



Applied Remote Sensing Training (ARSET) Program

Using Earth Observations for Pre- and Post-Fire Monitoring

Homework Questions

Question 1

List three climate variables that contribute to wildfire risk.

Answer: precipitation, temperature, humidity, winds

Question 2

Fire spreads faster on steep slopes.

Answers: (bold correct)

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

Question 3

What indices can be used to monitor vegetation health prior to a wildfire event? [select all that apply]

Answers: (bold correct)

- a. **The Normalized Difference Vegetation Index (NDVI)**
- b. The Normalized Snow Index (NDSI)
- c. **The Enhanced Vegetation Index (EVI)**
- d. **The Soil Adjusted Vegetation Index (SAVI)**
- e. **The Evaporative Stress Index (ESI)**

Question 4

Fire danger is related to:

Answers: (bold correct)

- a. **Topography, fuels and weather**
- b. Topography, weather and area
- c. Weather, slope and vegetation indices
- d. Fuels, canopy density and slope

Question 5

In the Part 1 exercise for the Lytton Creek Fire, what was the value of the Fire Weather Index (FWI) in the location you selected? (See the steps on page 14).

Answer: The FWI ranges from about 20-60 across the region.

Question 6

In the Part 1 exercise for the Lytton Creek Fire, what was the value of the Fire Weather Index (FWI) in the location you selected (see the steps on page 14)?

Answers: The FWI ranges from about 20-60 across the region

Question 7

In the Part 1 exercise for the Bolivia fires, which climate model do we use for evaluating precipitation and temperature conditions?

Answers: (bold correct)

- a. gridMet
- b. CFS Reanalysis
- c. **TerraClimate**
- d. MERRA-2

Question 8

Burn severity is often considered the degree of:

Answers: (bold correct)

- a. Physical and chemical impacts to soil properties
- b. Dense forest impacted
- c. Vegetation mortality**
- d. Energy or heat released per unit time or area

Question 9

9. The Normalized Burn Ratio (NBR) uses which two image bands?

Answers: (bold correct)

- a. Green and near infrared
- b. Near infrared and red
- c. Near infrared and blue
- d. Near infrared and shortwave infrared**

Question 10

Which dataset(s) are available via Google Earth Engine (GEE)?

Answers: (bold correct)

- a. The Landsat series
- b. Sentinel-2
- c. MODIS
- d. VIIRS
- e. All of the above**

Question 11

Name two advantages and two disadvantages to the use of GEE.

Answers:

- Advantages
 - Allows processing of remote sensing data directly on Google's servers (cloud-computing)
 - Free for non-commercial use
 - Access and integration of many geospatial datasets at multiple scales
 - Ability to monitor global phenomena
 - Built in functions for quick processing
 - Flexible access through APIs (Climate Engine built in this manner)
- Disadvantages
 - Processing and storage limits
 - Inability to perform "batch jobs" without cost
 - Only free for non-commercial user
 - Complex operations can be challenging
 - Restricted programming framework
 - Aggregate layers make it difficult to determine the date of specific pixels

Question 12

After running the GEE script for the Lytton fires, what percentage of the pixels in the designated geometry were in the Moderate-low Severity class?

Answers: (bold correct)

- a. 7.51
- b. 6.55**
- c. 25.12
- d. 3.54

Question 13

What was the designated pre-fire end date in the GEE script for the Bolivia fires?

Answers: (bold correct)

- a. 2018-12-31**
- b. 2018-01-01
- c. 2121-11-01

d. 2020-11-01

Question 14

What satellite platform is used as the default in the GEE script for the Bolivia fires?

Answers: (bold correct)

- a. Sentinel-1
- b. Landsat 8**
- c. Sentinel-2
- d. VIIRS

Question 15

Describe a type of analysis you would like to conduct using NASA satellite data in GEE.

Long answer text: