Friday Night

Two teenagers hiking in Little Cottonwood Canyon were slightly injured Friday evening when lightning struck near them and knocked them unconscious.

The 14- and 16-year-old boys were ***huddled under a tree*** about a mile up the Red Pine trail with three adults just after 6 p.m. when the lightning and rain started. At one point, lightning struck close enough to the teens to knock them out, said Salt Lake County Sheriff's Office Lt. Don Hutson.

The pair was unconscious for about 20 seconds, he said.

Unified Fire Authority personnel responded and found the teens conscious and alert, Hutson said. The teens were transported by off-road vehicles to ambulances at the trialhead. They were then taken by ambulances to a hospital to be checked out.

The three adults walked down on their own, Hutson said.

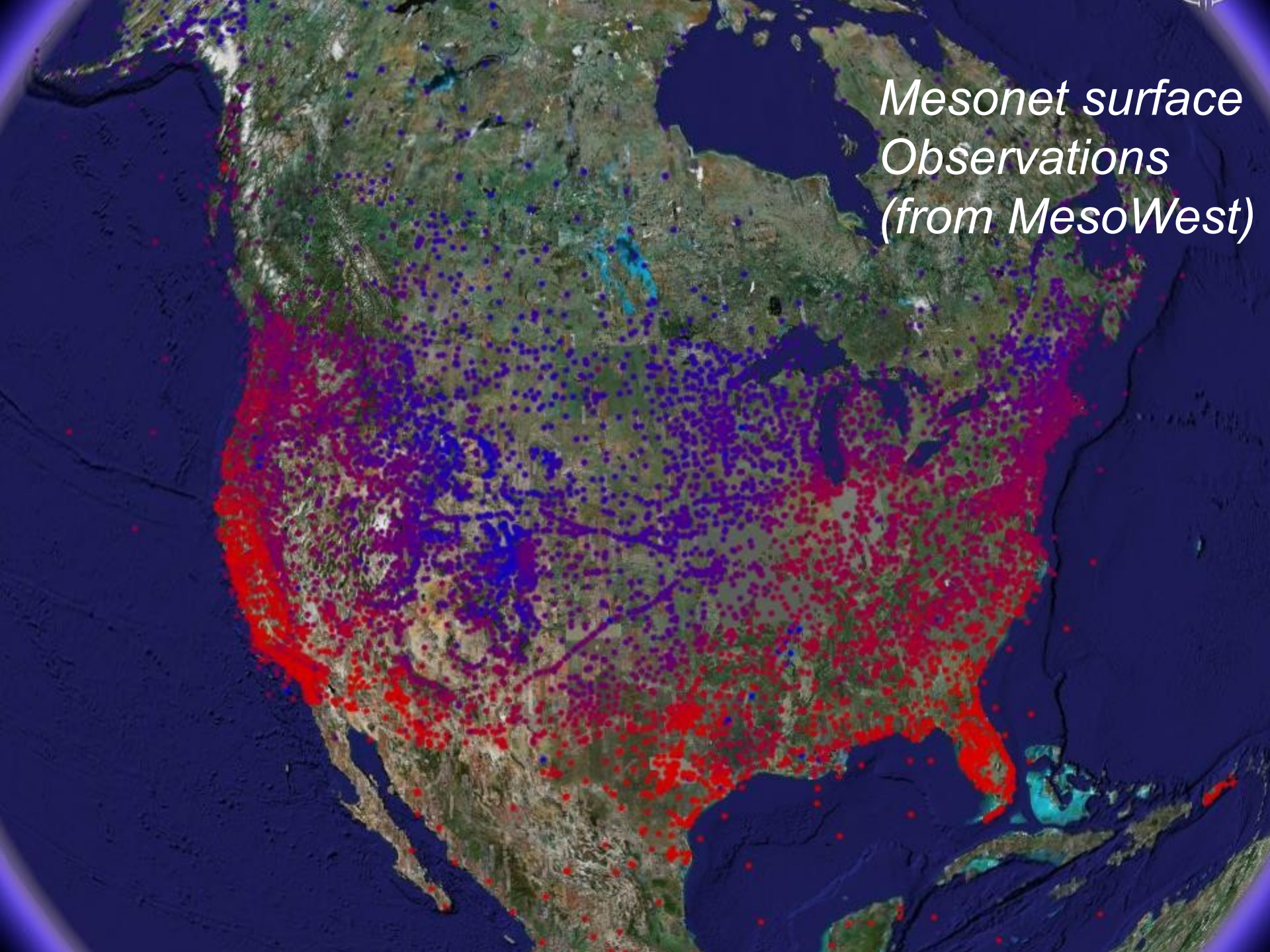
http://www.youtube.com/watch?v=1Ed3aV0NcLo

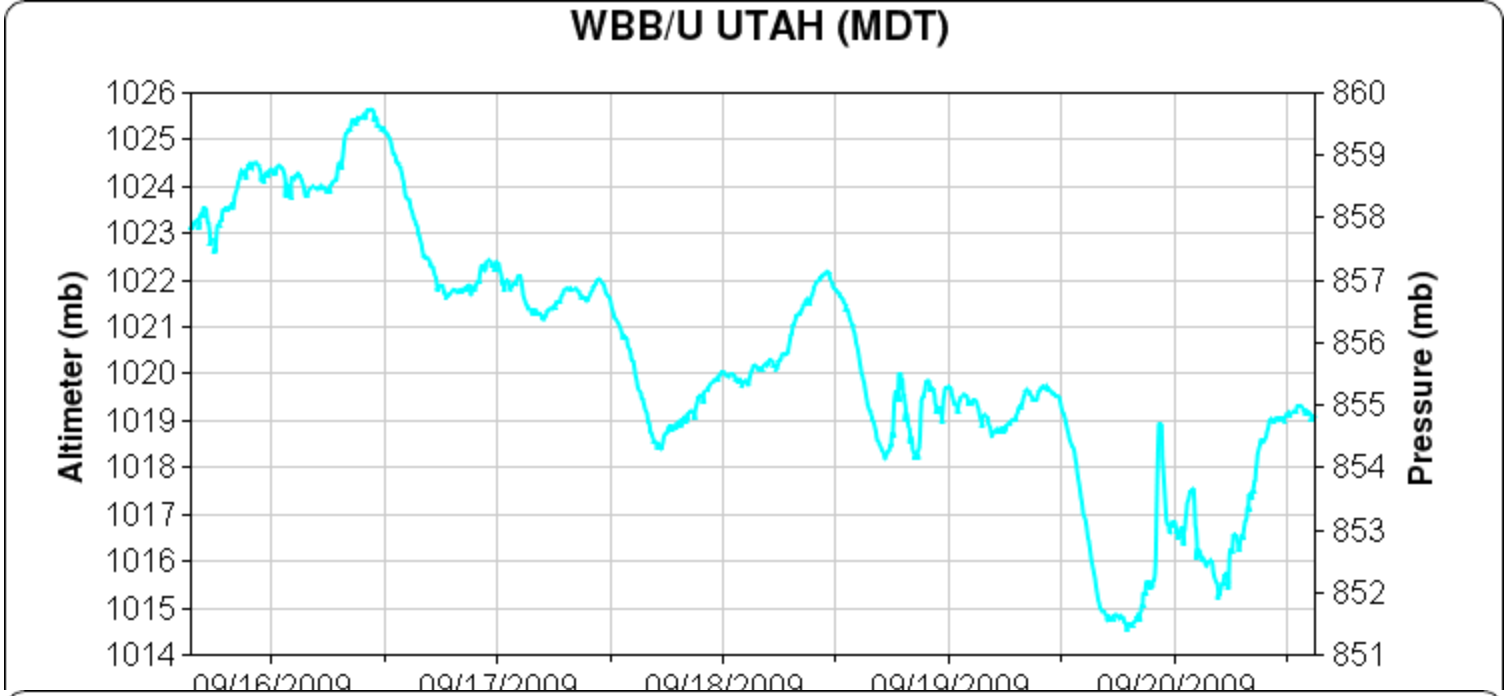
Observing the Environment

- Routine direct observations
  - at the surface
  - aloft
- Routine remote observations
  - Active sensor system
    - Requires system to send and receive
    - Example: radar
  - Passive sensor system
    - Requires sensor system to receive only
    - Example: satellite

NOTES: www.chpc.utah.edu/~u0035056/Atmos3000.0921.2009.pdf


Routine
Surface
Observations
(mainly at
airports)


Mesonet surface
Observations
(from MesoWest)


WBB/U UTAH (MDT)
Altimeter (mb)
Pressure (mb)
1026
1025
1024
1023
1022
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1020
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1018
1017
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1015
1014
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09/18/2009
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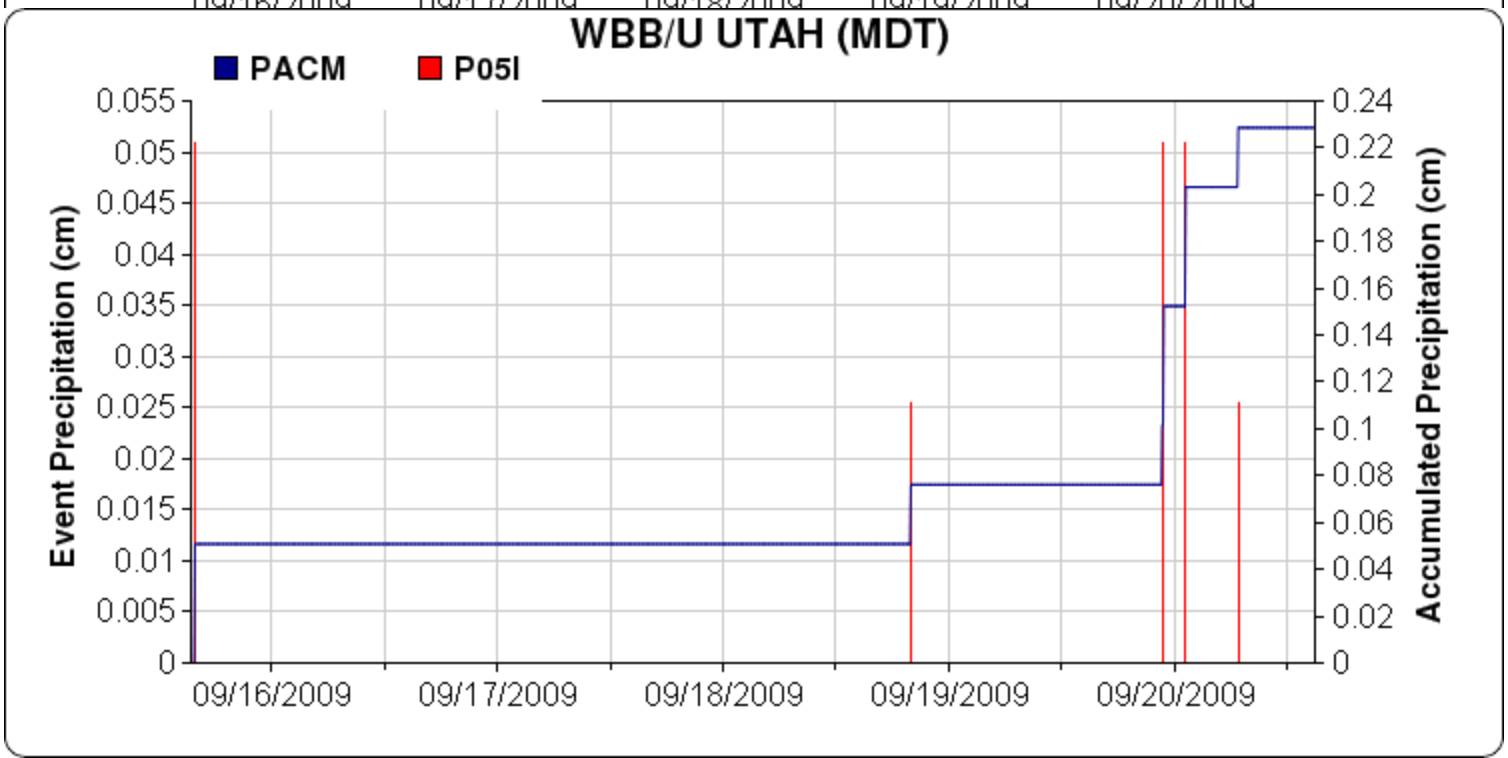
09/20/2009


WBB/U UTAH (MDT)
PACM
P05I
Event Precipitation (cm)
Accumulated Precipitation (cm)
0.055
0.05
0.045
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
0.24
0.22
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
09/16/2009
09/17/2009
09/18/2009
09/19/2009
09/20/2009

MesoWest Surface Weather Maps - Mozilla Firefox

File Edit View History Bookmarks Tools Accessibility Help

http://mesowest.utah.edu/cgi-bin/droman/mesomap.cgi?profile_id=wyVF5w2740JScjt

Most Visited Getting Started Latest Headlines Mesowest http://raws.wrh.noaa.... WBB Settings

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Welcome, **john**. My MesoWest | Logout

MesoWest Region Alaska GCA Product Surface Weather Maps Go MesoWest | Help

Show Menu | Show Tables | Search | Active Fires | Map Product: Default Change Save Profile | Update Profile | Load Profile | Print Profile

Most recent observation within 15 min ending at **00:45 UTC** 9/19/2009

Active Profile: **sept 19 09 00:45 utc**

Terrain Hybrid Ma

Legend X

US NEXRAD Radar

Help

Date: 090919_0046

Time: 00:45 UTC

Vcp: 21 DBZ

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 -5 -10 -15 -20 -25 -30 ND

H V Y M O D L G T V L G T

Update

Centerville West Bountiful Bountiful Woods Cross North Salt Lake Mueller Park Cow Bay Knoll Round Knoll Molly's Nipple Garr Knolls Kennecott Copper Corp Pond Garfield Arthur Magna Lake Point West Valley City Taylorsville Murray Bacchus Salt Lake

Google 2 mi 5 km MesoWest

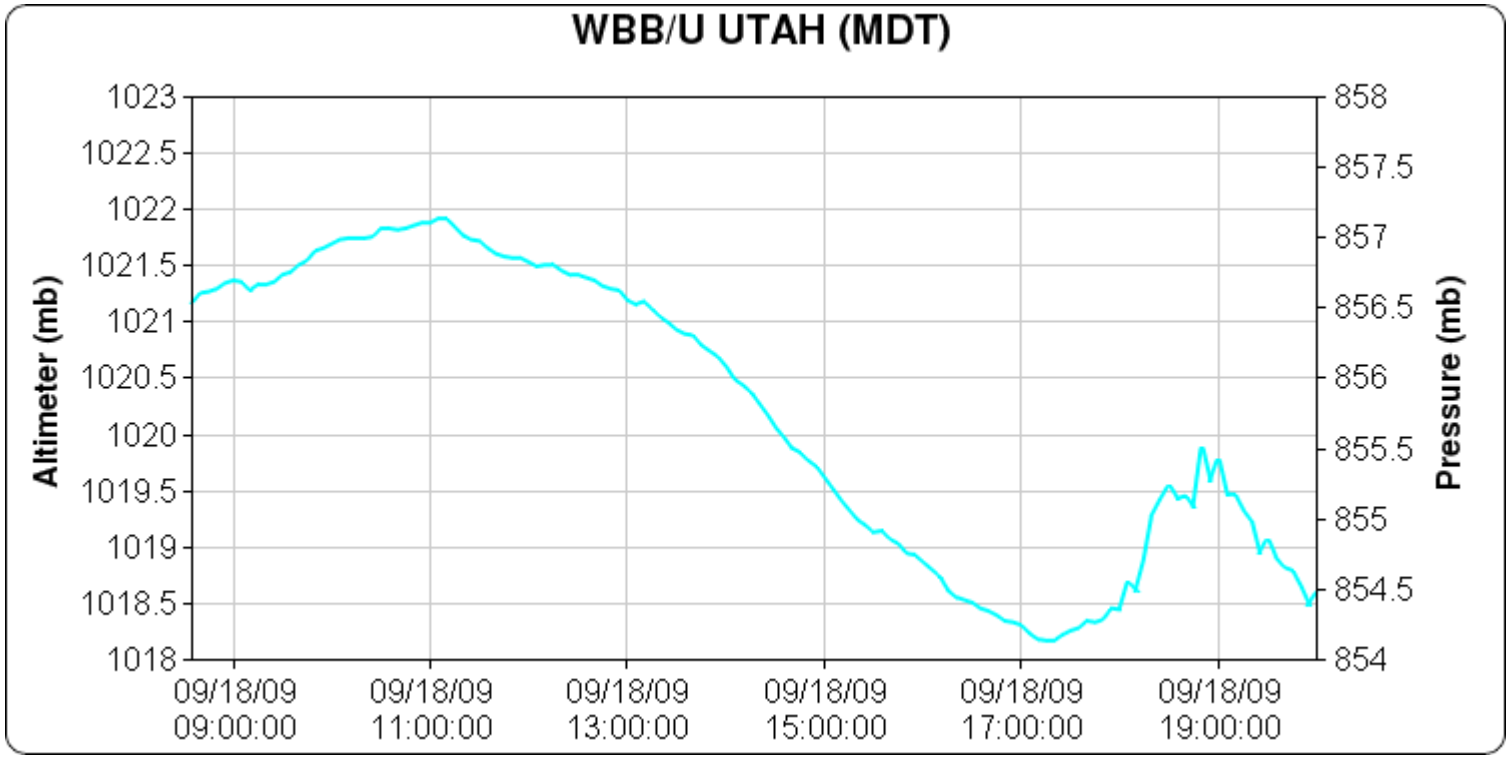
Map data ©2009 Tele Atl

Questions?

Find: Next Previous Highlight all Match case

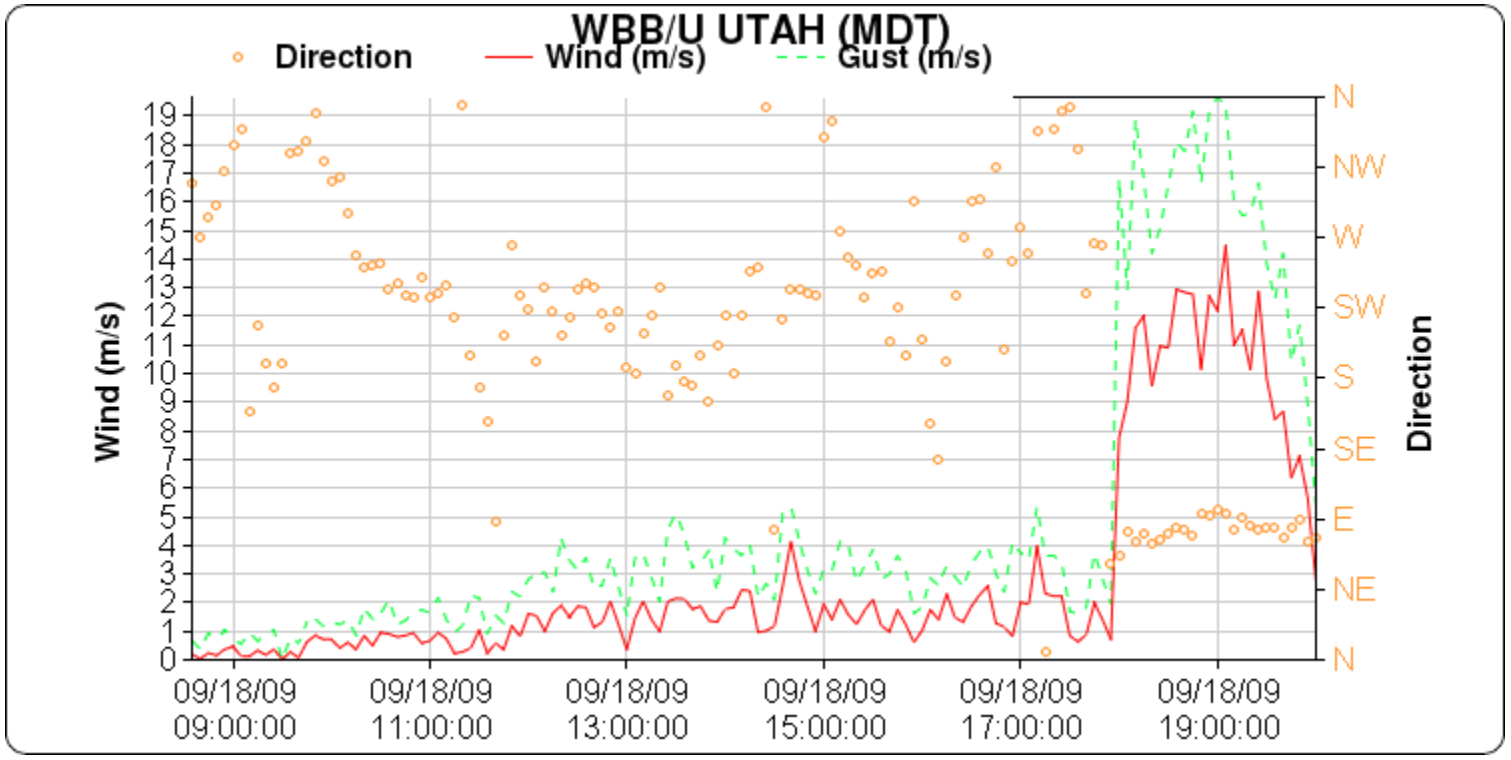
Transferring data from mesowest.utah.edu...

Friday Evening: WBB



http://mesowest.utah.edu

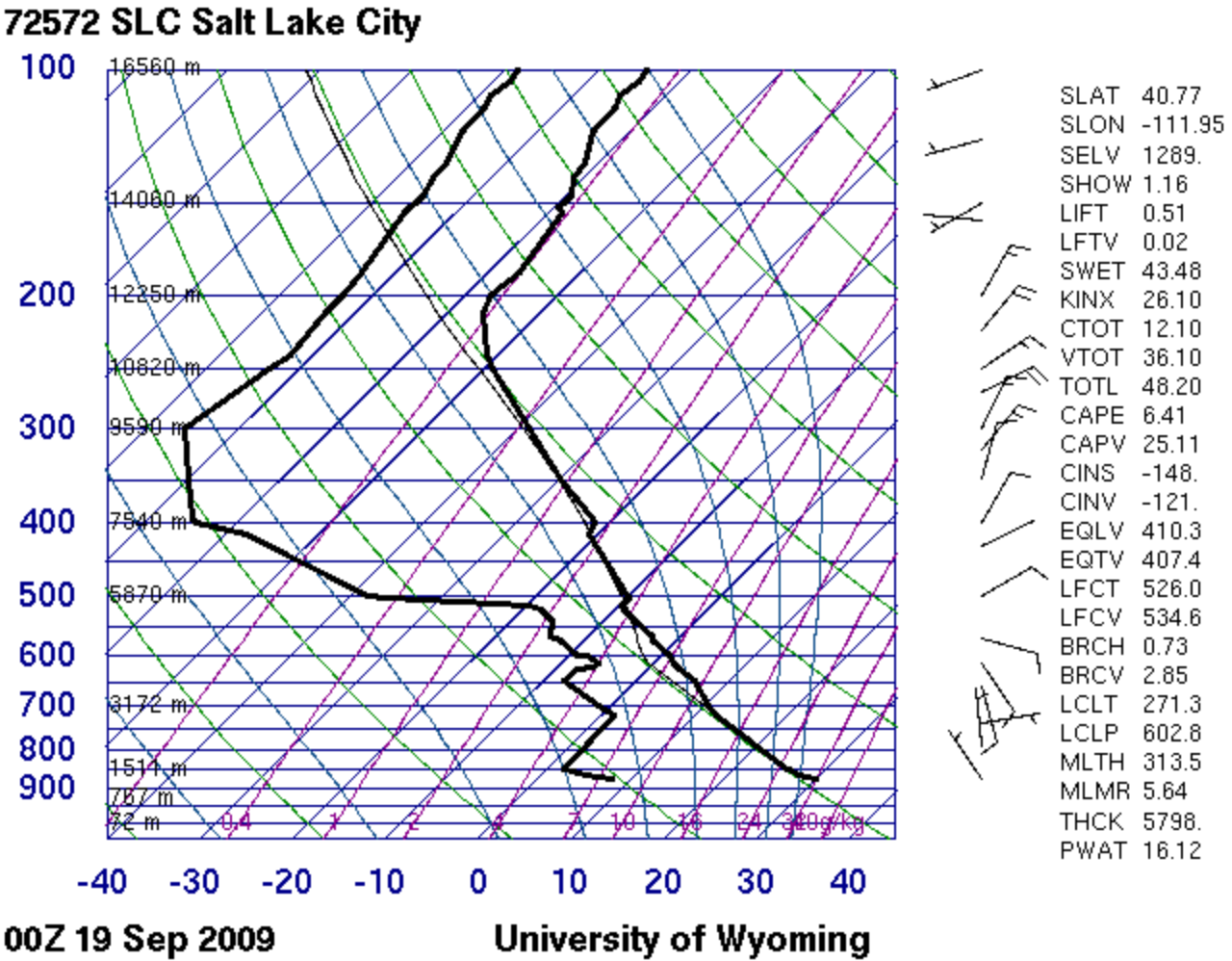
Friday Evening: WBB




Routine
Upper air
Observations

Friday night

http://www.chpc.utah.edu/~u0034822/covecam/movies/090918.all.big.mov



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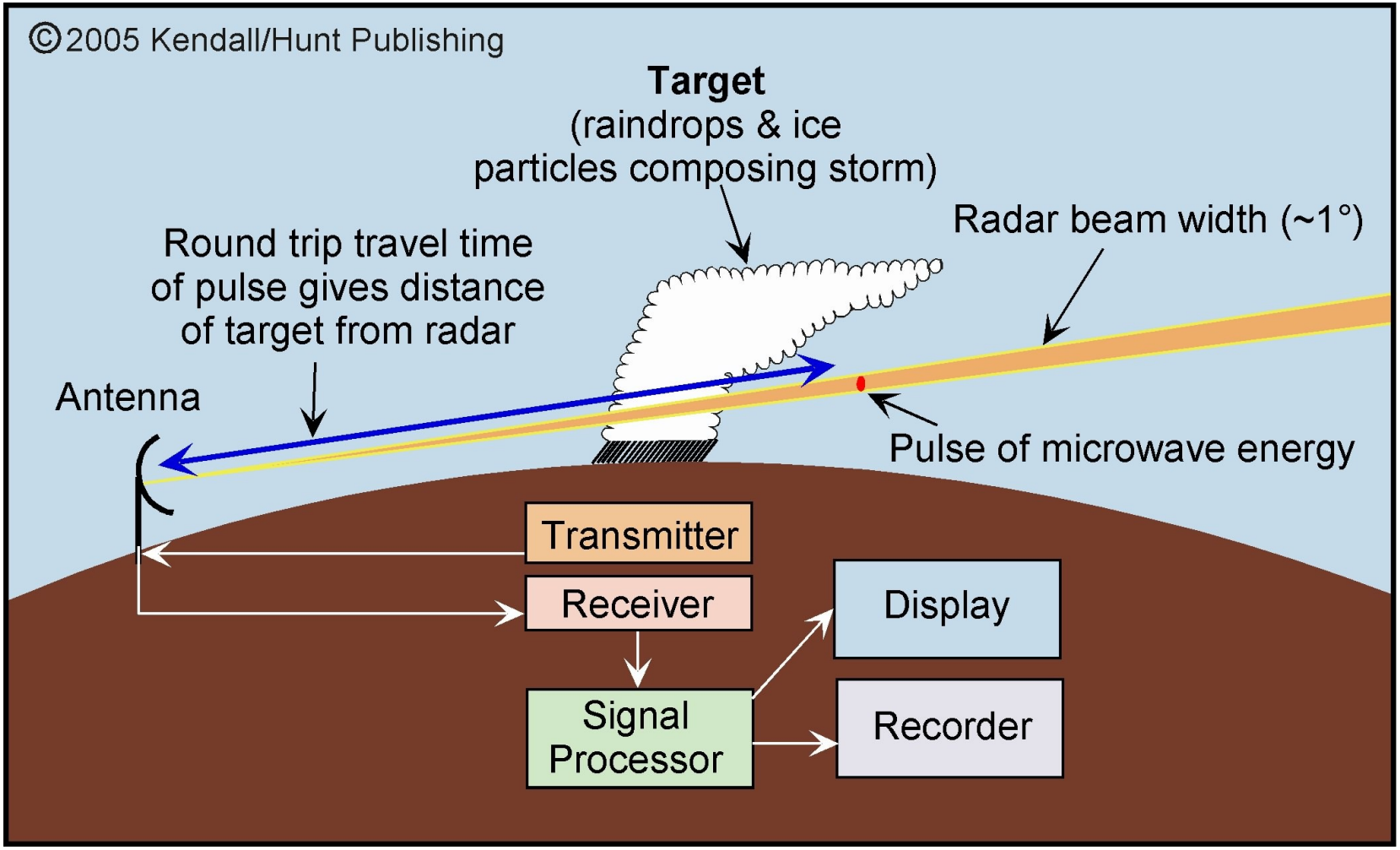
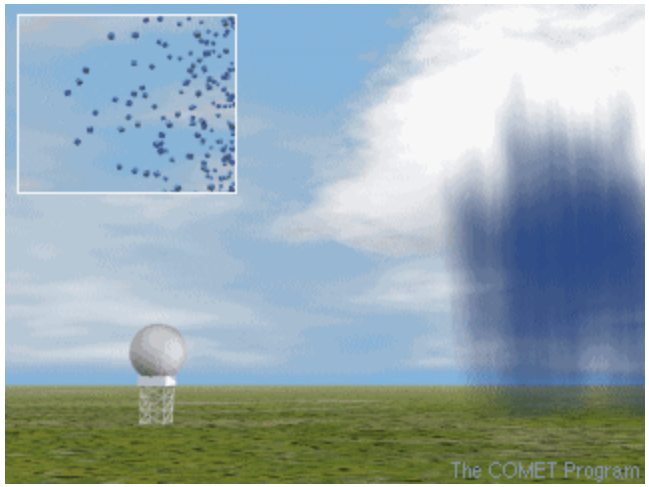
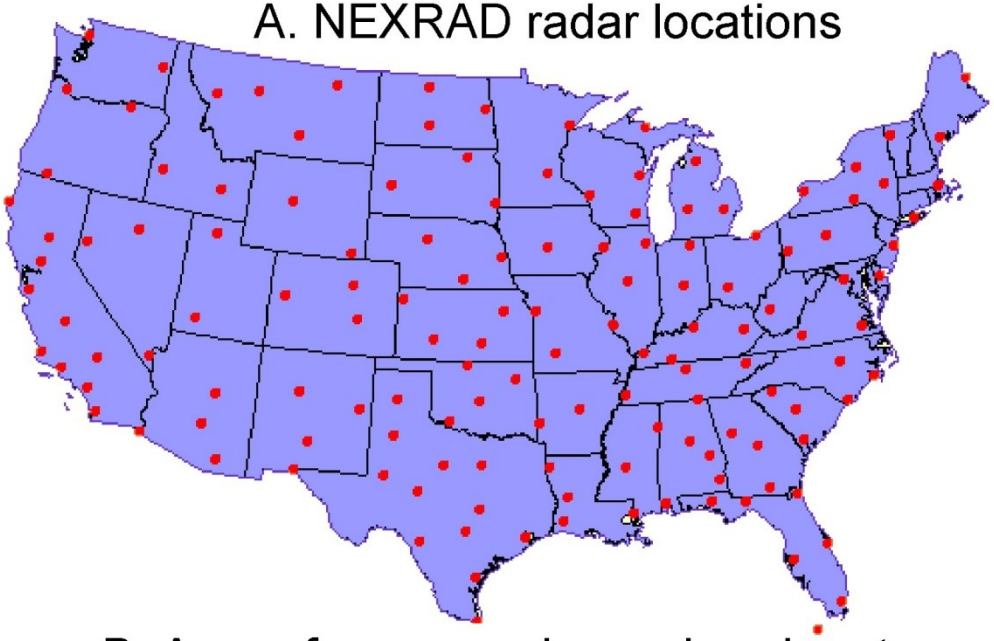
Radar Observation



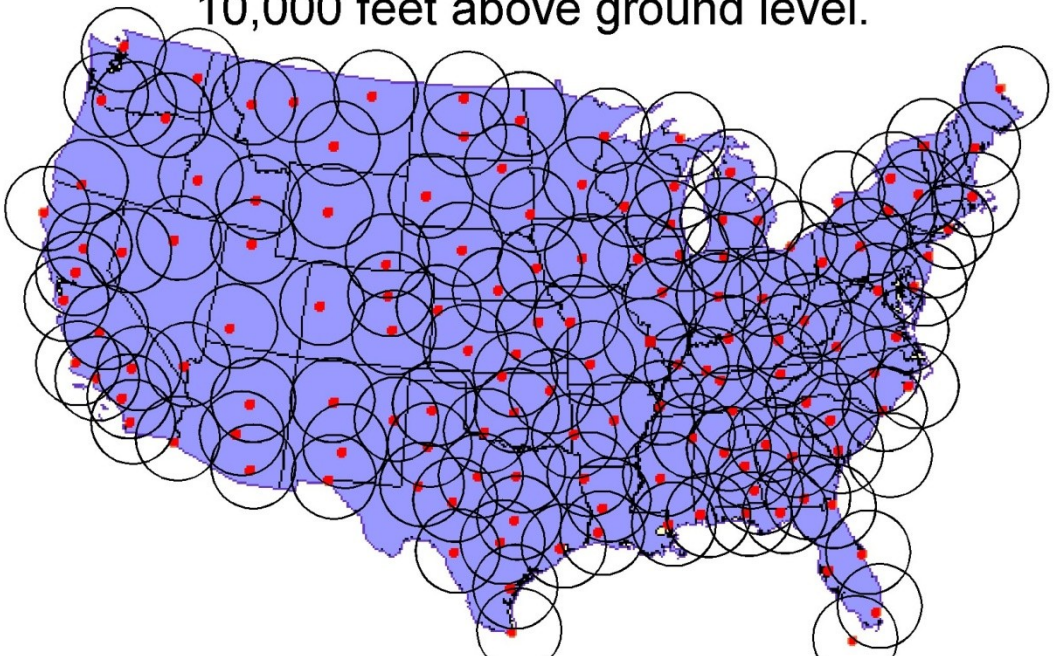
Radar



A. NEXRAD radar locations



B. Area of coverage by each radar at 10,000 feet above ground level.



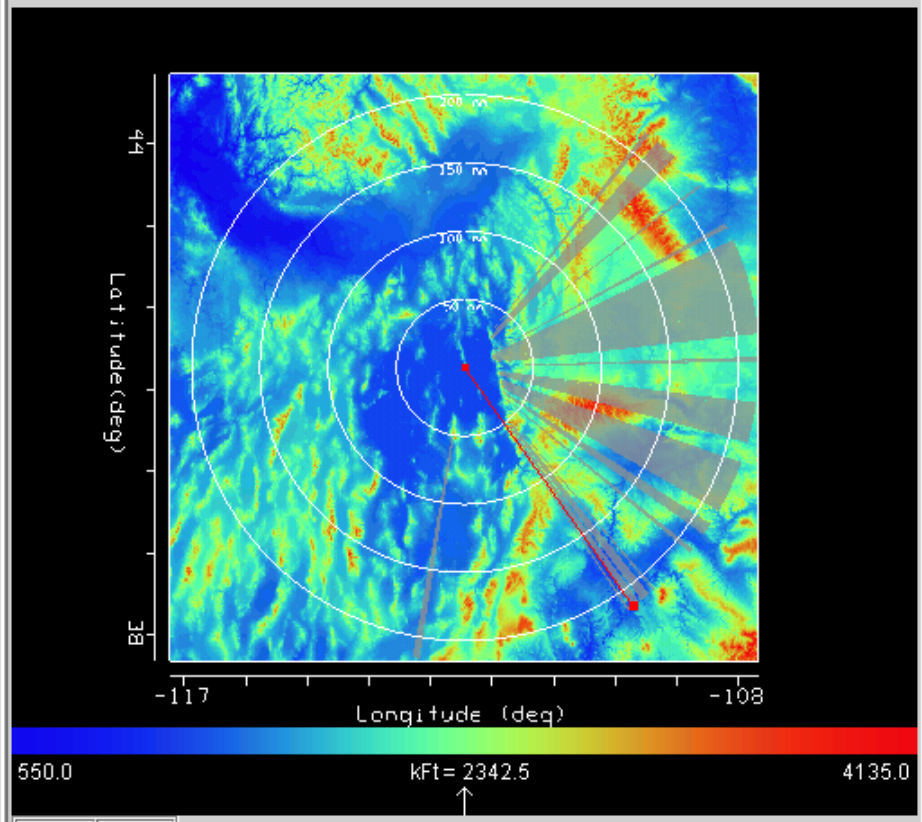
VCPRPE

File Compare Help

Current Radar Info

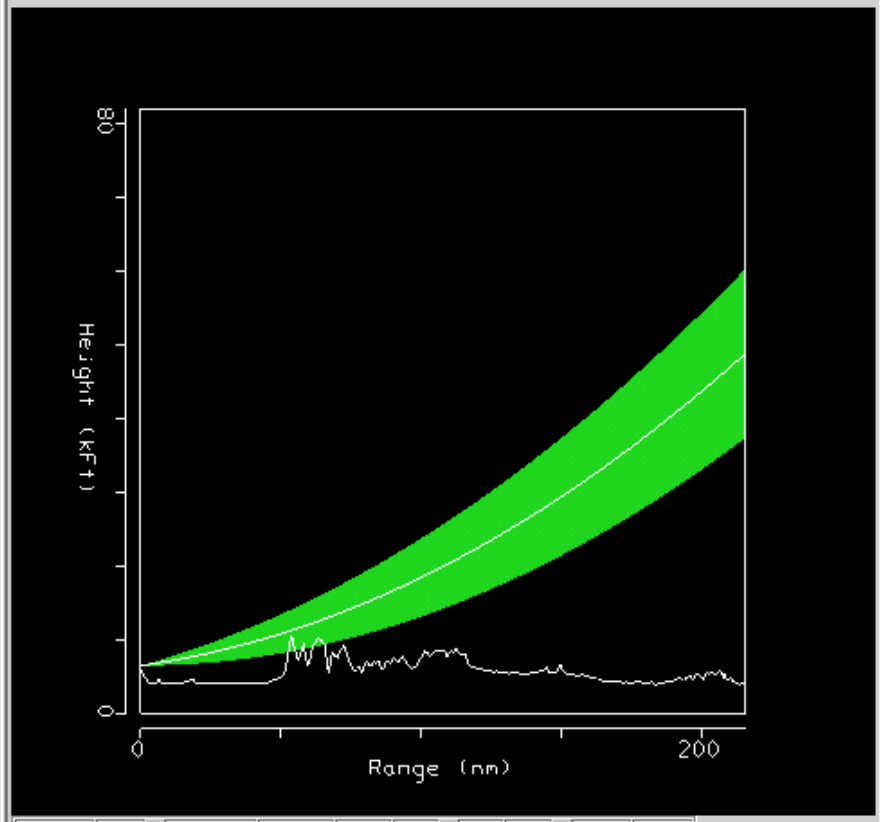
ICAO: KMTX , Site Name: "SALT LAKE CITY " , Location: SALT LAKE CITY, UT , Latitude: 41.263 , Longitude: -112.448 , Feedhorn Elevation (m): 1999.0

PPI Panel



Reset Rings

VCP RayPath



Reset GC Beams Label BW BF HF HL Sdg DBz

VCP Controls

VCP11

VCP11

00.50

04.30
03.35
02.40
01.45
00.50

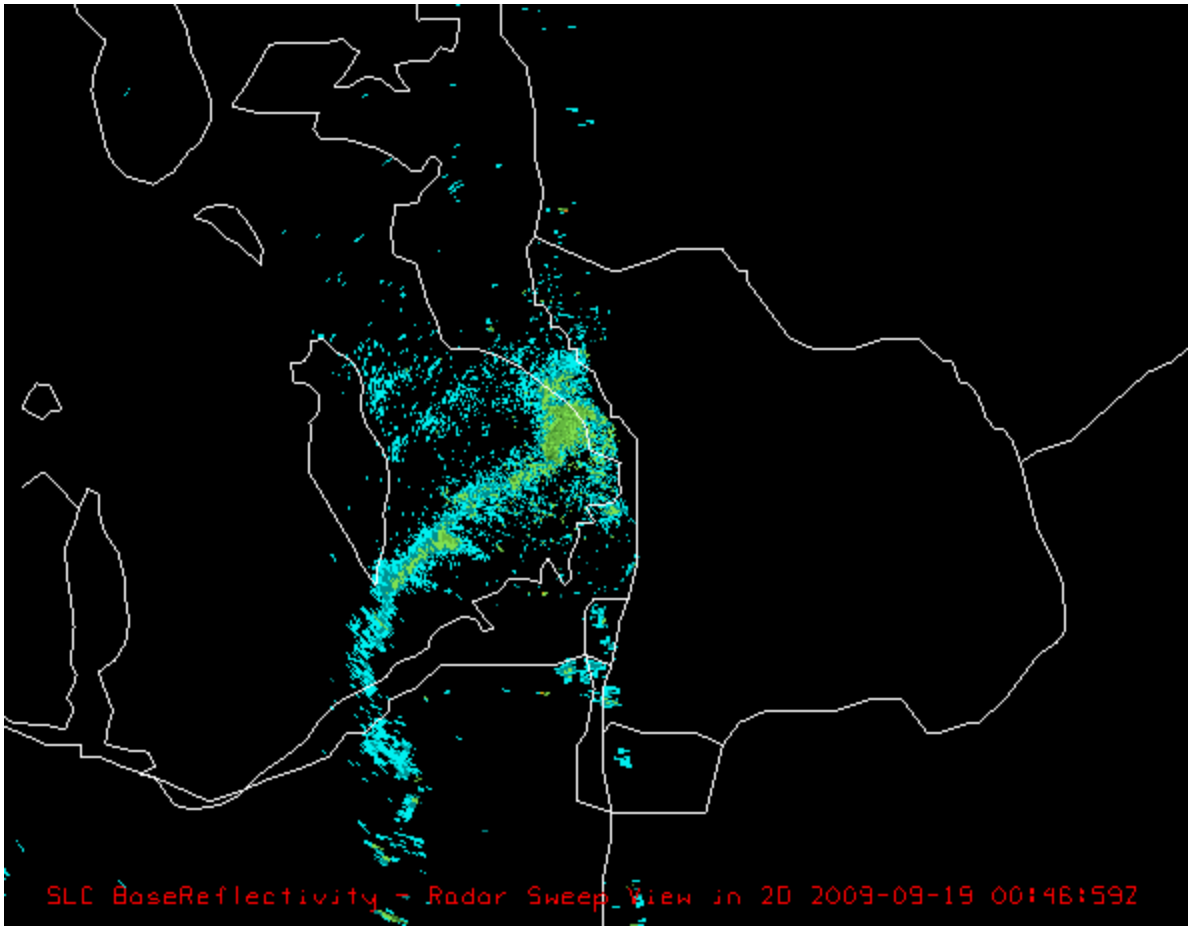
Elev. 00.50

Azimuth 144.81

Beam Blockage (%) 020

Friday evening: TDWR Reflectivity

http://www.chpc.utah.edu/~u0034822/covecam/movies/090918.all.mov



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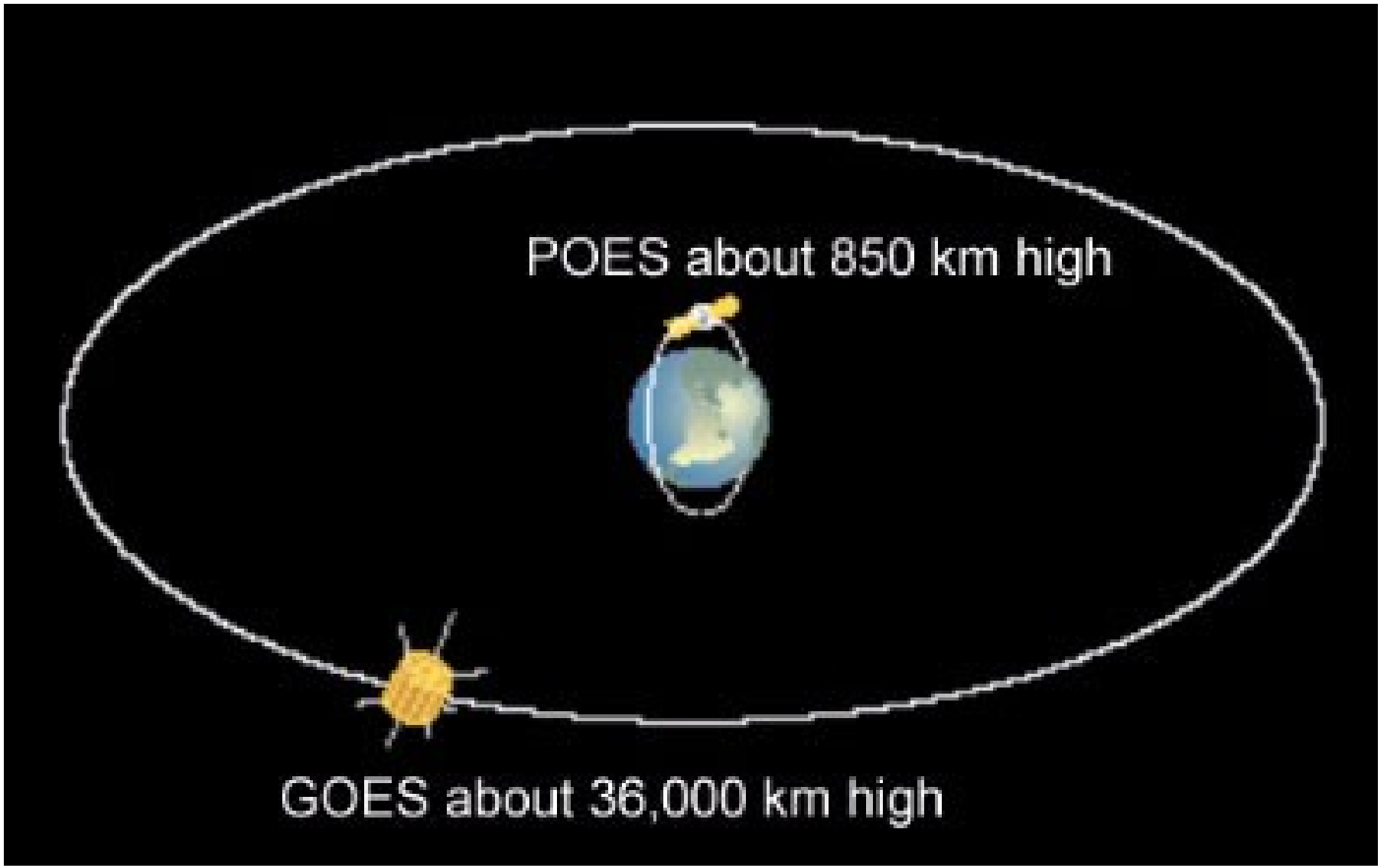
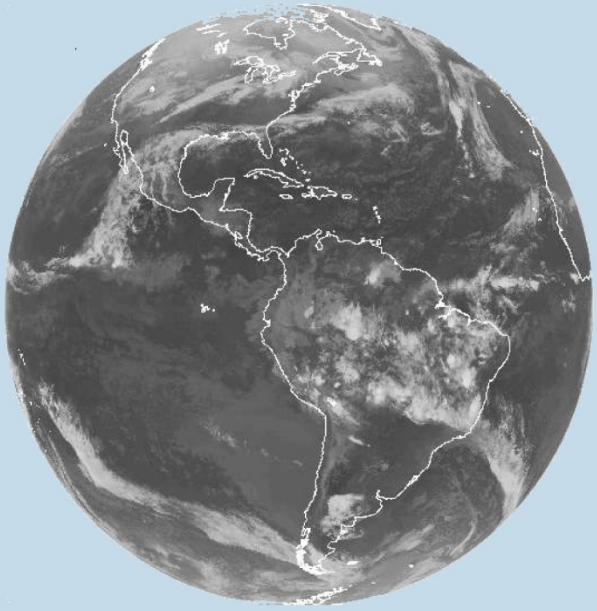
Critical Aspects of Satellite Observations

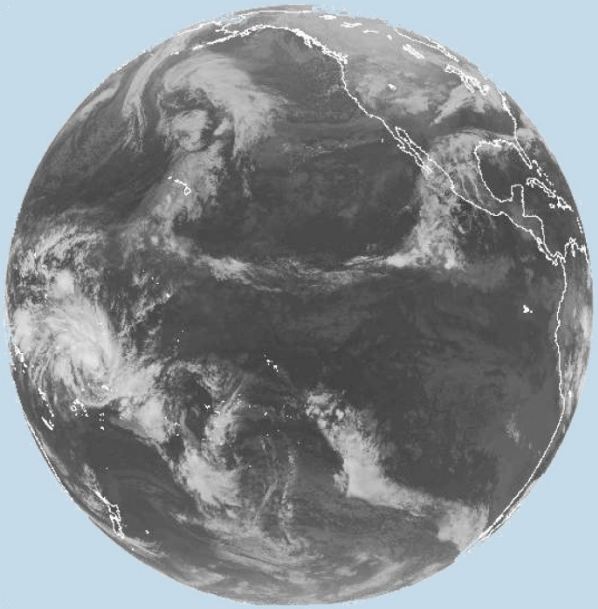
- satellite orbit
  - Geostationary (GOES)
    - ~36000 km above surface
    - Remains fixed above particular point on equator
    - Rotates with earth
  - Polar (POES)
    - ~850 km above surface
    - Earth rotates beneath satellite (satellite is sun synchronous)
    - Travels north and south over poles

Polar vs. geostationary orbit

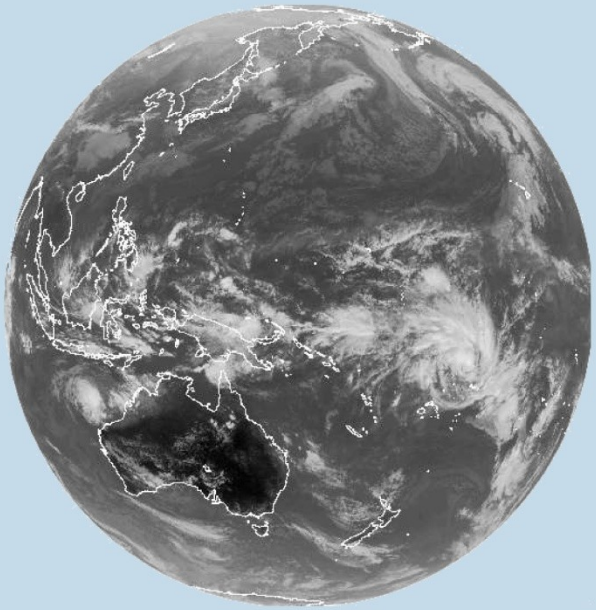




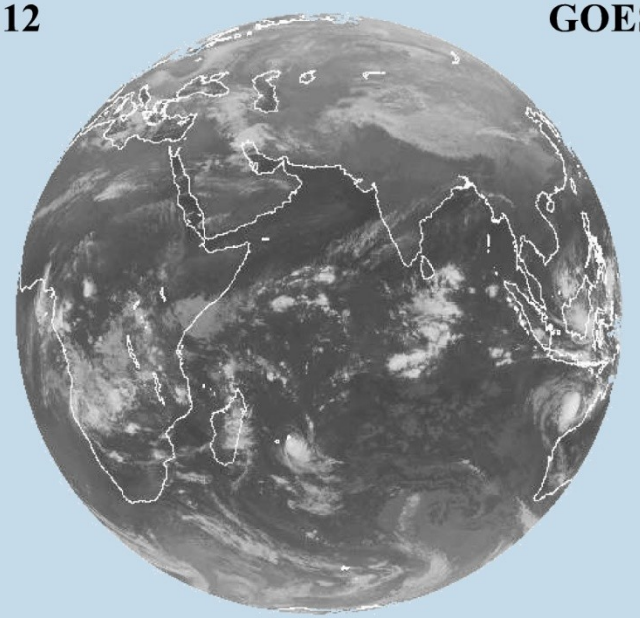
GOES 12



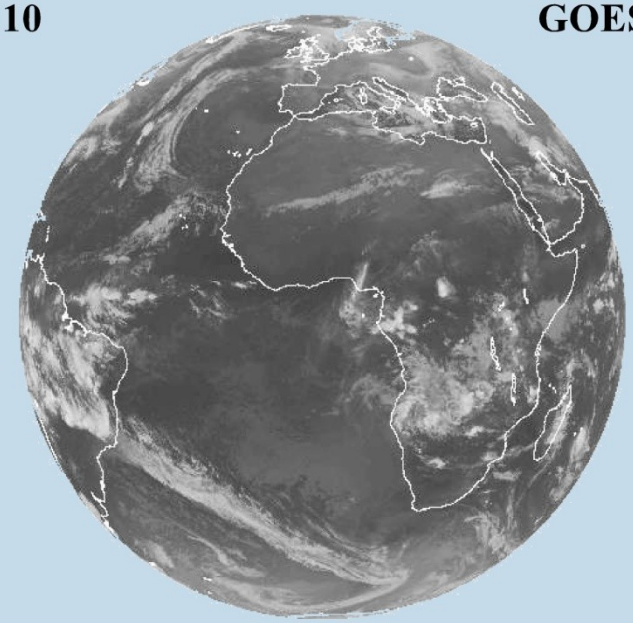
GOES 10



GOES 9



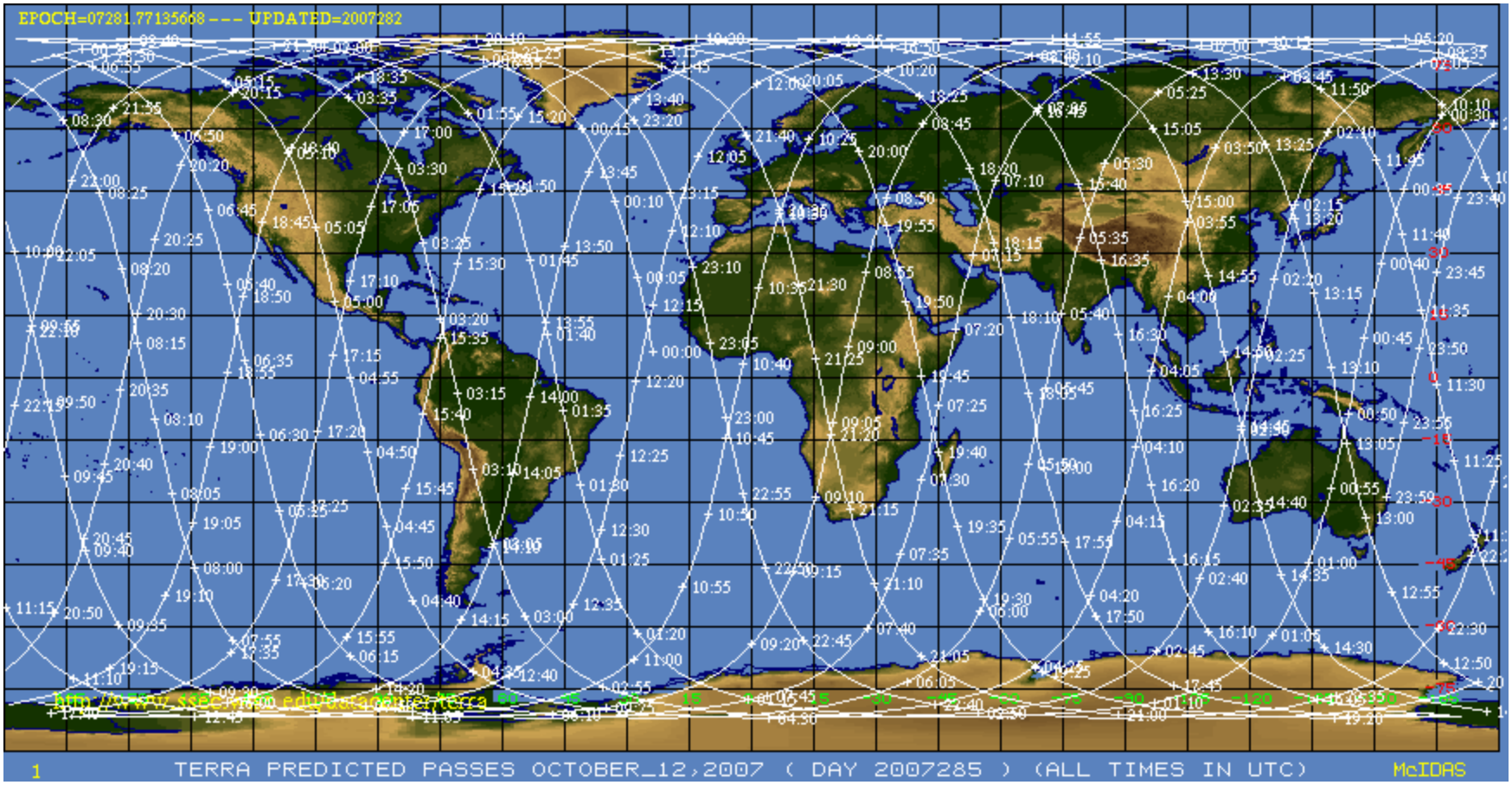
INDSAT



METEOSAT

0000 UTC
3 JANUARY 2004

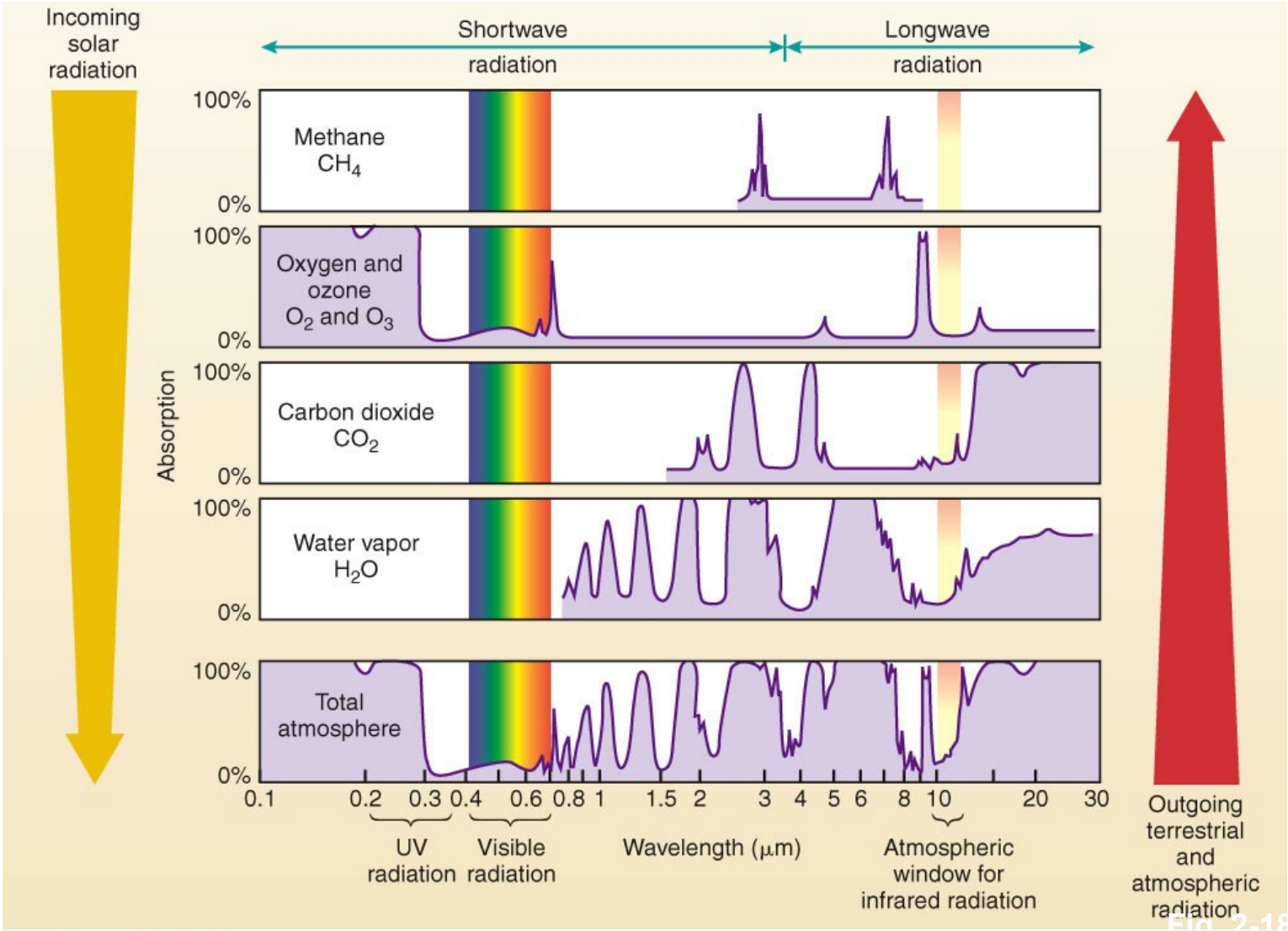
Polar Orbiting Passes in 1 Day



Critical Aspects of Satellite Observations

- Portion of electromagnetic spectrum that sensor measures
  - Visible light (.4 - .7 microns)
  - Water vapor (~ 6-7 microns)
  - Infrared (10-11 microns)
- Satellite sensor sees radiation returned upwards from earth's surface or top of clouds
- If atmosphere or clouds absorb radiation before it reaches top of atmosphere, then sensor can not detect it

Electromagnetic Spectrum

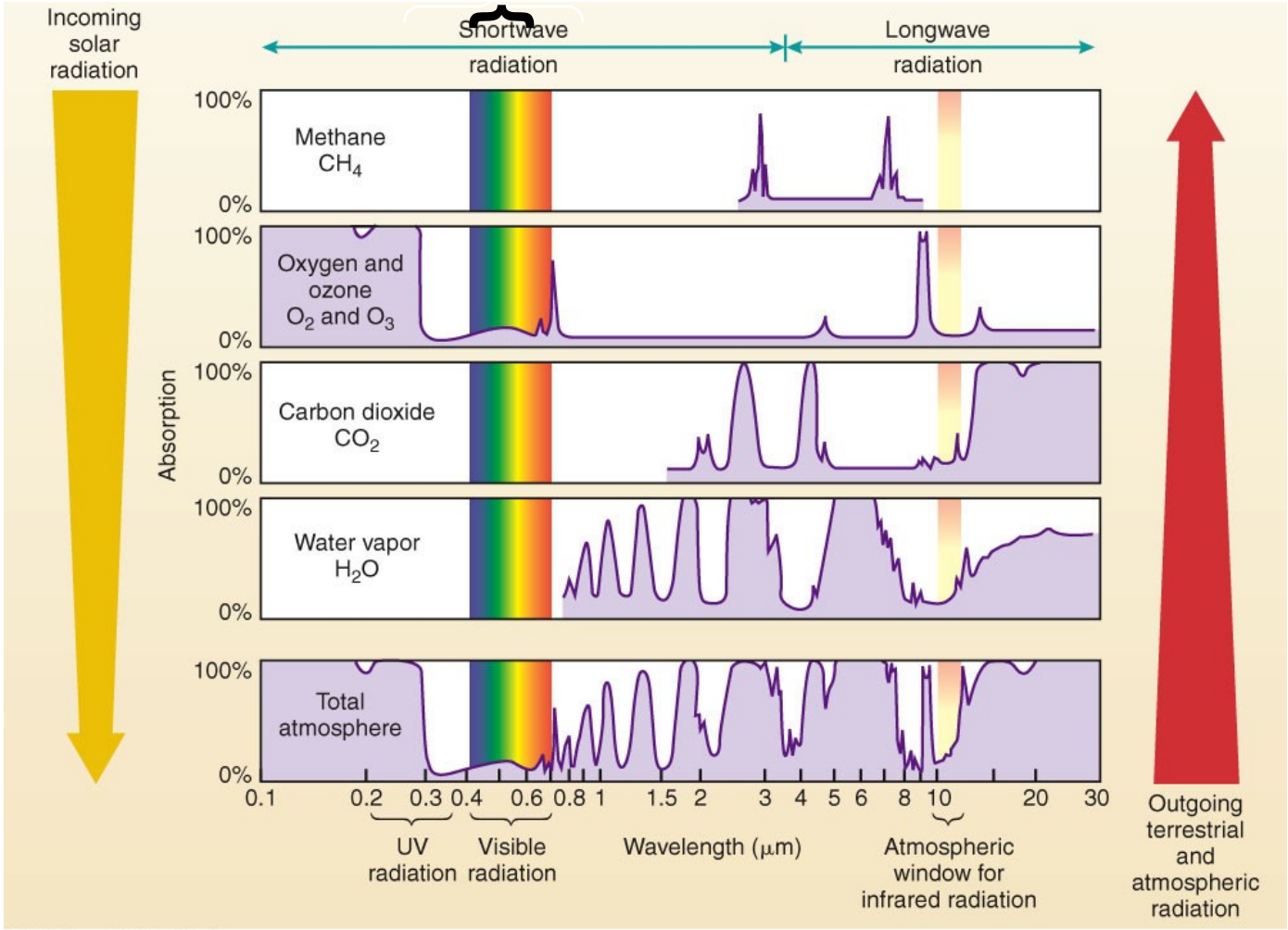


Broadband visible

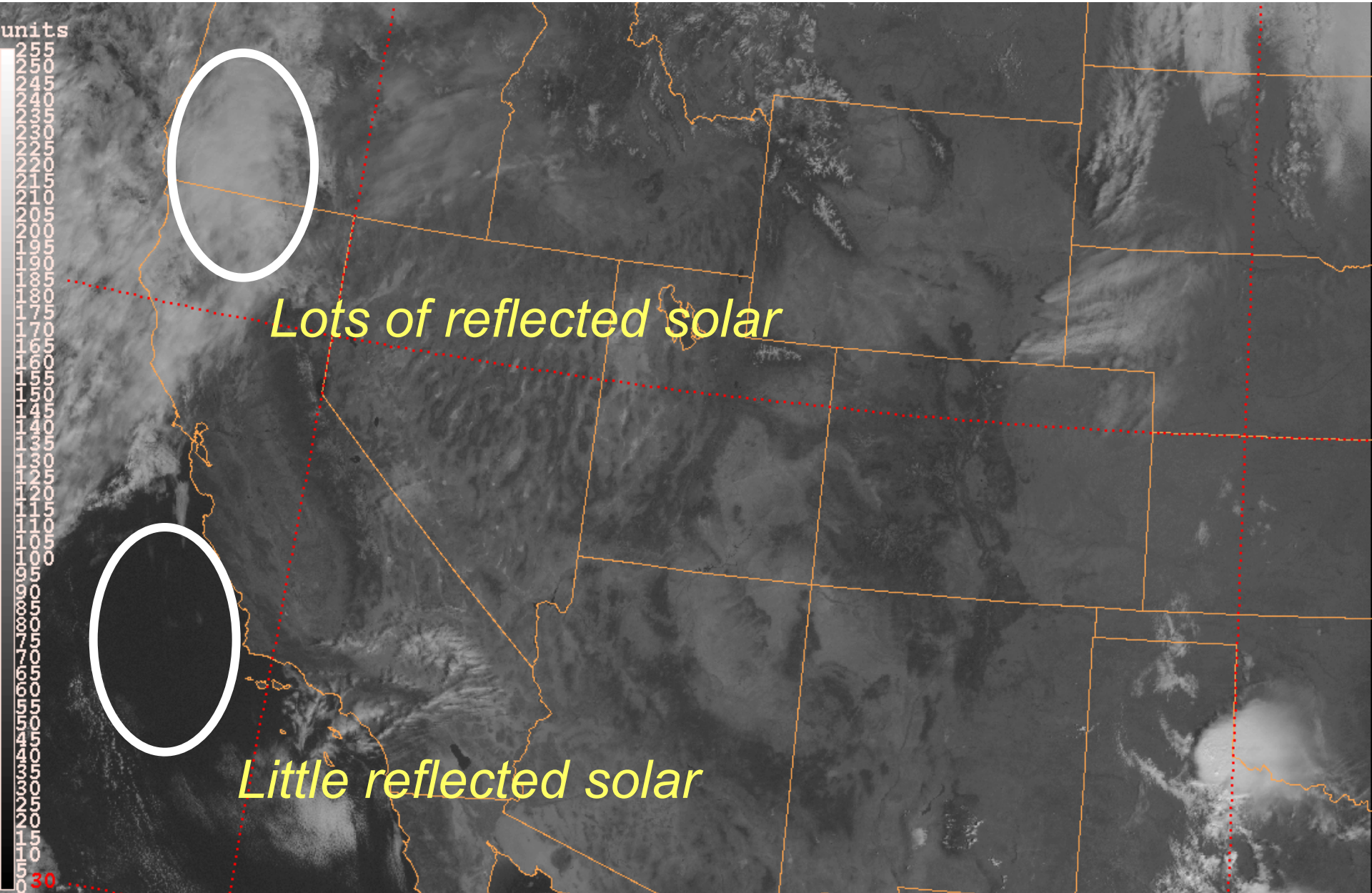
- Broadband (all visible wavelengths .4-.7 micron)
- Measures amount of light reflected upward from earth's surface and from clouds
- More reflective surfaces and thick clouds reflect more visible light
  - Common convention is to display as white
- Only useful during the day
- Water surfaces, vegetation, and thin clouds reflect less visible light
  - Common convention is to display as dark

Broadband visible

Amount of total visible light reflected to space



Broadband visible: GOES

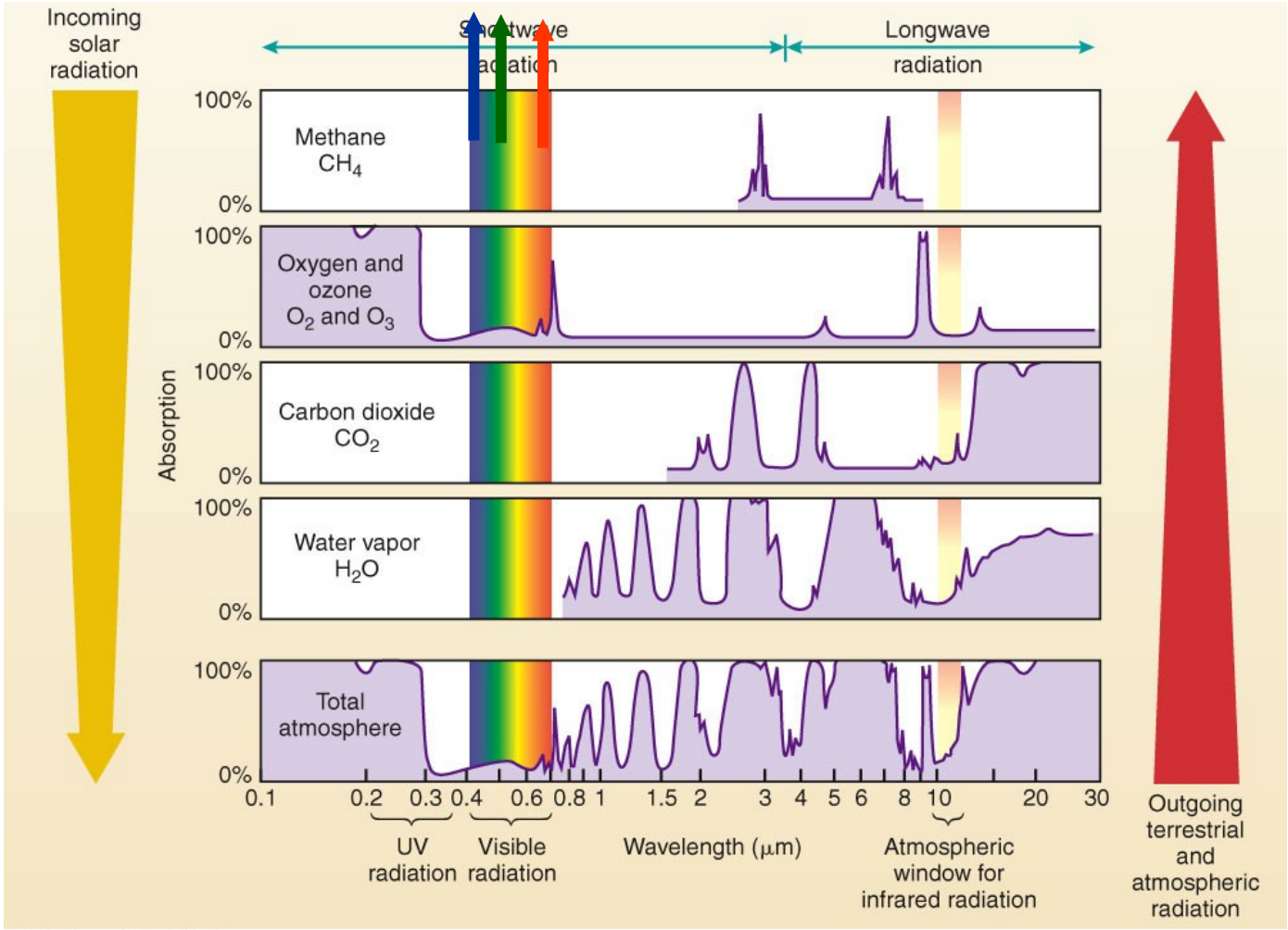


True color visible

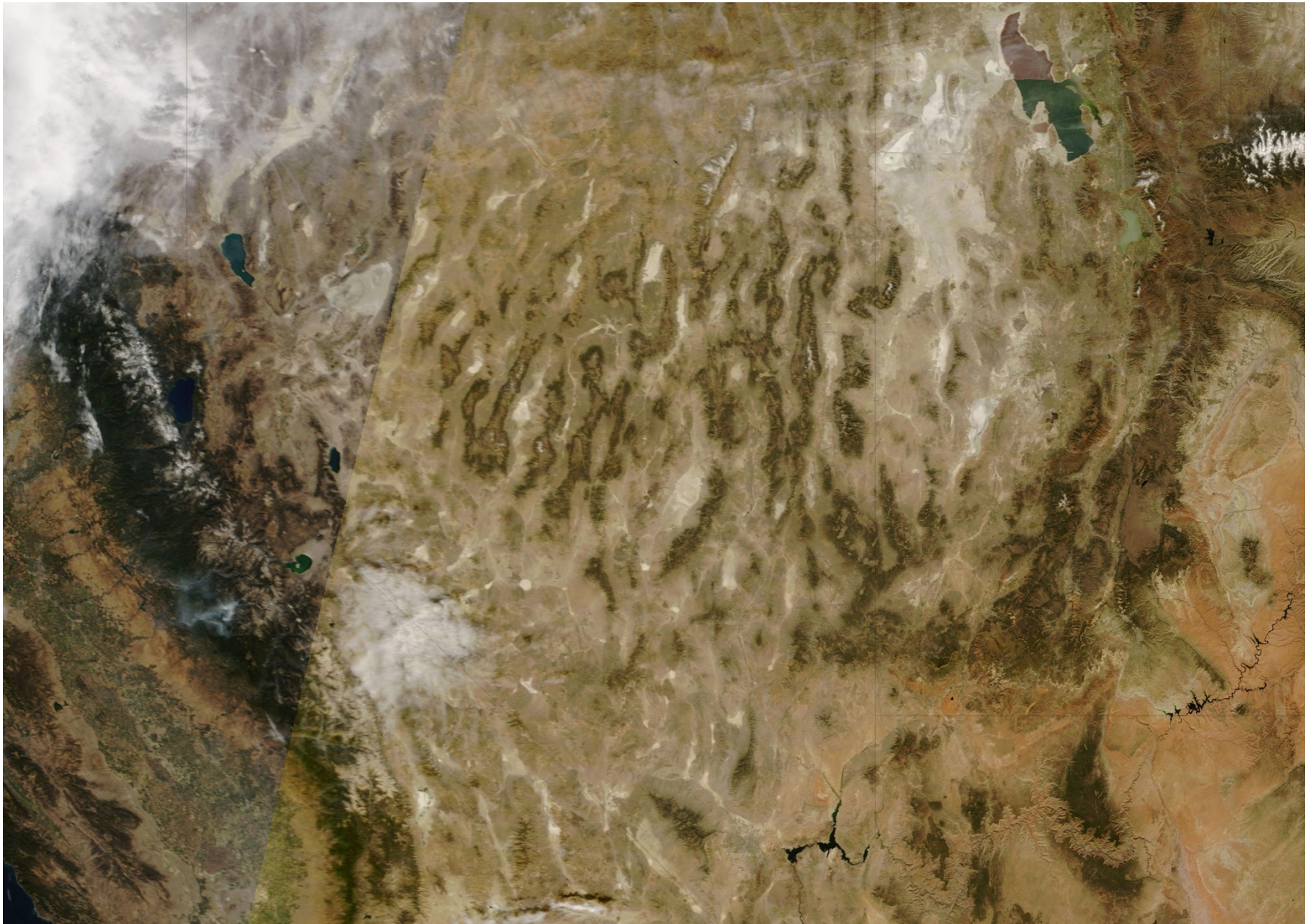
- "True color"
  - Sensors measure energy received in narrow bands of red, green, and blue light
  - Measures amount of light reflected upward from earth's surface and from clouds in three separate bands
  - Only useful during the day
  - Common convention is to display as:
    - white: objects that reflect a lot of red, green, and blue equally
    - black: objects that reflect little red, green, and blue equally
    - green: objects that reflect a lot of green light but little red or blue, etc.

True color visible

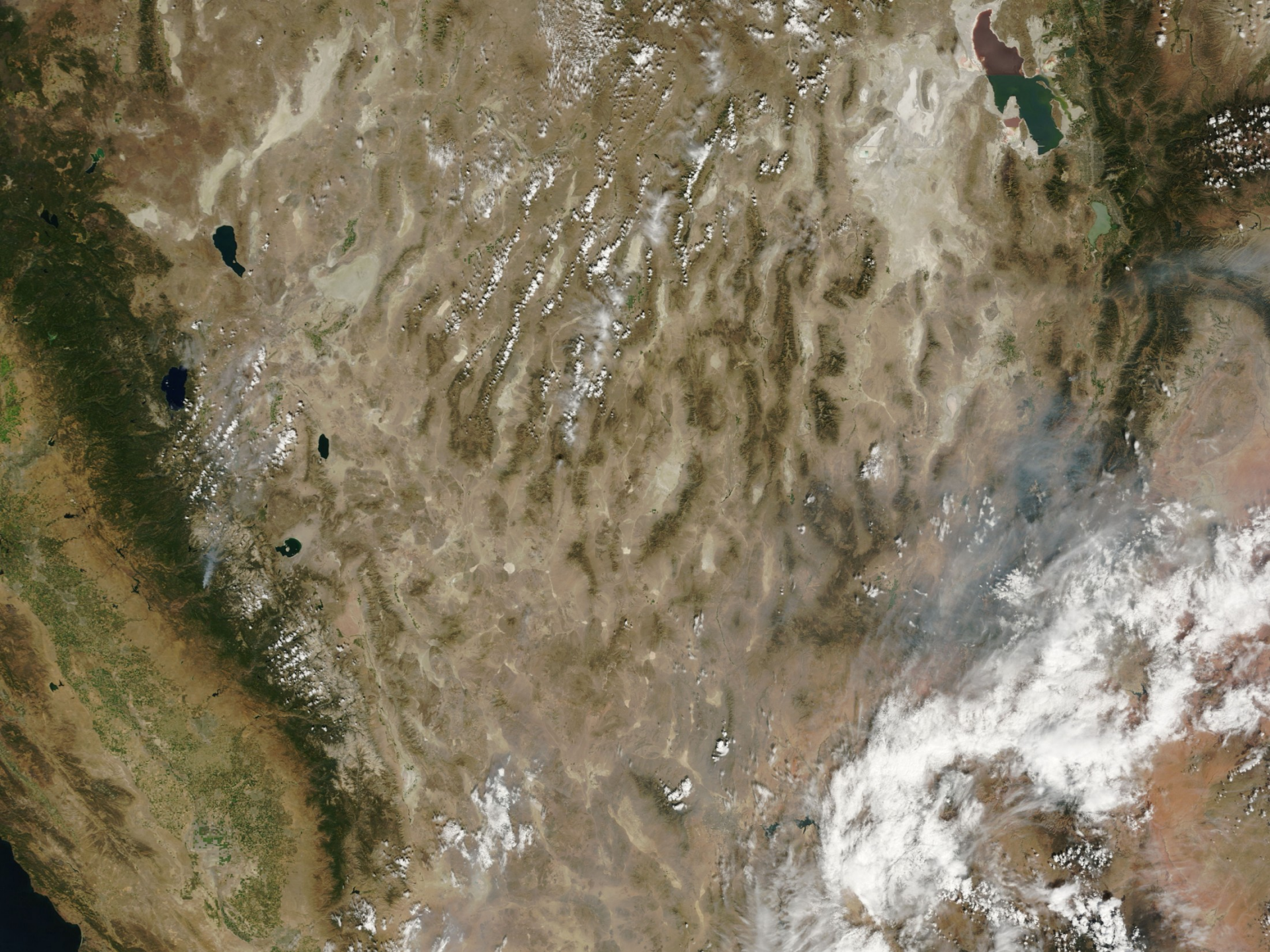
Amount of red, green, blue light reflected to space



Polar Orbiting MODIS



Polar orbiting MODIS

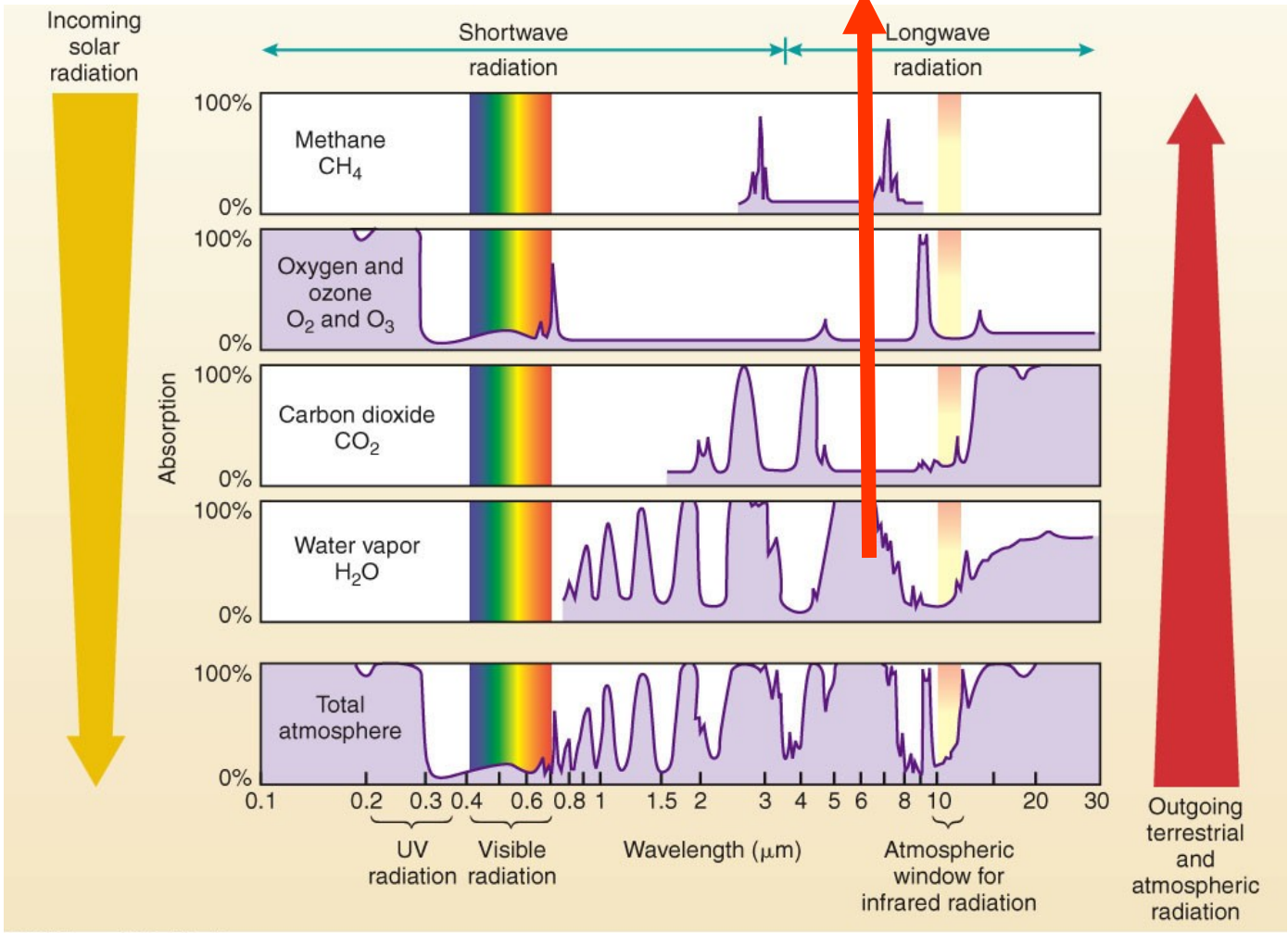


Water Vapor

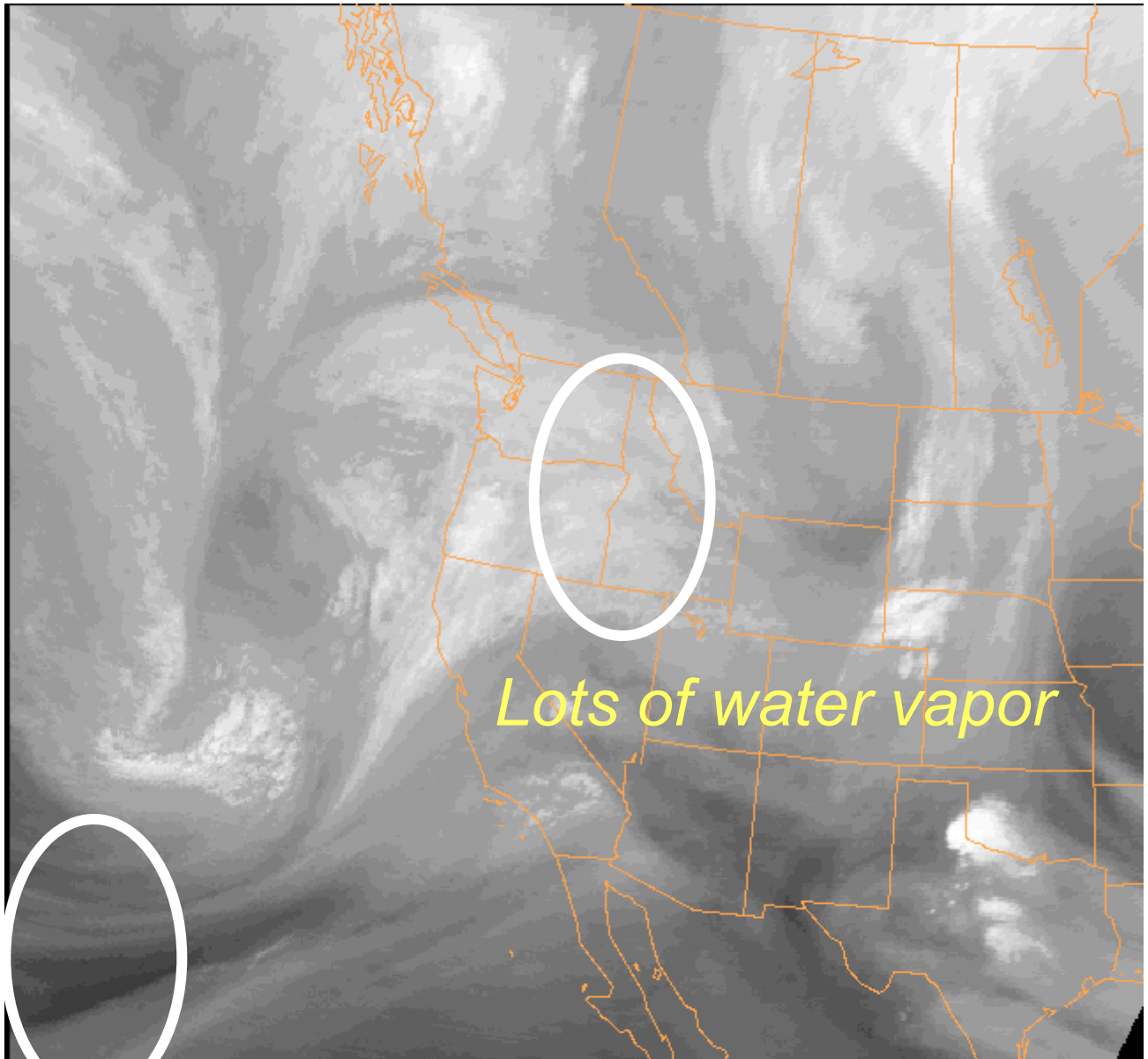
- Sensor measures energy in 6-7 micron range
- Measures amount of energy emitted upward primarily from invisible water vapor and visible cloud
- Available 24 hours
- Common convention is to display as white those areas where there is a lot of water vapor or cloud
- Common convention is to display as dark those areas where there is a little water vapor or cloud
- Most sensitive to water vapor from 3-10 km above earth’s surface

Water Vapor

Amount of energy emitted by water vapor and cloud



GOES Water Vapor

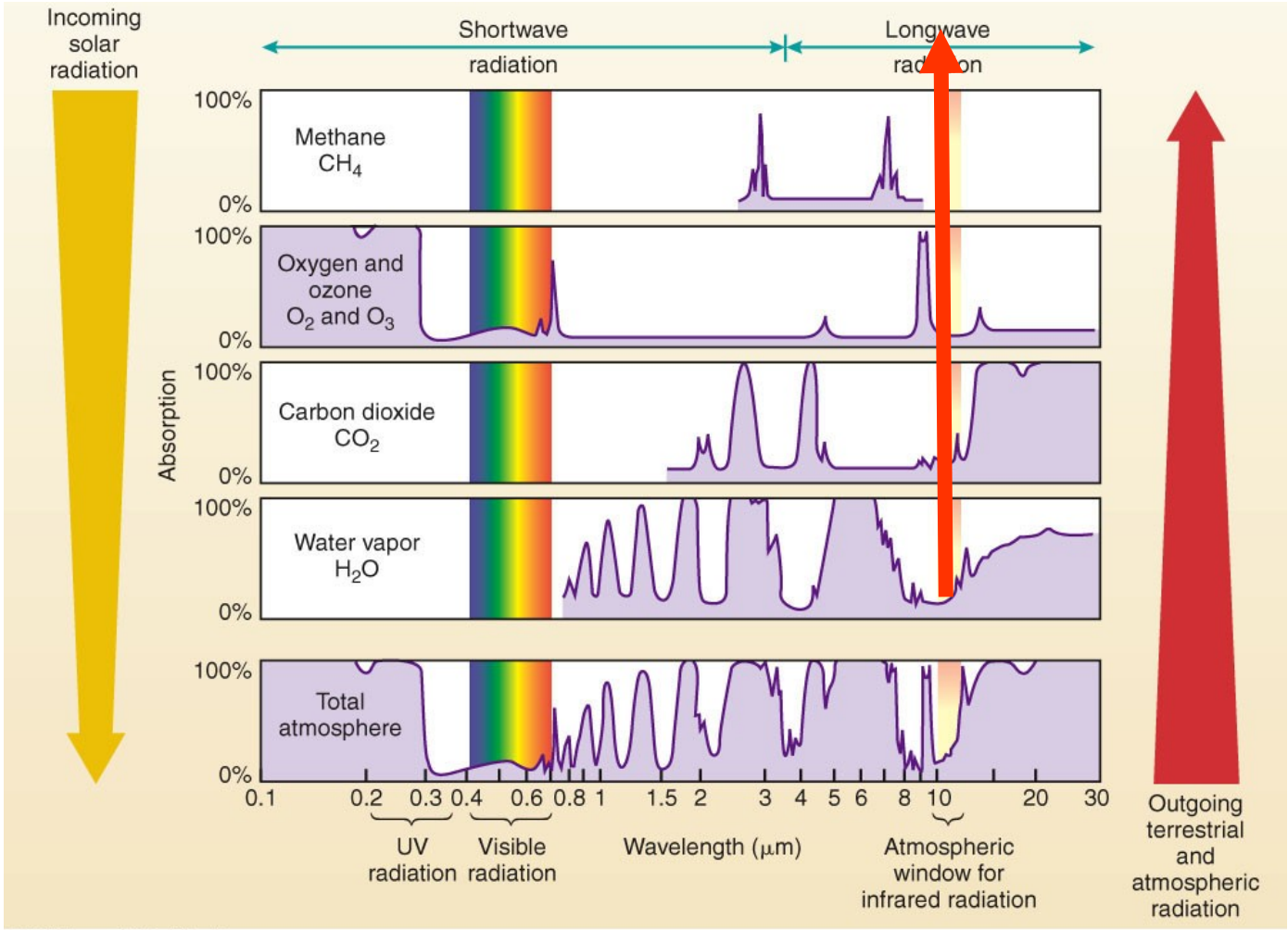


Infrared

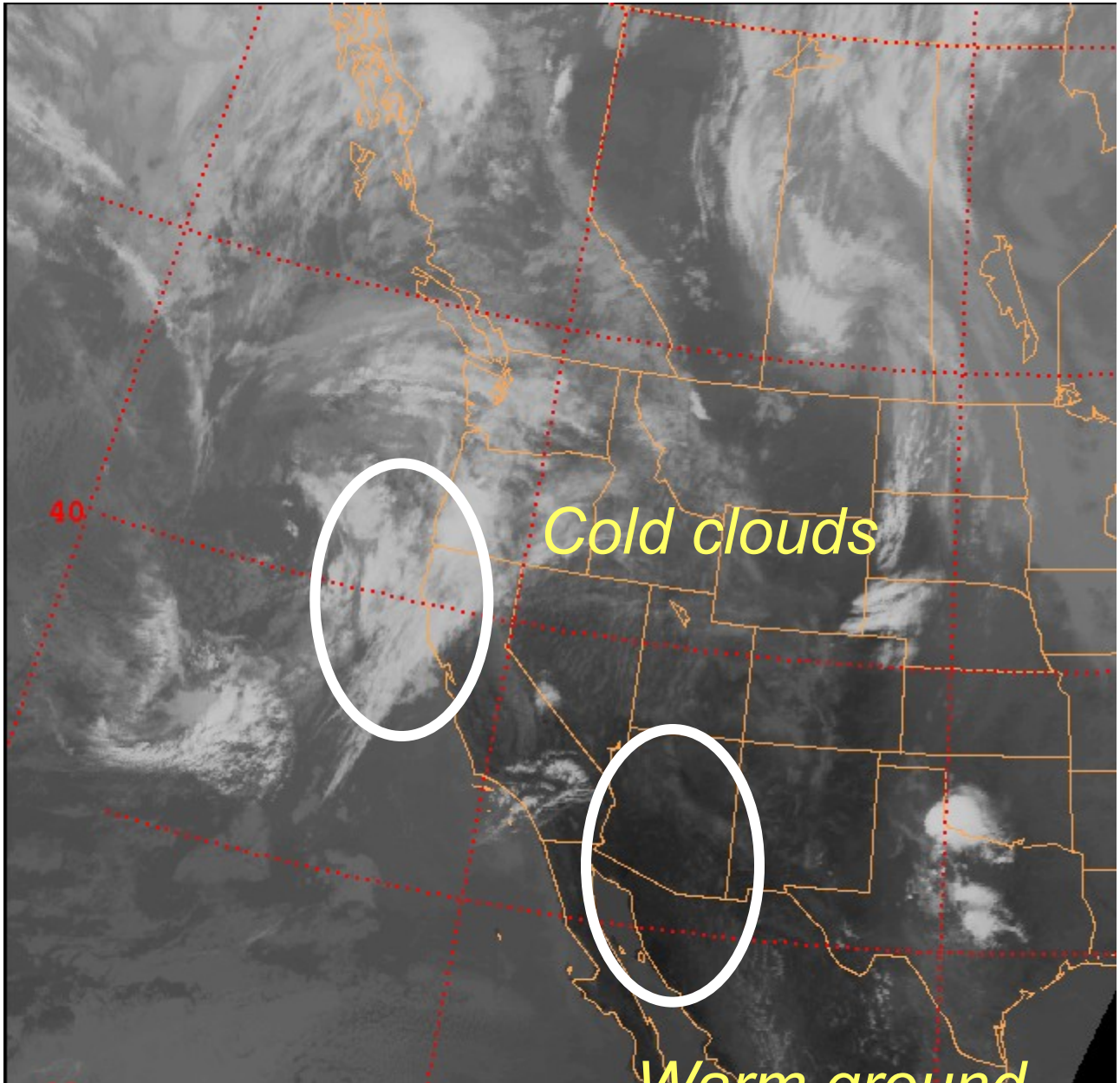
- Sensor measures energy in 10-11 micron range
- Measures amount of energy emitted upward from all earth objects (surface and clouds)
- Directly related to temperature: warm objects emit lots of infrared; cold objects emit little
- Available 24 hours
- Common convention is to display:
  - cold objects as white
  - warm objects as dark

Infrared

Amount of energy emitted by all bodies



GOES Infrared



Discriminating between low/high and thick/thin clouds

- Use infrared image for temperature:
  - Low clouds tend to be warm (grey in IR image)
  - High clouds tend to be cold (white in IR image)
- Use visible image for thickness
  - Thin clouds reflect less solar energy (grey in visible image)
  - Thick clouds reflect lots of solar energy (white in visible image)

High/thin:
Vis: grey
IR: white

Low/thin:
Vis: grey
IR: grey

High/thick:
Vis: white
IR: white

Low/thick:
Vis: white
IR: grey

Summary

- Satellite passive remote sensors are invaluable for monitoring weather 24/7
- GOES and POES satellites play different roles
  - GOES continual monitoring of sectors of globe
  - POES monitoring of entire globe 2 times per day
- Measuring energy received in visible and10-11 micron bands provides information on clouds
- Measuring energy received in 6-7 micron band provides information on water vapor (and clouds)
- NOTES: www.chpc.utah.edu /~u0035056/Atmos3000.0921.2009.pdf