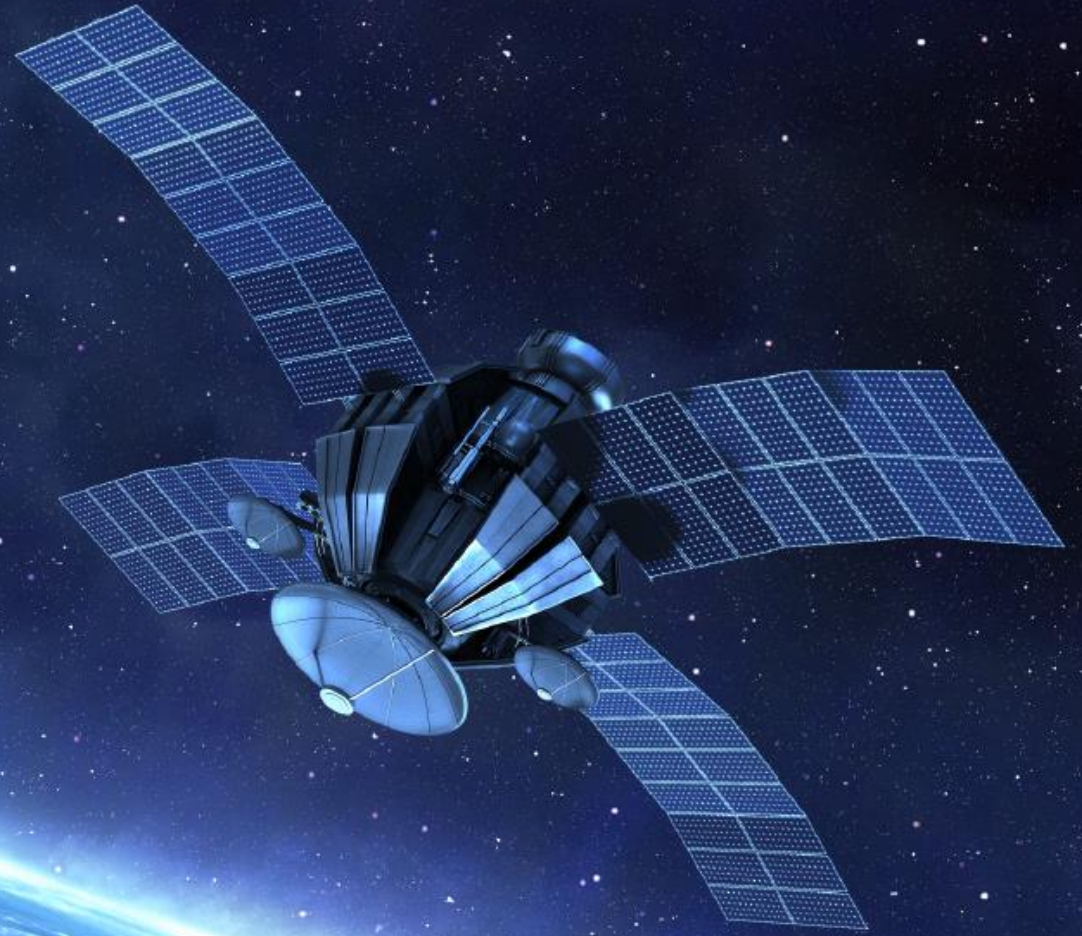


Remote Sensing



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INTRODUCTION

- Remote sensing is the art and science of recording, measuring, and analyzing information about a phenomenon from a distance. Humans with the aid of their eyes, noses, and ears are constantly seeing, smelling, and hearing things from a distance as they move through an environment.
- In order to study large areas of the Earth's surface geographers use devices known as remote sensors. These sensors are mounted on platforms such as helicopters, planes, and satellites that make it possible for the sensors to observe the Earth from above.
- Remote sensing has been used for earthquake research from the 70s, with the first appearance of satellite images. First of all it was used in structural geological and geomorphological research.
- Active faults and structures were mapped on the base of satellite images. This method is very limited in time series analysis.

What is remote sensing?

- ❖ Remote Sensing: remote sensing is science and art
 - Acquiring,
 - Processing, And
 - Interpreting
- ❖ Images and related data that are obtained from ground-based, air-or space borne instruments that record the interaction between matter(target)and electromagnetic radiation.
- ❖ Remote Sensing: using electromagnetic spectrum to image the land, ocean, and atmosphere.
- ❖ The scanning of the earth by satellite or high-flying aircraft in order to obtain information about it.

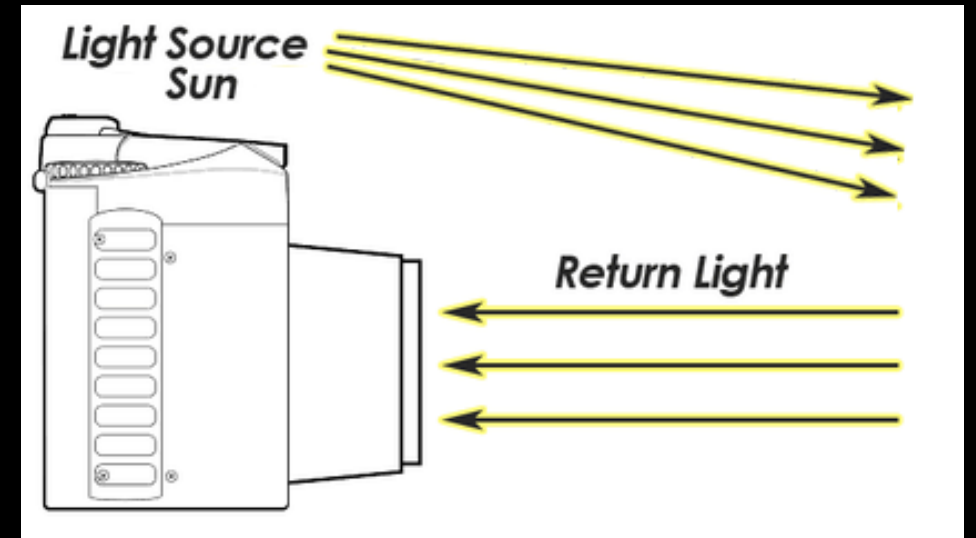
TYPES OF REMOTE SENSING:

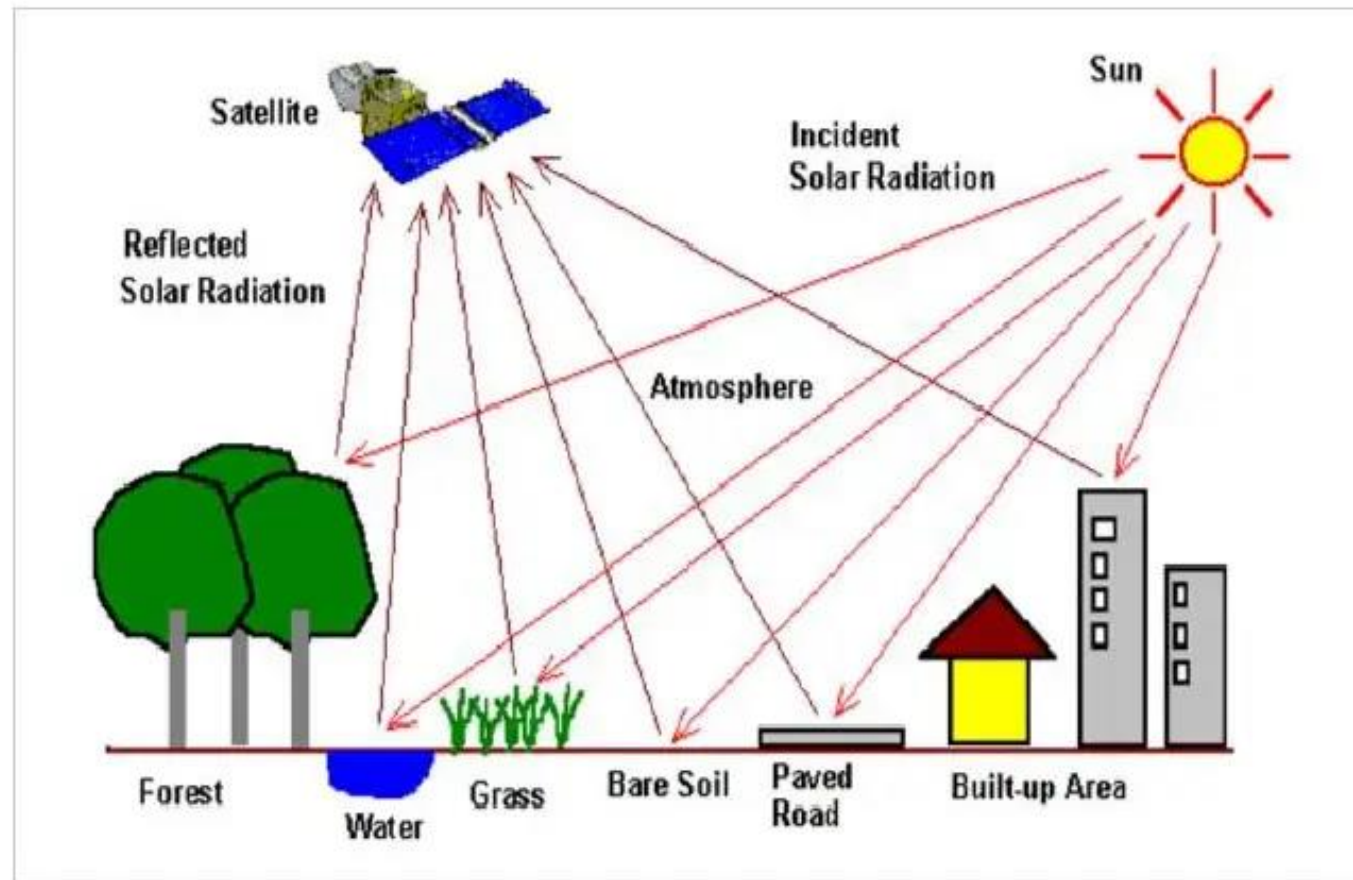
There are two main types of remote sensing:

1. Passive remote sensing and
2. Active remote sensing.

PASSIVE SENSORS:

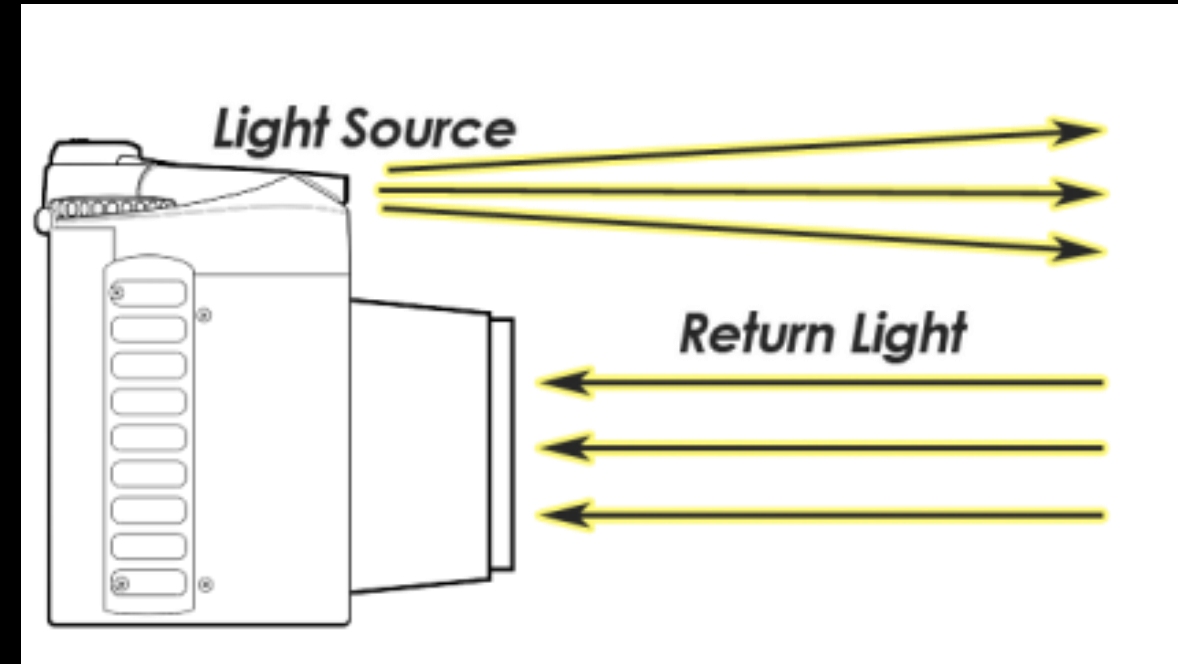
- Detect natural radiation that is emitted or reflected by the object surrounding area being observed.
- Reflected sunlight is the most common source of radiation measured by passive sensors.
- Examples of passive remote sensors include film photography, infrared, and radiometers.

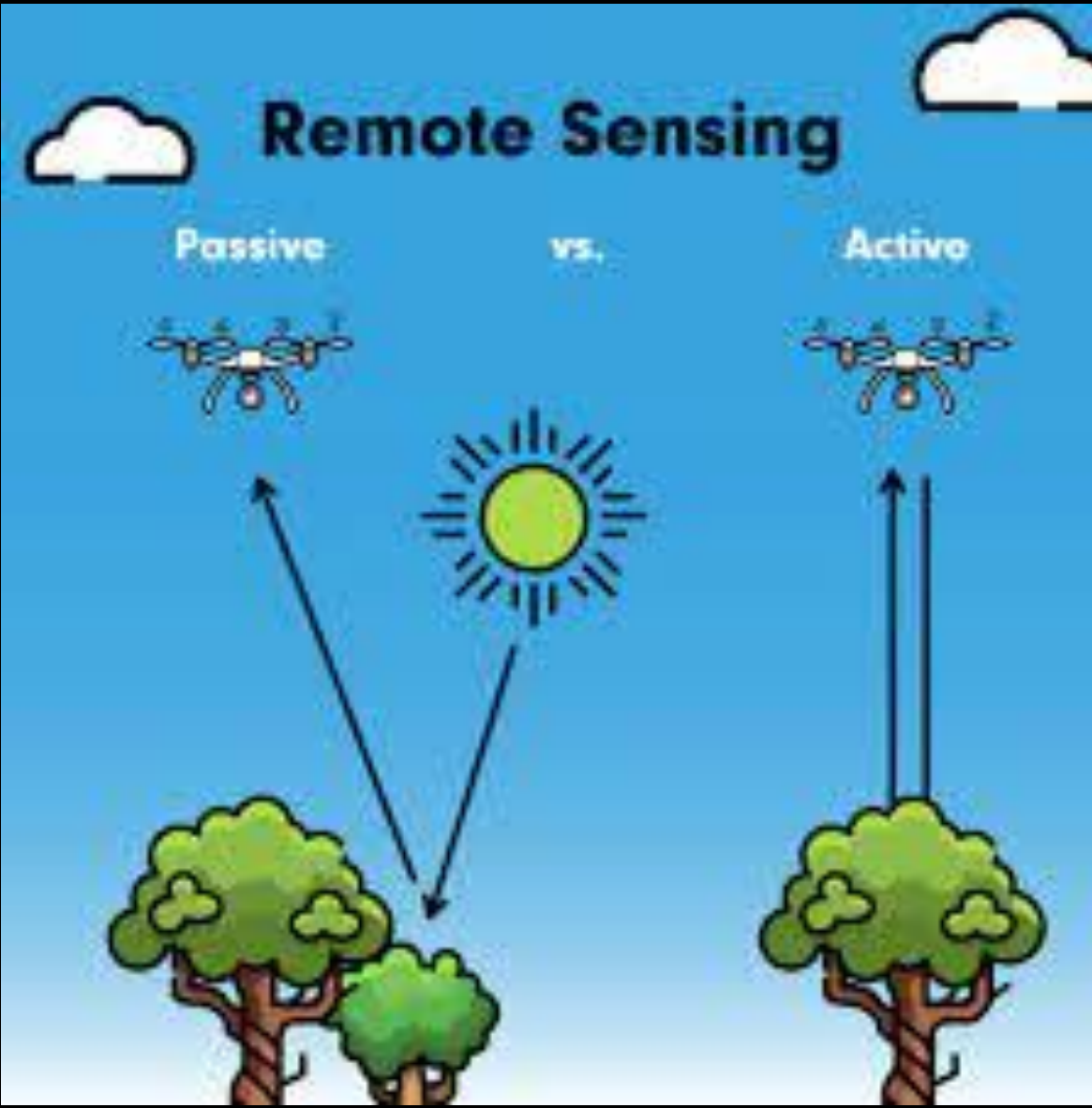




ACTIVE REMOTE SENSING:

- On the other hand, emits energy in order to scan objects and areas where upon a sensor then detects and measures the radiation that is reflected or backscattered from the target.
- **Radar** is an example of active remote sensing where the time delay between emission and return is measured, establishing the location, height, speeds and direction of an object.

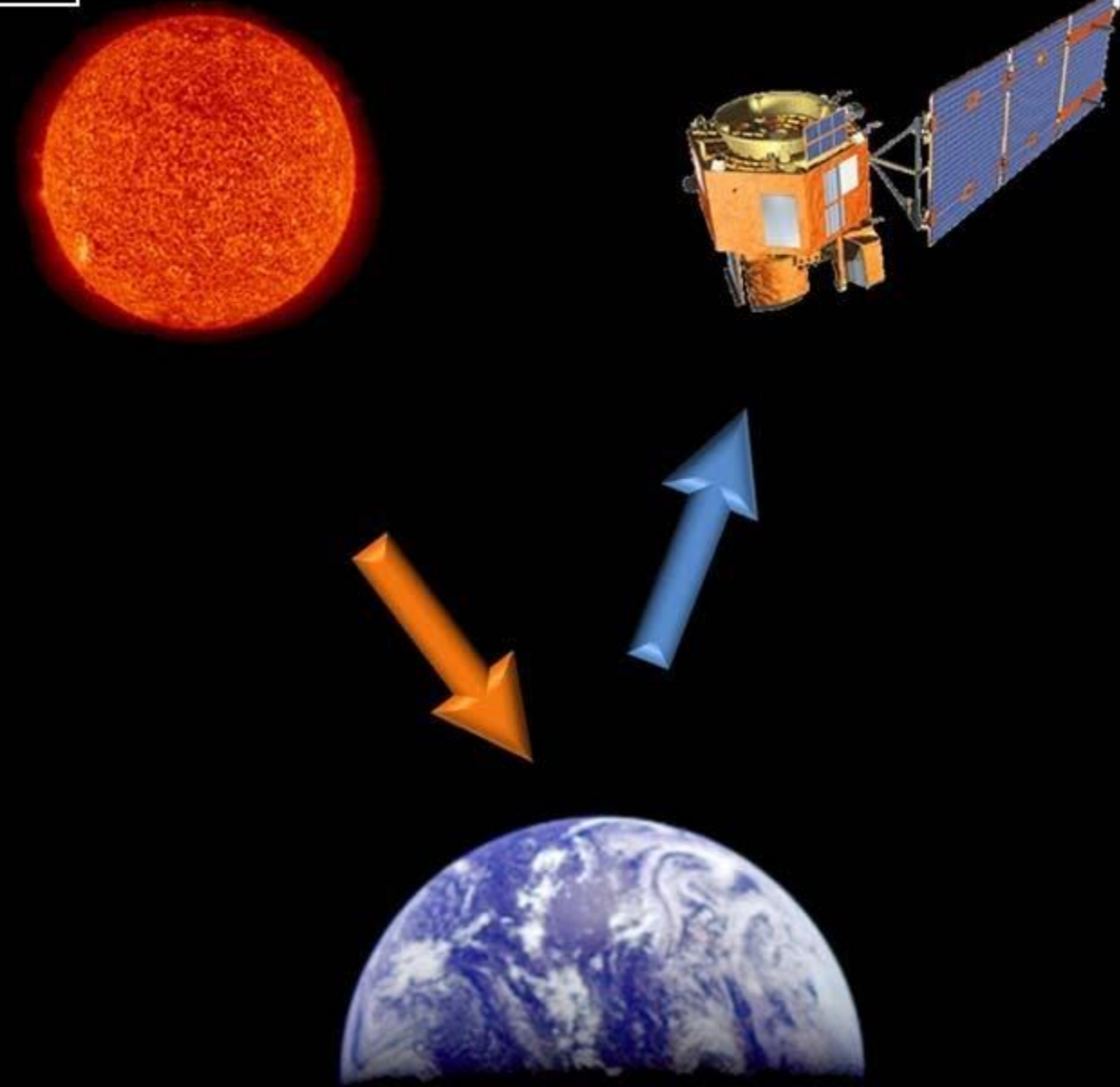
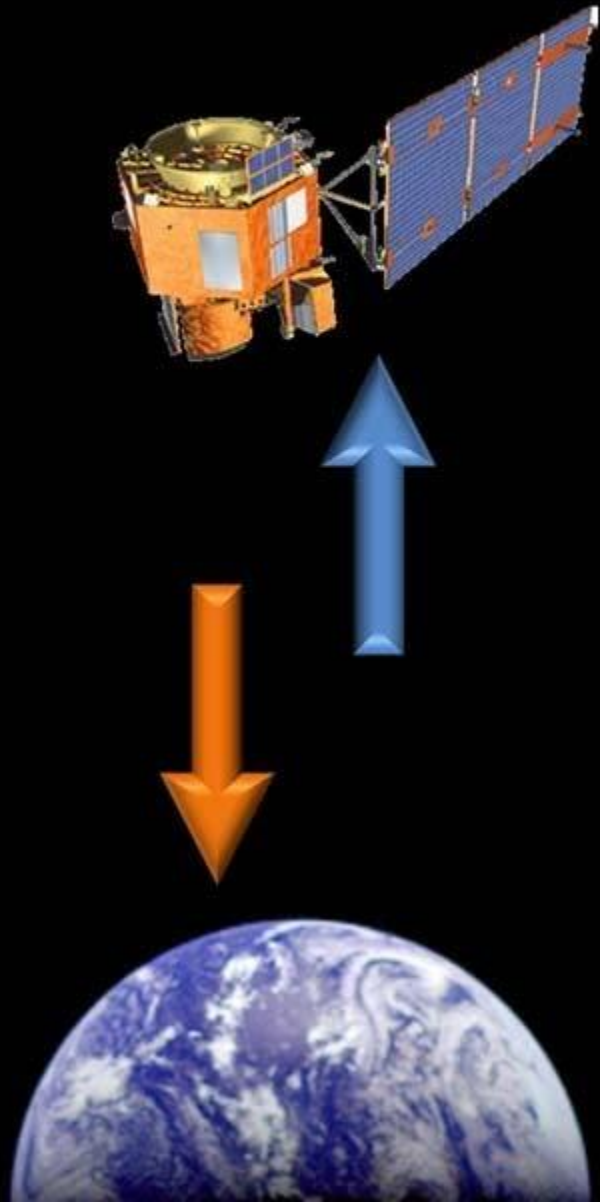




ACTIVE REMOTE SENSING

VS

PASSIVE REMOTE SENSING



ELEMENTS INVOLVED IN REMOTE SENSING

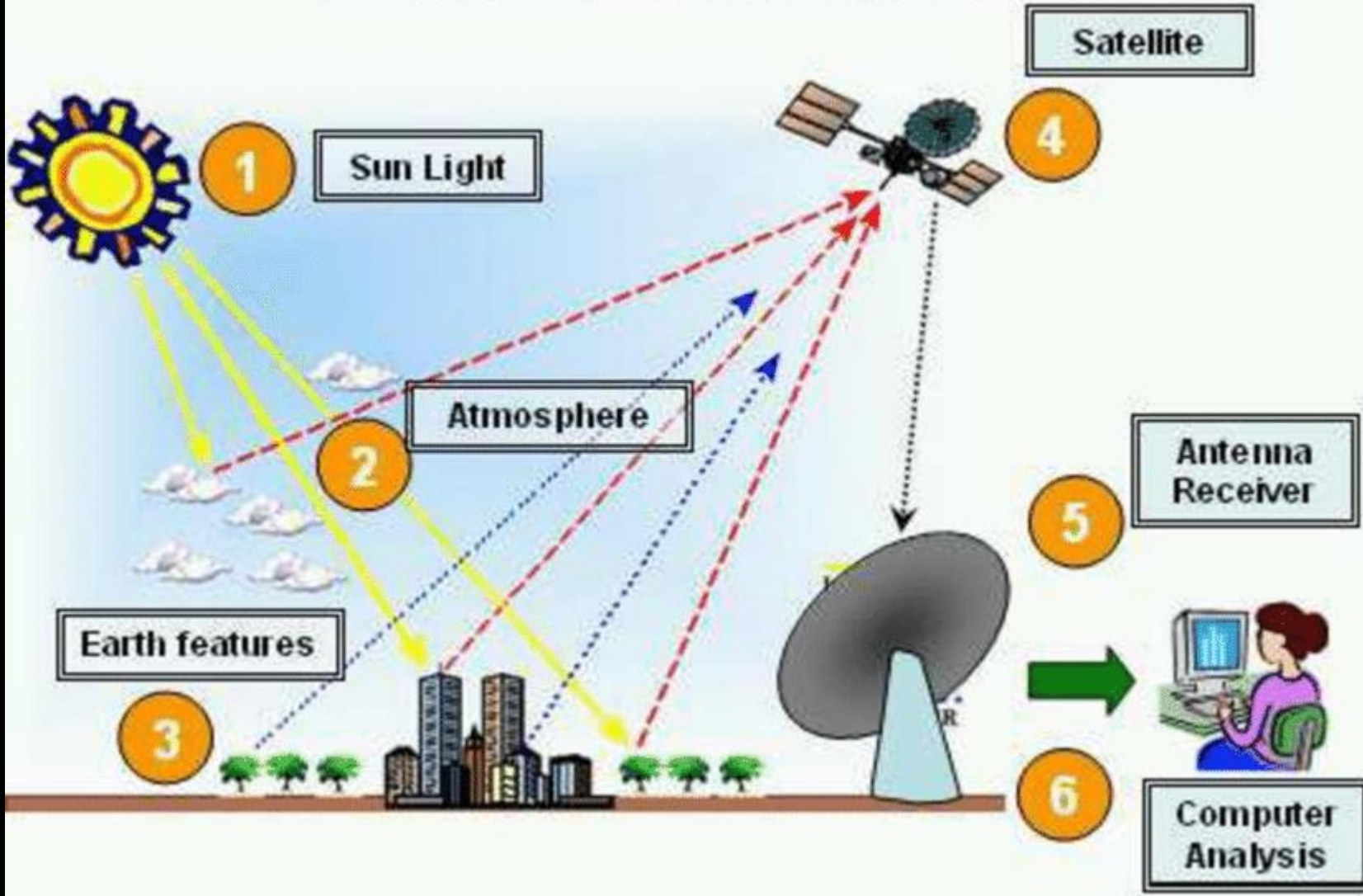
1. Energy Source

The primary requirement for remote sensing is to have an energy source, which provides electromagnetic energy to the target of interest. The sun being a major source of energy, radiation and illumination having a sharp power allows capturing reflected light with conventional cameras and films.

2. Radiation and the Atmosphere

The energy is required to illuminate the target. This energy is in the form of Electromagnetic radiation. Electromagnetic radiation is a dynamic form of energy that propagates as wave motion at a velocity in space.

REMOTE SENSING PROCESS

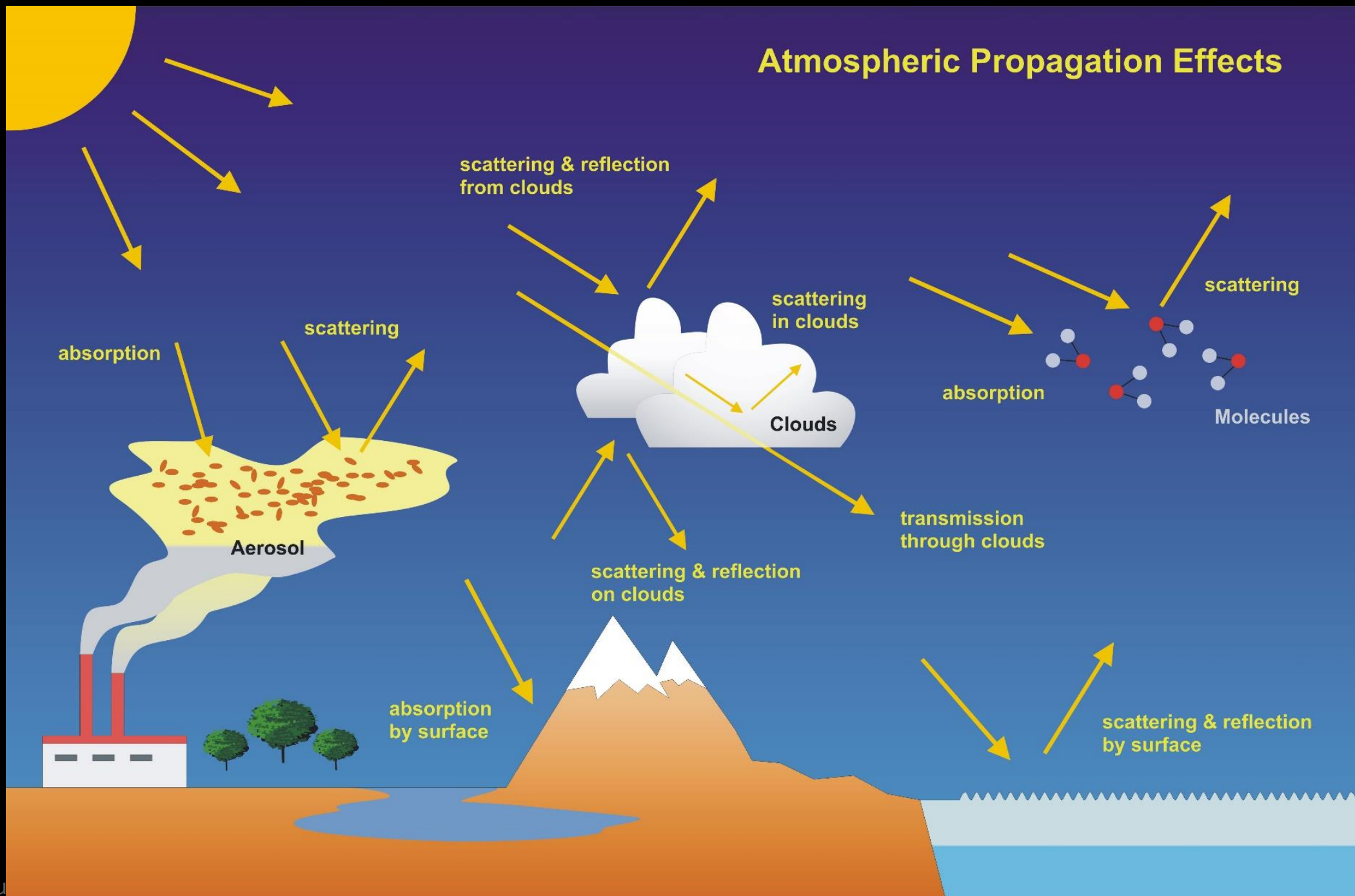


3. Interaction with the target

The interaction of Electromagnetic radiation with the target is important to remote sensing for two main reasons. First, information carried by Electromagnetic radiation reflected by the earth's surface is modified while traversing through the atmosphere. Second, the interaction of Electromagnetic radiation with the atmosphere can be used to obtain useful information about the atmosphere itself.

- **Scattering**
- **Absorption**

Atmospheric Propagation Effects



4. Recording of energy by the sensor

After the energy has been scattered by or emitted from the target, we require a sensor (remote not in contact with the target) to collect and record the electromagnetic radiation.

5. Transmission, Reception and Processing

The energy recorded by the sensor has to be transmitted in electronic form, to a receiving and processing station where the data processed into an image.

Image Restoration

Restoration processes are designed to recognize and compensate for errors, noise and geometric distortion introduced into the data during the scanning transmission and recording processes.

Image Enhancement: Enhancement is the modification of an image, to alter its impact on viewer. General enhancement distorts the original digital values; therefore enhancement is not done until the restoration processes are completed.

6. Interpretation and Analysis

Image interpretation is defined as the act of examining images to identify objects and judge their significance. An interpreter studies remotely sensed data and attempts through logical process to detect, identify, measure and evaluate the significance of environment and cultural object pattern and spatial relationship.

Image interpretation is essential for the efficient and effective use of the data. The elements of image interpretation such as image tone, shape, size, pattern, image texture, shadow and association are helpful to identify the exact target and to analyse.

7. Application

The final element of the remote sensing process is achieved when the data that we have extract from imagery is revealed some new information and it assist in solving a particular problem.

THANK YOU