

Answer Key Activity 3

GOES-R Compared with Earlier Satellites

In this activity you will be comparing satellite images.

Time: Activity 3:	Introduction	5 minutes
	Activity 3.1 with discussion	15 minutes
	Activity 3.2 with discussion	25-30 minutes
	Activity 3.3 with discussion	20-25 minutes

Activity 3.1 Image Comparison

The ABI on the GOES-R is approximately 5 times faster than current satellite imagers.

Watch [Video A](#) to help you complete the following:

1. Compare and contrast the two video simulations.

Comparison: Both simulations show cloud movement over the north-eastern United States for an extended period of time allowing scientists to see cloud features develop and change over a given area.

Contrasting: The simulation on the right shows more detail with increased frequency than the simulation on the left, of the clouds over north-eastern United States. The simulation on the right is five times faster, based on a one minute interval versus a five minute interval, than the simulation on the left.

2. Which of the two video simulations do you think would lead to more accurate weather forecasting? Explain why one is better than the other.

The video simulation on the right would likely lead to more accurate weather forecasting than the video simulation on the left. The right side video would be more accurate because it shows more detail and imagery. The video imagery on the right is refreshed more rapidly, than the video on the left, allowing meteorologists to more easily predict the path of the clouds and storm.

Activity 3.2 Image Comparison

(Helpful Hint: Refer students back to the video images from Activity 2.)

The ABI aboard the GOES-R has the ability to make observations using the Infrared (IR) band.

Watch [Video B](#) to help you complete the following:

1. Summarize what is happening in the satellite image in Video B.

Video B shows the smoke plumes from wildfires over the states of Oregon, Washington and Idaho on September 9, 2012 in 1 minute visible satellite imagery (band 1). The smoke appears to be moving in a

north-eastern direction. The geostationary satellite imagery allows for the rapid scan images of wildfires that can help in monitoring changes of wind speed and direction, moisture, fuel loads, etc.

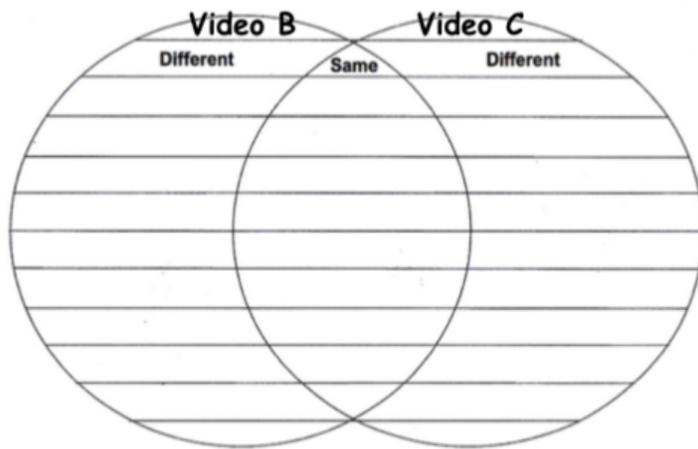
Watch [Video C](#) to help you answer the following:

2. Summarize what is happening in the satellite image in Video C.

Video C shows the location of the fires and smoke plumes from wildfires over the states of Oregon, Washington and Idaho on September 9, 2012 in infrared (IR) satellite imagery with red pixels pin-pointing the hottest part of the fires. Infrared imagery makes it easy identify the location, size and intensity of the fires. The smoke appears to be moving in a north-eastern direction. The geostationary satellite imagery allows for the rapid scan images of wildfires that can help in monitoring changes of wind speed and direction, moisture, fuel loads, etc.

3. Compare and contrast the Videos B (visible satellite imagery) and C (IR satellite imagery) by completing the Venn diagram below. Please draw the Venn diagram on your answer sheet to complete it.

See the GOES-R Teacher Copy Activity 3.2 Venn Diagram sheet for possible answers.



4. Explain how the image differences, from Videos B and C, could potentially help save lives.

The geostationary satellite imagery allows for the rapid scan images (minute by minute) of wildl that can help in monitoring changes of wind speed and direction, moisture, fuel loads, etc. to hel predict and monitor fire movement and direction allowing for efficient evacuations of people an allocation of fire fighting resources.

Activity 3.3 Continuous Satellite Coverage

Watch [Video D](#) to help you complete the following:

1. What natural disaster approached the East Coast of the United States in October 2012 in the video clip?

Hurricane Sandy swept through the Caribbean and up the East Coast of the United States in late October 2012. The storm left dozens dead, thousands homeless and millions without power. The total damage cost was billions of dollars.

2. Predict why the screen goes dark several times during the video clip. Does the eye of the storm move during the dark times? (Hint: How long is this clip?)

The video goes dark several times because these are visible satellite images that depend on reflected sunlight and it was dark during night time over the six days included in this video clip. The eye of the storm does move. It appears to move in a northerly direction before turning westerly and making landfall.

3. Explain how having continuous satellite coverage of a storm aids forecasters.

Continuous satellite coverage of a storm allows forecasters to see how the storm is either gaining or decreasing in strength in real time. It allows forecasters to predict the intensity of the storm (cell growth) and the direction the storm is moving more accurately than periodic updates. Forecasters are more likely to be able to assess potential rainfall with continuous satellite coverage.

4. Infer and describe how continuous storm coverage may aid people living in the projected path of a storm.

Continuous and up-to-date storm coverage may aid people living in the project path of a storm by allowing them to better prepare for the effects of the storm. People will be able to better prepare their dwellings to withstand the storm elements; rain, wind, flooding, etc.... People will have more time to prepare to evacuate, if necessary, if they have a better understanding of the potential storm impact due to continuous coverage. Continuous storm coverage will help Emergency Medical Services and Federal Emergency Management Agency to prepare for needs of the people in the path of the storm.

Continuous storm coverage can help cities and government prepare for impending disaster needs.

Resources for Activities

Activity 3.1 Image Comparison

[Video A](#) (September 2012 visible satellite image in 15 minute intervals and 1 minute intervals)

http://remotesensing.spiedigitallibrary.org/data/Journals/APPRES/926148/JARS_7_1_073462_ds003.mov

Activity 3.2 Image Comparison

[Video B](#) (September 2012 visible satellite imagery of forest fires in 1 minute intervals)

http://remotesensing.spiedigitallibrary.org/data/Journals/APPRES/926148/JARS_7_1_073462_ds004.mov

[Video C](#) (September 2012 enhanced IR satellite imagery of forest fires in 1 minute intervals)

http://remotesensing.spiedigitallibrary.org/data/Journals/APPRES/926148/JARS_7_1_073462_ds005.mov

Activity 3.3 Continuous Satellite Coverage

[Video D](#) (Visible images of Hurricane Sandy)

http://remotesensing.spiedigitallibrary.org/data/Journals/APPRES/926148/JARS_7_1_073462_ds006.mov