



Applied Remote Sensing Training (ARSET) Program

Use of Solar Induced Fluorescence and LIDAR to Assess Vegetation Change and Vulnerability

Homework Questions

Question 1

LiDARs are passive systems.

Answers: (bold correct)

- a. True
- b. False**

Question 2

A LiDAR pulse can penetrate through a vegetation canopy because of the gaps in the canopy.

Answers: (bold correct)

- a. True**
- b. False

Question 3

A LiDAR pulse operating at 532nm (green light) can penetrate into the water, up to a certain degree.

Answers: (bold correct)

- a. True**
- b. False

Question 4

A LiDAR pulse operating at 1064 nm (near infrared):

Answers: (bold correct)

- a. Can penetrate into the water
- b. Reflects well off vegetation**
- c. Is highlight absorbed by vegetation
- d. Cannot penetrate into the water**

Question 5

A full waveform LiDAR:

Answers: (bold correct)

- a. Records individual returns representing the peaks in the reflected signal
- b. Records the arrival time associated with a single photon detection occurring anywhere within the vertical distribution of the reflected signal
- c. Records the distribution of the returned light**
- d. All of the above

Question 6

A discrete LiDAR:

Answers: (bold correct)

- a. Records individual returns representing the peaks in the reflected signal**
- b. Records the arrival time associated with a single photon detection occurring anywhere within the vertical distribution of the reflected signal
- c. Records the distribution of the returned light
- d. All of the above

Question 7

A photon counting LiDAR:

Answers: (bold correct)

- a. Transmits a low-power laser
- b. Records the arrival time associated with a single photon detection occurring anywhere within the vertical distribution of the reflected signal
- c. Is highly sensitive to solar photons
- d. All of the above**

Question 8

Space-borne LiDARS are:

Answers: (bold correct)

- a. Mapping missions
- b. Sampling missions**

Question 9

Space-borne LiDARs can "see" through dense clouds.

Answers: (bold correct)

- a. True
- b. False**

Question 10

ICESat-2 has a full waveform LiDAR operating at 532nm.

Answers: (bold correct)

- a. True
- b. False**

Question 11

ICESat-2 ATL08 is a land/vegetation product.

Answers: (bold correct)

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

Question 12

ICESat-2 data can be used for bathymetric studies.

Answers: (bold correct)

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

Question 13

ICESat-2 only covers the poles.

Answers: (bold correct)

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

Question 14

ICESat-2 has 6 beams. How do you separate the weak beams from the strong beams?

Answers: (bold correct)

- a. The beam quality flag
- b. The date of acquisition
- c. The time of acquisition
- d. **The beam number**

Question 15

GED1 is a:

Answers: (bold correct)

- a. Full waveform LiDAR on the International Space Station
- b. Full waveform LiDAR on a satellite
- c. A photon counting LiDAR on a satellite
- d. A photon counting LiDAR on the International Space Station

Question 16

The GEDI LiDAR operates at 1024 nm.

Answers: (bold correct)

- a. True
- b. False**

Question 17

GEDI data is more useful for studies of woody vegetation.

Answers: (bold correct)

- a. True**
- b. False

Question 18

Clouds are considered in the quality flags for ICESat-2 and GEDI.

Answers: (bold correct)

- a. True**
- b. False

Question 19

Provide an example of how LiDAR data can be used for post-disaster damage assessment.

Short answer text:

Question 20

During photosynthesis, a small fraction of the absorbed light is re-emitted as fluorescence.

Answers: (bold correct)

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

Question 21

Solar induced chlorophyll fluorescence is less directly tied to plant health and activity than traditional measurements like greenness.

Answers: (bold correct)

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

Question 22

Solar induced chlorophyll fluorescence can be measured from space by:

Answers: (bold correct)

- a. Emitting a strong flash from the sensor
- b. Using NDVI
- c. **Using Fraunhofer lines**
- d. Using thermal infrared

Question 23

SIF and GPP are highly correlated:

Answers: (bold correct)

- a. In short time scales (e.g. diurnal cycles)
- b. Under vegetarian stress conditions
- c. **When aggregated in space and time over larger scales**
- d. All of the above

Question 24

TROPOMI has denser SIF data acquisitions than OCO-2.

Answers: (bold correct)

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

Question 25

How do you see LiDAR data applying to your work?

Short answer text:

Question 26

How do you see solar induced chlorophyll fluorescence data applying to your work?

Short answer text: