



Applied Remote Sensing Training (ARSET) Program

Methane Observations for Large Emission Event Detection and Monitoring (2024)

Homework Questions

Question 1

Methane is an important target for policy makers because there is much more atmospheric methane than carbon dioxide.

Answers: (bold correct)

- a. True
- b. False**

Feedback:

This statement is false. Methane is an important target for policy makers because it is a potent greenhouse gas. Even though CO₂ is about 200x more abundant in the atmosphere than methane, methane still contributes as much as 16% of warming relative to the pre-industrial era.

Question 2

The goals of the US GHG Center involve making data that supports decision making, improving the quality and reliability of information, and providing users with consensus information.

Answers: (bold correct)

- a. True**
- b. False

Feedback

The US GHG Center facilitates coordination across federal and non-federal, domestic, and international entities to integrate and enhance GHG data and modeling capabilities from the USG and non-USG sources for scalable impact.

Question 3

Which satellite sensor spatial resolution would be best for identifying a methane point source emission?

Answers: (bold correct)

- a. 50 x 50 km
- b. 10 km x 10 km
- c. **30 m x 30 m**

Feedback:

Satellite sensors require high spatial resolution in order to detect methane point source emissions. Point source imagers have spatial resolutions on the order of 10s of m², whereas current area flux mappers have spatial resolutions on the order of 3-10 km² and are better suited to mapping global methane gradients.

Question 4

The EMIT sensor onboard the ISS observes methane plumes at all latitudes.

Answers: (bold correct)

- a. True
- b. **False**

Feedback:

Because of the ISS orbit, EMIT does not have coverage at high latitudes near the poles.

Question 5

Emit detects methane plumes emitted by various sectors such as the fossil fuel industry, landfills and agriculture. What information do EMIT methane enhancement maps currently provide about a given region?

Answers: (bold correct)

- a. **Enhancements of methane above the background of their scene**
- b. The emission rate of methane from a source
- c. The atmospheric profile of methane

Feedback:

EMIT methane enhancement maps show enhancements of methane above the background of their scene. Future products include methane emission rates.

Question 6

Which of the following is **NOT** a limitation of observing large emission events from satellites?

Answers: (bold correct)

- a. Current technology is limited to only large methane point sources.
- b. **Point source emissions can be attributed to a specific emission sector.**
- c. Individual sensors have limited spatial coverage and temporal revisits.
- d. Repeat observations are required to assess if emissions are intermittent or persistent.

Feedback:

The ability of point source emissions to be attributed to a specific emission sector is a strength of observing large emission events by satellite. Emission sector attribution can lead to improved understanding of the contribution from different sources and inform mitigation activities.

Question 7

Which data portal would you use if you wanted to access EMIT data on the cloud?

Answers: (bold correct)

- a. US GHG Center
- b. EMIT VISIONS portal
- c. **NASA Earthdata Search**

Feedback:

From NASA Earthdata search you can find information on accessing EMIT data on the cloud as well as directly download EMIT data.

Question 8

Which data portal would you use if you wanted to step forward in time to view consecutive methane plume observations over a persistent methane source?

Answers: (bold correct)

- a. US GHG Center
- b. **EMIT VISIONS portal**
- c. NASA Earthdata Search

Feedback:

The EMIT VISIONS portal allows you to zoom in over a methane plume of interest and step forward in time to view consecutive methane plume observations.

Question 9

Which data portal would you use if you wanted to find out why there is a gap in EMIT methane plume observations over a persistent methane source?

Answers: (bold correct)

- a. US GHG Center
- b. **EMIT VISIONS portal**
- c. NASA Earthdata Search

Feedback:

The EMIT VISIONS portal provides a quick way to see additional information such as the spatial coverage of EMIT observations and cloud cover, two likely reasons for a gap in methane plume observations. You can also get this information from the EMIT files at NASA Earthdata, but you would have to open the file to see that information.

Question 10

Which data portal would you use if you wanted to find greenhouse gas data from EMIT as well as greenhouse gas data from other US agencies?

Answers: (bold correct)

- a. **US GHG Center**
- b. EMIT VISIONS portal
- c. NASA Earthdata Search

Feedback:

The EMIT Visions portal and NASA Earthdata search only show greenhouse data from NASA. The US GHG Center contains data sources from multiple agencies.