TERRA – Setting Up Flights

Included in git repo

# Creating the Screen

1. Load data from one flight.
2. Check flight track by displaying latitude vs longitude.
3. Run TERRAInstall.cmd. This should add the appropriate files to your user procedures directory.
4. Load FlightFitting.ipf in your Igor experiment (#include “FlightFitting”).
5. Load flight path csv file (this can be generated by GIS or other means outside of Igor) and plot it with the flight track to ensure everything looks correct.
6. Create an excel file with the start and end times of your boxes matching Example\_ScreenDetails\_2018.xlsx. Load this file into your Igor experiment.
7. Run getIndex (BorS, Name, Time) where BorS = “screen”, Name = the name of the screen (in ScreenName column) and Time is the date/time wave of the data to get the start and end index of the screen (stIndex, endIndex)
8. If there are parts of the flight that occur between the start and end time of the box but should not be included in the kriged screen (e.g. spirals) create exc\_st and exc\_end containing the start and end time for each section that should NOT be included (refer to Example\_AIRCRAFT\_Box\_Screen\_Spiral\_Times.xlsx as an example).
9. Ensure that flight path goes from left to right in the situation that you were positioned at the plume source. If it is not, run switchDirection.
10. Concatenate the fit path waves (either POINT\_Y and POINT\_X if you did not switch directions or switchPathY and switchPathX if you did) into ScreenPosXY\_deg using this command: Concatenate/O {Xwave, Ywave}, ScreenPosXY\_deg
11. Concatenate the latitude and longitude waves into Flight\_positions\_deg using this command: Concatenate/O {ymm\_\_m300\_v2\_\_londecd, ymm\_\_m300\_v2\_\_latdecd}, Flight\_positions\_deg
12. Obtain a digital elevation model for the study area.
13. Adjust load2() SetScale commands to fit with the digital elevation model being used.
14. Run loadElevations() to load in the digital elevation model and scale it, and to get the ground elevation below the flight track and below the best fit flight box/screen – this will take a few minutes.

# Creating Fit of Wind Below Flight Track

1. Open WindProfiles\_2018.pxp and load flight start and end times into the experiment.
2. Run MakeProfiles to compile wind data points below the flight track to the ground for each box/screen.
3. Run FitProfiles to fit wind points to a log function.
4. Save fita, fitd, fitb, fitrms (with flight start and end times) to a file.
5. Optional - View profile for a flight by running displayFit(fNum) in WindProfiles\_2018.pxp.

# Create the Wind Screens

1. Run MapPosition2Screens(flightNum, Lat, Lon, Alt, Time) to map the flight points to the best fit flight screen – this will take a few minutes.
2. Run Variables(flightNum).
3. Run Flag(fltStr) where fltStr is a text flag to be used to denote which points are part of the screen (e.g. “F02\_Screen1”).
4. Run Wind (fltStr, WindSpeed, WindDirection).
5. Run runAllScreen() and select PositionSZWE from the pull down list to krig the east wind screen – this can take several hours to run.
6. When kriging is complete examine the plot that is generated to see that it makes sense and it looks like kriging has properly interpolated the data values shown as points on the plot.
7. Run runInterpScreen() and select PositionSZWN from the pull down list to krig the north wind screen – this could take a few minutes to run.
8. As before, when kriging is complete examine the plot that is generated and check that it makes sense.
9. Run FillWind(fNum) to use the wind profile data to fill the area below the flight path to the ground.

# Create the Air Flux Screen

1. Run AirDensity (fltStr, Pressure, Temperature, DewPointTemperature).
2. Run runInterpScreen() and select PositionSZA from the pull down list to krig the air density – this could take a few minutes to run.
3. Run FillAir() and check the plot.
4. Run FluxCalcSetup() to get the air flux through the screen.
5. Create folder for the flight using the name = fltStr.
6. Run exportTERRAWaves(fltStr) to export the files as Igor binary and choose the created folder.
7. Save experiment.
8. Open a new experiment file and use “Browse expt...” on the Data Browser to link to the previous file.
9. Copy over the weights and weightsLoc waves to the new experiment and save the experiment as weights\_fltStr (for example weights\_F02\_Screen1) to match the other files.