



Applied Remote Sensing Training (ARSET) Program

SAR for Detecting and Monitoring Floods, Sea Ice, and Subsidence from Groundwater Extraction

Homework Questions

Question 1

Sea ice looks different to the radar signal when it is melting and when it is freezing.

Answers: (bold correct)

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

Question 2

SAR can be used to identify sea ice thickness.

Answers: (bold correct)

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

Question 3

SAR “sees” sea ice surface roughness and volume inhomogeneities (e.g. air inclusions, brine pockets, large snow grains, etc.).

Answers: (bold correct)

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

Question 4

Young ice is easy to detect and monitor because it has a very specific SAR signature.

Answers: (bold correct)

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

Question 5

Changes in salinity in sea ice changes the dielectric constant and affects the penetration depth of the SAR signal.

Answers: (bold correct)

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

Question 6

Please indicate the correct statement/s related to the scattering mechanisms from sea ice using different wavelengths.

Answers: (bold correct)

- a. X- and C-band scattering occurs primarily from the surface
- b. S-band scattering occurs partly from the surface and partly from ice volume
- c. L-band scattering occurs primarily from ice volume
- d. **All of the above**

Question 7

HV provides better separation between:

Answers: (bold correct)

- a. Sea ice and land ice
- b. Sea ice and polar bears
- c. Open water and sea ice**
- d. Open ocean water and inland water

Question 8

An interferogram is created using the SAR:

Answers: (bold correct)

- a. Amplitude
- b. Phase**
- c. HH polarization
- d. HH and HV polarizations

Question 9

Low coherence or decorrelation for any reason causes:

Answers: (bold correct)

- a. A gain in information
- b. A loss of information**
- c. It has no effect**

Question 10

Some of the challenges in detecting subsidence due to groundwater extraction with SAR are:

Answers: (bold correct)

- a. Vegetation growth
- b. Atmospheric effects
- c. Snow melt
- d. All of the above**

Question 11

Correlation effects multiply, unlike phase effects that add.

Answers: (bold correct)

- a. True**
- b. False

Question 12

The longer the radar wavelength the lower the penetration depth.

Answers: (bold correct)

- a. True
- b. False**

Question 13

Calm open water surfaces appear smooth to the radar signal. Select the scattering mechanism expected in this case.

Answers: (bold correct)

- a. Double bounce reflection leading to very high backscatter
- b. Volume scattering leading to high backscatter
- c. Specular reflection leading to low backscatter**
- d. Myopic reflection leading to erratic backscatter

Question 14

Through a period of two months the land surface goes from dry to wet to the formation of open water bodies. How will the SAR time series signal look like?

Answers: (bold correct)

- a. **Initially low but increase as soil moisture increases and then decrease as water bodies appear on the surface**
- b. Initially high but decrease as soil moisture increases and then decrease as water bodies appear on the surface

Question 15

Inundated vegetation is dominated by:

Answers: (bold correct)

- a. Rough surface scattering
- b. Specular reflection
- c. Volume scattering
- d. **Double bounce**