NASA DEVELOP SUMMER 2017:
Deriving Water Quality Parameters from Landsat 8 and Sentinel-2 Imagery Using ACOLITE Processing Software

This is a short guide to processing Landsat 8 and Sentinel-2 imagery to retrieve water quality variables provided within ACOLITE software. The steps are as follows:

Step 1: Run images through ACOLITE
Step 2: Convert NetCDF files to GeoTIFFs
Step 3: Geolocate

If you're working on a Mac computer, ACOLITE will not be compatible with your current XQuartz version. Download the older version, 2.7.9 here before you begin:
https://www.xquartz.org/releases/XQuartz-2.7.9.html

Images can be bulk downloaded using USGS EarthExplorer Bulk Download Application (BDA). Once downloaded, they need to be unzipped before being passed to ACOLITE.

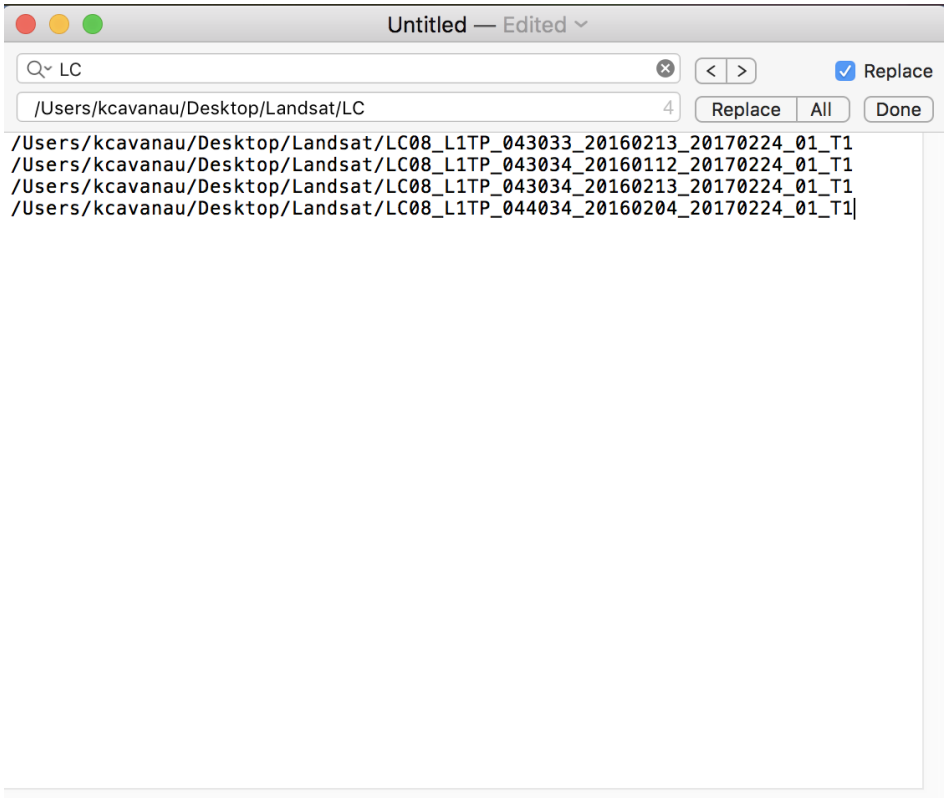
**Step 1: Run images through ACOLITE**

1. All of your unzipped, downloaded Landsat path/rows or Sentinel-2 tiles should be located in the same directory. Each scene/tile is located within its own folder.


2. Create a text file containing a list of the paths to each image.

**For a Mac**: Select all of the paths/tiles and copy them. Open up the application TextEdit. Select "Format" → "Make Plain Text."
Select "Edit" → "Paste and Match Style".

You should now have a list of all of the scenes/tiles located within your directory. In order to bulk process on ACOLITE, you need to supply the paths to all of these scenes. For example – in the image above, the four Landsat scenes are located within a folder named "Landsat" on my desktop. To supply the whole path within text edit, I can search for the first two letters "LC" and "replace all" with /Users/kcavanau/Desktop/Landsat/LC. Save the text file as dirslist.txt within the acolite_mac folder. The resulting text file should look as follows:




**For a Windows**: Select all of the paths/tiles and copy them. Hold Shift → Right Click → "Copy as Path." Paste the file names into Notepad, and delete the enclosing quotes. Save the text file as dirslist.txt within the acolite_win folder. The resulting file should look the same as the one above.

3. Configure the ACOLITE settings file

**For a Mac**: Open up XQuartz. Change the directory to where your acolite_mac folder is located (i.e. cd /users/kcavanau/applications/acolite_mac). Next, to open ACOLITE, type the following into the XQuartz command window:

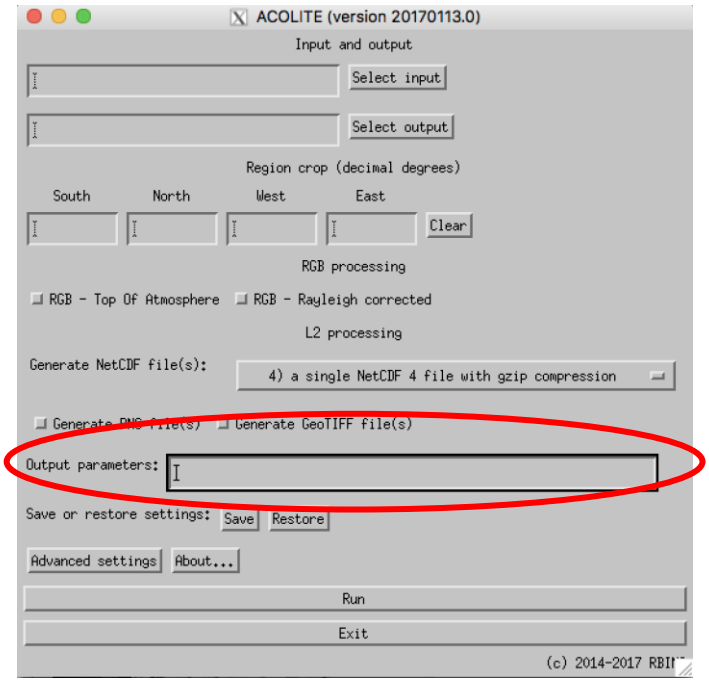
idl84/bin/idl -rt=acolite.sav

Click OK.

**For a Windows**: Double click the Application icon (acolite_win.exe) within your acolite_win folder.

Click OK.

For both platforms, the following screen should pop up:




Leave input, output, and region crop blank. Unclick all boxes. Leave "4) a single NetCDF 4 file with gzip compression" selected. For "Output parameters" (circled in red). Within this box, type the desired parameter you want to derive. All parameters are listed in the ACOLITE manual (https://odnature.naturalsciences.be/downloads/remsem/acolite/ACOLITE_processing_options_20170113.0.pdf). To derive multiple parameters within one NetCDF, separate them with a comma and no space.

Click "Save," and save as the default name (acolite_settings.cfg) within your acolite application folder (either acolite_win or acolite_mac). Exit ACOLITE.

4. Run ACOLITE

**For a Mac**: In XQuartz, make sure you change the directory to where your acolite_mac folder is located (i.e. cd /users/kcavanau/applications/acolite_mac). After checking that you saved the image list (dirslist.txt) and the settings file (acolite_settings.cfg) to your acolite_win folder, type the following command into XQuartz:

idl84/bin/idl -rt=acolite.sav -args settings=acolite_settings.cfg image=dirlist.txt

Your scenes should run, and export into the path/row folder as NetCDF files.

**For a Windows**: Open a command prompt, and change the directory to where your acolite_win folder is located (i.e. cd C:/users/kcavanau/desktop/acolite_win). Type the following into the command line:

C:/users/kcavanau/desktop/acolite_win/idl84/bin/bin.x86_64/idlrt.exe –vm=acolite.sav –args settings=acolite_settings.cfg image=dirslist.txt

Your scenes should run, and export into the path/row folder as NetCDF files.

Step 2: Convert NetCDF files to GeoTIFFs.

1. After ACOLITE finishes running on your paths/tiles, search for ".nc" within your main directory. A list of all of the NetCDF files produced by ACOLITE should appear.
2. Copy and paste them to a new directory, and convert the files to GeoTIFF format.
    a. You may use gdal_translate (http://www.gdal.org/gdal_translate.html) to convert the files to GeoTIFFs or use ArcGIS to export and save as a GeoTIFF (such as the Make NetCDF Feature Layer tool).

Step 3: Geolocate the GeoTIFFS using the upper left and lower right hand coordinates.

- gdal_translate may also be used to complete this task

Note: The images may become flipped upside down during Step 2 or 3. If this happens, you may use the Flip tool in ArcGIS.

Email develop.geoinformatics@gmail.com or post a question on the DESC if you have any troubleshooting questions. You may also call in during the Geoinformatics Open Doors.