Sentinel Hub – cloud powered satellite imagery processing tools

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Plethora of EO data available – rapidly evolving
Traditional ways of working with EO data
Volume of data going up

- Open-data - Sentinel, Landsat
- Several TB of data every day
Industrialization of EO sector
Earth observation platform

Open EO data - Sentinel-1, Sentinel-2, Landsat, etc.

Commercial EO data – WorldWind, GeoEye,...

Aerial imagery (drone, plane)

Other raster data

SENTINEL Hub

WMTS

WMS

WCS

API

Cloud GIS

Web applications

Open source GIS (QGIS, OpenJump,..)

Commercial GIS applications

Machine learning
Earth observation platform

Open EO data - Sentinel-1, Sentinel-2, Landsat, etc.

Commercial EO data – WorldWind, GeoEye,…

Aerial imagery (drone, plane)

Other raster data (DEM)

Cadastre

Disaster response

Agriculture

Defence

Insurance

Land Change

Drought monitoring

…
Added value services – EO products
Build your own EO product

```javascript
var val = (2*(c4+1)-Math.sqrt(Math.pow(2*c4+1,2)-8*(c4-c2)))/2;

return [1,val,val,val];
```
EO classification example


http://www.mdpi.com/2072-4292/8/8/66
EO classification example
EO classification example

http://apps.sentinel-hub.com/eo-browser/
Statistical API – time series

```json
{
    "NDVI": [
        {
            "date": "2015-08-30",
            "basicStats": {
                "min": -0.5478424429893494,
                "max": 0.7815912365913391,
                "mean": 0.147320137875888,
                "stDev": 0.35443419609590726
            }
        },
        {
            "date": "2015-07-11",
            "basicStats": {
                "min": -0.5127978920936584,
                "max": 0.811504236183167,
                "mean": 0.20168528533031557,
                "stDev": 0.31436594348376923
            }
        }
    ]
}```
Advanced functions

- Indices time series
Data Sources

• Currently available
  Sentinel-2 (full global archive)
  Landsat-5, 7, 8 (ESA Archive)
  Landsat-8 USGS (almost full global archive)
  Sentinel-3 (full global archive)
  Envisat MERIS (full global archive)
  Sentinel-1 GRD
  MODIS Terra and Aqua
  SRTM
  Planet and RapidEye

• Synced with SciHub and USGS
Real-time processing of EO data: 1 – 4 sec

- **query meta-data**
  (AOI, time-range, cloud coverage)

- **download necessary data**
  only relevant pixels (bands, area, scale)

- **decompress**

- **pre-mosaic filters**
  basic atmospheric correction, radiance to reflectance (landsat)

- **mosaic**
  priority / order (cloud coverage, date)
  cloud replacement

- **bands composite**
  true color, false color, NDVI, etc.
  (date, tiles, clouds)
  user-defined styles

- **post-mosaic filters**
  dynamic contrast, HDR, midtone, gamma

- **re-projection**
  Web Mercator, WGS84, D48, etc.

- **output encoding**
  JPG, PNG, GeoTiff (JP2 possible)
  optional lossy compression
Sentinel Playground

http://apps.sentinel-hub.com/sentinel-playground/
Sentinel Playground on GitHub

Simple application for using Sentinel-2 WMS service http://apps.sentinel-hub.com/sentinel...
How do people use the data?

GIS and Beers
@GIS_and_Beers

Ataque al corazón!! Heart attack in #Tokio using @sentinel_hub #infrared #copernicus #sentinel

 Translate from Spanish
Agriculture applications
Wildfire monitoring

GIS and Beers @GIS_and_Beers · Aug 25
Sigue el 🔥 incendio de #Cabrera 😨😨😨
Seguimos esperando las últimas imágenes de #sentinel 🧟

Translate from Spanish
Landslide at Grainne's Gap #Donegal #Inishowen captured from Space #Sentinel1 22nd & 26th August 2017 SAR RGB Image
Floods

Simon Gascoin @sgascoin · Aug 30
Flooded areas near Highway 90 and Dayton TX (July 24 vs. Aug 29)
#Sentinel1 #HarveyFlood
Así se ve el embalse desde #Sentinel2. A finales de agosto de este año y del año pasado @sentinel_hub
Environmental monitoring

Zack Labe (@ZLabe) - Sep 2
Satellites are an indispensable tool for monitoring the Earth system. Today's Sentinel-3 terrestrial-chlorophyll-band over Galveston Bay, TX.
Giving power to the people
Conclusion

- Real-time processing of data
  - cost efficient, flexible
- Operational
- Try it out

- More info
  - http://www.sentinel-hub.com/
  - http://apps.sentinel-hub.com/sentinel-playground
  - http://apps.sentinel-hub.com eo-browser/
Sentinel Hub references