**ANTARCTIC ICE CHART PRODUCTION**

Nick Hughes, 2013-x-18

Antarctic ice chart files can be found in /disk1/Antarctic on pc2790. There is a routine in place to automatically keep any file cretaed in this area as read/write by all users.

**Copy files for the new date**

1. Open a Terminal window and

cd /disk1/Antarctic

cp -r old\_date newdate
 where old\_date is the date of the previous ice chart (as yyyymmdd) and new\_date is the date of todays ice chart (as yyyymmdd).

**Startup sequence**

2. Start QGIS and do the following sequence:

a) Open the previous ice chart project (icechart\_yyyymmdd.qgs in the qgis sub-folder of the new folder for today).

b) File > Save Project As... and save the project changing the filename to todays date.

c) Go down the layers panel to the Satellite group and right-click - Remove any satellite image files (NOT the rs2files and modis\_subsets\_ll layers).

d) In the Ice Chart group, right-click - Remove the antarctic\_yyyymmdd layer.

e) In the Ice Chart group, right-click - Save As... the blank\_icechart layer to antarctic\_yyyymmdd.shp in the **qgis/icechart sub-folder** of the new folder for today. Remember to click the Add saved file to map box at the bottom left of the Save vector layer as... window before hitting OK. Drag the new layer down to just abive the blank\_icechart layer. Double-click on the layer name and click Load Style... and select ice\_concentration\_colours.qml

f) In the Ice Chart group, right-click – Save As... the antarctic\_yyyymmdd\_icebergs layer. Save as with the new date and adding the saved file to the map. Drag down to just above the new antarctic\_yyyymmdd layer. Right-click and Remove the antarctic\_yyyymmdd\_icebergs layer for the old date. Double-click on the layer name and click Load Style... and select iceberg\_polygons.qml

g) In the Annotation group, right-click – Save As... the antarctic\_yyyymmdd\_hires layer and save as with the new date and adding the saved file to the map. Drag down to the top of the Annotation group layers and double-click the layer name. Click Load Style... and select hires\_coverage.qml. Right-click and Remove the antarctic\_yyyymmdd\_hires layer for the old date.

h) In the Icebergs group, right-click – Remove the byu\_iceberg\_yyyymmdd layer for the old date.

3. In the terminal window,

cd yyyymmdd/tmp (where yyyymmdd is todays date)

Delete all the old temporary satellite image files, e.g.

rm asi\* byu\* RS2\* modis\*

**Get the satellite data**

4. In QGIS, make the rs2files layer visible, right-click and select Query.... Edit the query text so that the date is more recent, e.g. yesterday, and click OK. This shows you the coveage of the most recent Radarsat-2 images. Click on (Identify Features) and click on the blue RS2 polygons. This gives you a window with information including the date and time of the image that you can use when copying the files to the tmp folder.

5. In QGIS, the modis\_subsets\_ll layer shows the coverage and names of the standard areas of MODIS images. The (Identify Features) provides information such as the shortname that is part of the filename for copying files.

6. In the terminal window,

a) Copy the BYU iceberg marker information from the Istjenesten server,

cp /vol/istjenesten/data/Antarctic/byu\_iceberg\_yyyymmdd.\* ./

b) Copy the RS2 image files, using the date and times acquires using the method in Step 4, e.g.

cp /vol/istjenesten/data/Radarsat-2/Antarctic/GeoTIFF/\*\_yyyymmdd\_hhmmss\_\* ./

c) Copy the AMSR2 image file, using yesterdays date,

cp /vol/istjenesten/data/AMSR2/Antarctic/GeoTIFF/\*20131017\* ./

d) Copy MODIS image files, e.g.

cp /vol/istjenesten/data/MODIS/Antarctic/GeoTIFF/\*20131018\* ./

7. Open the image files in QGIS, select (Add Raster Layer) and select filenames ending in .tif.

For the AMSR2 data, double-click on the layer name and select Load Style... and the AMSR\_Transparent\_Background.qml file to remove the dark blue openwater back ground to the image.

For the RS2 data where the files end in \_HH.tif, double-click on the layer name and select Load Style... and the RS2\_HH\_Transparent\_Background.qml file to quickly get a viewable grey-scaling and remove the surround of the image. Selecting the Pyramids tab at the top of the Layer Properties window, highlighting the diferrent Pyramid resolutions and clicking Build pyramids will generate a file to improve QGIS performance.

**Icebergs**

8. In QGIS, open the icebergs marker file from the tmp-folder for today, select (Add Vector Layer) and select the filename byu\_iceberg\_yyyymmdd.shp. Sometimes the automatic script to generate this file glitches. If you get a cluster of points obviously in the wrong place (e.g. over land and around 0°E), run the script again manually. Login to the Istjenesten server as istjenesten, cd ~/software/Antarctic/iceberg, ./antarctic\_icebergs.sh. **Redo 6.a)** Double click on the layer name and Load Style..., selecting iceberg\_markers.qml to get the red trinagles with ID label.

9. Where you have good RS2 coverage. create or edit the exiting polygon in the antarctic\_yyyymmdd\_icebergs layer AND delete the corresponding marker in the byu\_iceberg\_yyyymmdd layer. Delete any polygons where you are unable to match with satellite images, but leave the marker.

**Sea Ice**

10. The initial ice chart layer created in Step 2e provides blank coverage polygon for the ice chart. This should be split using the (Split Features) tool. The polygons have *iceconc* and *icetype* attributes, just like those for the StatOil sea ice mapping. For the moment, just the *iceconc* field should be used and a training session on Antarctic sea ice types should be arranged for early November.

See Table 1 for the ice concentration and Table 2 for the ice type coding.

**High Resolution Coverage**

11. The high resolution coverage layer (antarctic\_yyyymmdd\_hires) created in step 2g should be editted to show the areas where RS2 was used to draw the ice chart. Existing polygons should be deleted and new ones drawn.

|  |  |
| --- | --- |
| *Iceconc value* | *Ice concentration* |
| **0** | Ice free (undefined) |
| **1** | Open water |
| **2** | Very open drift ice |
| **3** | Open drift ice |
| **4** | Close drift ice |
| **5** | Very close drift ice |
| **6** | Fast ice |

**Table 1: Ice concentration classes and corresponding values.**

|  |  |
| --- | --- |
| *Icetype value* | *Ice type (Stage of Development = SoD)* |
| **0** | Ice free |
| **1** | <1/10 ice of unspecified SoD (open water) |
| **2** | New ice |
| **3** | Dark nilas |
| **4** | Light nilas |
| **5** | Young ice |
| **6** | Grey ice |
| **7** | Grey-white ice |
| **8** | First-year ice (FY) |
| **9** | FY thin ice (white ice) |
| **10** | FY thin ice (white ice) first stage |
| **11** | FY thin ice (white ice) second stage |
| **12** | FY medium ice |
| **13** | FY thick ice |
| **14** | Old ice |
| **15** | Second-year ice |
| **16** | Multi-year ice |
| **17** | Fast ice of unspecified SoD |
| **18** | Ice shelf |
| **19** | Ice of unspecified SoD |
| **20** | Drifitng ice of land origin (icebergs) |

**Table 2: Ice types (stage of development ) and corresponding values.**

**Creating, Saving and Printing Maps**

12. The page layout tools for generating a map for printing can be found in the *File* menu. This gives the option to add a *New Print Composer* , open the *Composer Manager* , or select a *Print Composer* individually.

2 maps need to be created, for ice concentration over the whole area, and within the Antarctic Peninsula subset. Start by opening the *Composer Manager*, select each and *Rename* to todays date. Use show to bring up the Ice Chart yyyymmdd map. Then *Close* the Composer Manager.

See previous examples in Appendix A for how the maps, titles and legends should look.

**Main Ice Chart map**

Select the map area and change from *Rectangle* to *Cache* in the *Update Preview* box to the right. Deselect *Lock layers for map item* tick box and click *Update Preview* to get the current layers into the map. The following layers should be made visible in the main QGIS window:

antarctic\_yyyymmdd (ice chart layer),
antarctic\_yyyymmdd\_icebergs,
iceshelf\_20100222 (ice shelf),
points\_antarctic (longitude/latitude points),
graticule\_antarctic (longitude/latitude lines),
country (landmask),
antarctic\_yyyymmdd\_hires (high resolution satellite coverage), and
byu\_iceberg\_yyyymmdd.

Reselect the *Lock layers for map item* tick box.

Click the title text lines and edit the source satellite, date and time in the text box on the left-hand side of the window.

Select the Legend box. Edit the text for *Legend items* (hit the button at the bottom-right to bring up the list) and remove items such as longitude/latitude lines that should not be listed.

Save a new template file , then generate an output PNG graphic , before closing the print composer window. The name of the PNG graphic should be satfname\_NIS\_iceconc.png.

**Peninsula Ice Chart Map**

This is the same just using the Ice Chart yyyymmdd Peninsula map.

**Generate small JPEG images**

13. The PNG graphic files can be JPEG compressed and reduced in size (< 200 Kb) for transmission over a slow satellite link with the following command in a Linux terminal window:

convert -resize 50% -fuzz 5% -trim +repage -define jpeg:extent=200kb
 filename.png filename.jpg

Replace the filename with antarctic\_yyyymmdd and antarctic\_yyyymmdd\_peninsula as needed.

**Conversion to SIGRID-3/ICEMAR format**

14. The SIGRID-3/ICEMAR production script is designed to run off the ice charts database on the Istjenesten server. All we need to copy the data to the database...

/disk1/Antarctic/scripts/inject\_icechart\_antarctic.sh yyyymmdd AA

where yyyymmdd is the date and AA is the analyst’s initials (2 letters, e.g. HL = Håvard Larsen and NH = Nick Hughes). All files must be in the correct places, yyyymmdd/qgis/icechart ! The conversion uses the ice shelf and iceberg polygons to mask the sea ice polygons.

The modified version of the ICEMAR product script on the Istjenesten server will automatically recognise that there are Antarctic ice charts polygons available and do the rest.

**Upload to FTP server**

15. Use gFTP or other software to upload the PNG and JPEG files to ftp://ftp.met.no/projects/icecharts The usual Istjenesten login can be used.

**Copy graphics to Polar View web server**

16. Generate thumbnail -

convert -resize 217x153 antarctic\_yyyymmdd.jpg antarctic\_tmb.JPG

Copy antarctic\_yyyymmdd.jpg to Polar View server. Ftp to polarview.met.no (user: polarview, passwd: polar00view) and copy to /var/www/antarctic/antarctic.jpg and /var/www/antarctic/antarctic\_tmb.JPG. The script

/disk1/Antarctic/scripts/copy\_to\_polarview.sh yyyymmdd

does this automatically.

 (“cd ../../scripts/ - ./copy\_to\_polarview.sh yyyymmdd)

Steps 13-16 should be an automatic script…

**APPENDIX A – Examples of ice concentration maps**



