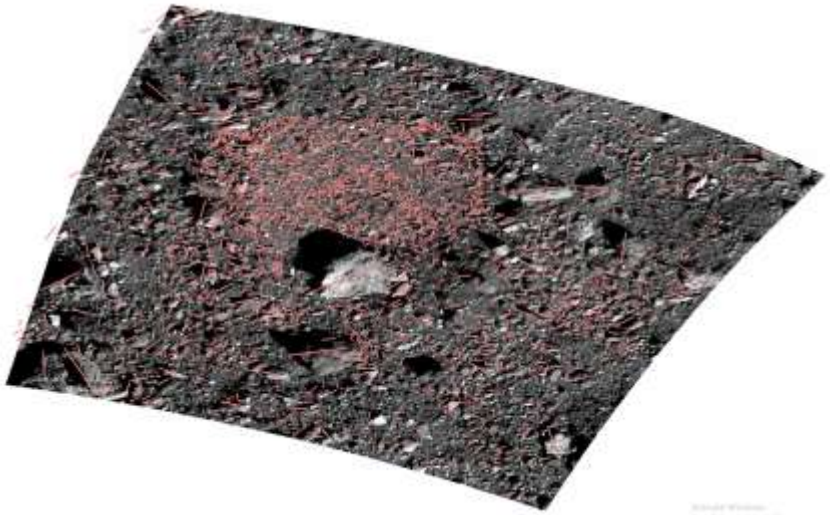
Bennu Data in ArcMap Verification Checklist

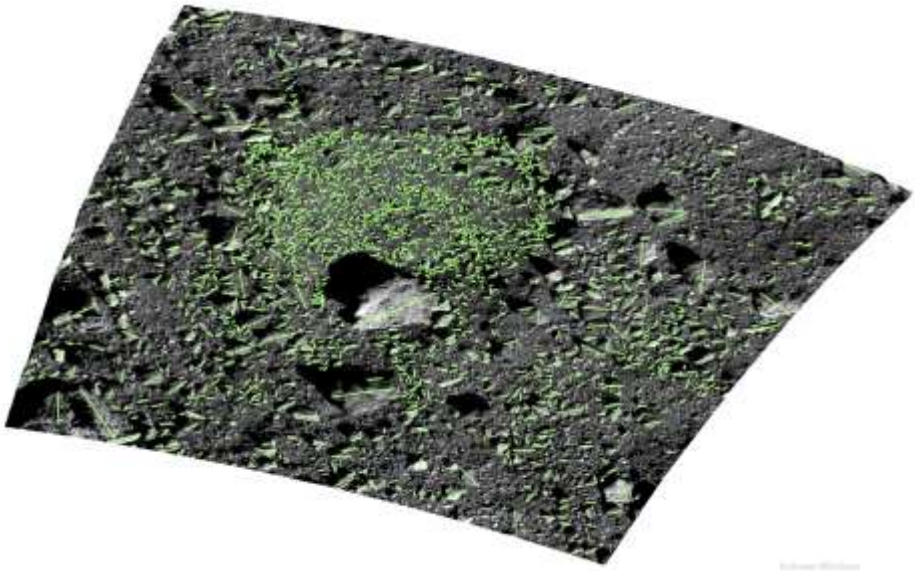
Registration, Images, and Counts

Images (either single images or multiple image mosaics) and their corresponding shapefiles must be registered using the same spice data. If images and shape files are not registered using the same information they will not line up when displayed in ArcMap. Counts should always line up close to perfectly when displayed on a map projected image. If they look off, that means the boulder shape file you are using has not been calculated using the same underlaying data as the images you are looking at.

Misregistered Counts:



Correctly Registered Counts:



If any shapefiles looks less than high quality stop and double check they are registered using the same underlying data.

Checking Image/Shapefile Registration

Check 1:

Check the dates on the images and the shapefiles (or hazard count table)

Every hazard count table will have a last modified column.

The cubes that boulder counting is using are organized into folders with dates embedded in the names in the counting dataset folder:
/export/ipwg/share/Counting_Datasets/BBD_ROI_Counting/Images_Registered_YYYYMMDD

At this point in the mission it is relatively safe to assume that the swapfiles date modified value should be close to but on or AFTER the date that the cubes were produced. Cube production happens before hazard count processing so any hazard counts with dates before the cubes were produced will not have the same registration.

Check 2:

Check the shape models:

Every hazard count table will have a shape model column.

Every cube will have the shape model used in its metadata. To see the metadata of a cube you can more the cube.

```
-bash-4.2$ more 20190321T195847S366_pol_iofL2pan.cub
Object = IsisCube
  Group = Kernels
    NaifFrameCode              = -64360
    LeapSecond                 = $base/kernels/lsk/naif0012.tls
    TargetAttitudeShape        = $osirisrex/kernels/pck/bennu_v14.tpc
    TargetPosition             = (Table, $osirisrex/kernels/tspk/de424.bsp,
                                  $osirisrex/kernels/tspk/bennu_refdrmc_v1.bsp,
                                  $osirisrex/kernels/tspk/sb-101955-76.bsp,
                                  $osirisrex/kernels/pck/pck00010.tpc)
    InstrumentPointing         = (Table,
                                  $osirisrex/kernels/ck/orx_sc_rel_190318_19032-
                                  4_v02.bc, $osirisrex/kernels/fk/orx_v14.tf)
    Instrument                 = ($osirisrex/kernels/ik/orx_ocams_v07.ti,
                                  $osirisrex/kernels/fk/orx_struct_polycam_v01.-
                                  bc)
    SpacecraftClock            = $osirisrex/kernels/sclk/ORX_SCLKSCET.00044.tsc
    InstrumentPosition         = (Table,
                                  $osirisrex/kernels/spk/orx_190301_190424_1904-
                                  12_od125-N-M13D-L-M15D_v1.bsp)
    InstrumentAddendum         = $osirisrex/kernels/iak/orex_ocams_addendum_v0-
                                 6.ti
    ShapeModel                 = /ipwg-tmp/g_00800mm_spc_obj_0000n00000_v028.b-
                                 ds
    InstrumentPositionQuality = Reconstructed
    InstrumentPointingQuality = Reconstructed
    CameraVersion              = 2
  End_Group
End_Object
```

Check 3:

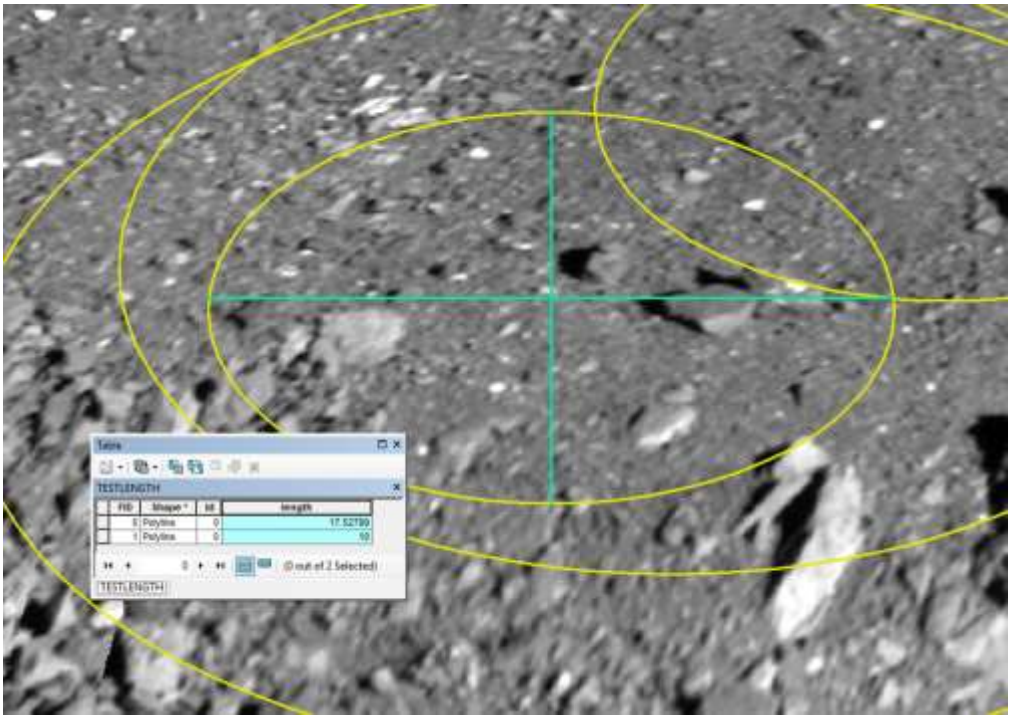
Check using ISIS3. Grab a center lat, lon, X,Y, or Z for a single count either from the database output or from the attribute table in ArcMap. Find the same pixel using qview and use qview to get the line and sample values at that point. Use ISIS3 campt using the line and sample as inputs. The lat, lon, x, y and z values should be identical (or reasonably identical due to rounding errors).

Projections and Distortion

For whatever reason, assumptions about ArcMap automatically compensating for different projections should not be made when using Bennu data.

Lengths

Do not trust lengths calculated in ArcMap. Even in equirectangular projection the length measurements using Bennu data are subject to distortion in the high latitudes (it's not being compensated for as would be expected).



Areas

Because ArcMap doesn't automatically compensate for projection issues, areas should be calculated in a sinusoidal projection.

Sanity Checks

The ROIs with a 5m radius should have an area of ~78m^2 when calculated in sinusoidal projection.