Mega Tiler v1.0

Geospatial Laser Applications and Measurements

Applied Research Laboratories

University of Texas at Austin

ICESat-2 Mega Tiler

- The ICESat-2 Mega Tiler is a geospatial analysis tool that allows users to load, process, analyze, plot, and export ICESat-2 ATL03 data that has been stored in LAZ 1.4 mega tiles

- Users can analyze a region of the world by specifying a latitude/longitude bounding box

- Regions can be analyzed by individual 1° x 1° tiles (up to a maximum of 5° x 5° tiles)

- All ICESat-2 data within the specified latitude/longitude bounding box can be exported to:
  - .gzip file
  - .csv file
  - .laz 1.4 file
  - .kml file
  - .tif file

- The ICESat-2 Mega Tiler is a command line tool built in Python (it requires no .exe or .dll files)
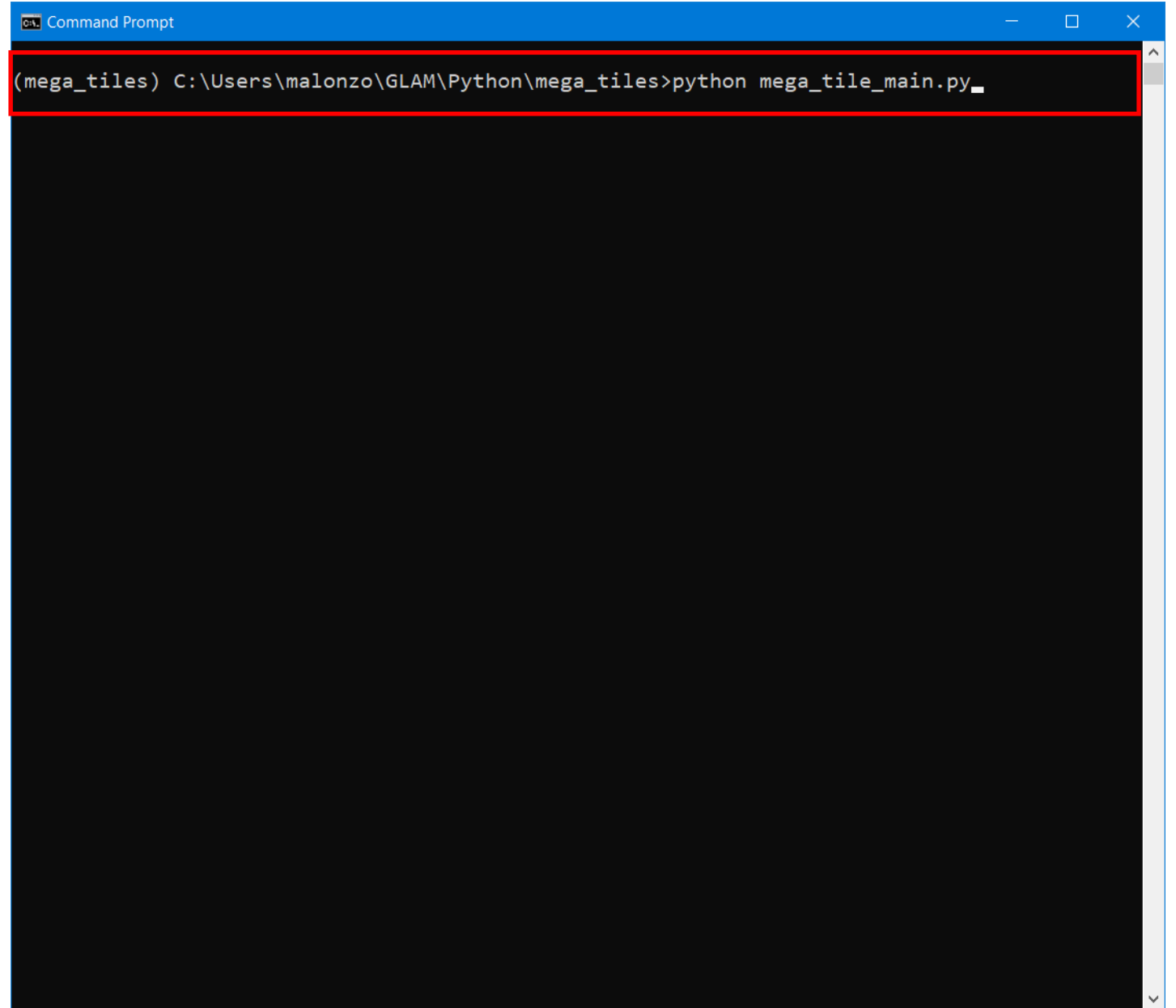
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- The code can be run in the Windows Command shell by first activating the Python Conda environment:
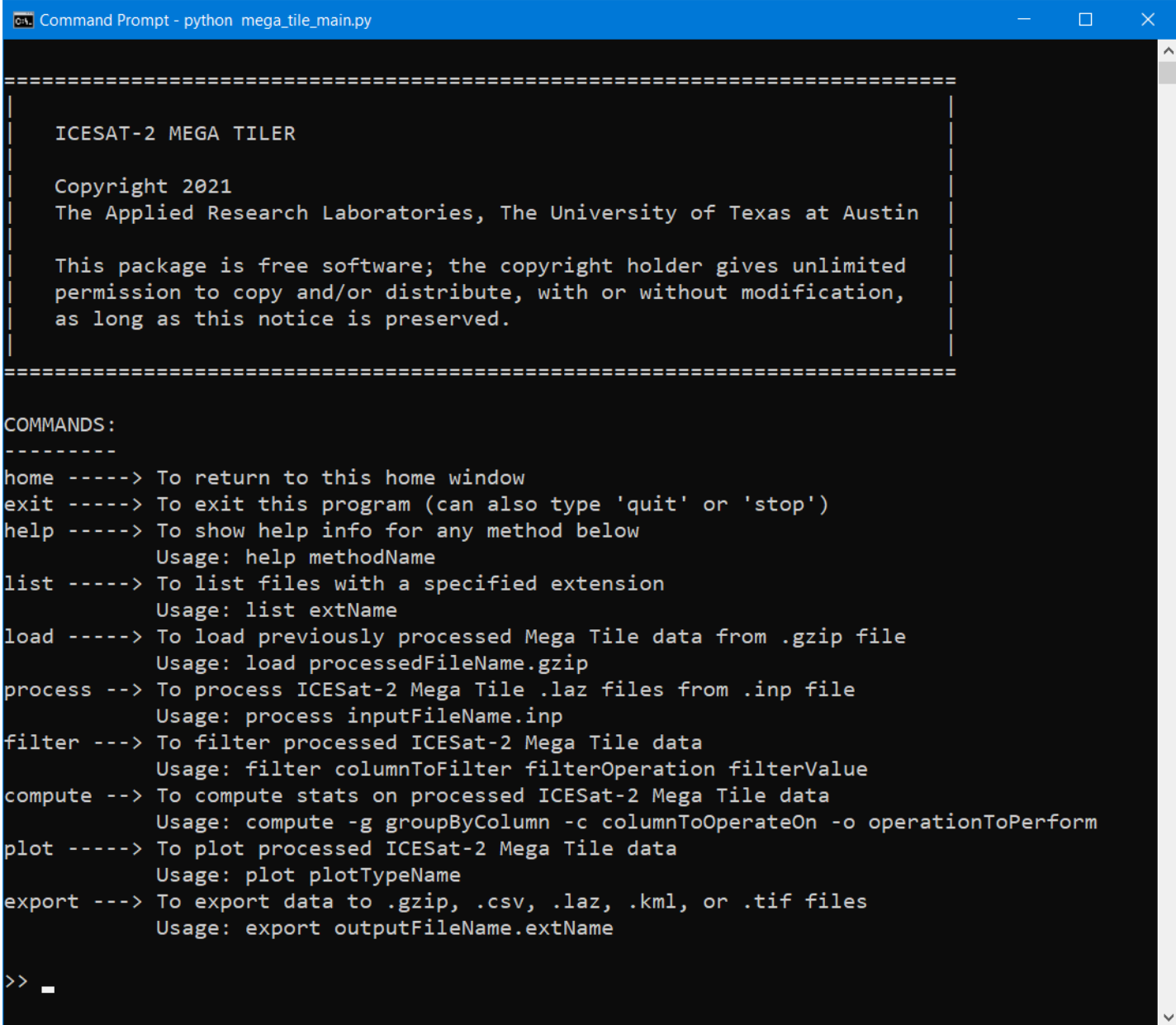
  >> activate mega_tiles

  and then typing:

  >> python mega_tile_main.py

Command Prompt

(mega_tiles) C:\Users\malonzo\GLAM\Python\mega_tiles>python mega_tile_main.py

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- This is the main window which contains all of the user commands

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- Use the `process` command to process mega tile data

- Type `help process` (or any other command) for more info on how to use that command

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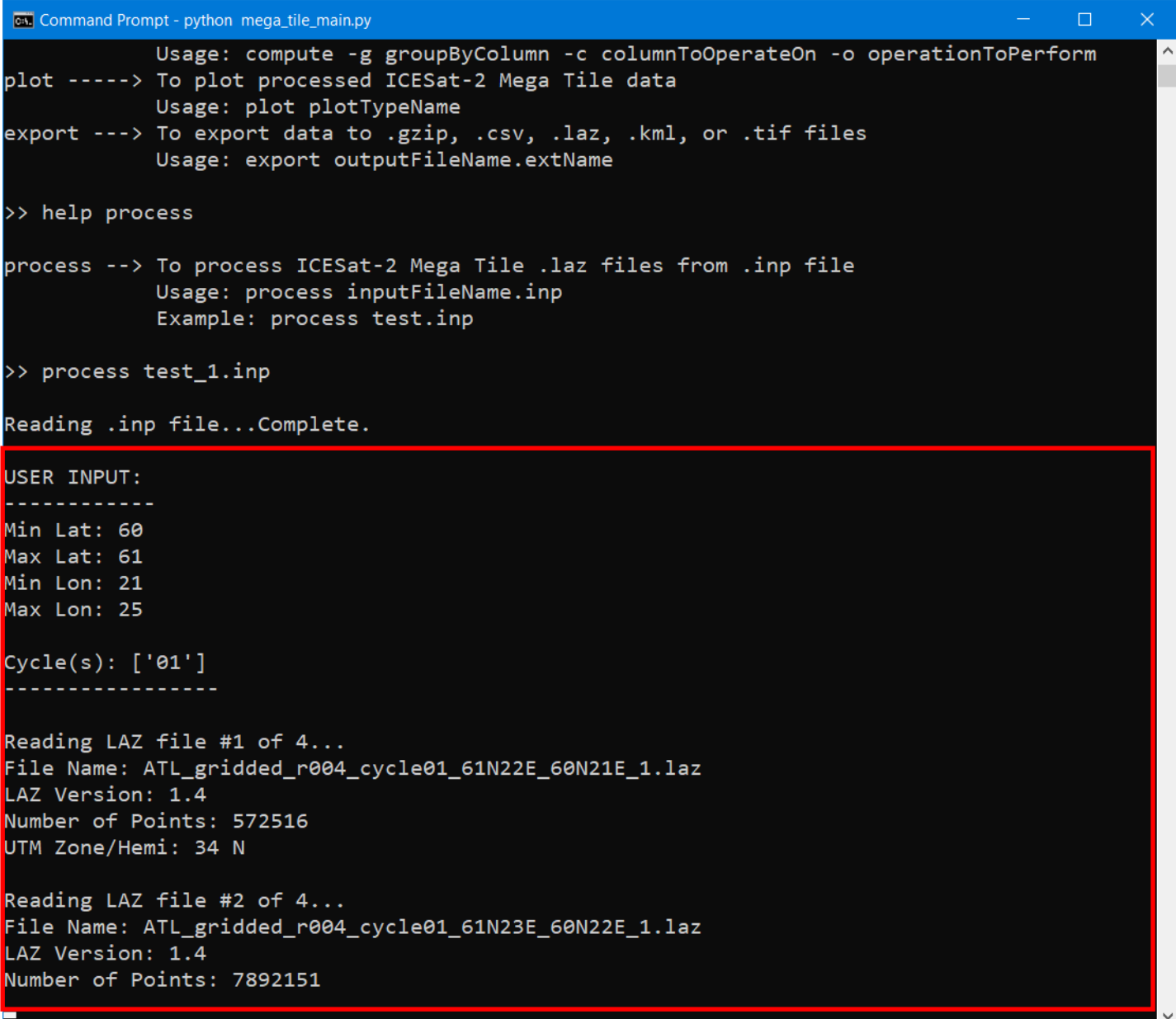- The process command reads an input (.inp) file with lat/lon bounds and cycle number for the mega tile data

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- Messages are sent to the command window while data is processing

- An example of processing an input file named test_1.inp:

```
>> process test_1.inp
```

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- A snapshot of the processed data after the input file has been processed

- Some default stats are displayed for each field in the .laz file

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- Users can filter data

- For instance:

```
>> filter classification == 1
```
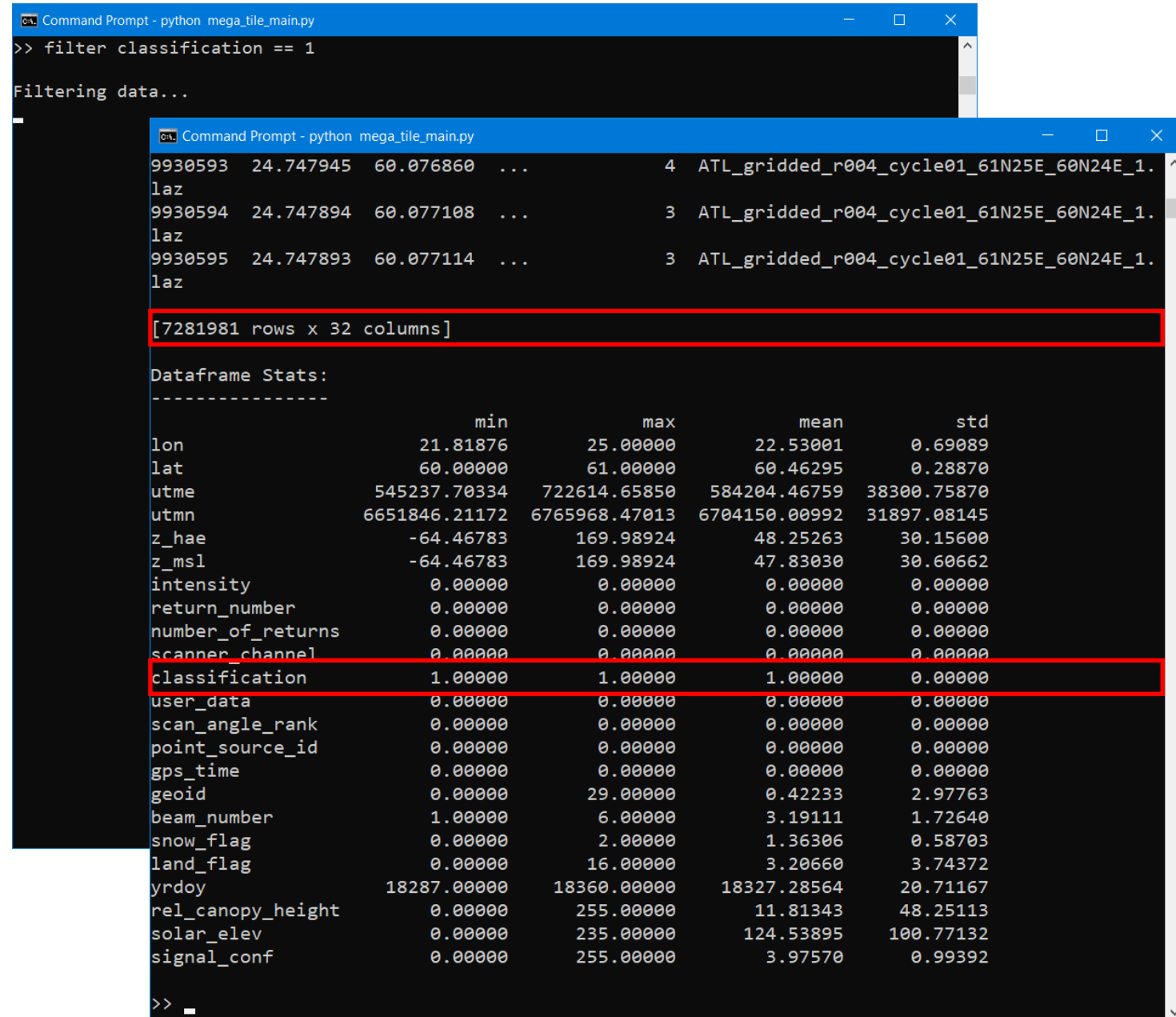
- Unfiltered dataframe shape was:
    - 9,930,596 x 32

- Filtered dataframe shape is:
    - 7,281,981, x 32

- Dataframes cannot be unfiltered after issuing the `filter` command

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- Users can compute stats on the data

- For instance:

```
>> compute -g classification
         -c ['z_hae']
         -o mean
```

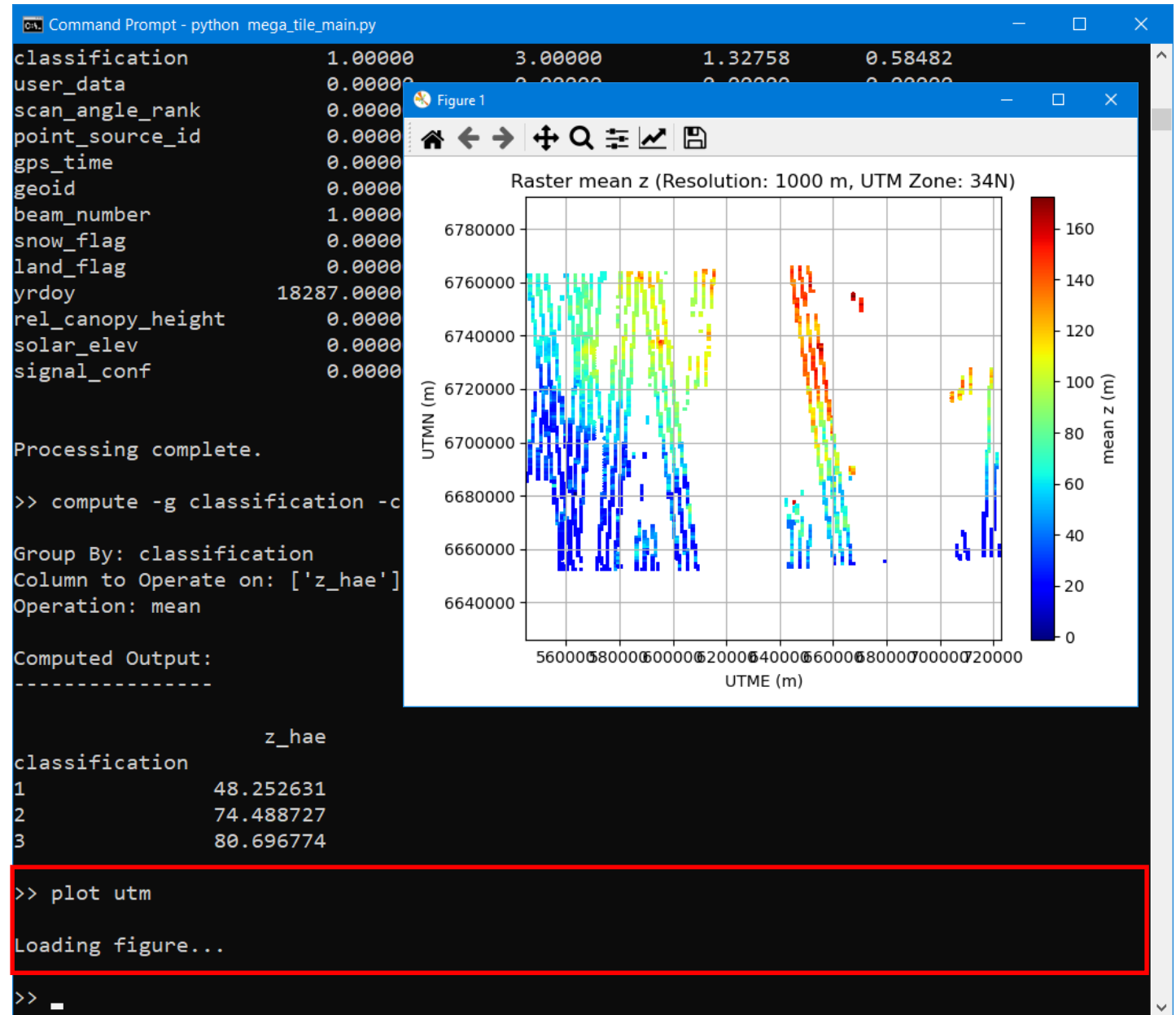- This command will group all data by classification and compute the mean Z HAE (height above ellipsoid) for each classification

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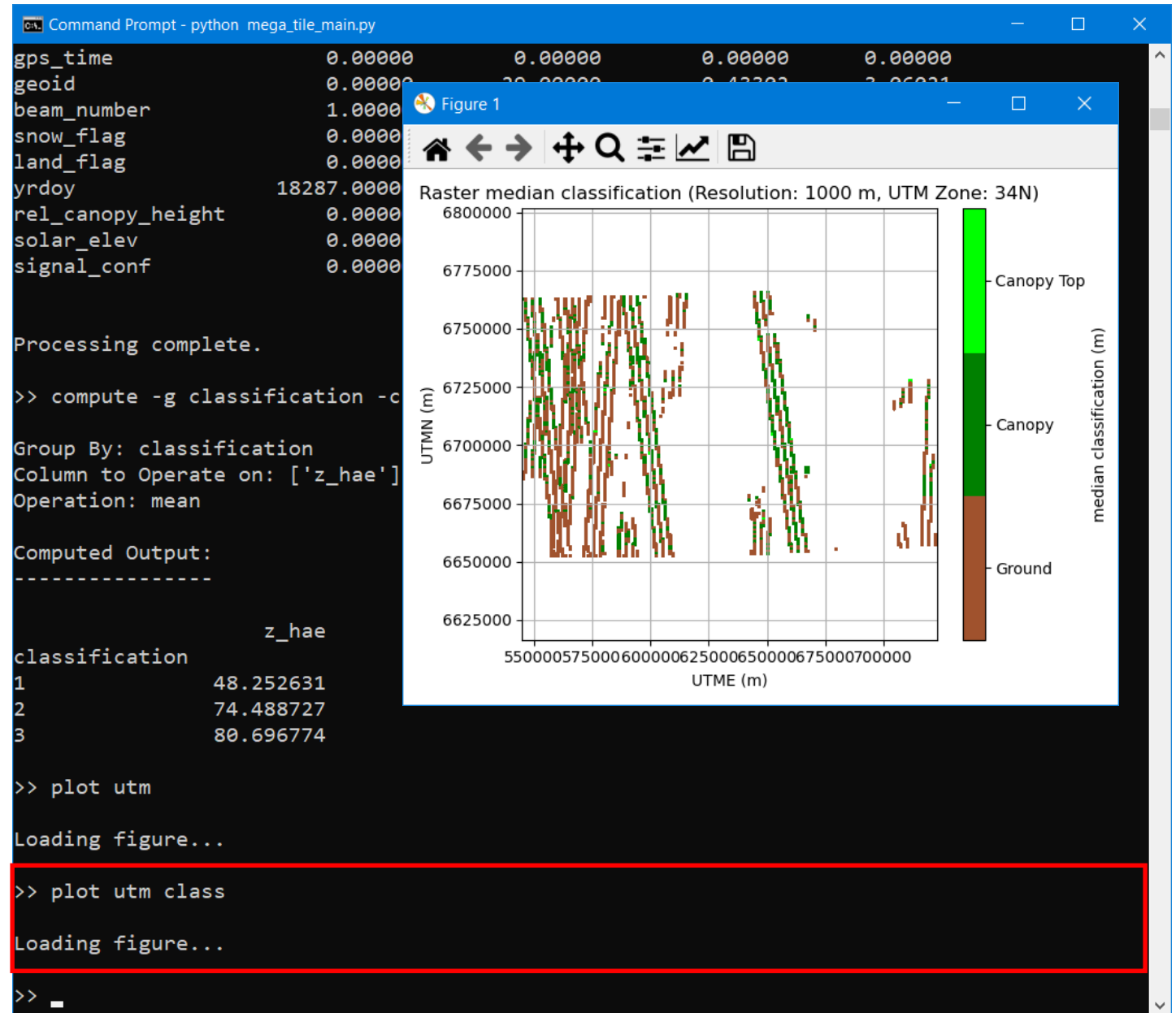- Users can plot the mega tile data in UTM coordinates by altitude

* Any text with "utm" was replaced with "xy" in v1.0 to be open to UTM or Polar Stereographic coordinates

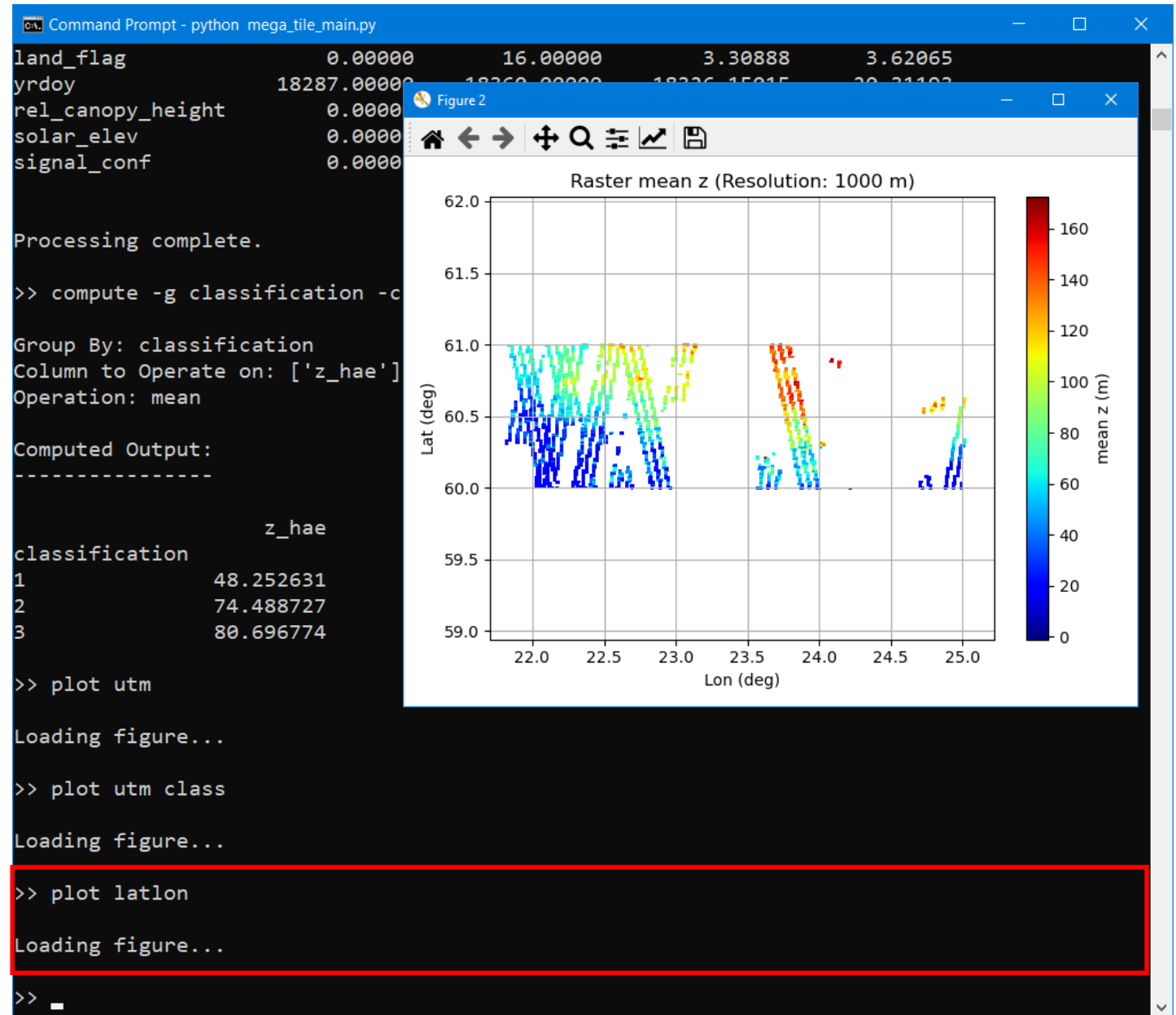For instance, `plot utm` has been replaced with `plot xy`

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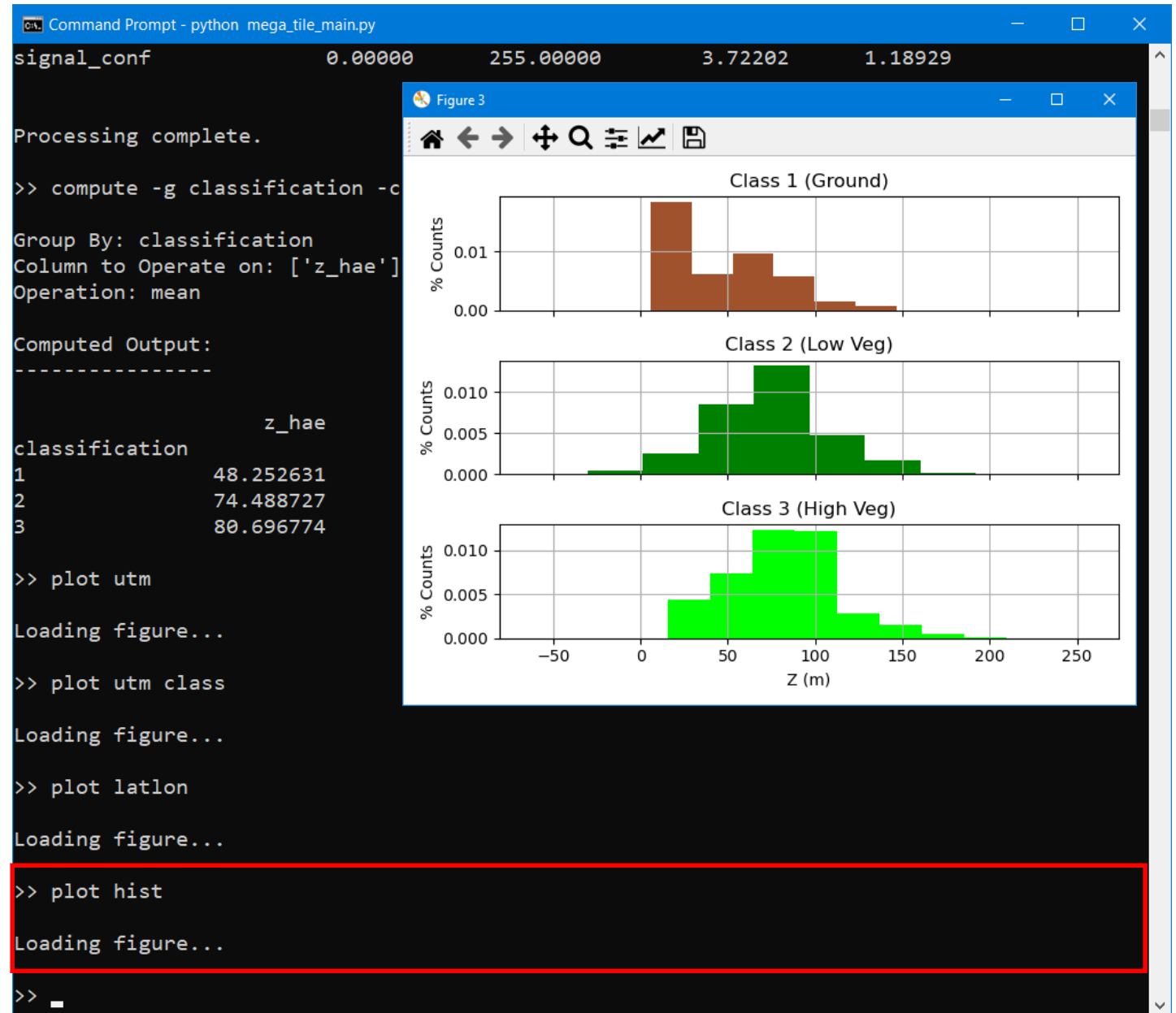- Users can plot the mega tile data in UTM coordinates by classification

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- Users can plot the mega tile data in lat/lon coordinates

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- Users can plot a histogram of the data

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- Users can plot the mega tile data as a 3D point cloud to pan/zoom around

- Data can be colored by:
  - Altitude (default)
  - Classification

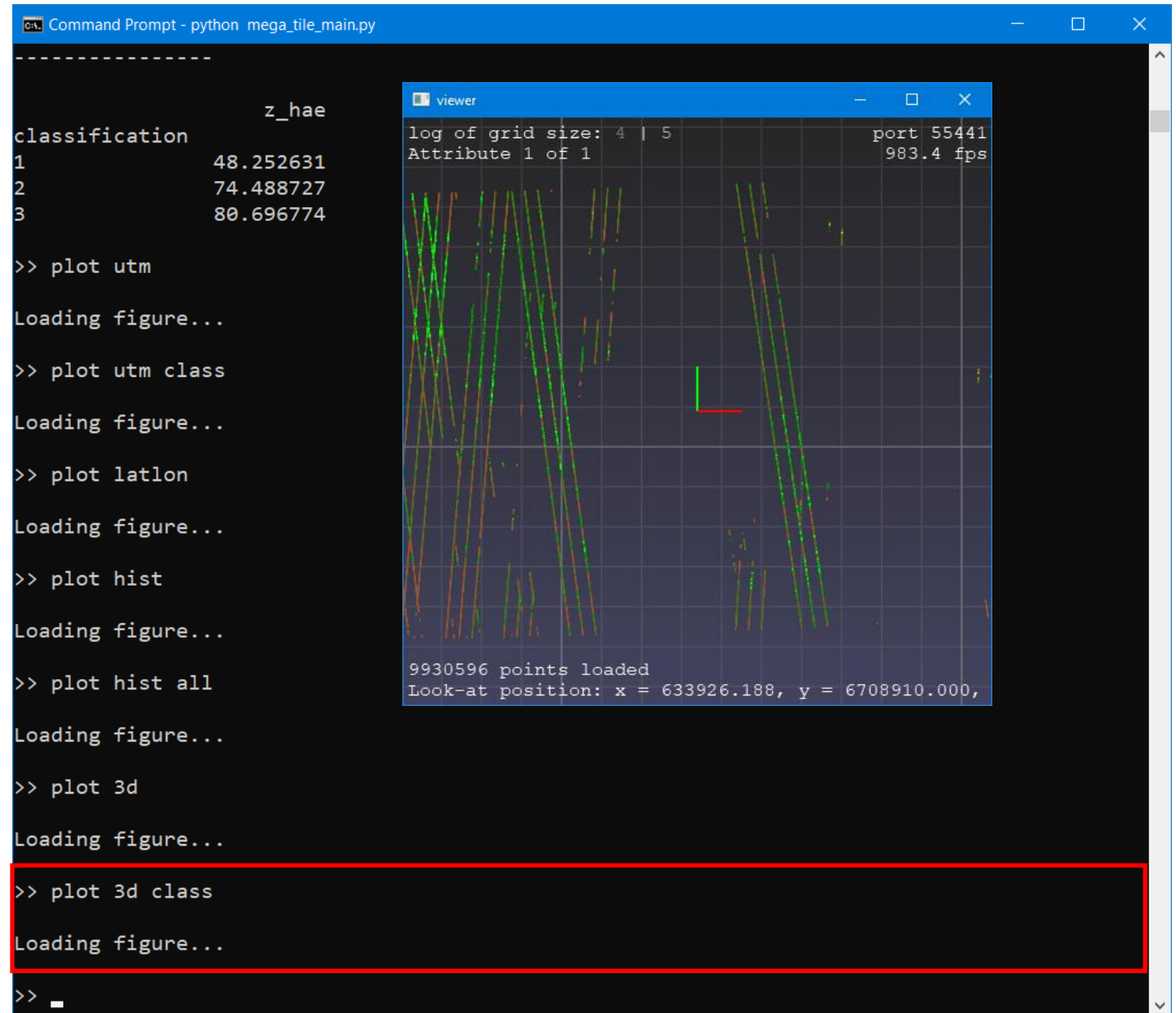- Users can rotate/zoom the 3D point cloud with the mouse and pan around the point cloud by holding Shift + Mouse Button

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- The point cloud can be colored by classification
    - Ground = Brown
    - Canopy = Dark Green
    - Top of Canopy = Light Green

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- Data can be exported to:
  - .gzip
  - .csv
  - .laz 1.4
  - .kml
  - .tif

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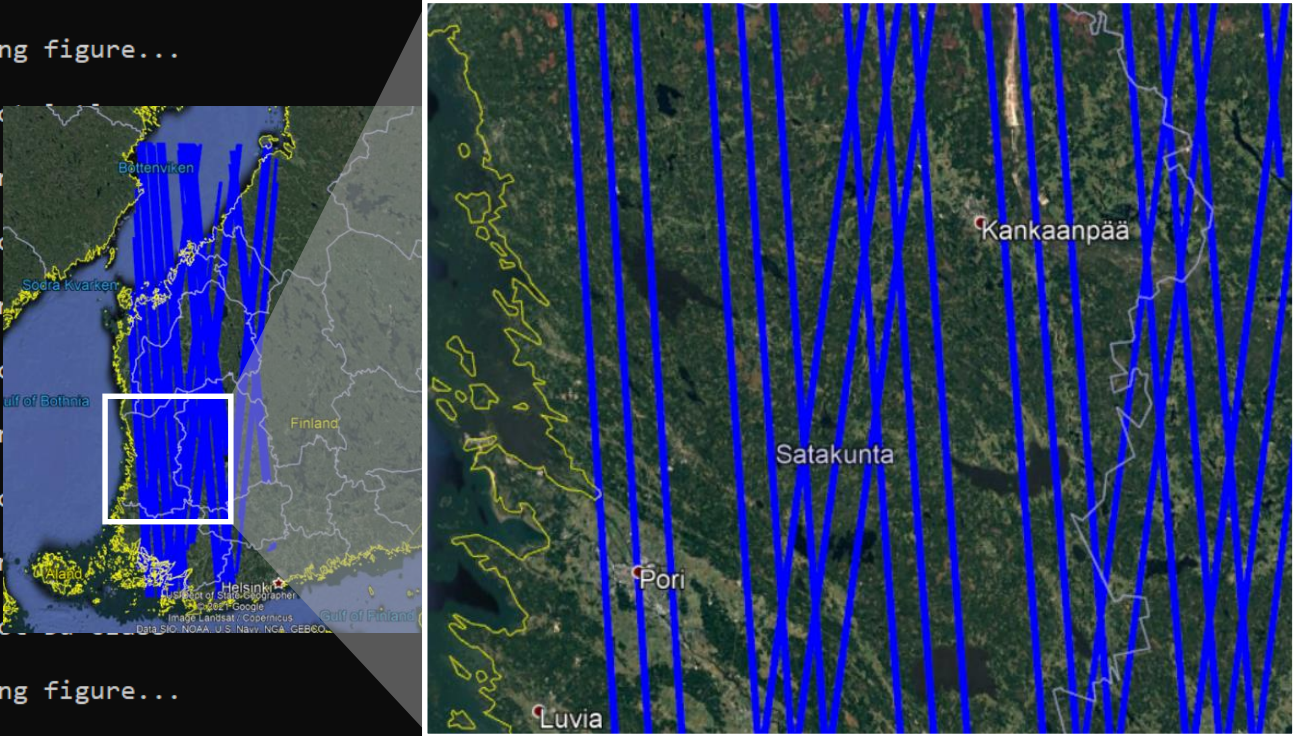
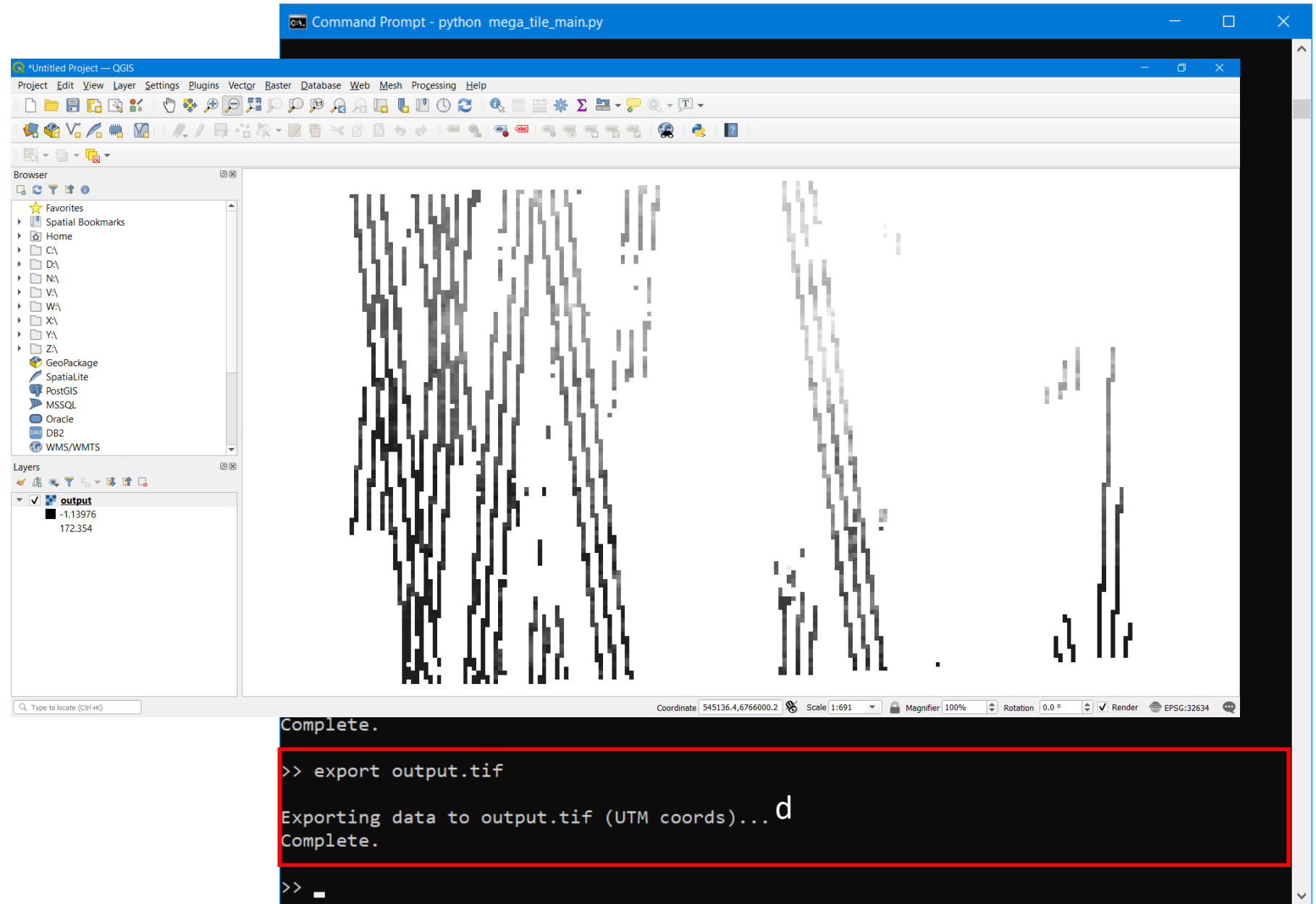# ICESat-2 Mega Tiler

- Export to .laz file
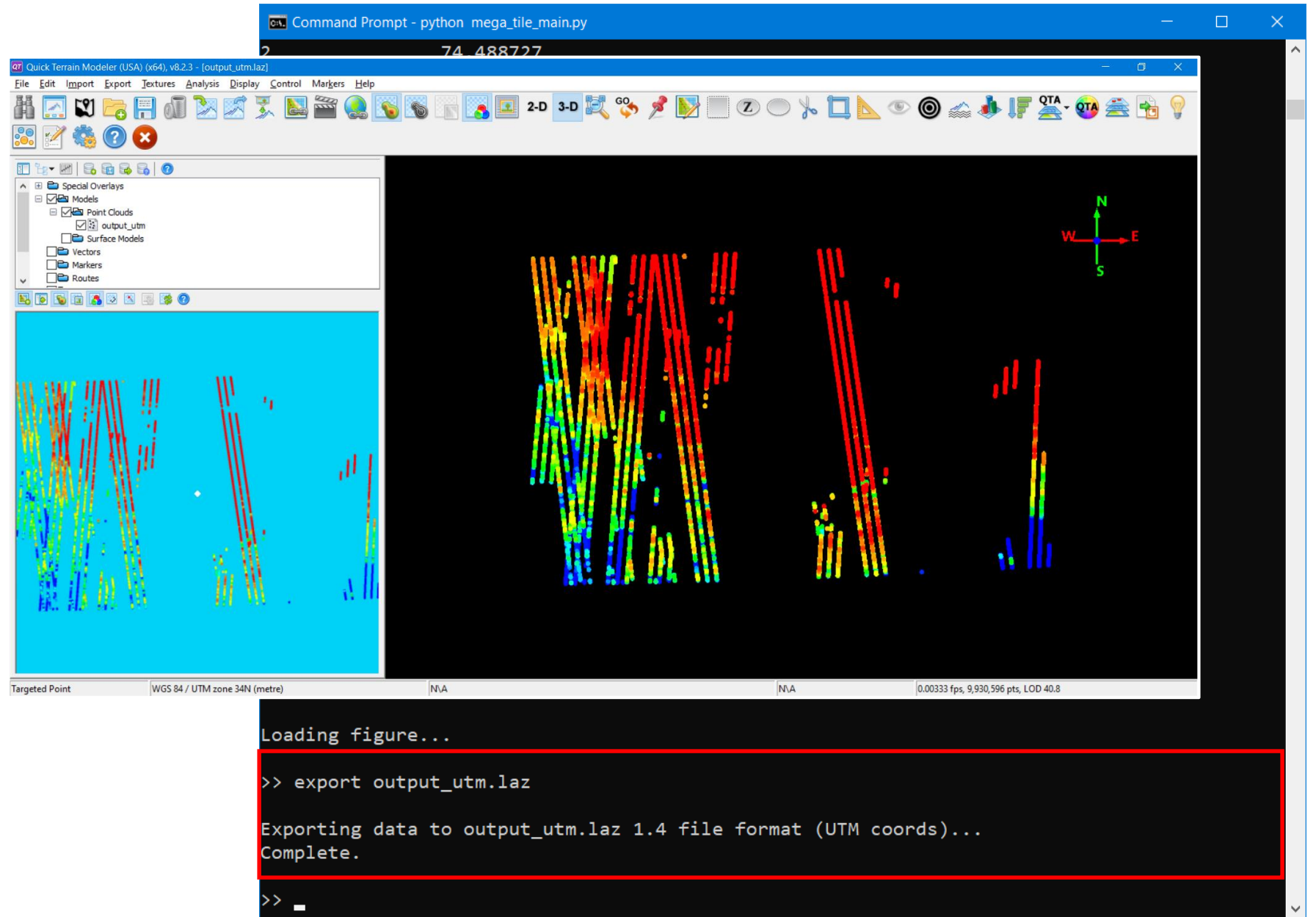
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- Export to .kml file

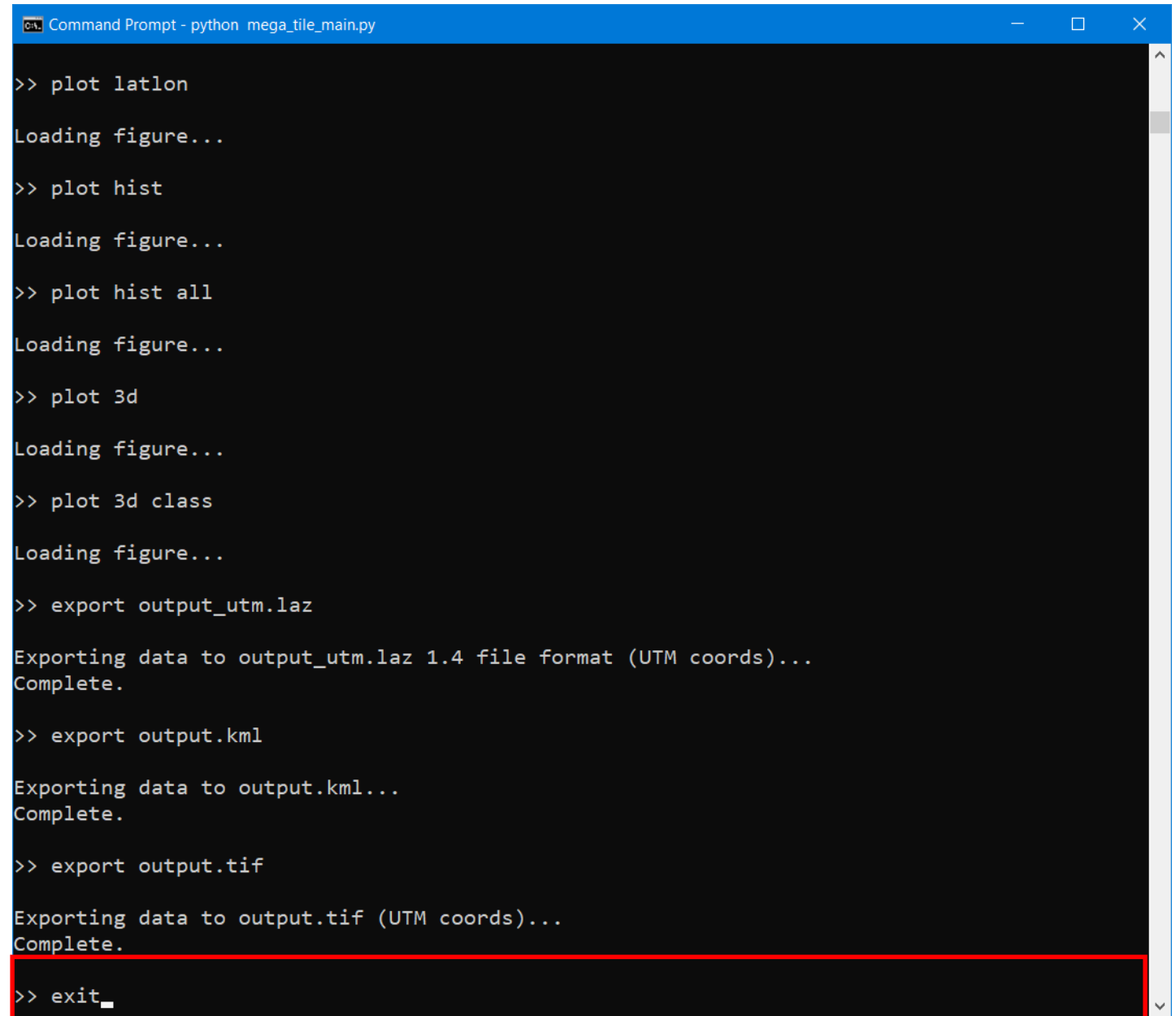- Each individual ICESat-2 track within the specified lat/lon bounds is shown as a separate line segment in the KML file

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- Export to .tif file

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- Type `exit` to exit from the tool and return to Windows Command shell
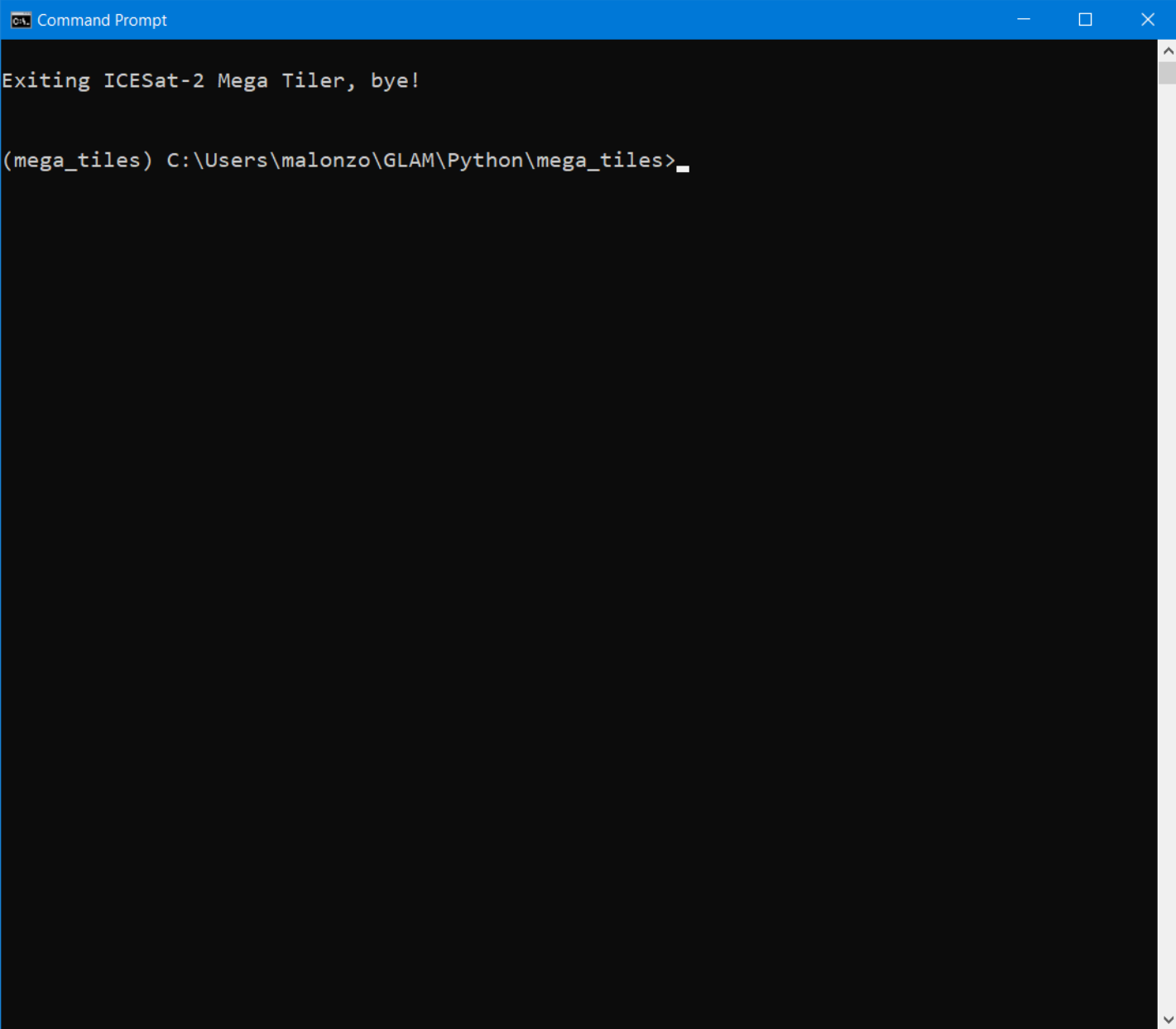
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- Back to the Windows command shell
- Still in the Python Conda environment
- To exit Python Conda environment, type:

    >> `deactivate`