**ET processing for website distribution:**

**8day USA ET V4 processing**

processing from VS117

estimated dates to run:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Period | 073 | 081 | 089 | 097 | 105 | 113 |
| ProcessDate | 3/24/18 | 4/2/18 | 4/9/18 | 4/17/18 | 4/25/18 | 5/4/18 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Period | 121 | 129 | 137 | 145 | 153 | 161 |
| ProcessDate | 5/11/18 | 5/21/18 | 5/28/18 | 6/5/18 | 6/13/18 | 6/21/18 |

\*Missing Input Data MOD11A2

LPDAAC location: <https://e4ftl01.cr.usgs.gov/MOLT/MOD11A2.006/>

This script has two parts:

1) download the LST input from LP DAAC and 2) create ET and graphics.

From CMD run

1) D:\Stornext\fewspsnfs2\WaterSmart\Users\Stefanie\operational\US\_operational\USA\

Version4\operational\Scripts\_op\**LST\_download.py** (3-4 mins)

2) D:\Stornext\fewspsnfs2\WaterSmart\Users\Stefanie\operational\US\_operational\USA\

Version4\operational\Scripts\_op\**ETa\_calculationALLV4.py** (5-10 mins)

The season for ET in USA is April 01 - Oct 31. Please verify for period 089 - first data of the season - that it is on the website <https://earlywarning.usgs.gov/useta>.

If not, for some reason, contact Mike Budde to see who could help fixing it. The last person to work on the site was Shyam, and he did it “under the radar”.

* Season Graphics are being hosted on website, but no seasonal geotiff data...not sure if that is intentional?
* But the Monthly graphics and data are posted on website.

Customer requests:

NOAA is using our ET data to create an Evaporative Demand Drought Index (EDDI)

[**https://www.esrl.noaa.gov/psd/eddi/**](https://www.esrl.noaa.gov/psd/eddi/)**,** therefore they would like for us to stage 8-day USA ETf data in tiff format under [**https://edcftp.cr.usgs.gov/project/fews/USETa/**](https://edcftp.cr.usgs.gov/project/fews/USETa/).

Lesley Smith - NOAA Affiliate <[lesley.l.smith@noaa.gov](mailto:lesley.l.smith@noaa.gov)> is the contact person I work with. She knows you are covering for me.

I did update the script to incorporate the staging of the data they needed and ran test successfully.

Also, I made the changes from GitHub, so you should be able to see where, what, etc.

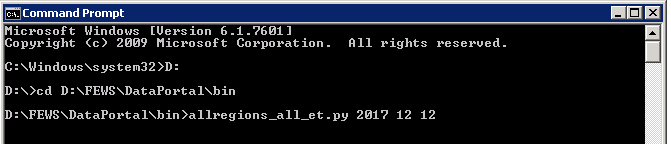
Should the April+ Season 8day PNG graphics “latest.png” still be going out to Bob Flynn?

**Global ET processing (Version 4)**

Scripts are under VS117 - D:\FEWS\DataPortal\bin\....

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Period | 032 | 033 | 041 | 042 | 043 | 051 | 052 |
| ProcessDate | 03/22/18 | 4/2/18 | 4/12/18 | 4/22/18 | 5/2/18 | 5/12/18 | 5/22/18 |
|  | 053 | 061 | 062 | 063 | 071 | 072 | 073 |
|  | 6/2/18 | 6/12/18 | 6/22/18 | 7/2/18 | 7/12/18 | 7/22/18 | 8/2/18 |

Run script from command prompt as follows:



Script takes about 1.0 - 1.5 hours usually.

Since this is the beginning of the year, a lot of seasons for ET regions are starting. Therefore, please verify for the 1. dekad in April, May, etc. that the data was created, all folders are there and the data is on the website.

Seasonal Folder location for ET rasters: D:\FEWS\DataPortal\data\Global\Dekadal\ETa\geotiff + season

FEWS team updated the EWX data path to D:\Stornext\scienceweb1\shared\fews\EWX\data\ETA\Global

Please verify for the first couple runs that the data is going there, if not please check the “lib” folder script et\_processes.py, 1. Function where all the variables are defined if the the EWX path is correct. (D:\FEWS\DataPortal\lib\et\_processes.py)

**Note:** the global config location

D:\FEWS\DataPortal\bin\global\dekadal\eta\global\_dekadal\_eta\_config.py

4/23/18: Found via Climate Engine. ⅓ pixel shift. Bad extent origin x,y. **Dekads OK?**

**Monthly ETa 08/2017 - present**

**Year 2017**

**Including Regions**

1. TODO:Fix/replace bad geotiffs on disk & fews site server. Probably rerun all dekads from 08/2017-present
2. TODO: Fix operational code for pixel shift issue

Top: 80 Top: 80.0022588484

Left: -180 Left: -180

Right: 180.000293039 Right: 180.000293039

Bottom: -60.0022588484 Bottom: -60

**Good (needs to be this) Bad (currently is this)**

4/25/18: Updated the global et code to copy the EWX files to SMB3 in addition to Stornext\*

**\*5/2/18: The April monthly ETa product did not create/save (043 5/2/18 run)**

**-Tried re-running twice** - **FIXED** by adding the SMB3 dir variable to all dek, mo, year config scripts. (had initially just added to global dekad config.py)

**\*Followup issue: 5/7/18 - Central Asia & Continental Africa Region graphics did not create for 043 dekad or April 2018. (but subregions and Global were good).** - **FIXED** by adding the SMB3 dir variable to all dek, mo, year config scripts for Central Asia and Africa now too. (NOTE: Subregion configs do not appear to need the SMB3 path, just global, asia, africa)

**Historical Global ET processing (Version 5)**

There is a more detailed document under Y:\FEWS\Users\Stefanie\operational\GlobalET\SOP

(D:\Stornext\fewspsnfs2\FEWS\Users)

Global SSEBopETa Version5.docx which describes how the dT, etc. was created.

Completed tasks:

* Figure out what Kt factor to use for the updated dT → decided on static Kt = 0.16 for the globe. Value is published in FAO 56, page 60-61
* Comparison of dT values with different input parameters is located under D:\Stornext\fewspsnfs2\FEWS\Users\Stefanie\operational\Ra\_calculationV5\comparison\_dT, excel sheet
* Created a new Latitude grid with 1km resolution

In Version 4, the extraterrestrial radiation Ra was calculated using a 10km latitude grid, which caused smaller Islands and coastal areas to be partially or completely missing. An updated latitude grid at 1km was created using ‘Create Fishnet’ tool in ArcGIS.

D:\Stornext\fewspsnfs2\FEWS\Users\Stefanie\operational\Ra\_calculationV5\lat\_pts\

Lat\_grid1km

* Updated Worldmet data with latest versions. Smoothed out WorldClim data with “3 running average” method.
* Rerun Ra calculation with 1km latitude grid and USGS elevation(D:\Stornext\fewspsnfs2\

FEWS\Users\Stefanie\operational\Ra\_calculationV5\mn30\_grd\mn30\_grd)

D:\Stornext\fewspsnfs2\

FEWS\Users\Stefanie\operational\Ra\_calculationV5\Ra\_calculationV5.py

* Create dekadal Ra grids from daily Ra grids - CellStatistics, mean

Save under: D:\Stornext\fewspsnfs2\

FEWS\Users\Stefanie\operational\Ra\_calculationV5\Ragrids\_dekad

* Process dT with new Ra data, script to use: D:\Stornext\fewspsnfs2\FEWS

\Users\Stefanie\operational\Ra\_calculationV5\Ra\_calculationV5.py

Input:

**Enter elevation file:** D:\Stornext\fewspsnfs2\

FEWS\Users\Stefanie\operational\Ra\_calculationV5\mn30\_grd\mn30\_grd

**Need to calculate Rn?** (yes or no):yes

**Resistance factor:** 110

**TempAvg:** D:\Stornext\fewspsnfs2\WaterSmart\Data\Temperature\TA\_worldmet\tavg

**Albedo grid or value in calculation? (grid or value):** value

**Albedo value** = 0.23

**Include relative Humidity data in Rn calc? (yes or no):** no

**Input parameterRa grid:** D:\Stornext\fewspsnfs2\FEWS\Users\Stefanie\operational\

Ra\_calculationV5\Ragrids\_dekad

**TempMax:** D:\Stornext\fewspsnfs2\WaterSmart\Data\Temperature\TA\_worldmet\tmax

**TempMin:** D:\Stornext\fewspsnfs2\WaterSmart\Data\Temperature\TA\_worldmet\tmin

For the c factor, re-processed NDVI data Version 6 as following:

* Processed NDVI V6

Using new Version 6 MODIS data, Saved at: D:\Stornext\fewspsnfs2\WaterSmart\Data\NDVI\Global\_NDVI\V006

NDVI “too little light in winter” issue fix:

Periods before 073 and after 281 don’t have the full global extent of NDVI due to no enough light. To eliminate this issue for calculation purposes, the NDVI with the first complete global extent (073) is used to fill in the missing data for January, February, October, November, and December. The last 3 months are filled with period 073 because period 265 has too high NDVI values in the northern latitudes (summer) 281 and will therefore possibly impact conditions based on NDVI thresholds.

The NDVI data downloaded is improved using following steps:

· Mosaic e.g. period 009, 025, .. to period 073 so the missing extent received the values of period 073

· Create 8-day time steps by dividing the 2 neighboring periods (001+016/2 = 009)

· Reassign 8-day periods to dekadal time steps by ignoring periods 017, 057, 097, 137, 177, 209, 241, 281, 321, 361

Those steps are all included in a python script named D:\Stornext\fewspsnfs2\WaterSmart\Data\NDVI\Global\_NDVI\NDVI\_processing.py

Current task:

* create daily DT with Daymet V3, run D:\Stornext\fewspsnfs2\FEWS\Users\Stefanie\operational\Ra\_calculationV5\

dT\_Rn\_calculation\_daily.py

Used Daymet cellsize for dT

Input\_dT\_Rn\_calculation\_daily.txt has inputs used to run daily dT

* Create Dynamic C factor - 2 runs: first one for creating median c factor, second run for using median in c factor process

Started with 1. Run

Saved under: …\fewspsnfs2\FEWS\Users\Stefanie\operational\GlobalET\cfactor\Run1\_YYYY

For Dynamic C Factor grid creation use: D:\Stornext\fewspsnfs2\WaterSmart\Data\NDVI\Global\_NDVI\med\_dek0317 à median NDVI for each dekad from 2003 – 2017.

For ET fraction calculation use: D:\Stornext\fewspsnfs2\WaterSmart\Data\NDVI\Global\_NDVI\maxNDVI0315.tif file for operational processing because the previous year Annual maximum NDVI is not available yet, which will be used when the year is reprocessed at the beginning of the new year. The annual maximum NDVI has a range to 10000 by setting all values > 10000 to 10000.

Next tasks:

* Create ET:

All the V5 scripts and stuff is located under **D:\Stornext\fewspsnfs2\FEWS\Users\Stefanie\operational\GlobalET**

1. Create ETf - 2 runs: first one for creating median ETf, second run for using median in ETf process
2. Cloud Mask
3. ETa

