

The Irish Earth Observation (IEO) Python Module: Localised Open- Source Data Management for Landsat and Beyond

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What is the IEO Python module?

802 lines (734 sloc) | 32 KB

```
1  #!/usr/bin/python
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5
6  # Irish Earth Observation (IEO) Python Module
7  # version 1.0.6
8
9  import os, datetime, time, shutil, sys, glob, csv, ENVIfile, modistools, numpy, numexpr
10 from xml.dom import minidom
11 from subprocess import Popen
```

- An open-source Python library utilising GDAL and Numpy.
 - On Github: <https://github.com/Teagasc/ieo>
- Currently only supports Landsat:
 - Other sensors will be added.
- Can be adapted for any location and projection.

Some basics on IEO

- The defaults are for Ireland and Irish Transverse Mercator (ITM) projection.
- Uses ENVI format for outputs via ENVIfile.py submodule – easier to manage, exploit metadata compared to GeoTIFF, HDF:
 - Band names
 - Wavelength information
 - Temporal data
 - Custom metadata like parent data sets

What else does IEO do?

- Stores Landsat image library metadata in a shapefile:
 - Footprints and metadata for all available scenes from the USGS/EROS in the local projection.
 - Local file locations of ingested data.
- These routines are used by IEOtools (<https://github.com/Teagasc/IEOtools>) to manage our local Landsat archive:
 - Creation of LEDAPS/ LaSRC processing lists for USGS/EROS/ESPA.
 - Ingestion of those data after ESPA processing.
- Can be incorporated with other Python code for output file creation and management.

Irish Landsat scene catalogue shapefile

Untitled - ArcMap

File Edit View Bookmarks Insert Selection Geoprocessing Customize Windows Help

1:9,937,728 82%

Table

WRS2_Ireland_scenes

FID	Shape	scenID	sensor	acqDate	Updated	path	row	CenterLat	CenterLong	CC	CCFull	UL_Q_CCA	UR_Q_CCA	LL_Q_CCA	LR_Q_CCA	dayOrNight	sunEl	sunAz	
0	Polygon	LT52080212011290KIS00	LANDSAT_T	17/10/2011	17/07/2014	208	21	55.91681	-8.3152	9	95.49	82.95	100	99.03	99.99	DAY	23.826635	164.799023	2011:290
1	Polygon	LT52070212011283KIS00	LANDSAT_T	10/10/2011	12/11/2014	207	21	55.91465	-6.7534	5	56.66	7.17	71.31	57.41	90.73	DAY	26.346756	163.926266	2011:283
2	Polygon	LT52080212011274KIS00	LANDSAT_T	01/10/2011	12/11/2014	208	21	55.91663	-8.30305	8	84.86	98.88	91.42	72.18	76.97	DAY	29.652197	162.579887	2011:274
3	Polygon	LT52080212011258KIS00	LANDSAT_T	15/09/2011	12/11/2014	208	21	55.9198	-8.32512	7	78.58	98.26	75.53	78.49	62.04	DAY	35.524228	159.712829	2011:258
4	Polygon	LT52070212011251KIS00	LANDSAT_T	08/09/2011	12/11/2014	207	21	55.92043	-6.78163	1	14.2	11.18	18.92	7.96	18.76	DAY	38.017304	158.328978	2011:251
5	Polygon	LT52080212011242KIS00	LANDSAT_T	30/08/2011	12/11/2014	208	21	55.9227	-8.32491	5	58.02	52.64	67.06	38.73	73.65	DAY	41.089028	156.502731	2011:242
6	Polygon	LT52070212011235KIS00	LANDSAT_T	23/08/2011	12/11/2014	207	21	55.92136	-6.77789	8	82.75	84.93	96.07	70.29	79.73	DAY	43.35383	155.118822	2011:235
7	Polygon	LT52080212011226KIS00	LANDSAT_T	14/08/2011	12/11/2014	208	21	55.92158	-8.31721	1	15.12	13.68	14.87	10	21.93	DAY	46.056215	153.444529	2011:226
8	Polygon	LT52070212011219KIS00	LANDSAT_T	07/08/2011	12/11/2014	207	21	55.91807	-6.77181	5	59.5	60.27	98.61	15.49	63.61	DAY	47.977346	152.304593	2011:219

(0 out of 6432 Selected)

WRS2_Ireland_scenes

Table Of Contents

- Layers
 - WRS2_Ireland_scenes
 - AdminBndy1_ITM
 - AdminBndy3_ITM
 - Basemap
 - World Imagery

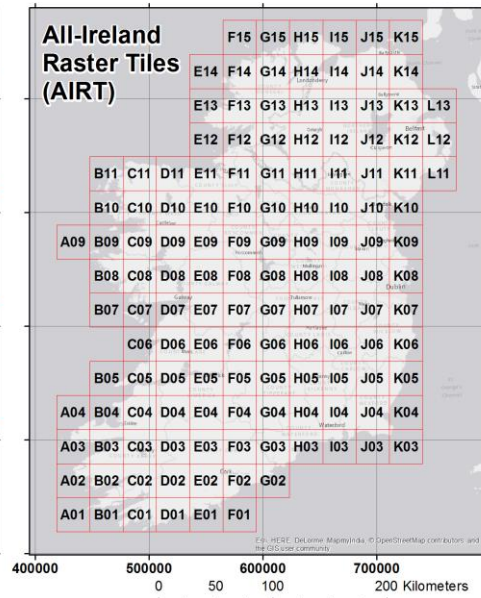
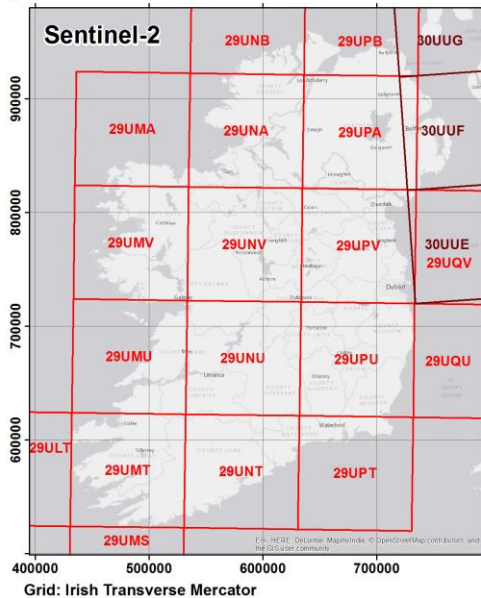
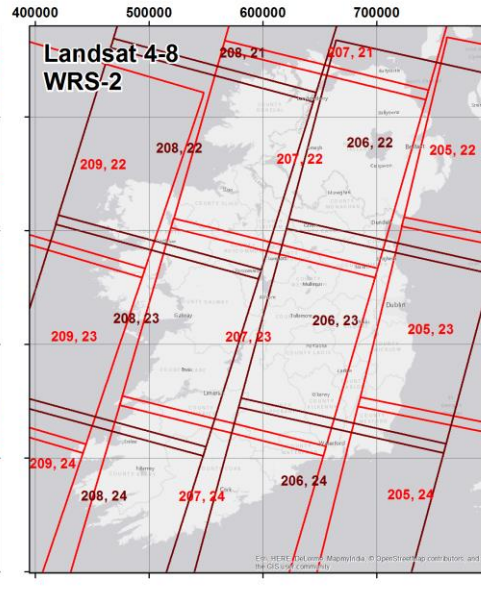
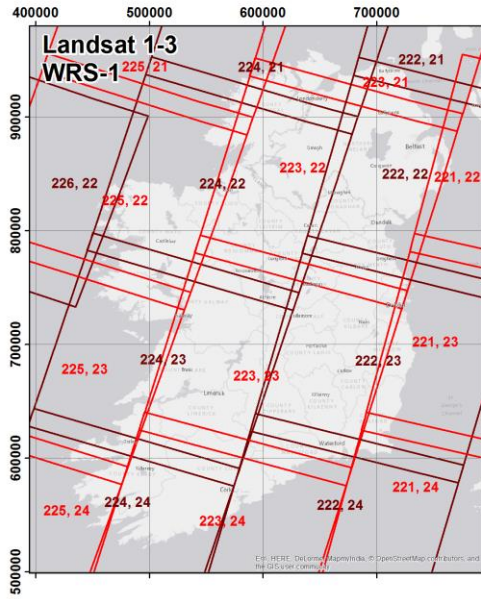
6122 scenes in local archive

37063.401 1241255.813 Meters

IEO provides input data information for Python code

Data	Subdirectory
Surface reflectance	ieo.srdir
Thermal data	ieo.btmdir
Cloud and cloud shadow mask	ieo.fmaskdir
NDVI	ieo.ndvidir
EVI	ieo.evidir
Image catalogue	ieo.catdir

Included shapefiles in ITM



- Landsat WRS-1, WRS-2 path and row locations over Ireland.
- Sentinel-2 tiles.
- All-Ireland Raster Tiles (AIRT, 29 × 30 km grid cells).

Future plans

- Fix bugs with Landsat code.
- Add support for the following data products:
 - MÉRA
 - Sentinel-2 surface reflectance
 - Sentinel-1 SAR data
 - EO-1 Hyperion, ALI
 - Venµs
 - Other sensors
 - DEM

My vision for this module

- I want IEO to be a collaborative project that suits the needs of the Irish and broader EO communities.
- You are all welcome to join me in developing this module on Github:
 - IEO module: <https://github.com/Teagasc/ieo>
 - IEOtools: <https://github.com/Teagasc/IEOtools>