

# Three Dimensional Spherical Display Systems and McIDAS: Tools for Science, Education and Outreach

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McIDAS Users' Group Meeting  
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# 2008 – Received a Wisconsin Idea Grant to Purchase a Globe

## Wisconsin Idea Goal is to Share the University's Research

Locally  
Statewide  
Nationally

### Locally

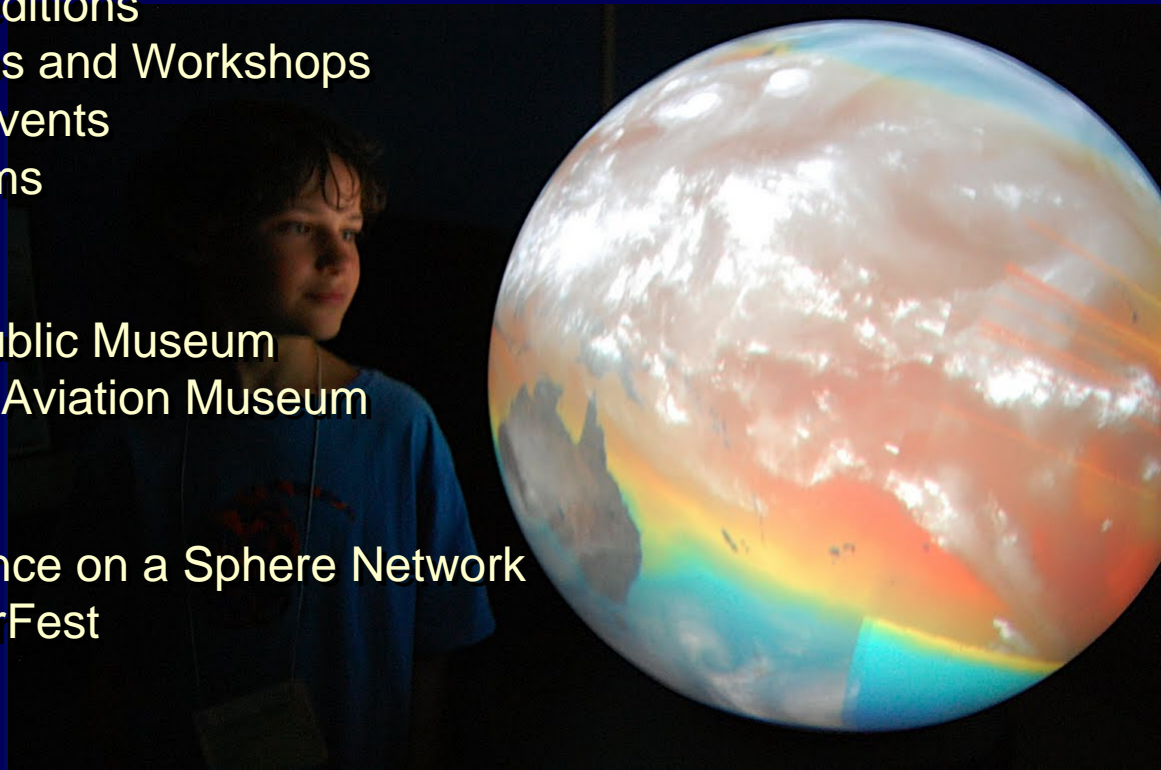
Science Expeditions  
School Groups and Workshops  
Community Events  
Local Museums

### Statewide

Milwaukee Public Museum  
Experimental Aviation Museum

### Nationally

NOAA's Science on a Sphere Network  
AMS WeatherFest



# In House Outreach

## Telling the Story

Wow Factor

Darkened Room

Bleacher Seating

Ready to Listen and Learn

Led by Outreach Specialists



# In House Outreach

## Using McIDAS-X to Create Educational Animations

Sunlight – Start at the very beginning

Daily

Yearly – **Talk about Antarctic Research**

Satellites

Sun Synchronous

Orbit

Scanning

Geostationary – **Talk about Dr. Suomi**

Orbit

Location

Scanning

Sensors

Visible

Infrared

Water Vapor

# In House Outreach

## Using McIDAS-X to Create Educational Animations

Oceans

Temperatures  
Anomalies

Air Sea Interactions

Water Vapor & Sea Surface Temperatures  
Hurricanes – Talk about Hurricane Research  
Climatology

Atmosphere

Streamlines – 3D  
Model

Planets

Weather Facts – Talk about Planetary Research

Earthquakes

# In House Outreach

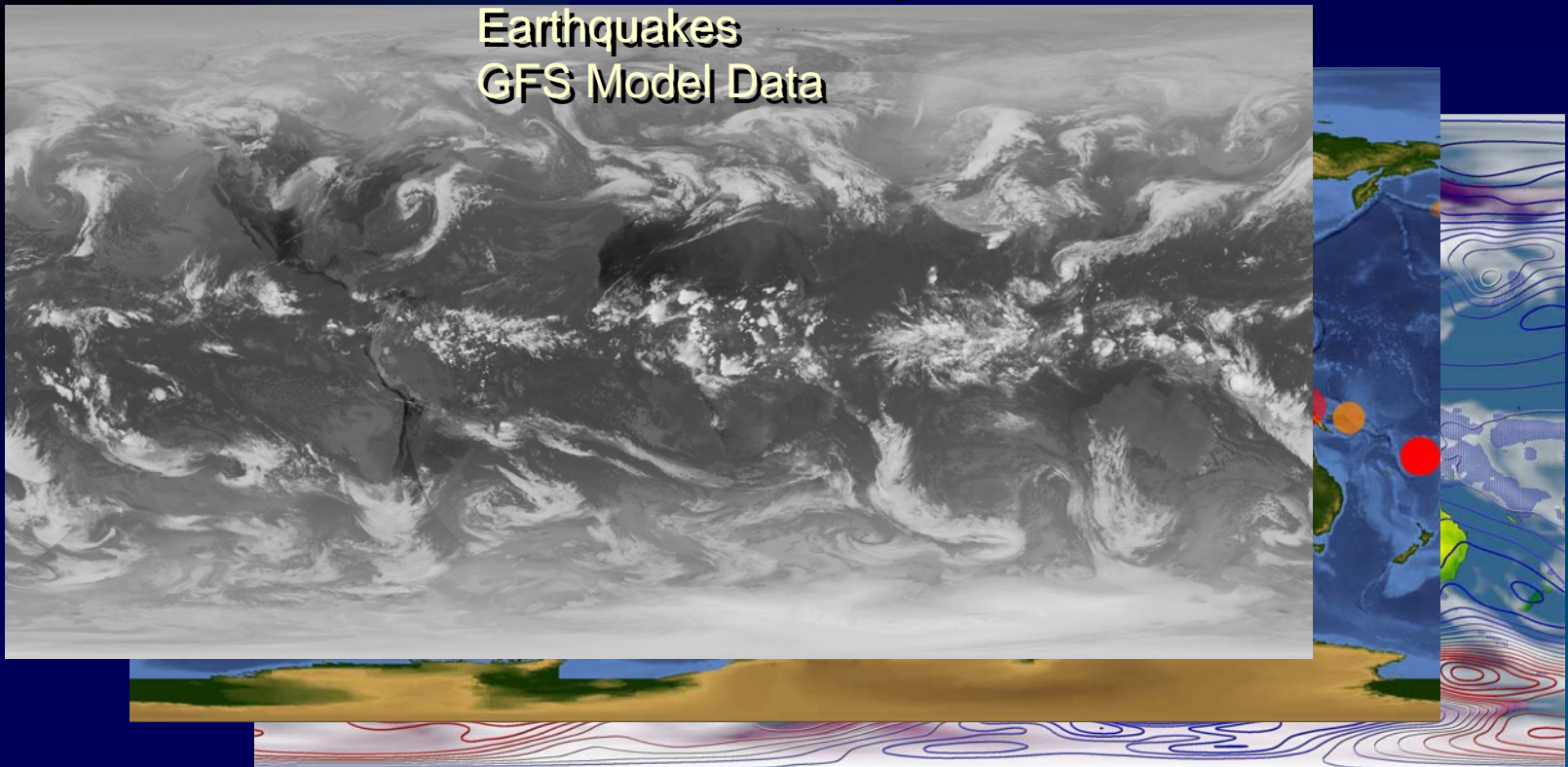
## Using McIDAS-X to Create Educational Animations

Adding in Real-Time Data

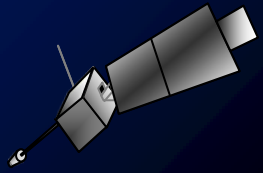
Global Satellite Images

Earthquakes

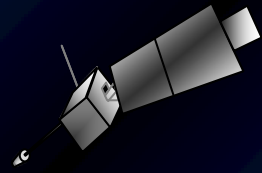
GFS Model Data



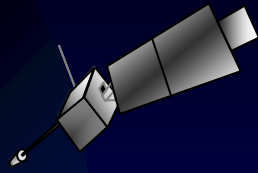
# Real-Time Data



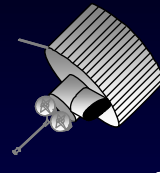
MTSAT



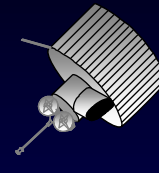
GOES-West



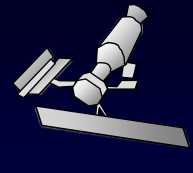
GOES-East



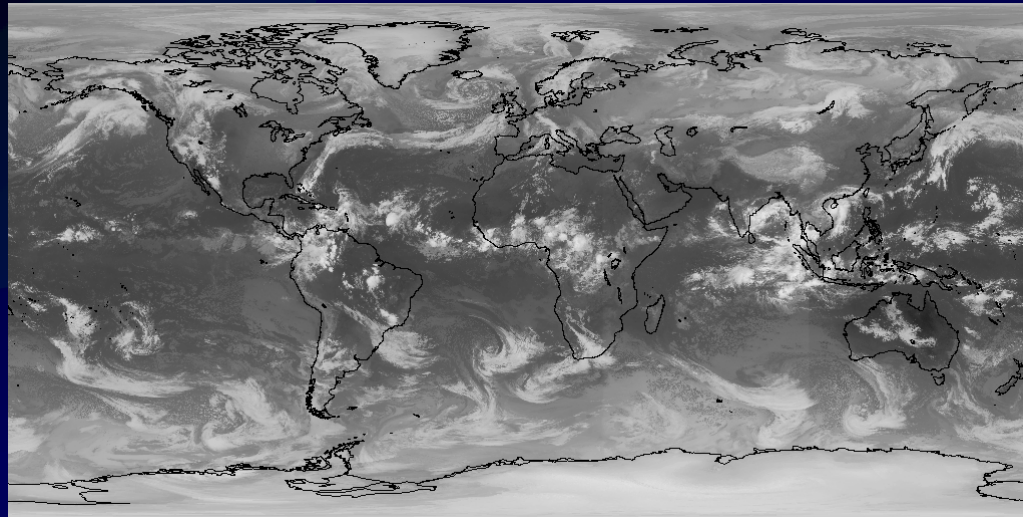
Meteosat 0°



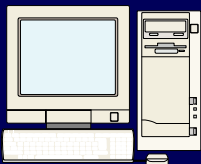
Meteosat 57°E



Polar (6)



McIDAS-X



Server

McIDAS-X or V



Client



## McIDAS-X



cron process  
mcenv  
IMGDISP  
FRMSAVE  
conversion

## McIDAS-V



create bundle  
cron process  
python script  
conversion

McIDAS-X or V



Client



# Taking the Globe on the Road

## Standalone Exhibit

Touch screen interface to create a learning environment for visitors

Choose animation

Watch the animation

Listen to description of animation

Read short facts about animation

Madison Children's Museum

Test exhibit for both us and museum

Needed parent interaction for younger kids (~ 3<sup>rd</sup> grade)

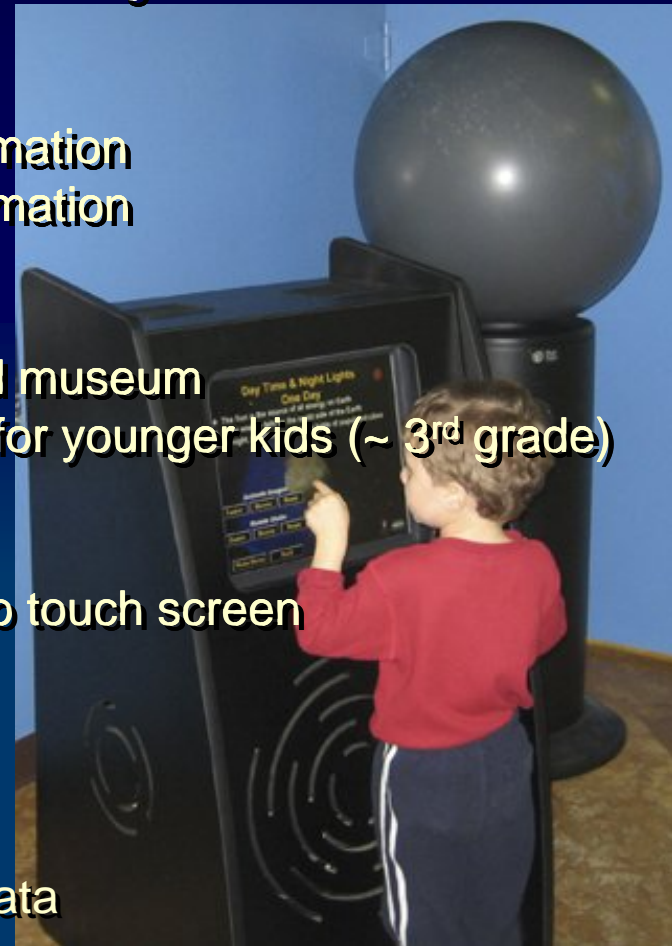
Space Place

Added planet information to touch screen

Milwaukee Public Museum

Experimental Aviation Museum

First time using real-time data





**Our Earth – Day & Night**



**Weather Satellites**



**Oceans & Hurricanes**



**Solar System**

**Touch the buttons!!**

See More on the Globe  
Learn About:  
The Earth,  
Oceans,  
Weather Satellites,  
and  
Solar System

# Polar Orbiting Satellites



- ✦ Orbit at 450 miles (715 km) above the Earth
- ✦ Travel at 17,000 miles per hour
- ✦ Collect a swath of data as the Earth rotates below, Scanning the entire earth two times a day
- ✦ Track storms near the poles

450 miles (715 km)

*Animate Images*

**Faster**

**Slower**

**Reset**

*Rotate Globe*

**Faster**

**Slower**

**Reset**

**Main Menu**

**Back**

Scale of Globe:  
1 inch = ~350 miles



# Jupiter

- ✦ Jupiter is covered with multi-colored bands of clouds of ammonia ice crystals
- ✦ The bands of clouds move rapidly at speeds greater than 200 mph
- ✦ The giant red spot seen on Jupiter is a storm system larger than Earth and has lasted more than 300 years
- ✦ Since 1973, seven spacecraft have flown by Jupiter

## Moons of Jupiter

Calisto

Europa

Ganymede

Io

*Rotate Globe*

Faster

Slower

Reset

Main Menu

Back

# Workshops Take Advantage of McIDAS-V 3D Capabilities

## Summer High School Workshops

Scientist led discussions

History

Satellites

Modeling

3D Sphere

Reinforce information

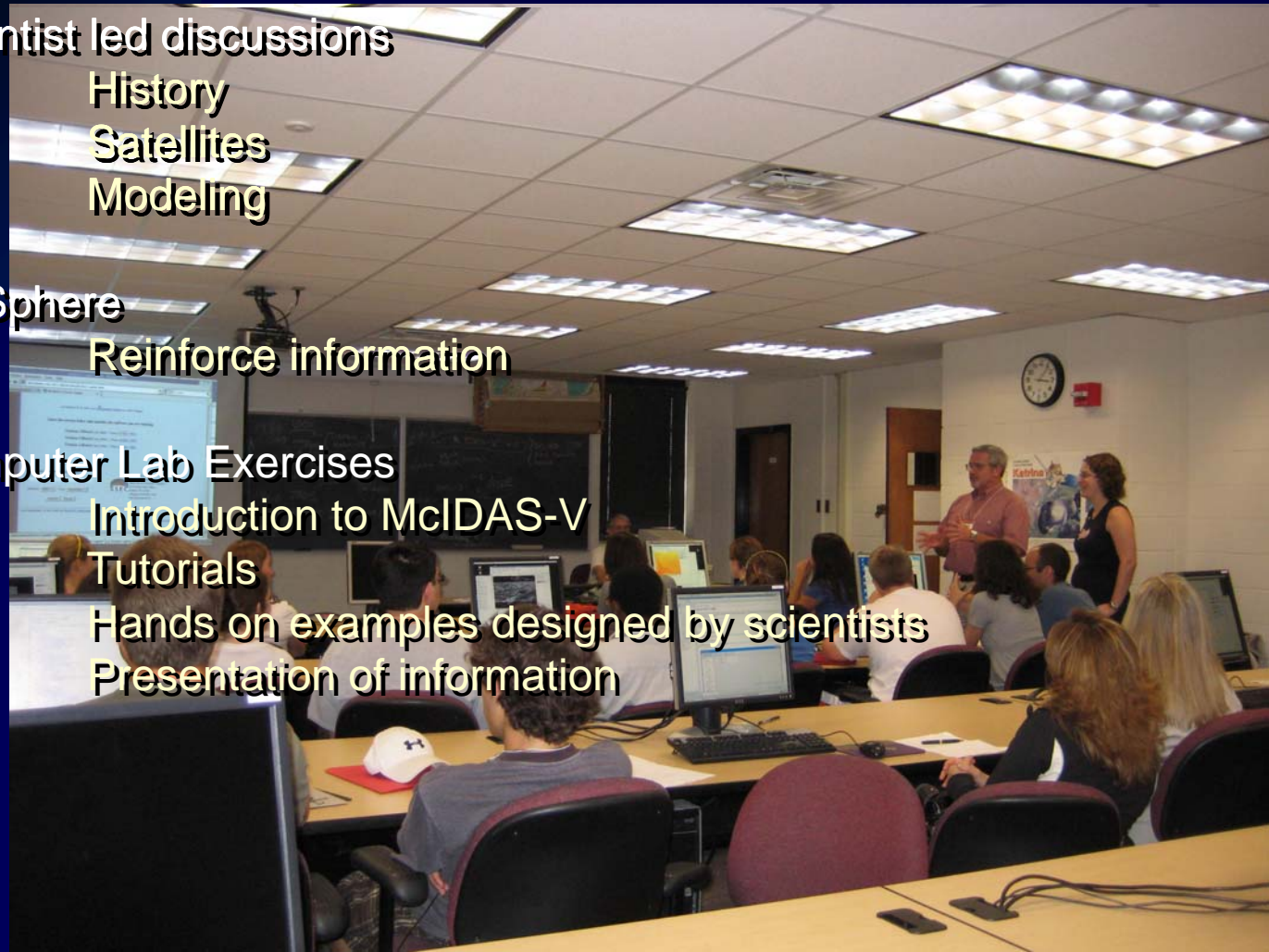
Computer Lab Exercises

Introduction to McIDAS-V

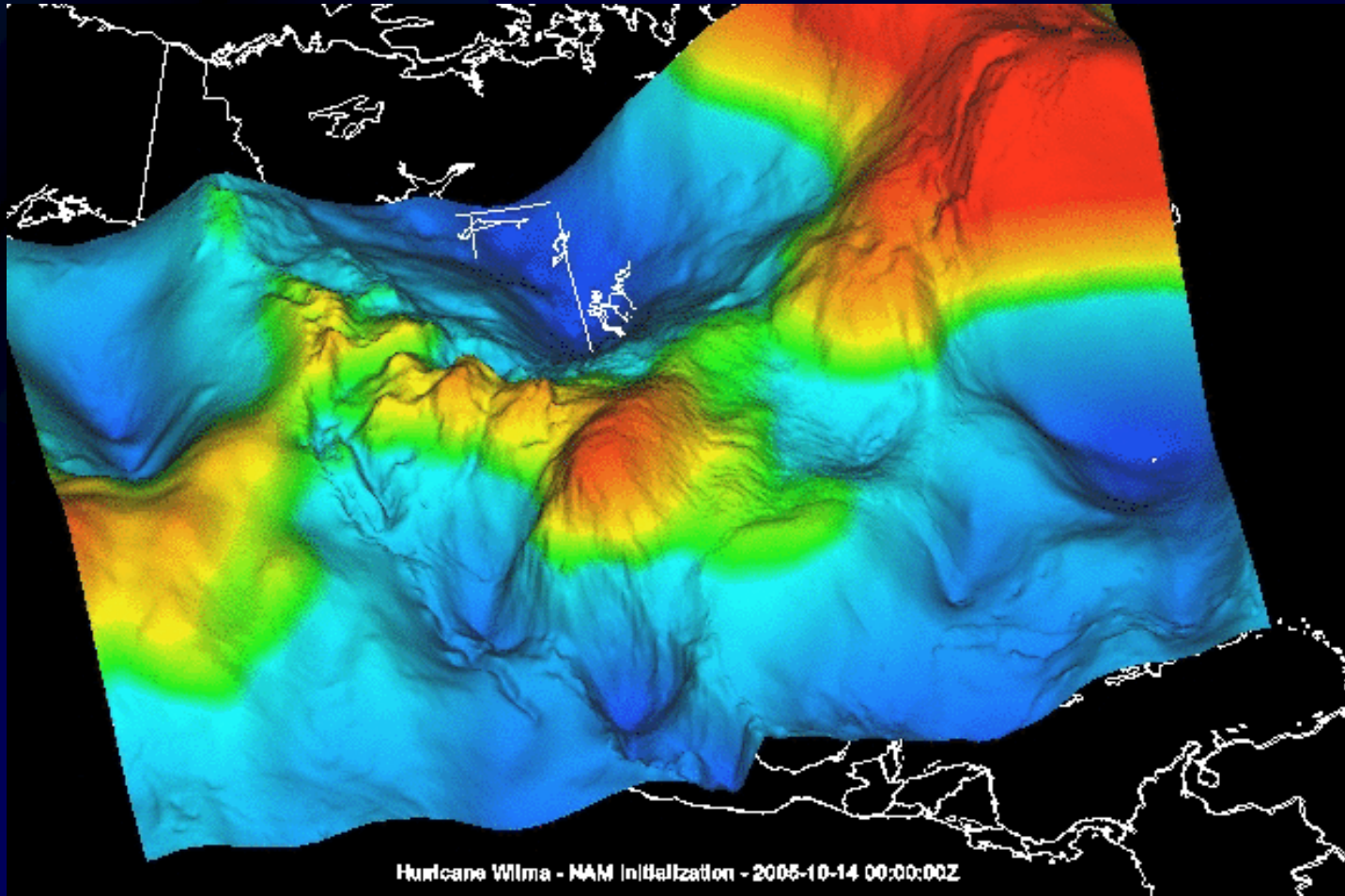
Tutorials

Hands on examples designed by scientists

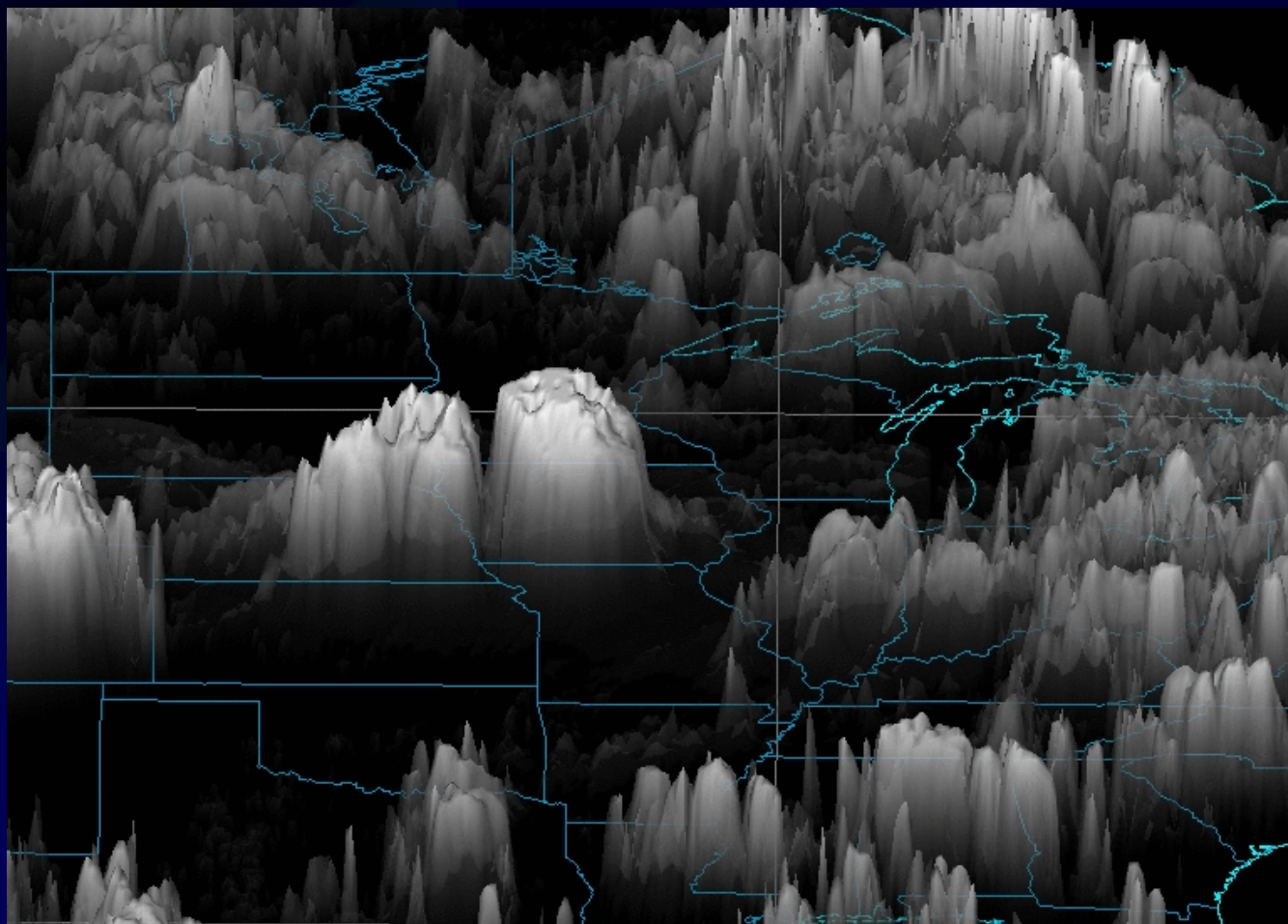
Presentation of information



# Hurricane Wilma October 2005



# United Airlines Flight 967 Turbulence Case – June 2010



# Summary

## 3D Globe

Improved the quality of our in-house outreach programs  
Provided an avenue to share the University's Research

## McIDAS-X

Used to create composite satellite images and other products  
Allows for updating 3D globe with real-time data

## McIDAS-V

Used in workshops for in-depth studies  
Allows for updating 3D globe with real-time data  
Freely Available

<http://www.ssec.wisc.edu/mcidas>