Feb 1

**Desk**

Installed gdal, tried to install Planet Lab’s Python API

In GEE file LandCover/Planet Create Validation Data, start setting up how to easily and quickly, visually identify planting and harvest, SC/DC fields

Feb 4

**Desk**

* Set up Planet Python API on desktop and laptop using <https://medium.com/planet-stories/planet-people-and-pixels-a-data-pipeline-to-link-planet-api-to-google-earth-engine-1166606445a8>.
  + Laptop: install gdal
  + Desktop: install Anaconda 3.7 to get pip command to work, but didn’t. instead of doing pip install planet, did python –m pip install planet and that worked. Installed GDAL using <https://sandbox.idre.ucla.edu/sandbox/tutorials/installing-gdal-for-windows>. To get python to be recognized as a command, go to Users/MsMonkey and type where python. Then do SETX MYPATH “C:\Users\MsMonkey” and python will be recognized. For some reason couldn’t do the same for a folder under MsMonkey, so had to move setup.py file into MsMonkey – the fix was to add C:/Users/MsMonkey WITHOUT ‘;’ at the beginning to the path.
  + In both desktop and laptop, stuck at step ‘python ppipe.py’
* Downloaded this month’s Planet images and started an image\_lookup\_table on desktop to keep track of order number, poly, satellite, date, and whether downloaded failed. Uploaded images to GEE asset
* Worked on GEE file LandCover/Planet Create Validation Data

Feb 5

**Desk**

In GEE file LandCover/Planet Create Validation Data, decided to hard code properties (i.e. planting date) rather than looping through the images and taking notes per date. This also makes it easier to turn the feature or feature collection into a validation image later.

Began a new folder under assets, PlanetValidationData, to store the observed planting, harvest dates

Feb 6

**Desk**

In GEE file LandCover/Planet Create Validation Data v2, extended the first version to allow multiple fields/features to get observations input, instead of exporting a single field’s observations.

In GEE file LandCover/Planet OBIA, started a method to do image segmentation on a mosaic of Planet images to get an image representing individual fields in a CAR poly. Decided to start by manually delineating fields; don’t do image segmentation because not sure if will get fields that have internally uniform crop timing.

Feb 7

**Desk**

In GEE file LandCover/Planet Manual Field Delineation, set up code to create and export feature collections representing the fields in each CAR poly, to be used as input to Planet Create Validation Data v2. This file will take user-input multipolygon of fields and export feature collection of fields and field ids as asset. Put in asset folder ‘Planet Validation Data’. The files will be called ‘raw\_fields\_in\_poly#’, where ‘raw’ means that no observations have been added

Manually delineated agri fields and natural veg in poly1, 2018.

Feb 8

**Desk**

Extended manual classification of Planet images in Planet Manual Field Delineation to include all the agri that’s possible to see in the given set of images, urban, center pivot, and natural veg

In GEE file LandCover/Planet Do Validation, import the observed feature collection that was exported using Planet Create Validation Data v2 and turn it into an image. Then continue doing validation of timing images and land cover maps.

Feb 11

**Meeting with Iryna**

Soy vs not soy: getting training data

* Spectrally:
  + Use Sentinel data. Planet data is tricky because calibration doesn’t really work out. Sentinel has more rigorous/standard calibration, so go with Sentinel instead of Planet.
  + Do scatterplots band by band over soy vs non soy points to see what bands might be separating soy from nonsoy. Multiband indices might be able to highlight differences.
* Visually:
  + Can look visually to see if something is soy vs not soy. Look for patterning of the crops in Google Earth Pro.
  + In ArcGIS, create random points and see if you can tell the difference between what’s soy vs not soy and see if can visually see a difference, esp in a specific season.
  + Find a year that’s data rich that’s recent and do a slide bar the random points.
* Timeseries-wise:
  + Figure out phenological difference of soy vs nonsoy agri
  + Test whether variability within SC/DC soy is more than variability between soy vs nonsoy with temporal principal components
  + Temporal principal components – input is time trajectories of individual pixels, feed it into PCA, and look at first few components – get the principle trajectories that give the most variation. See which pixels have a high correlation with each trajectory. It will show me the variety of soy timing, do it for my big dataset of soy. Can see where/if people are failing on their first crop.
* Training/testing points:
  + 20 training points is enough if the nonsoy agri only represents a single type of crop
  + Spatial coverage for training points is important. Basic rules: for both training and testing points, 10x the number of bands per class. For training, 30 for training at least for statistical purposes. Recommend 50 samples per class. If pixels are coming from same field, would want 50 of those clusters. For testing, 50 per class.
  + Assuming identical bands (i.e. atmosphere correction), can pool years’ worth of training/testing data to train a single classifier. Another issue: when pool years together, try to stick with MODIS because it has higher revisit time. Doing mosaic over e.g. 2 weeks will shift the actual date of acquisition and this may introduce error.
  + Need to get more ground truth data – especially for more recent years. (Ask Avery?)

Center pivot:

* Try to identify time of the year during which there is at least some contrast, then separate circular features from other features. First find the crops by looking at the min and max EVI (crops will have a much larger difference than natural vegetation), then take the difference, and use the difference to find the circle. Then do object based classification. Take annual max minus annual min. Look at Sentinel because it has higher revisit time.

Calibration Planet Scope and Rapid Eye:

* Combining Planet Scope and Rapid Eye – calibrated quite differently. Need to calibrate Planet images with metadata using API, won’t be very scalable to Brazil. Use Sentinel because it’s more forward looking – there will be a lot of algorithms/uses for it in the future.

Feb 13

**Avery meeting**

* Ask Avery for new soy/nonsoy training points that Jake didn’t have originally
* For soy farms, look at farms in Cerrado that have soy to choose places with soy. However, just because a survey is reported as soy, can’t guarantee that the whole thing is soy; but most of mechanized agri in these locations are soy.
* Contact Jill Danes who’s a postdoc at Stanford, does center pivot classification in US; ask about center pivot in Brazil

**Desk**

Helped Avery think about what survey questions and what polygons to survey (GEE script: Choosing\_Soy\_Properties

Feb 19

**Desk**

In GEE script LandCover/Planet Do Validation, code up validation/accuracy metrics for crop timing and land cover maps (where the test data is what I’ve created from Planet imagery)

In GEE script LandCover/Common Assets, put in commonly used asset names and functions for easy access later (to copy and paste into new code)

Feb 20

**Desk**

Summarize next steps based on Iryna meeting

**Sally meeting**

Ask Gabriel if can visually see difference between soy and nonsoy crops

List nonsoy agriculture options – sugar? Corn?

The map I’m producing of SC/DC, etc is a product in itself, so document well for making metadata later

For center pivot detection, normalize the difference in max and min EVI. Also try to keep the object oriented classification as an image with integers as band values so can identify circles

Feb 21

**Desk**

Start using LandCover/Planet Create Validation Data v2 to create full crop timing validation data for poly1

Feb 22

**Desk**

Decided to hard code custom vis parameters for Planet Images and step through them using check boxes instead of the slider. This is because many images need a custom vis param; there’s no one size fits all.

In LandCover/Common Assets, put in the planet image assets and their custom vis params for each of access later; this can be used in LandCover/Planet Create Validation Data v2

Feb 25

**Meeting with Gabriel**

For agri credit data, ask Avery for someone who is joining government agri credit data to CAR polys

Other crops planted at same time as soy: wheat (becoming more common but not common historically); corn (but usually won’t be followed by a second crop); some plant that come before the real crops in order to prep the soil (sometimes planted during sanitary break, usually has a shorter growing cycle of 3 months, usually green before wet season)

**Desk**

* Create 2018 land cover and crop timing maps in order to apply to 2018 validation data created from Planet Labs.
* For land cover map, new GEE file LandCover/Soy Classification Trial 1 that combines all years’ of training point data into training a single classifier. Need to do this because don’t have training data for 2018. This didn’t work – exporting gave an error.
* For crop timing map, new GEE file Timseries\_Analysis\_Modis/Timeseries Analysis v10 that uses my new land cover maps (not Jake’s) and map3 instead of map2.3 as the mask. Export the full (unmasked) crop timing for SC and DC, so don’t need to run crop timing code again

Feb 26

**Desk**

In GEE file Timeseries\_Analysis\_Modis/Timeseries Analysis v10, export 2018 crop timing map (full, not masked)

In GEE file LandCover/Soy Classification Trial 1, figure out how to lump many years’ worth of training data to train a single classifier; figure out why lumping 2003 to 2017 training data gave an error. Probably need to separate 2003 from 2004 – 2018; 2003 seems to be missing one training property/band compared to the other years.

Used 2017’s soy points from soy\_pts\_agsat\_1 to choose four polygons of soy in Mato Grosso over which to download Planet images

Feb 27

**Desk**

In GEE file Timeseries\_Analysis\_Modis/Timeseries Analysis v10, export 2018 crop timing map (full, not masked) but 2003 – 2017 maps masked by mapbiomas3 agri class because of GEE asset space limits. Use Timeseries\_Analysis\_Modis/Timeseries Produce Final Asset v2 to export all years as a single image asset.

New GEE file LandCover/Soy Classification Create Final Asset to get from individual land cover maps for each year to one unified land cover asset containing all years, asset is called LandUse/soymaps.

New GEE file Land Cover/Soy Classification Trial 2 to add MT PLOS training points to existing agsat training points