





# Training Day 3 Daily Dairy

7 June 2024

1. Studied about different satellites:

-  LANDSAT 8
-  SENTINEL 2A
-  SENTINEL 5P
-  MODIS

2. Different processing levels

## SATELLITES

### 1. LANDSAT 8

**Overview:** LANDSAT 8 is a satellite mission launched by NASA on February 11, 2013. It is part of the Landsat program and continues the legacy of Earth observation with improved sensors and data quality.

**Sensors:** Operational Land Imager (OLI) and Thermal Infrared Sensor (TIRS).

**Applications:** LANDSAT 8 data is widely used for agriculture, forestry, land use mapping, environmental monitoring, and disaster management.

**Key Features:** Provides 11 spectral bands, including visible, near infrared, shortwave infrared, and thermal infrared. It has a revisit time of 16 days.

### 2. SENTINEL 2A

**Overview:** SENTINEL 2A is part of the European Space Agency's (ESA) Copernicus program, launched on June 23, 2015. It focuses on land and coastal area monitoring.

**Sensors:** Multispectral Instrument (MSI) with 13 spectral bands.

**Applications:** Used for agriculture, forestry, land cover classification, water quality monitoring, and disaster management.

**Key Features:** High resolution imaging with a spatial resolution of 10, 20, and 60 meters, depending on the spectral band. It has a revisit time of 5 days when combined with Sentinel2B.

### 3. SENTINEL 5P

**Overview:** SENTINEL 5P, also part of the Copernicus program, was launched on October 13, 2017. It is dedicated to monitoring air quality and atmospheric composition.

**Sensors:** Tropospheric Monitoring Instrument (TROPOMI).

**Applications:** Used for tracking air pollutants like nitrogen dioxide, sulphur dioxide, ozone, formaldehyde, and carbon monoxide. It supports climate research and public health monitoring.

**Key Features:** Provides daily global coverage with high spatial resolution (7x3.5 km) for detailed atmospheric data.

## 4. MODIS

**Overview:** MODIS (Moderate Resolution Imaging Spectroradiometer) is an instrument aboard NASA's Terra and Aqua satellites, launched in 1999 and 2002, respectively.

**Sensors:** MODIS captures data in 36 spectral bands, ranging from visible to thermal infrared.

**Applications:** Used for studying Earth's climate and environmental changes, including land cover change, ocean colour, and cloud properties.

**Key Features:** Provides global coverage every 1 to 2 days with a moderate spatial resolution of 250m, 500m, and 1km, depending on the spectral band.

# Different Processing Levels

Processing Levels refer to the stages of data processing that satellite imagery undergoes to become usable for analysis and application. They are generally categorized as:

### Level 0:

Description: Raw satellite data as received from the satellite.

Usage: Contains unprocessed sensor data with telemetry and ancillary information.

### Level 1:

Description: Corrected and calibrated data.

Usage: Includes radiometric and geometric corrections to remove distortions and ensure accurate measurements. Suitable for scientific analysis and further processing.

### Level 2:

Description: Derived geophysical parameters.

Usage: Data products that provide physical measurements like surface reflectance, sea surface temperature, or atmospheric properties. They are corrected for atmospheric effects and ready for specific applications.

### **Level 3:**

Description: Gridded or mapped data products.

Usage: Spatially and temporally aggregated data presented on a uniform grid. Useful for long term studies and comparisons across different regions or time periods.

### **Level 4:**

Description: Model outputs or data assimilated products.

Usage: Combines satellite data with model outputs to provide comprehensive datasets for analysis. These products are often used in climate models and forecasting applications.

### **Summary:**

Today's study focused on understanding key Earth observation satellites (LANDSAT 8, SENTINEL 2A, SENTINEL 5P, and MODIS) and their applications. Additionally, I explored the various data processing levels, ranging from raw data (Level 0) to advanced model outputs (Level 4). This knowledge is crucial for effectively utilizing satellite data in environmental monitoring and other applications.