Severe Course](#)
- [SHyMet Training DVD](#)
- [Key Contributors](#)
- [Sponsors](#)



## SHyMet: Severe Thunderstorm Forecasting Training Topics

- [SHyMet Home](#)
- [All SHyMet Modules](#)
  - [Intern Course](#)
  - [Forecaster Course](#)
  - [Tropical Course](#)
  - [Severe Course](#)
    - [Training Topics](#)
    - [Objectives](#)
    - [FAQ](#)
- [SHyMet Training DVD](#)
- [Key Contributors](#)
- [Sponsors](#)

This course will be delivered through the [E-Learning Management System \(LMS\)](#). Be sure to register with us first before signing up for the learning path within the LMS, go to the [Introduction link](#) for registration. Some of the student guides will link to VISIT student guides, this is because we are leveraging existing VISIT training sessions for this course. Remember, if you have taken a training session in the past, it will either be on record in the LMS, or you can just take the quiz if you recognize the training session from the past. The first five core courses are required to take in sequence. Any course with an associated WES exercise is optional, if you want to participate in the WES exercises, let us know when you sign up so that we can give you instructions.

### Student Guides:

#### Core Courses:

1. [Mesoscale Analysis of Convective Weather Using GOES RSO Imagery](#) (60 minutes)
2. [Use of GOES RSO imagery with other Remote Sensor Data for Diagnosing Severe Weather across the CONUS \(RSO 3\)](#) (130 minutes)
3. [GOES Imagery for Forecasting and Nowcasting Severe Weather](#) (60 minutes)
4. [Water Vapor Imagery Analysis for Severe Weather Forecasting](#) (60 minutes)
5. [Synthetic Imagery in Forecasting Severe Weather](#) (50 minutes)
6. [Predicting Supercell Motion in Operations](#) (80 minutes)
7. [Objective Satellite-Based Overshooting Top and Enhanced-V Anvil Thermal Couplet Signature Detection](#) (60 minutes)

#### Optional courses:

8. [Monitoring Gulf Moisture Return](#) (30 minutes)
9. [The UW Convective Initiation Product](#) (40 minutes)
10. [Coastal Severe Convective Weather](#) (55 minutes)
11. [Topographically induced Convergence Zones and Severe Convective Weather](#) (30 minutes)





**Highlights from NOAA and CIRA  
Support of  
WMO Virtual Laboratory for Training  
and Education in Satellite Meteorology  
(Vlab)**



# WMO Regional Focus Group Americas and Caribbean

Organizers: CIRA, NWS Training Division, NCEP International Desk, RTC in Costa Rica and Barbados, [WMO Virtual Laboratory \(VLab\)](#)

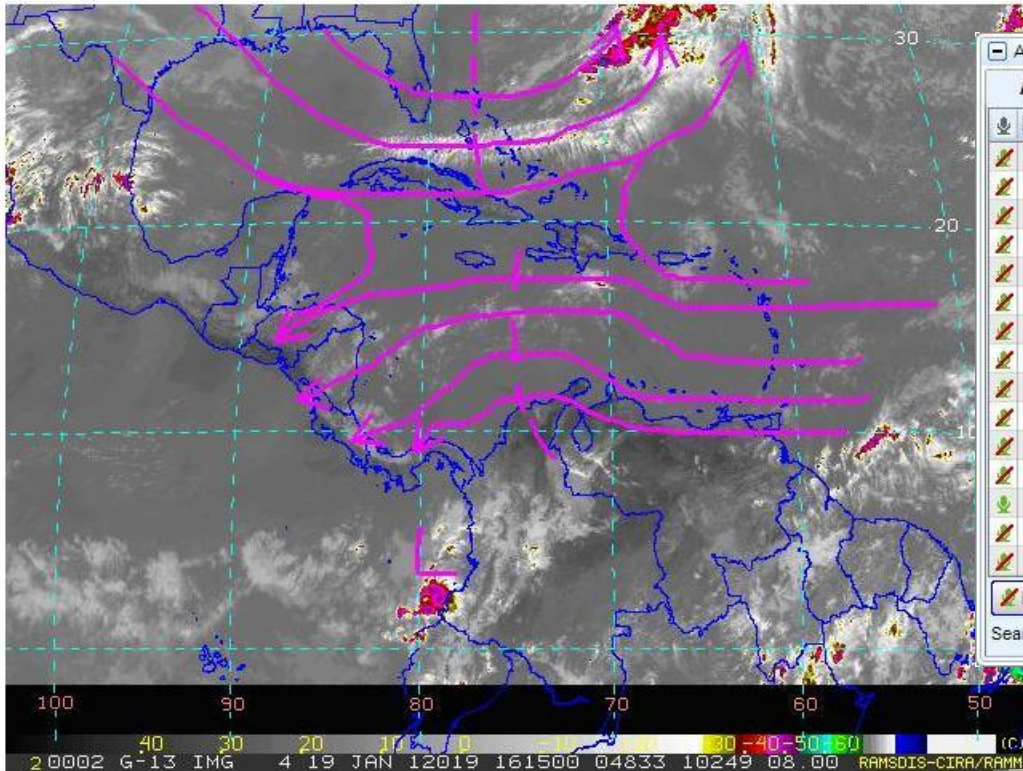
Conduct Monthly Weather Briefings  
Bilingual: English and Spanish

27 Participating countries **May 2011 – March 2012**

Antigua, Argentina, Bahamas, Barbados, Belize, Brazil, Cayman, Colombia, Costa Rica, Dominica, Dominican Republic, Ecuador, El Salvador, Grenada, Guatemala, Guyana, Honduras, Jamaica, Mexico, Panamá, Peru, Puerto Rico, Saint Kitts and Nevis, Saint Lucia, Trinidad and Tobago, Uruguay, and Venezuela



<http://rammb.cira.colostate.edu/training/rmtc/focusgroup.asp>



Attendee List (16 | Max 1001)

Attendees (15) Staff (1)

NAMES - ALPHABETICALLY

|    |    |                           |
|----|----|---------------------------|
| 🗑️ | ⚠️ | bhaleka seullal           |
| 🗑️ | ⚠️ | Eron McPherson            |
| 🗑️ | ⚠️ | Francisco Argenal         |
| 🗑️ | ⚠️ | Glen Albert               |
| 🗑️ | ⚠️ | Gloria Marin              |
| 🗑️ | ⚠️ | gregory thompson          |
| 🗑️ | ⚠️ | jesus salazar             |
| 🗑️ | ?  | Jorge Rojas               |
| 🗑️ | ?  | Juan Jose Amides Figueroa |
| 🗑️ | ⚠️ | Kathy-Ann Caesar          |
| 🗑️ | ⚠️ | Luis Garcia               |
| 🗑️ | ⚠️ | Luis R R Corea            |
| 🗑️ | ⚠️ | Mike Davison              |
| 🗑️ | ⚠️ | PABLO PERILLA             |
| 🗑️ | ⚠️ | Pilar Lopez               |

Mute All All Invite Others

Search

File Options View Help

Screen Sharing

Stopped No one sees your screen

Show My Screen Stop Showing Screen Give Keyboard & Mouse Change Presenter

Dashboard

Audience View 100%

WMO Focus Group / Grupo focal de OMM  
September 2011

Organizer: Dan Siskos | Presenter: Dan Siskos

Audio

Audio Mode: Mic & Speakers

MUTED 000000000

Audio Setup

Polls (0/0)

WMO Focus Group / Grupo focal de OMM  
September 2011  
Webinar ID: 664-545-433

GoToWebinar™



71. Caribbean 8 km IR4 (10.7um) - 4 images

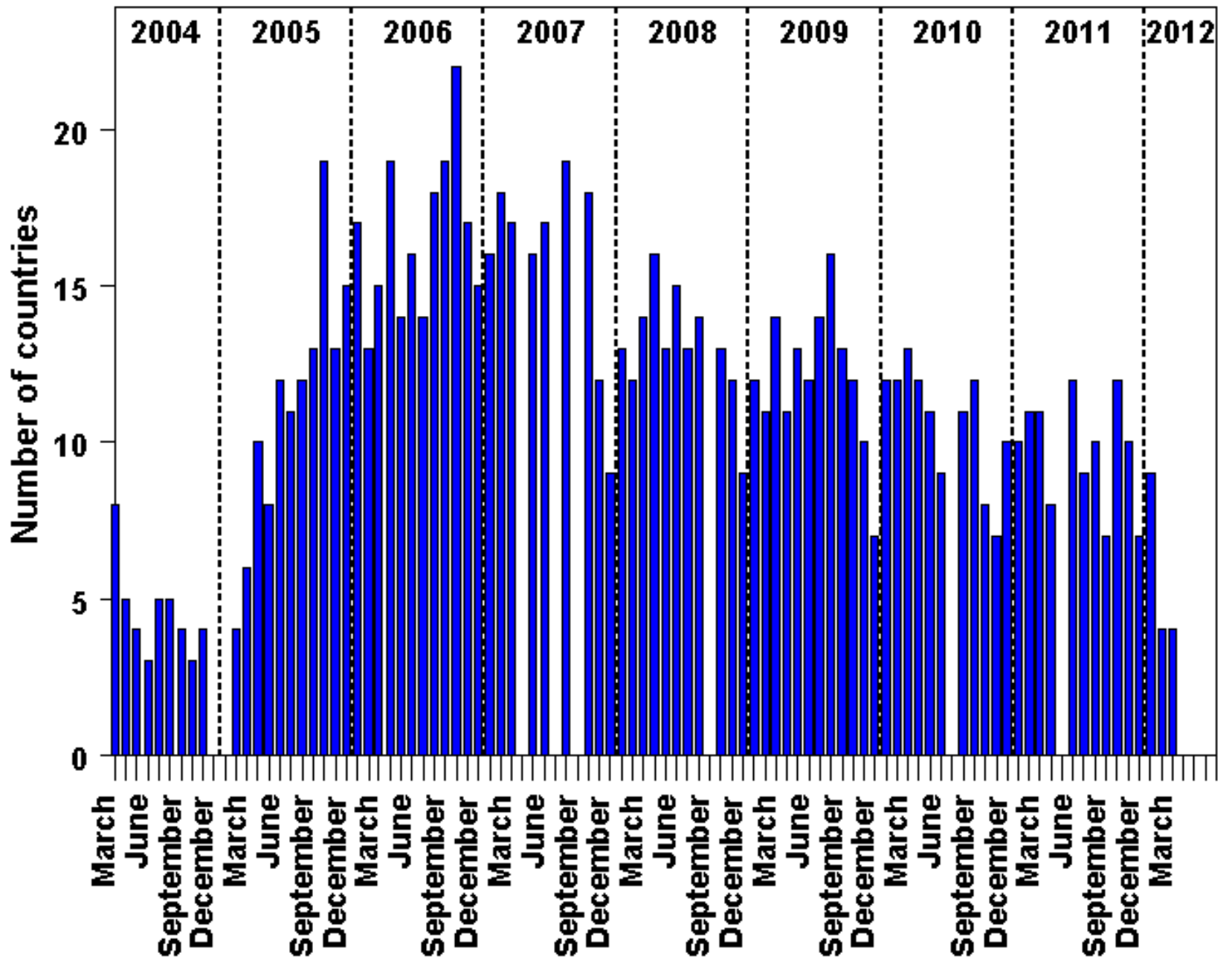
bb Red Stop Rock Animation Speed

Erase All Last < > Toggle

See URL Print Set Frame (now)

Bi-lingual:  
English and Spanish

# VLab Focus Group: Central and South America and the Caribbean







# Highlights

*Introduction to GOES-R* lecture to Caribbean users for Distance Learning Course on Aeronautical Meteorology by B. Connell - November 2012

Support for WMO VLab management group: NOAA/CIRA on committee charged to *“Write general guidelines for transition plan to support user readiness for new satellite generations”*.



## Key URLs for GOES Training from Partners

- ❑ <http://meted.ucar.edu/topics/modules/satellite>
- ❑ <http://meted.ucar.edu/esrc>
- ❑ <http://rammb.cira.colostate.edu/training/visit/>
- ❑ <http://rammb.cira.colostate.edu/training/shymet/>
- ❑ [http://rammb.cira.colostate.edu/training/shymet/severe\\_topics.asp](http://rammb.cira.colostate.edu/training/shymet/severe_topics.asp)
- ❑ <http://rammb.cira.colostate.edu/training/rmtc/focusgroup.asp>

**New materials are added frequently!**