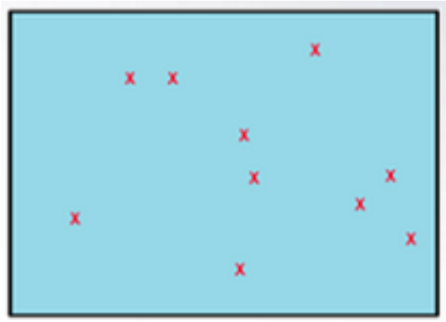
Raster data, Remote Sensing, and Google Earth Engine

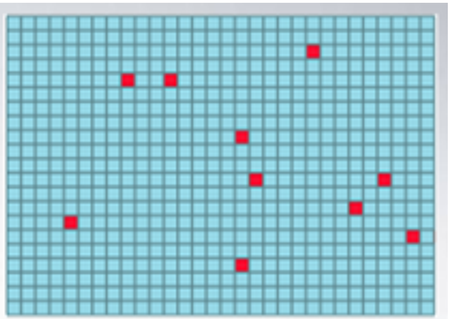
CYPLAN 255 Guest Lecture

Meiqing Li, April 8th, 2024

Vector vs. Raster Data

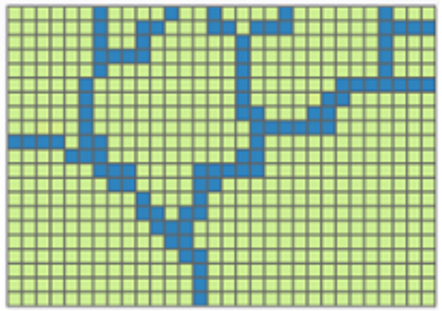


Point features



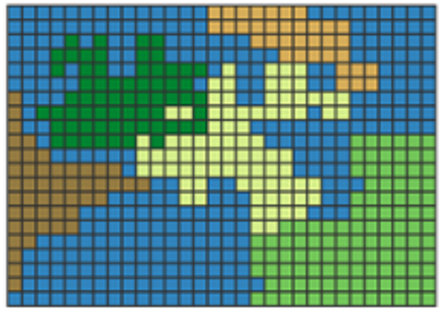
Raster point features

Line features



Raster line features

Polygon features



Raster polygon features

Raster Data in Python

Raster images and the `rasterio` library

- Colab tutorial
- The USGS National Data View
  - The USGS (United States Geological Survey) National Map Viewer provides access to a wide range of geospatial data and maps related to the United States. The National Map Viewer is an online tool that allows users to explore, visualize, and download various geospatial datasets and map, including topography, hydrography, and land cover data that are often in raster format.
- The USGS Earth Explorer
  - The USCS Earth Explorer is another source where you can search and download a wide variety of Earth observation data, including satellite and aerial imagery, remotely sensed data, and other geospatial datasets.

Mapping time-series satellite imagery

Google Earth Engine and API

- D-Lab blog post
- Colab tutorial
- Google Earth Engine (GEE) is a general purpose tool capable of extracting time-series remote sensing data from the GEE Data Catalog.
- There are two ways to access GEE:
  - Earth Engine Code Editor
  - Python or Javascript API
- Always check documentation! It is frequently updated.
- Cloud project set up: https://developers.google.com/earth-engine/cloud/earthengine_cloud_project_setup

Earth Engine Data Catalog

me | View all datasets | Browse by tags | Landsat | MODIS | Sentinel | Publisher | Community | API Docs

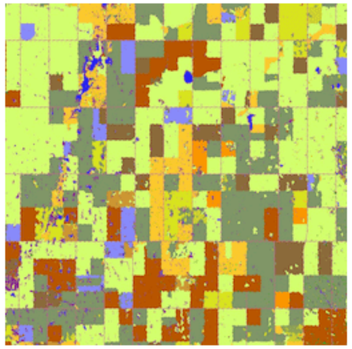
Earth Engine Data Catalog

Earth Engine's public data catalog includes a variety of standard Earth science raster datasets. You can import these datasets into your script environment with a single click. You can also upload your own raster data or vector data for private use or sharing in your scripts.

Looking for another dataset not in Earth Engine yet? Let us know by suggesting a dataset.

Filter list of datasets

Canada AAFC Annual Crop Inventory

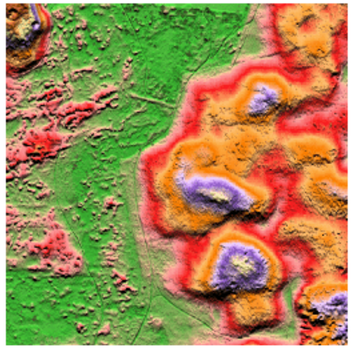


Starting in 2009, the Earth Observation Team of the Science and Technology Branch (STB) at Agriculture and Agri-Food Canada (AAFC) began the process of generating annual crop type digital maps. Focusing on the Prairie Provinces in 2009 and 2010, a Decision Tree (DT) based methodology ...

Allen Coral Atlas (ACA) - Geomorphic Zonation and Benthic Habitat - v2.0

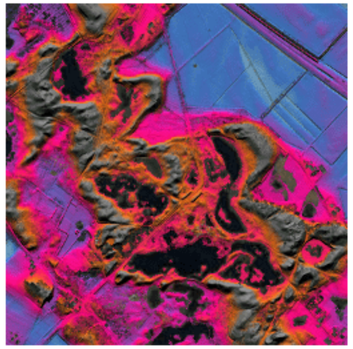
The Allen Coral Atlas dataset maps the geomorphic zonation and benthic habitat for the world's shallow coral reefs at 5 m pixel resolution. Also included is a global reef extent product that maps additional reef areas unable to be explicitly included in the geomorphic and ...

AHN Netherlands 0.5m DEM, Interpolated



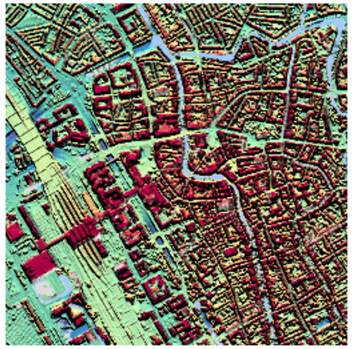
The AHN DEM is a 0.5m DEM covering the Netherlands. It was generated from LIDAR data taken in the spring between 2007 and 2012. It contains ground level samples with all other items above ground (such as buildings, bridges, trees etc.) removed. This version is ...

AHN Netherlands 0.5m DEM, Non-Interpolated



The AHN DEM is a 0.5m DEM covering the Netherlands. It was generated from LIDAR data taken in the spring between 2007 and 2012. It contains ground level samples with all other items above ground (such as buildings, bridges, trees etc.) removed. This version is ...

AHN Netherlands 0.5m DEM, Raw Samples



The AHN DEM is a 0.5m DEM covering the Netherlands. It was generated from LIDAR data taken in the spring between 2007 and 2012. This version contains both ground level samples and items above ground level (such as buildings, bridges, trees etc). The point cloud ...