

LAB 09 – Looking at Arctic sea-ice extent with AMSR-E

In September 2011, the U.S. National Snow and Ice Data Center reported that the extent of Arctic sea ice had reached the second lowest extent ever:

<http://nsidc.org/arcticseaicenews/2011/09/arctic-sea-ice-at-minimum-extent/>

However, the areal coverage of sea ice was very similar to the record minimum of 2007 and there was some confusion as to whether the record was set in 2007 or 2011. So, we will load AMSR-E data from both 2007 and 2011 into McIDAS-V and attempt to come to our own conclusion.

Instructions for this lab (key questions are in **yellow**):

1. Open McIDAS V
2. Load a bundle containing a full day of AMSR-E overpasses from 2007:
 - a. In the map window click **File** → **Open File**
 - b. Navigate to the bundle '**sea_ice_2007.mcvz**' under **Data** → **Bundles**
 - c. Click **OK** a few times
3. You should now have a composite image of the AMSR-E 18 GHz horizontally polarized channel from September 15, 2007, which allows you to see the sea ice extent on that day.
 - a. Try making your own estimate of the area of sea ice coverage:
 - i. In the map window click **Display** → **Draw Freely**
 - ii. The default settings should allow you to start drawing a red line on the map. Try drawing an outline around the sea ice, with your line starting and finishing at roughly the same point.
 - iii. If you want to start over click **Edit** → **Remove All** in the **Drawing Control** window
 - iv. Once you are happy, you can check the area of the shape you have drawn. Click the **Drawing Control** window, then click the **Shapes** tab. Here you can see both the length of the line in km you have drawn and the area of the shape it creates in km².
 - v. (**Note:** there is a bug in McIDAS-V that produces an incorrect value for area when drawing around the North Pole. However, while the absolute magnitude will be wrong, we can still compare the relative differences for 2007 and 2011 to decide which year had smaller ice coverage. So don't worry if your values are significantly different from those given in the above links).
 - vi. Write down the value you have determined for the area of sea ice coverage so you can compare it to 2011 later.
 - b. Capture an image of your current display so that you can easily compare it after we have loaded the 2011 data:
 - i. In the map window, click **View** → **Capture** → **Image...**
 - ii. Pick 'Image files' under **Files of Type**
 - iii. Pick a directory of your choice and use a file name ending in .png
 - iv. Click **Save**
4. Exit McIDAS-V and re-open it. Follow exactly the same procedure as before but using the '**sea_ice_2011.mcvz**' bundle.
 - a. Write down the value you determine for area of 2011 sea ice coverage.
 - b. Also, compare the 2007 and 2011 images and try to decide subjectively which area is smaller.