

CLASSIFY ROCKS THAT ARE SHARED BETWEEN TWO OR MORE GLACIERS AS "NODATA"

Method created by Adina Racoviteanu, 2007-09-05

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Template script: xxx_erase_shared_rocks.doc

Replace "xxx" with project prefix and save this script with a new name:
xxx_erase_shared_rocks.doc.

START

This document describes the steps I used to remove polygons that were classified as "rock", but which were shared by two glaciers, from the ice segments. Initially, I considered any rock outcrop as a nunatak, regardless of whether it was internal to a glacier or shared by two or more glaciers. This posed a problem for ingest into the GLIMS database, where rock outcrops that are shared between 2 glaciers should be considered NODATA instead of nunataks. So I had to modify the script so that:

- 1) rock outcrops that are completely inside a glacier polygon be coded as "intrnl_rock"
- 2) rock outcrops that are shared between the glaciers be erased and classified as "NODATA"

Shapefiles needed:

- xxx_gl_segments_filled.shp: the polygon shapefile containing ice boundaries (with ice divides only, and nunataks "filled" in)
- xxx_rock_segments_all.shp: the polygon shapefile with ALL internal rocks (including those that are shared between two glaciers)

Shapefiles created:

- xxx_rock_segments_intrnl_only.shp: shapefile containing ONLY rock polygons that are INTERNAL to glacier polygons
- xxx_rock_segments_shared.shp : shapefile containing rock polygons that are shared by 2 or more glaciers
- xxx_gl_segments_filled_without_shared_rock.shp: shapefile with glacier segments only, where rocks that are shared by 2 or more polygons are NODATA.

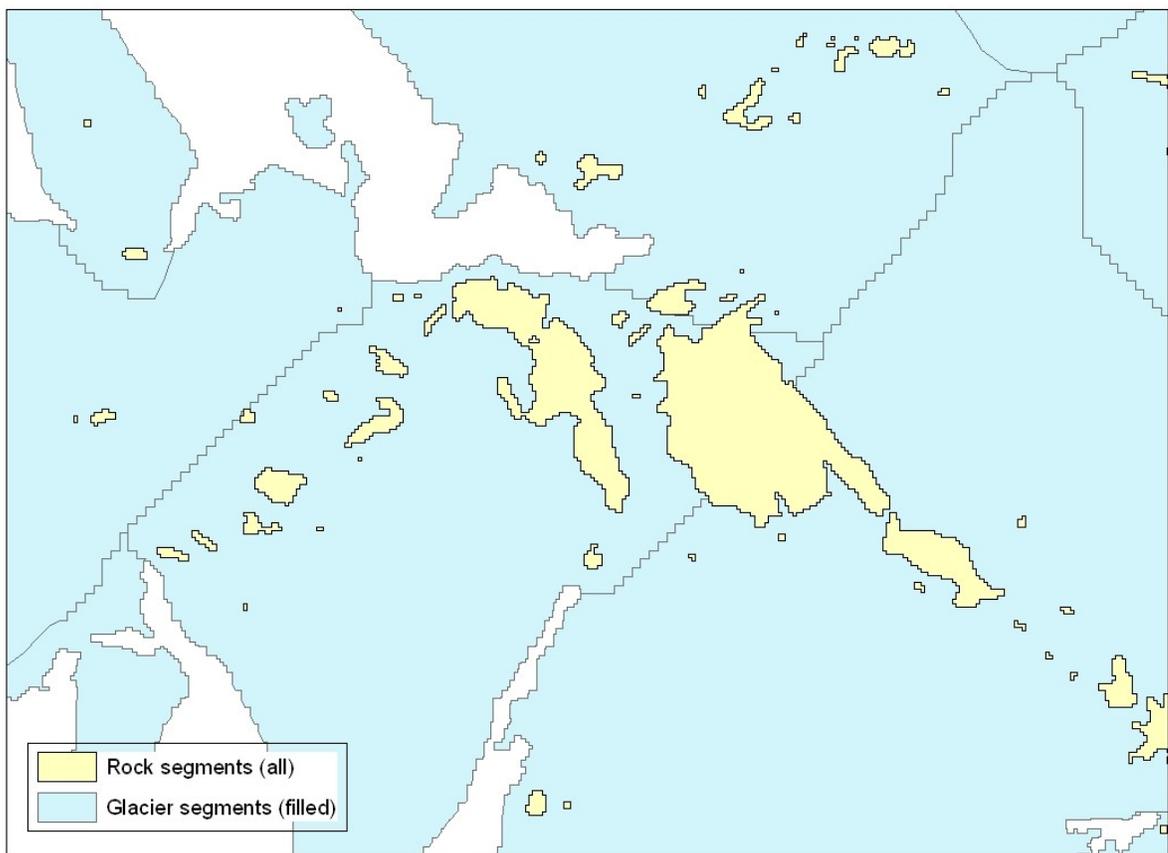
Tools: I ran these commands in ArcMap and ArcToolbox.

There are two main steps:

- 1) identify only those rocks that are shared between two glaciers;
- 2) erase those polygons from the ice shapefile.

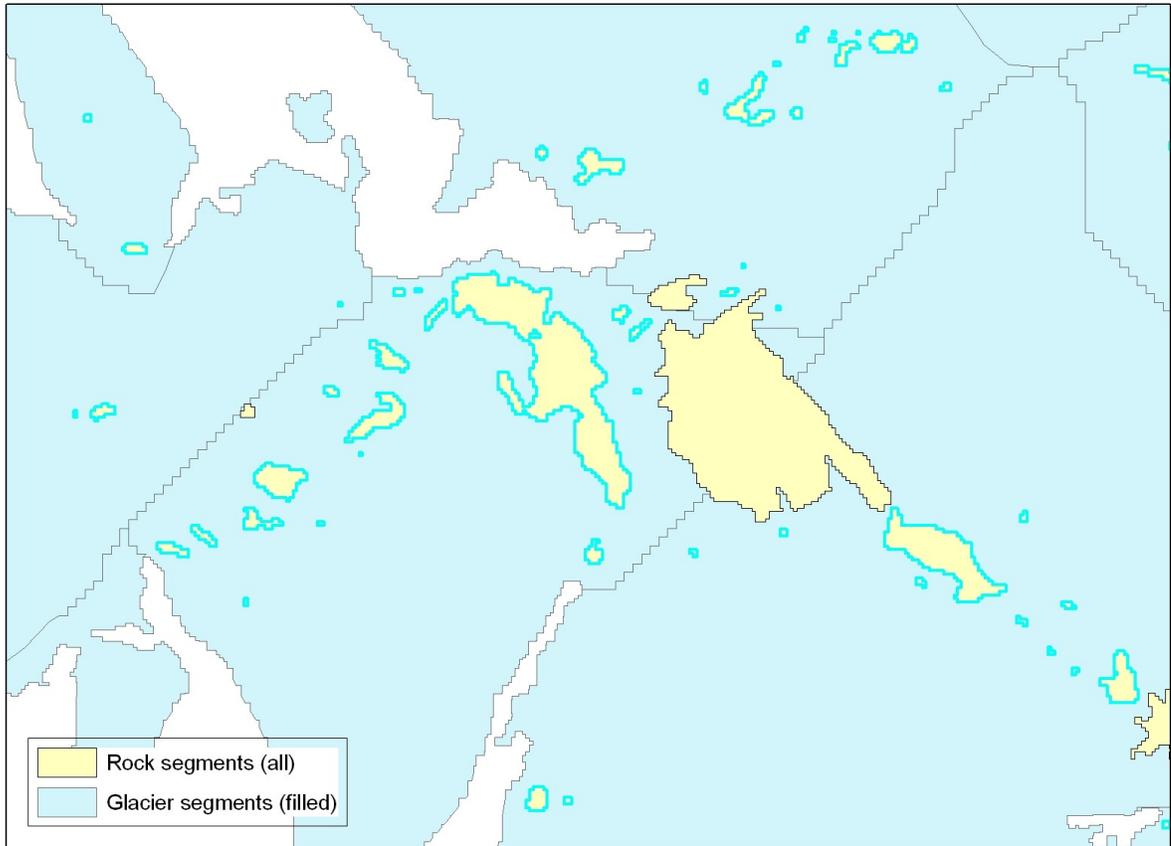
START

- Open ArcMap, and add xxx_gl_segments_filled.shp and xxx_rock_segments.shp to the map.
- Color code the glaciers in blue, and the rock polygons in rose, to distinguish them. At this step, both internal rock and rocks shared between two glaciers are in the same shapefile (Fig.1). In the next step, we'll need to differentiate those.

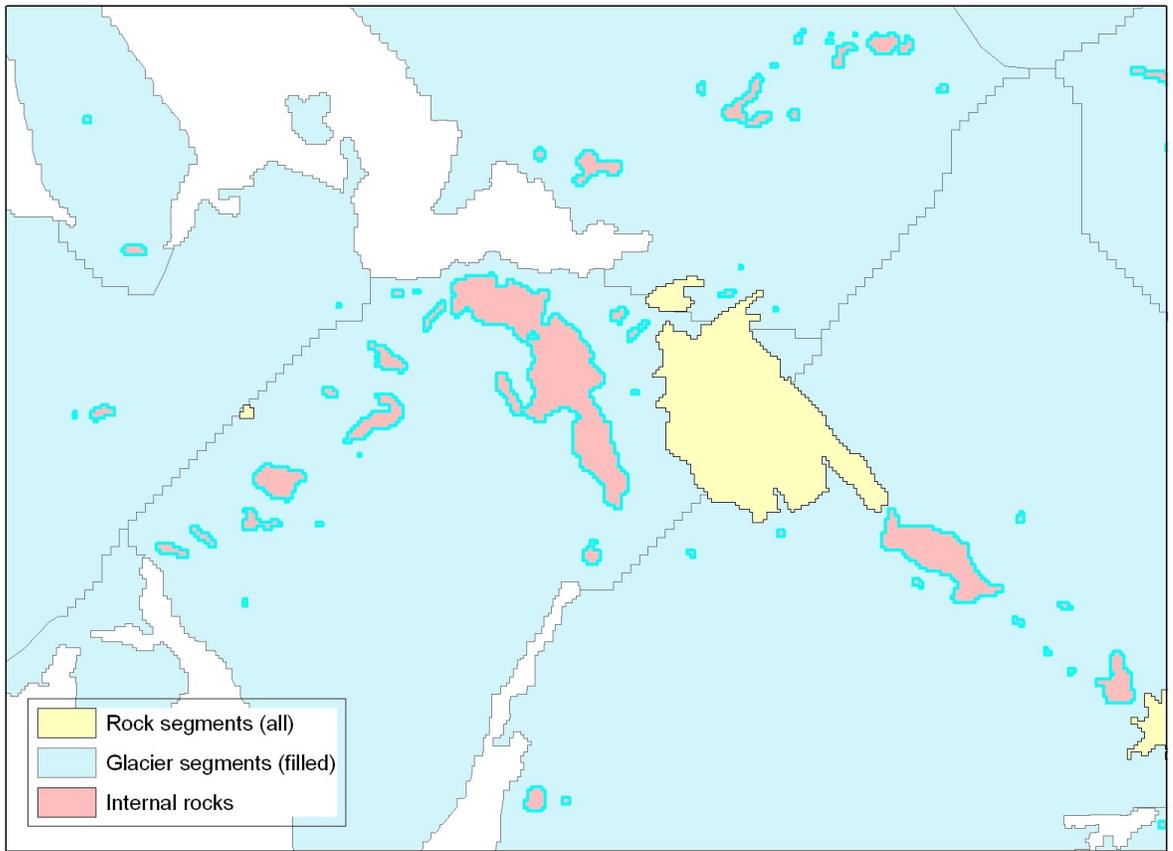


SELECT ONLY INTERNAL ROCK POLYGONS

- In ArcMap, pull down the Selection menu and choose "Select by location"
- Select features from xxx_rock_segments.shp that are COMPLETELY WITHIN xxx_gl_segments_filled.shp. Internal rocks will be highlighted in the selection (Fig.2)

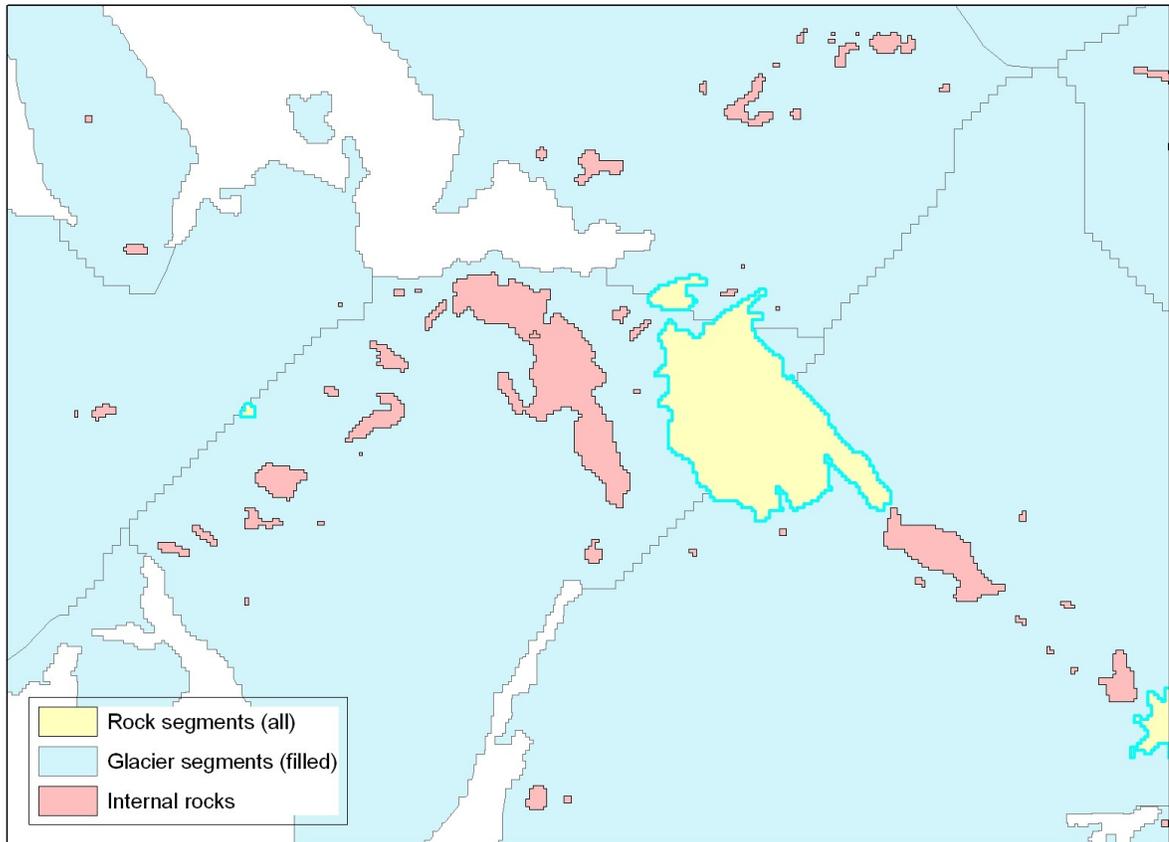


- Save this selection in a new layer:
 - In the Layer toolbar in ArcMap, right click on the xxx_rock_segments, select "Data" from the pulldown menu, and choose "Export data". Make sure you choose the option "export selected features" in the pulldown menu.
 - Name the file xxx_rock_segments_intnl_only.shp
 - Add the internal rocks to the map, and color them in rose. (Fig. 3).

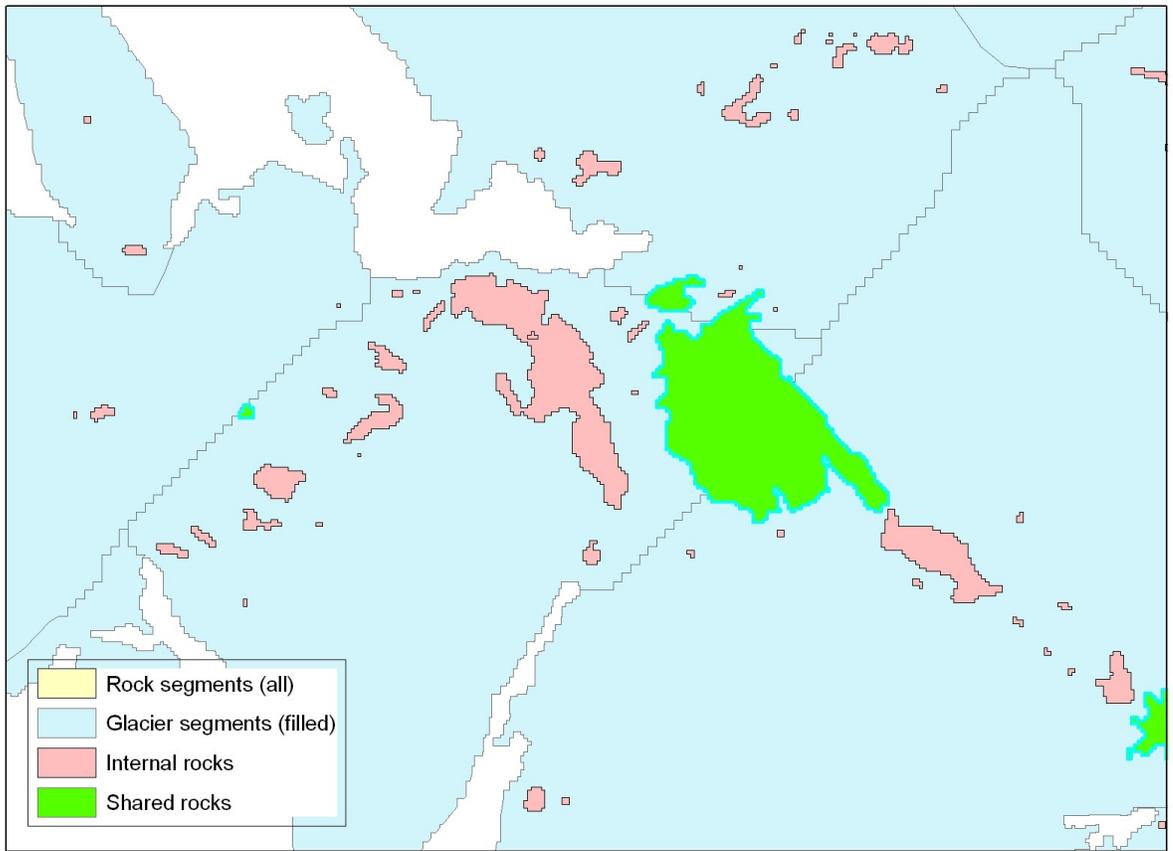


SELECT ROCKS THAT ARE SHARED BETWEEN TWO OR MORE GLACIERS

- With the internal rock polygons in the xxx_rock_segments.shp highlighted, and selected, right click again on the xxx_rock_segments.shp file in the layers, and choose "Selection" pulldown menu. Then choose "switch selection". This will deselect the internal rocks, and will select only polygons that are shared between 2 glaciers (Fig 4 below).

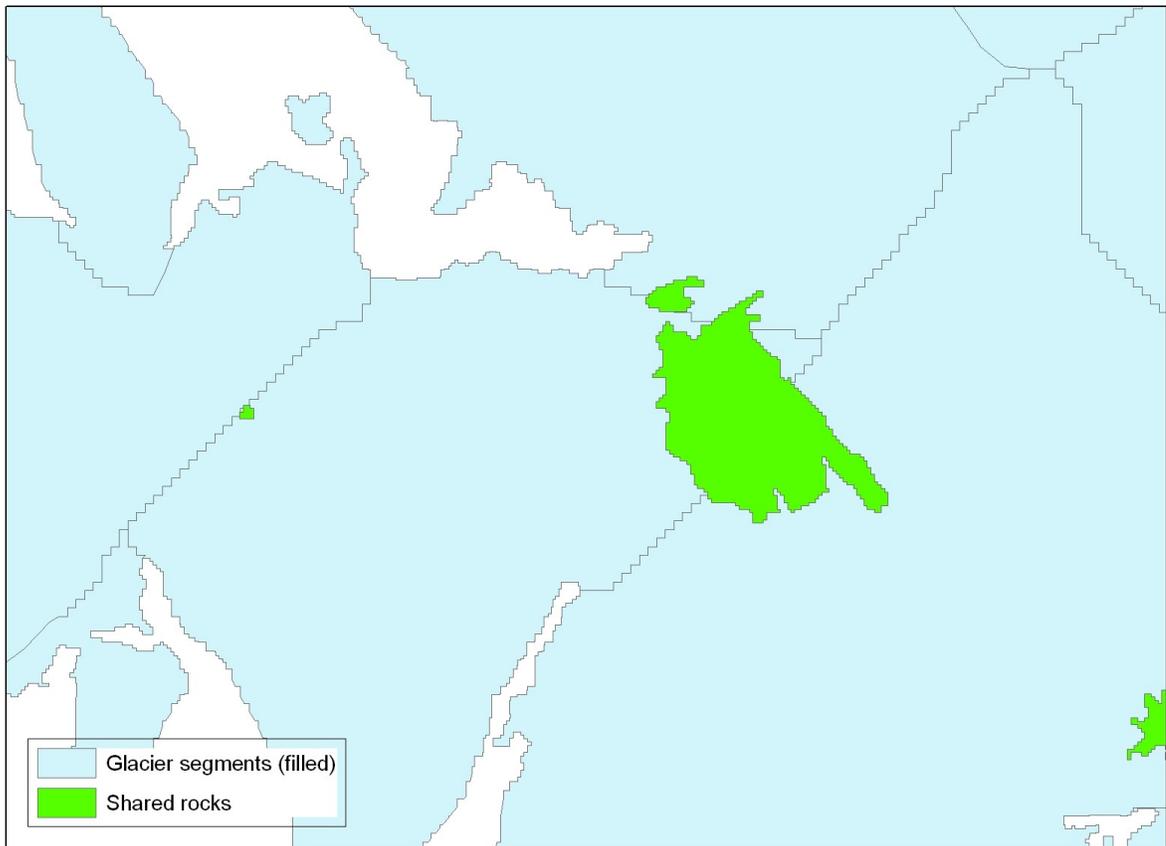


- Save this as a new shapefile:
 - Right click on the xxx_rock_segments.shp file in the layers, choose "Data", then "Export data", and name the new shapefile "xxx_rock_segments_shared.shp". Add the new layer to the map, and color it differently (Fig.5 below). Note that the shared rocks are still highlighted on the screen.



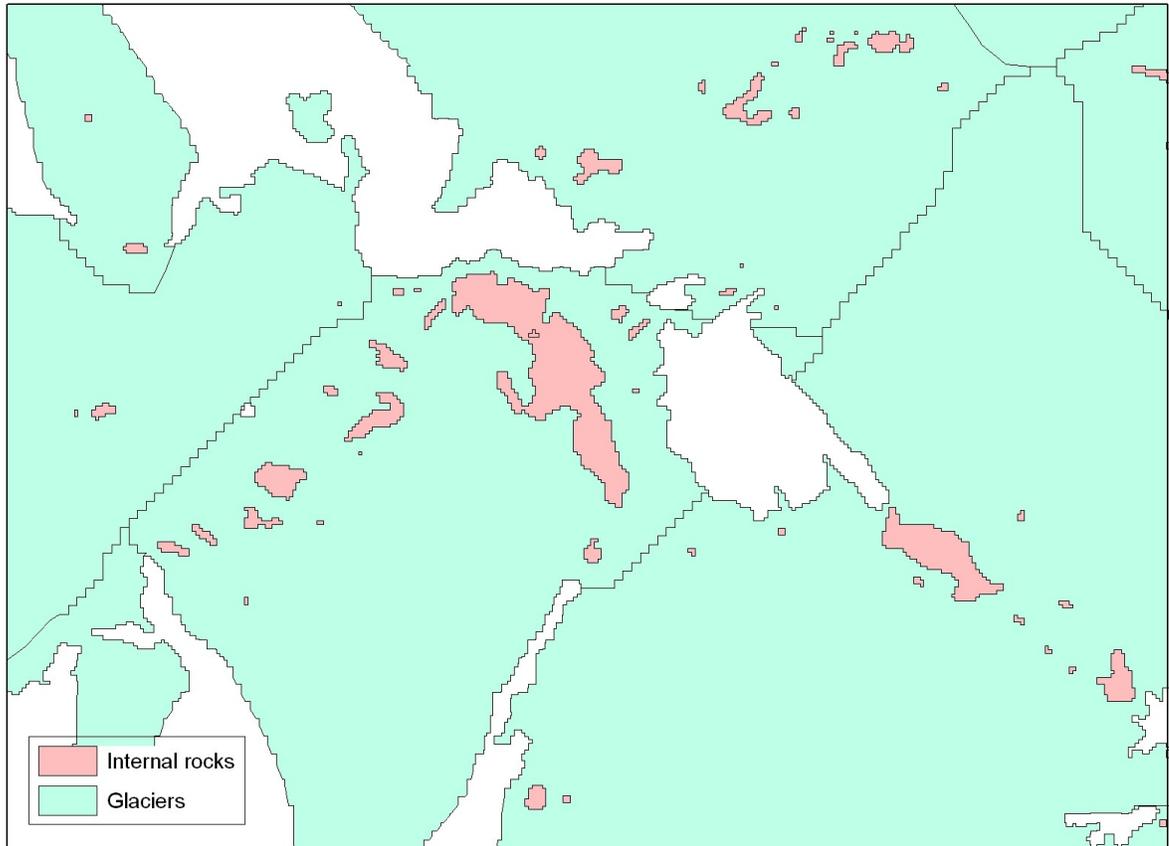
ERASE THE SHARED ROCKS

Now we'll "erase" those polygons that are NOT internal to the ice polygons (meaning they will become NODATA). We need the ice polygons (filled) and those rock polygons that are NOT internal (Fig.6 below)



- Start ArcToolbox.
- Under "Analysis" menu, choose "Overlay", and then launch the "Erase" command. ERASE creates a feature class by overlaying the Input Features with the polygons of the Erase Features. Only those portions of the Input Features falling outside the Erase Features boundaries are copied to the Output Feature Class.
- In the Erase window, specify:
 - input features: xxx_gl_segments_filled.shp
 - erase features: xxx_rock_segments_shared.shp
 - output feature class: xxx_gl_segments_filled_without_shared_rock.shp

This creates a new shapefile containing ice polygons (with ice divides) and voids (NODATA) where rocks are shared between two glaciers (Fig 7). The internal rock polygons are in now in a separate file (xxx_rock_segments_intnl_only.shp).



DONE.