

Using Synthetic Aperature Radar (SAR) to Examine Time-Series

Nicolas Vuille-dit-Bille

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Reference

<https://asf.alaska.edu/how-to/data-recipes/how-to-map-regional-inundation-with-spaceborne-l-band-sar-using-arcgis/>

Outlining process

- 1) Iterate Rasters Using In-Line Variable Substitution in Model Builder
- 2) Construct a Raster Function Chain to Pre-process
- 3) Batch Copy Raster
- 4) Classify and Reclassify
- 5) Reclassify to Water/NotWater and Sum

Material

- Tif HH files from Synthetic Aperature Radar (SAR)

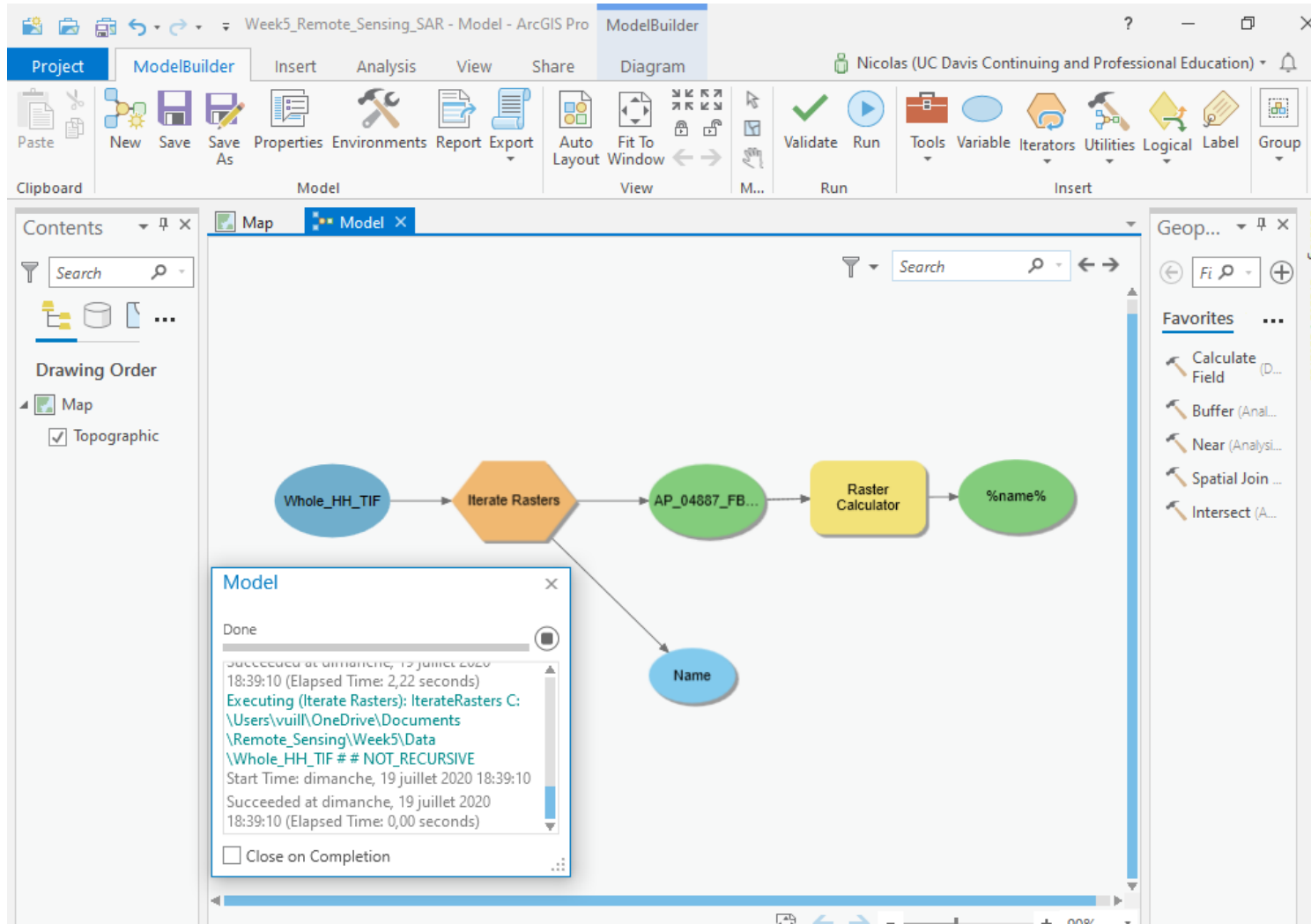
-> Reference: <https://asf.alaska.edu/how-to/data-recipes/how-to-map-regional-inundation-with-spaceborne-l-band-sar-using-arcgis/>

- Location: Amazon rain forest
- Spatial resolution
 - > Cell size X: 12.5m
 - > Cell size Y: 12.5m
- Spectral resolution: 1 band
- Pixel depth: 32 bit

Aim

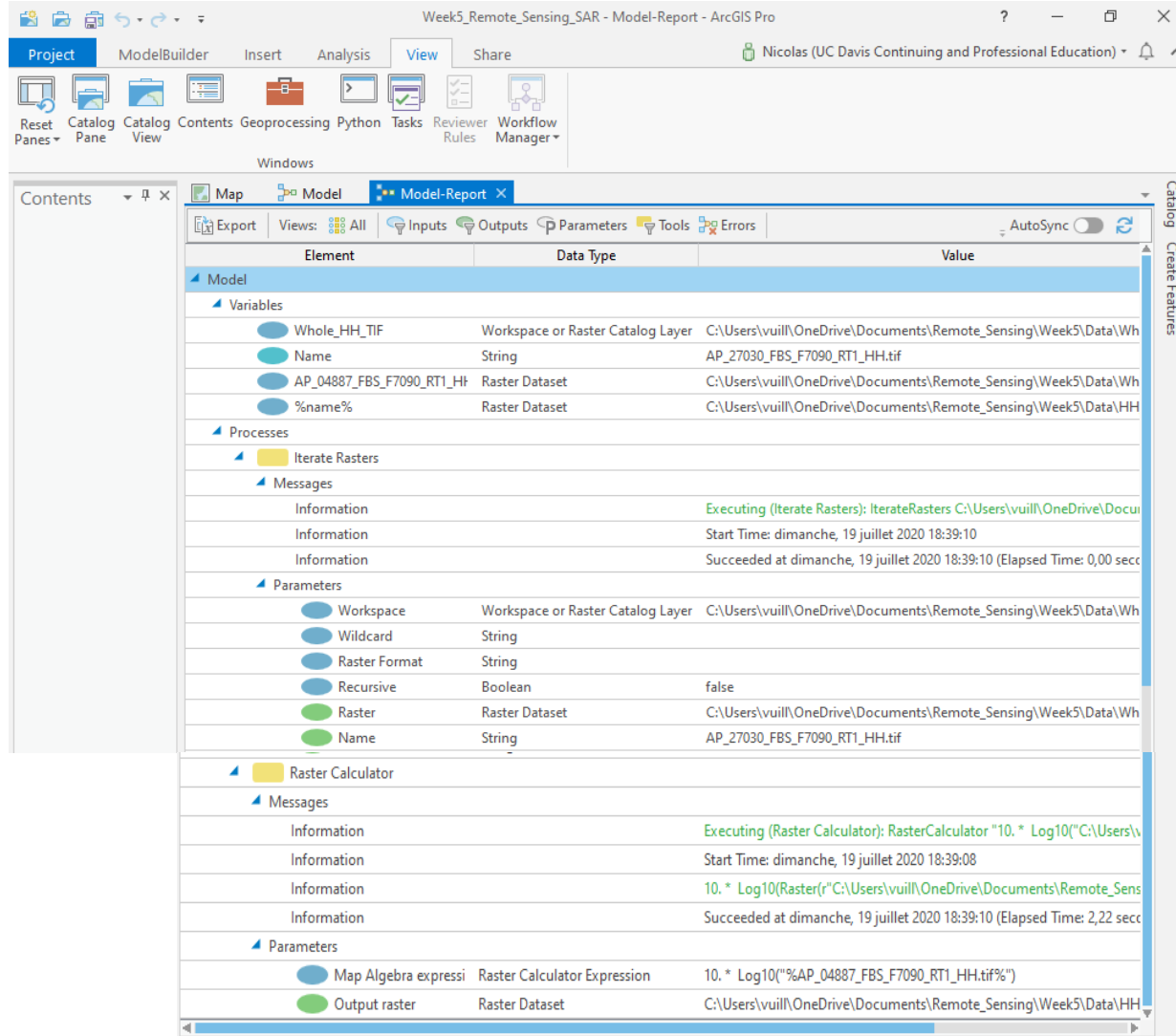
- Produce an innundation map from SAR time series data in order to classify and quantify area with permanent/semi-permanent water and area without water

1) Iterate Rasters Using In-Line Variable Substitution in Model Builder



- HH tif files directory are defined as input in the blue circle
- Iterate function (orange polygon) allows to iterate the same raster transformation for each tif file of the directory
- Raster transformation (yellow square) to convert HH to decibels
-> Transformation: $10 \cdot \log_{10}(\text{Raster})$
- Final output is represented by green circle

1) Iterate Rasters Using In-Line Variable Substitution in Model Builder

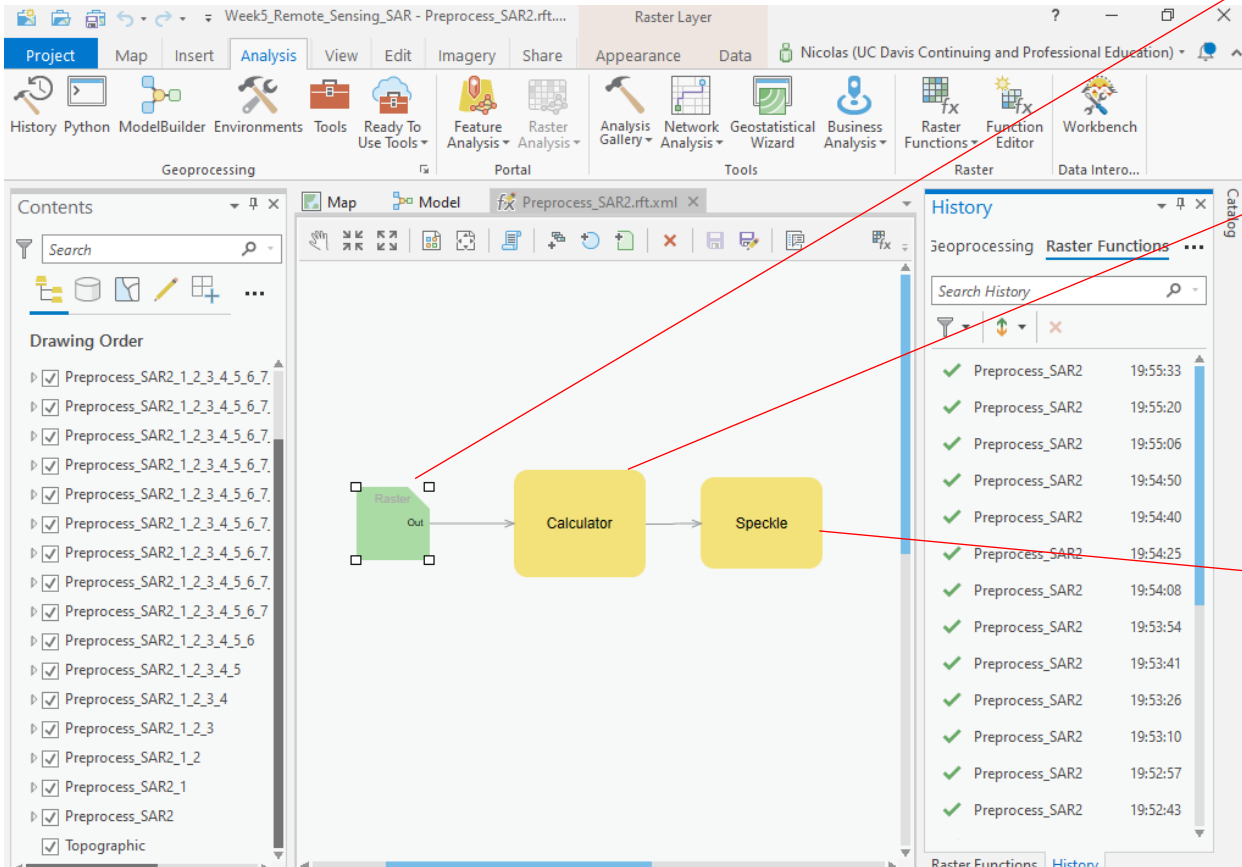


Element	Data Type	Value
Model		
Variables		
Whole_HH_TIF	Workspace or Raster Catalog Layer	C:\Users\vuill\OneDrive\Documents\Remote_Sensing\Week5\Data\Wh
Name	String	AP_27030_FBS_F7090_RT1_HH.tif
AP_04887_FBS_F7090_RT1_HH	Raster Dataset	C:\Users\vuill\OneDrive\Documents\Remote_Sensing\Week5\Data\Wh
%name%	Raster Dataset	C:\Users\vuill\OneDrive\Documents\Remote_Sensing\Week5\Data\HH
Processes		
Iterate Rasters		
Messages		
Information		Executing (Iterate Rasters): IterateRasters C:\Users\vuill\OneDrive\Docu
Information		Start Time: dimanche, 19 juillet 2020 18:39:10
Information		Succeeded at dimanche, 19 juillet 2020 18:39:10 (Elapsed Time: 0,00 secc
Parameters		
Workspace	Workspace or Raster Catalog Layer	C:\Users\vuill\OneDrive\Documents\Remote_Sensing\Week5\Data\Wh
Wildcard	String	
Raster Format	String	
Recursive	Boolean	false
Raster	Raster Dataset	C:\Users\vuill\OneDrive\Documents\Remote_Sensing\Week5\Data\Wh
Name	String	AP_27030_FBS_F7090_RT1_HH.tif
Raster Calculator		
Messages		
Information		Executing (Raster Calculator): RasterCalculator "10. * Log10("C:\Users\
Information		Start Time: dimanche, 19 juillet 2020 18:39:08
Information		10. * Log10(Raster("C:\Users\vuill\OneDrive\Documents\Remote_Sens
Information		Succeeded at dimanche, 19 juillet 2020 18:39:10 (Elapsed Time: 2,22 secc
Parameters		
Map Algebra expressi	Raster Calculator Expression	10. * Log10("%AP_04887_FBS_F7090_RT1_HH.tif%")
Output raster	Raster Dataset	C:\Users\vuill\OneDrive\Documents\Remote_Sensing\Week5\Data\HH

Final report of the Model builder process

- Messages inside the iterate rasters and the raster calculator processes indicate that everything has gone well during the running process

2) Construct a Raster Function Chain to Pre-process

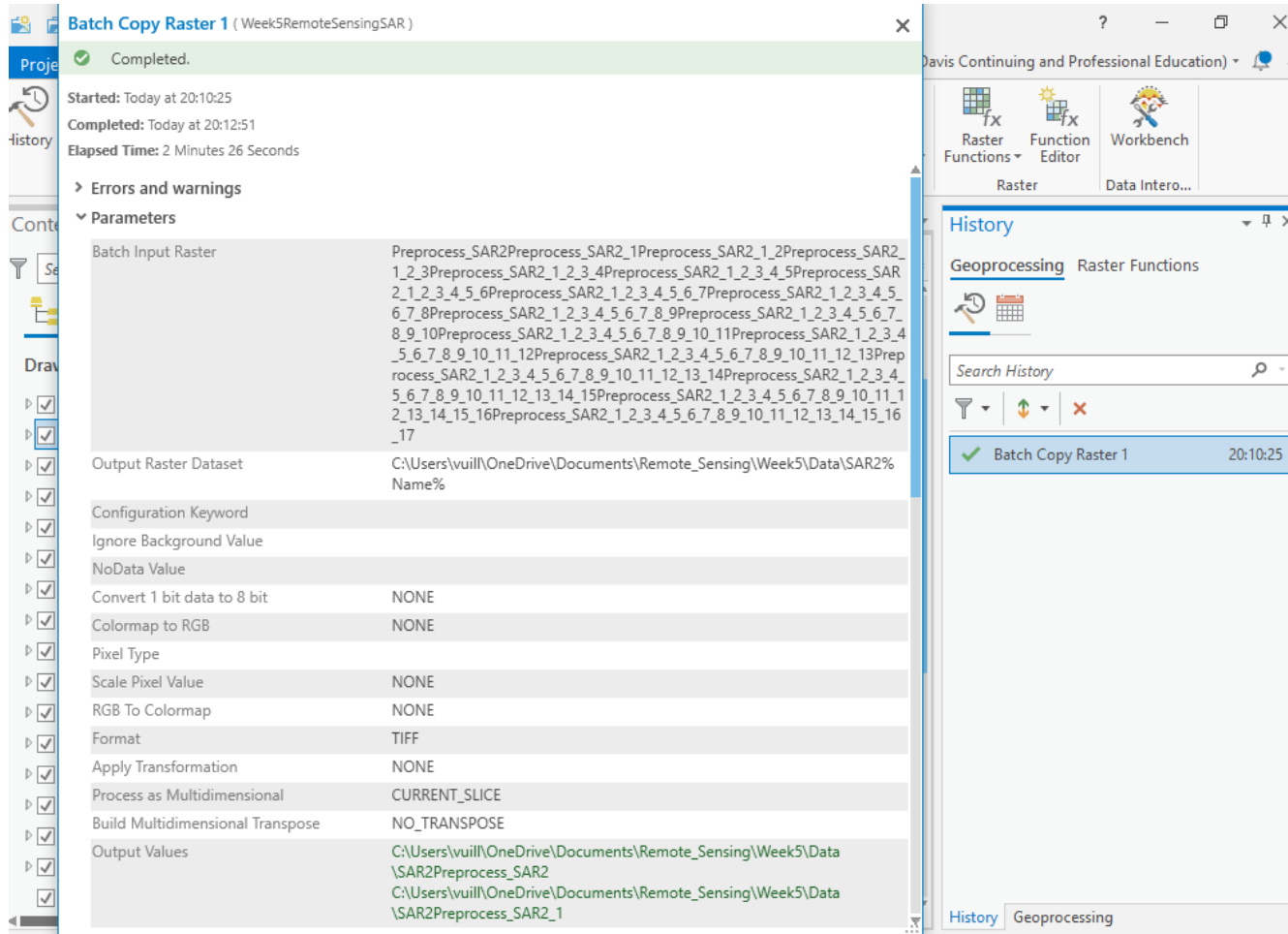


- Raster input

- Raster transformation (yellow square) to convert HH to decibels
-> Transformation: $10 \cdot \log_{10}(\text{Raster})$

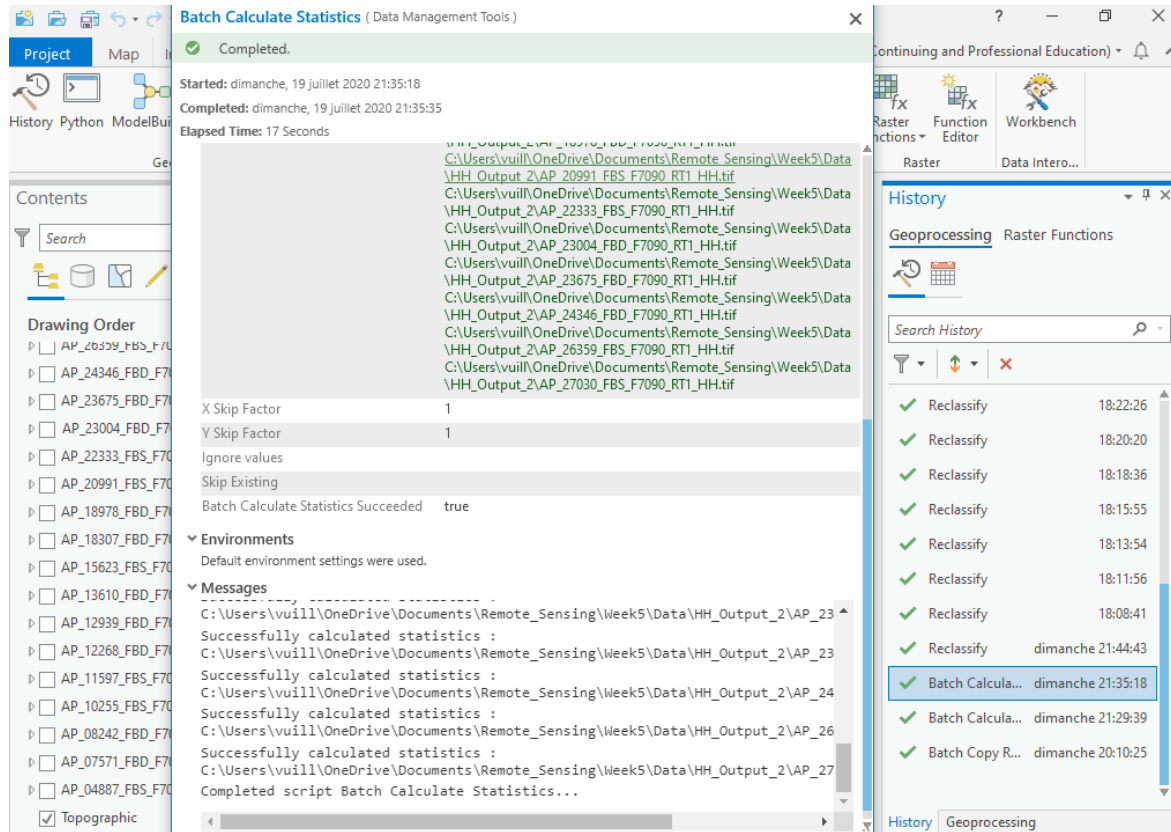
- Speckle Correction using enhanced Lee filter

2) Batch Copy Raster of HH files

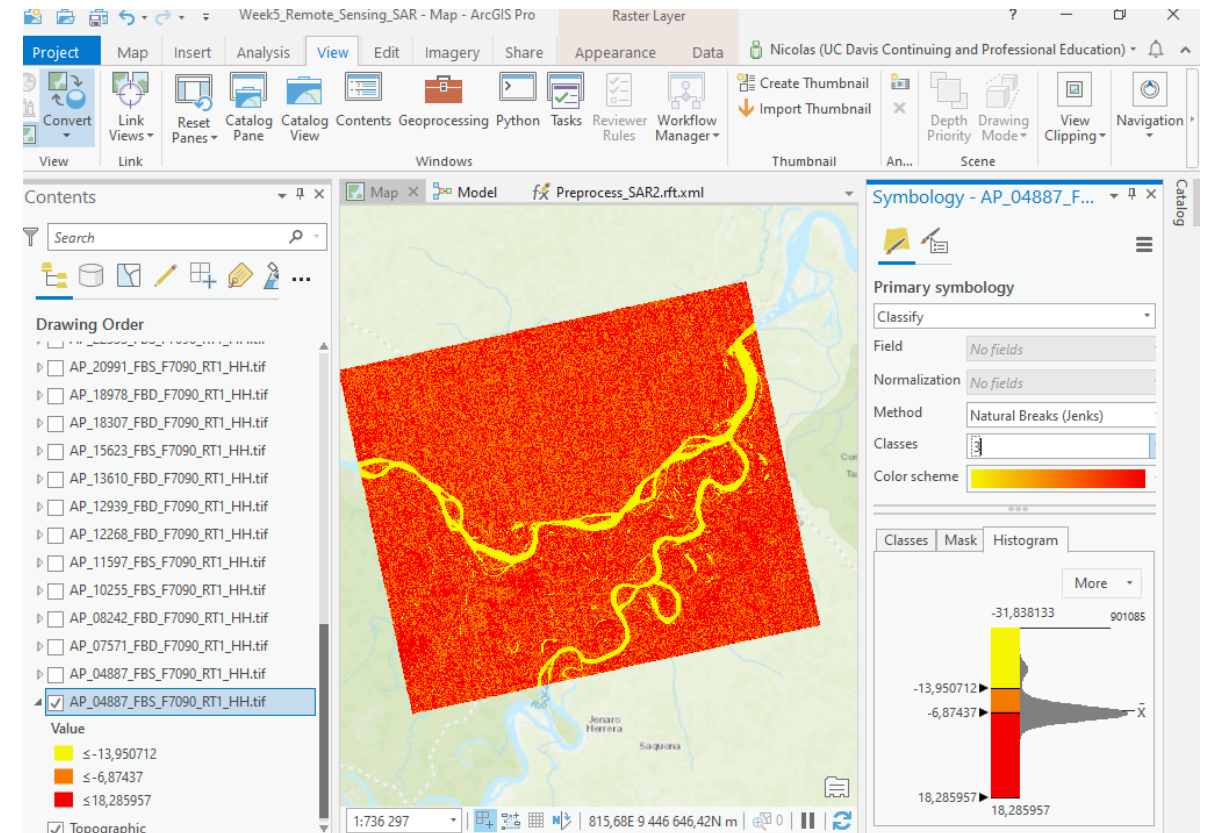


- History of Batch of copy raster tool
- Everything goes well with no error message

4) Classify and Reclassify: Statistic calculation for each HH files

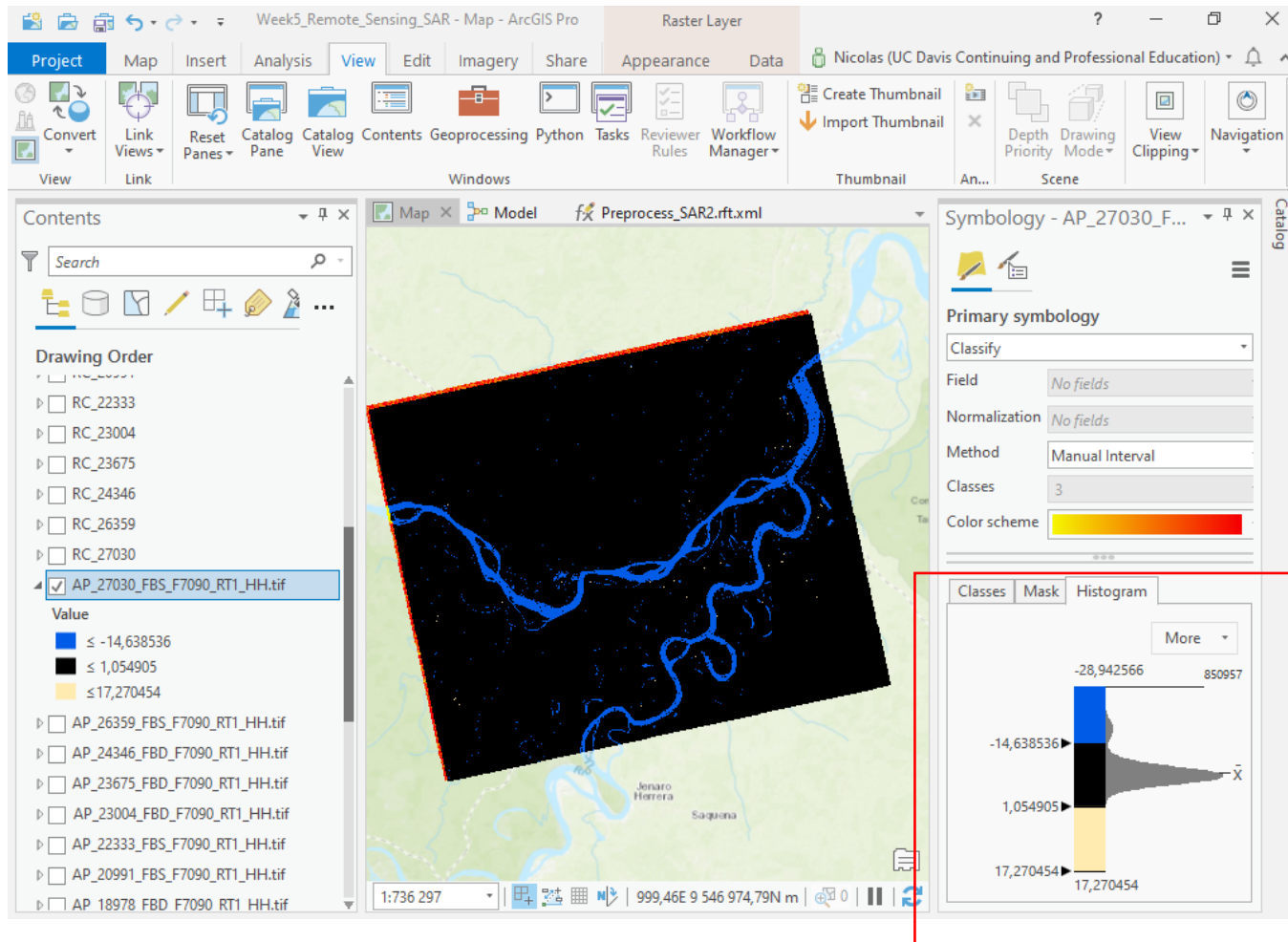


- Batch history of calculate statistic tool
- Everything goes well with no error message



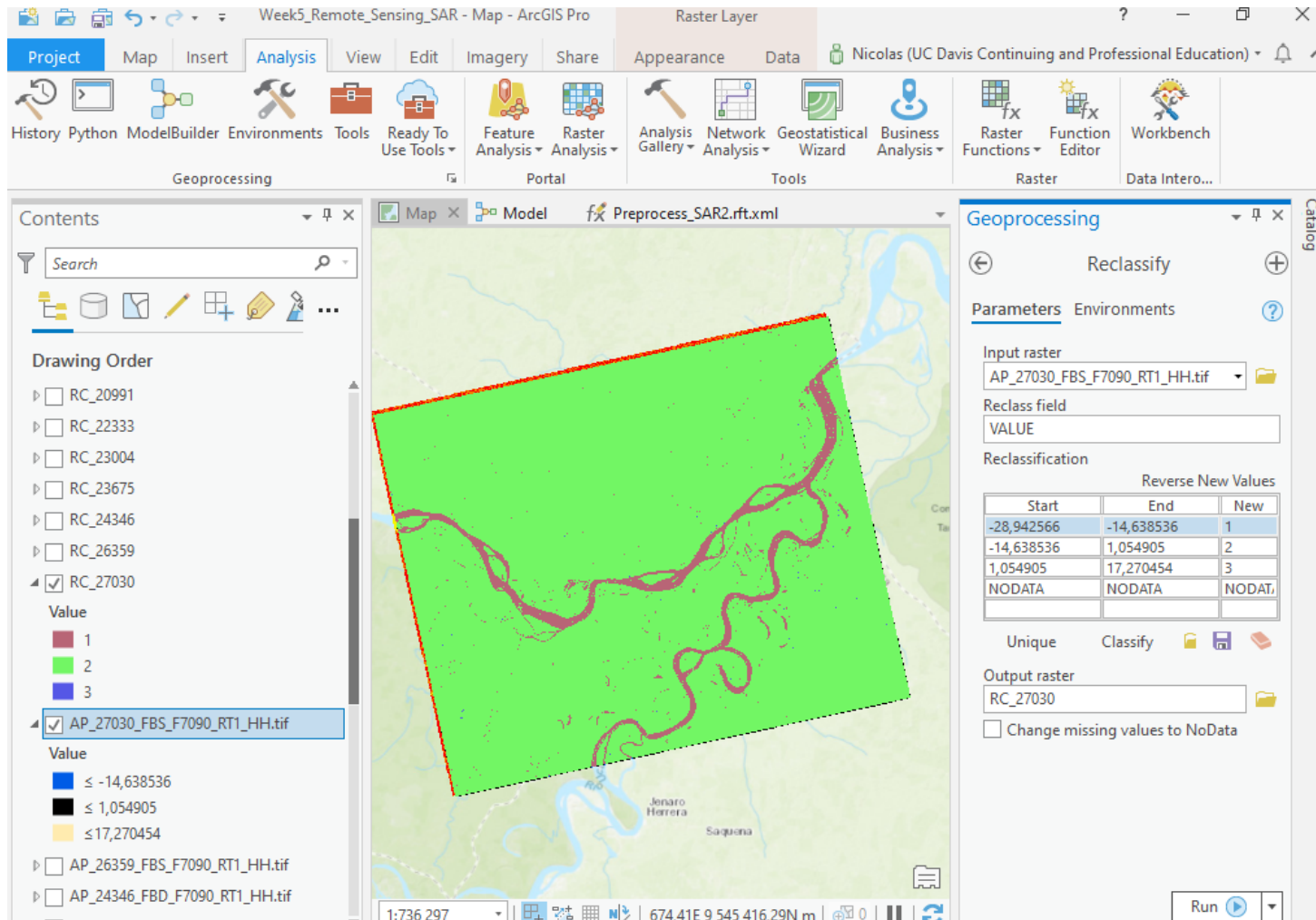
- After statistic calculation on raster HH file, it allows to classify values thanks to histogram

4) Classify and Reclassify: classification of the symbology



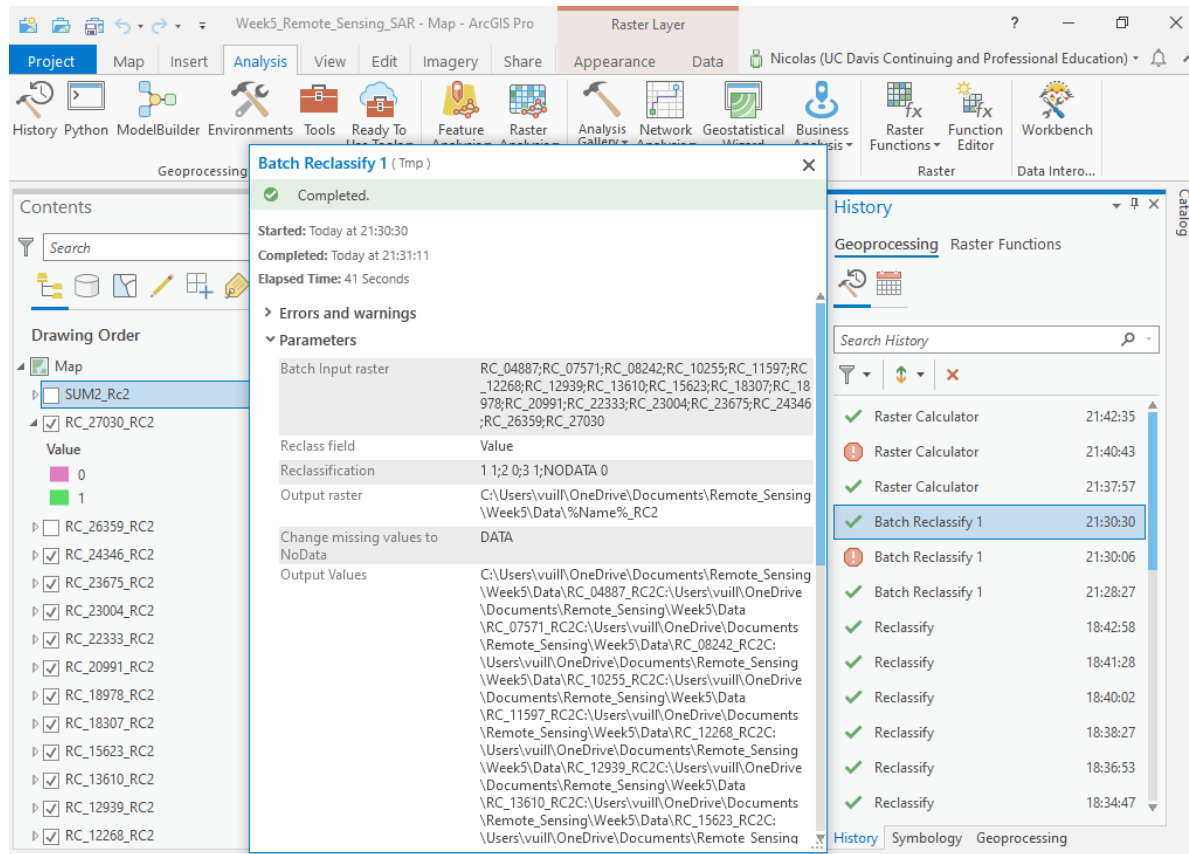
- Classification with 3 manual intervals
 - > Water (Blue)
 - > Ground (Black)
 - > Atmospheric artefacts (light brown)
- Breaks on the histogram can be adjusted to symbolize different environmental component

4) Classify and Reclassify: reclassification step

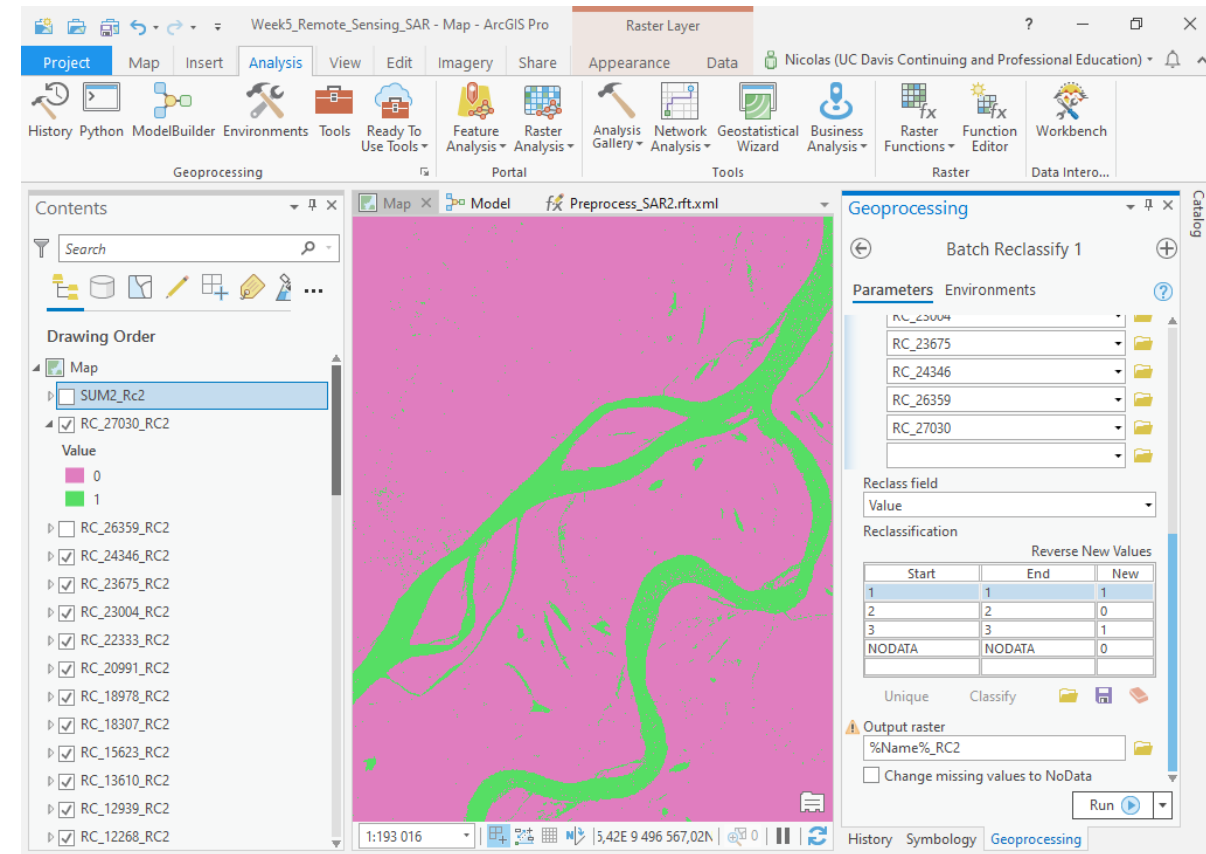


- Classified HH file with 3 manual intervals is then processed in the reclassify geoprocessing tool
- One unique value (1, 2 and 3) will be attributed to each class with the first reclassification

5) Reclassify to Water/NotWater and Sum



- Batch history of Reclassify tool
- Everything goes well with no error message



- One unique value (1 and 2) will be attributed to no water and water class with the second reclassification

5) Reclassify to Water/NotWater and Sum

