

TECHNICAL REPORT

Sea ice reports for the season 2011-2012



Prepared by Dr Jan L Lieser, Dr Robert A Massom, Dr Petra Heil
Antarctic Climate and Ecosystems Cooperative Research Centre 2012

ANTARCTIC CLIMATE
& ECOSYSTEMS CRC

Sea ice reports for the season 2011-2012

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ANTARCTIC CLIMATE
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Executive summary:

This document is a compilation of weekly sea ice reports for the East Antarctic. The reports were prepared to support ship operations in the region during the shipping season in 2011/2012. They were primarily used as a guidance for the Australian Antarctic program, but were partly provided to other Antarctic operators as well.

The focus of individual reports shifts with the main purpose of specific voyages of the Australian Antarctic research and supply vessel *Aurora Australis* throughout the season. The Antarctic voyages of the 2011/2012 season were:

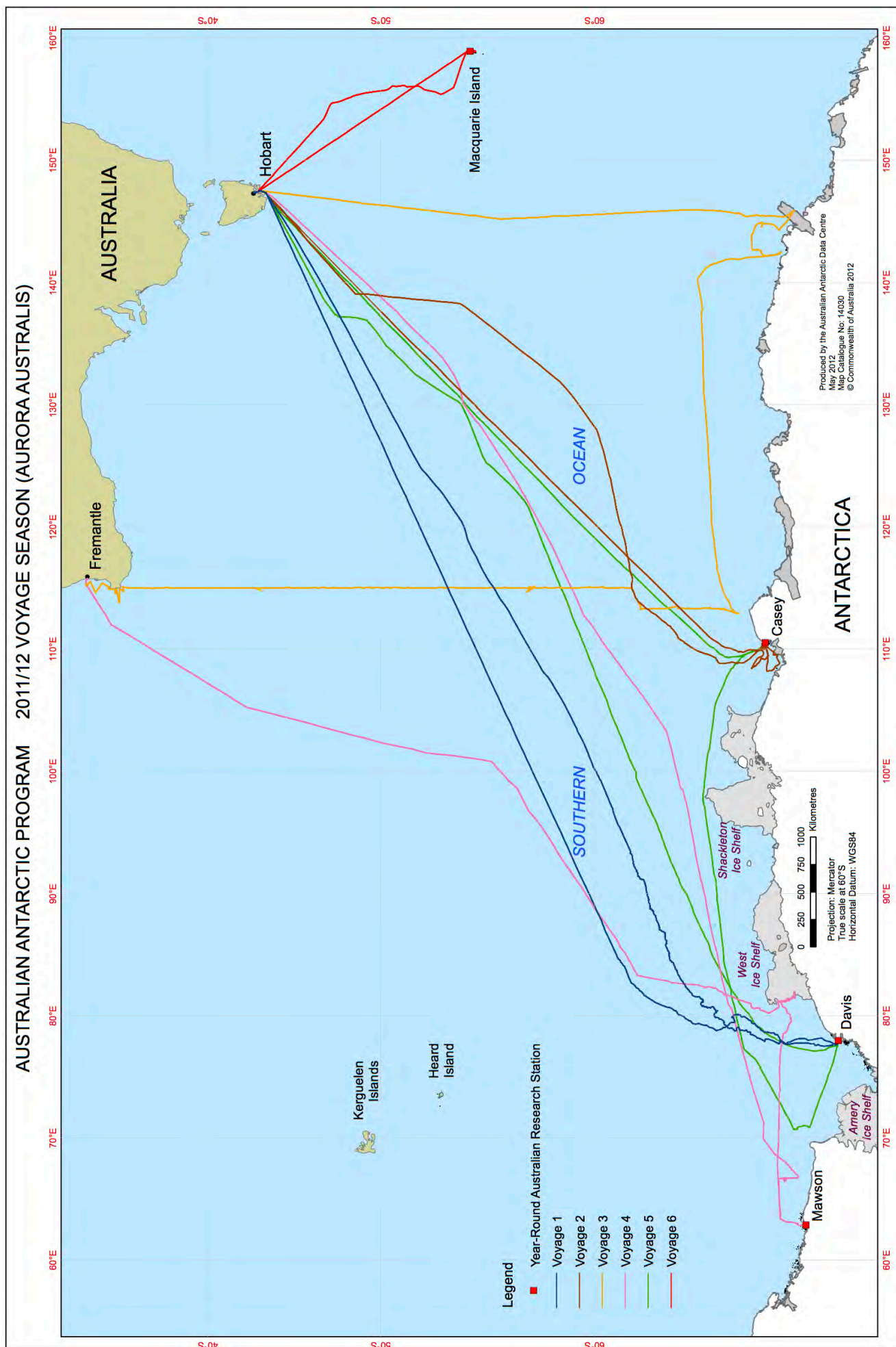
No.	Leave port	Main Purpose	Return
V1	23/10/2011	Davis resupply	26/11/2011
V2	02/12/2011	Casey resupply	03/01/2012
V3	05/01/2012	Commonwealth Bay visit and Marine Science	12/02/2012
V4	15/02/2012	Mawson resupply	15/03/2012
V5	17/03/2012	Recover Davis and Casey summer personnel	14/04/2012
V6	16/04/2012	Macquarie Island resupply	01/05/2012

Whenever required, the Sea Ice Group prepared sub-weekly updates for specific regions.

In general, the sea ice conditions for the 2011/2012 season can be regarded as close to average. However, two regions of particular concern were; the Commonwealth Bay region, where a grounded iceberg had a profound influence on the local sea ice conditions and prevented ship access into the bay and to Mawson's Hut, and the second, an unusually persistent land-fast sea ice off Mawson Station that threatened to prevent full resupply of the station.



RSV *Aurora Australis* in East Antarctic pack ice. (Photo credit: Kym B Newbery)



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Frequently used acronyms:

AAD	Australian Antarctic Division
ACE CRC	Antarctic Climate & Ecosystems Cooperative Research Center
ASAR	Advanced Synthetic Aperture Radar (onboard ENVISAT)
CB	Commonwealth Bay
CTD	Conductivity, Temperature, Depth (a hydrographic probe)
ENVISAT	Environmental Satellite (operated by European Space Agency)
GPS	Global Positioning System
I9S	WOCE ¹ Southern Ocean Atlas section I9 South
IR	Infrared (part of the electromagnetic spectrum)
MG	Mertz Glacier
MODIS ²	Moderate Resolution Imaging Spectroradiometer
NASA	National Aeronautics and Space Administration
OW	Open water
SSMIS	Special Sensor Microwave Imager/Sounder
VIS	Visible (part of the electromagnetic spectrum)
WSM	Wide Swath Mode (an ASAR operational mode)

¹ The World Ocean Circulation Experiment (WOCE) collects physical data regularly on hydrographic ocean sections.

² The MODIS instrument is operational on two satellites: AQUA and TERRA.

Assessment of sea ice conditions in Commonwealth Bay

Robert A Massom (AAD & ACE CRC) and Jan L Lieser (ACE CRC)

21/11/2011

This assessment is based on analysis of an Envisat ASAR image from 16 Nov 2011 (Figure 1) and MODIS visible-thermal IR imagery from 11 Nov 2011 (Figure 2).

The main issue regarding accessing Commonwealth Bay is that fragments of former iceberg B9B are grounded to the immediate north of Commonwealth Bay, to have a major effect on regional sea ice conditions:

- To the east of B9B, there is an unusually large build-up of thick, deformed ice which is semi-stationary (marked 'compact pseudo fast ice') - this is fed by ice from the Mertz Glacier polynya, which has accreted to the eastern margin (marked A). In this way, heavy new ice production in the polynya leads to an eastward advance of the pseudo fast ice margin A. There is normally a polynya in or to the immediate east of Commonwealth Bay, but this is now not the case (due to the presence of this 'pseudo fast ice'). In fact, fast ice now appears to extend eastwards as far as Buchanan Bay.
- The main feature to the west of Commonwealth Bay is a promontory of consolidated annual fast ice (relatively dark in the ASAR imagery, Figure 1) - this is a recurrent feature that is typically pinned in by lines of small icebergs grounded on shoals shallower than about 400-450 m. However, it now also connects to the southwestern tip of B9B, to effectively cut off the western approach to Commonwealth Bay. The northern approach is cut off by the B9B fragments themselves.
- There appears to be a 'lee' polynya (marked 'thinner ice') to the west of B9B and associated small icebergs. The only possible route towards Commonwealth Bay appears to be across this region. However i) this region is largely enclosed by extensive tongues of thick compact ice to the north, and ii) ice produced in this polynya will likely accrete to the eastern margin of the annual fast ice (marked B), to effectively back-fill the polynya under certain circumstances, that is the eastern margin of the annual fast ice could propagate eastwards.
- There is a suggestion of a small polynya in Commonwealth Bay (marked C in the image and enclosed by the two types of fast ice), but this could easily fill in with ice should wind conditions change. There appears no ready escape route out of the bay for sea ice formed *in situ*. It shows up fairly dark (that is cold) in the MODIS imagery (Figure 2), and therefore consolidated. This is likely to be a result of local thickening, and therefore an extension and further eastward advance of the annual fast ice marked with B.

In summary, these are unusually difficult sea ice conditions, due in large part to the presence of grounded iceberg fragments from B9B.

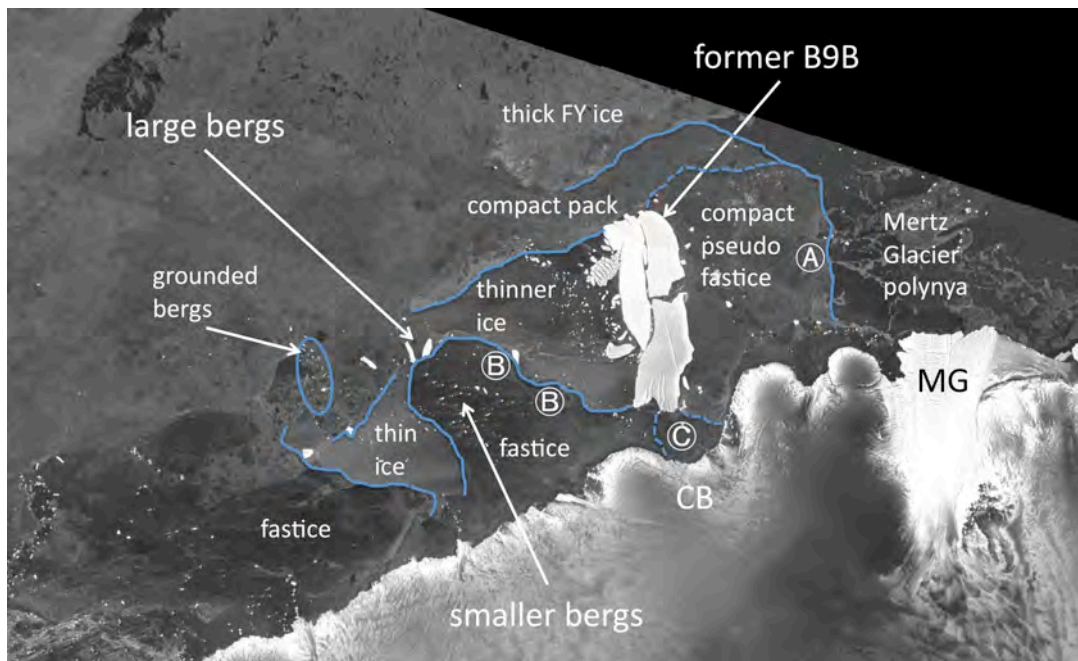


Figure 1: ENVISAT ASAR image of Commonwealth Bay acquired 16/11/2011, image provided by Neal Young.

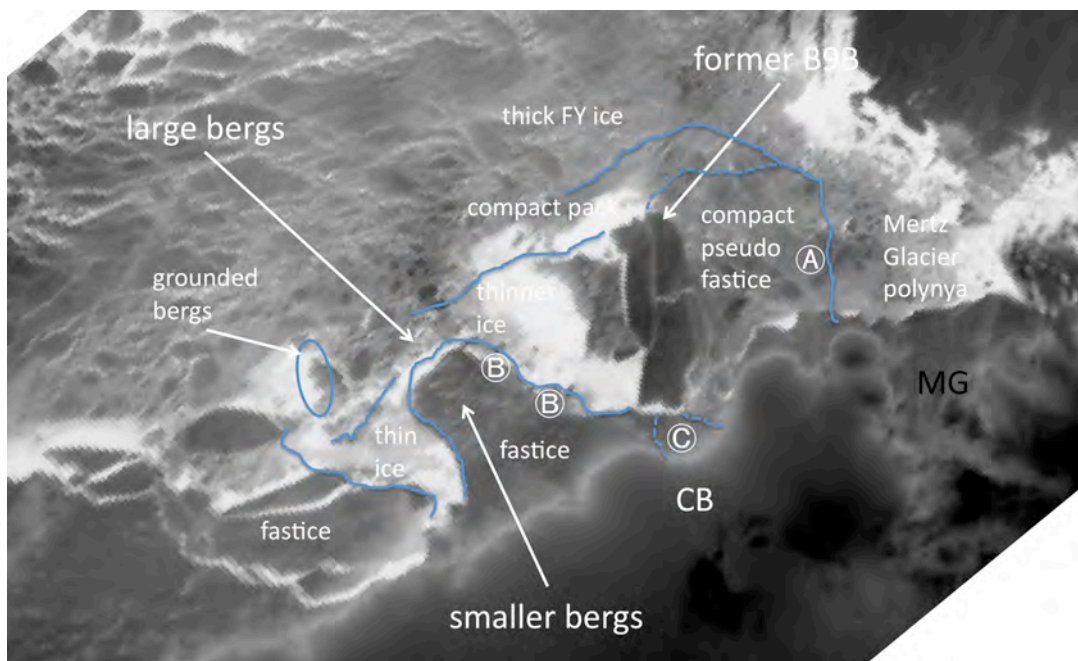


Figure 2: MODIS IR image of Commonwealth Bay acquired 11/11/2011, image provided by Alex Fraser.

Sea Ice Report #01/2011

by the AAD/ACE CRC Sea Ice Group

01/12/2011

This report follows on from Assessment of Sea Ice Conditions in Commonwealth Bay, dated 21/11/2011.

There are three regions in the focus of this report:

- **Mawson Station**

The pack ice edge off Mawson Station is at about 64° S with bands of sea ice extending even further to the north. The pack ice south of about 65° 30' S seems quite consolidated with a few massive floes incorporated into the mix. The region has been under clouds for about four days which makes a positive identification of the fast ice edge from RADAR imagery alone a bit tricky.

There is a stark contrast between rough land-fast ice, which is interspersed with large (long) linear kinematic features (ridges and former floe edges), and a smoother (dark) surface at about 67° 09' S and 62° 30' E. This dark area could be newly formed sheet ice (formed under quiescent conditions), with a large area of high backscatter to the northeast of it, which can be open water. The east-west streaky structures within this high backscatter area could be grease forming on the surface, advected by wind further to the northeast. Close inspection (image enhancement) of the smooth (dark) patch itself reveals similar east to west oriented structures (snow drift features). For illustration see attached Figure 1.

- **Casey Station**

Filaments of sea ice reach as far north as about 60° S yesterday with lots of bands of sea ice and small floes down to about 66° S. There are areas of large sea ice floes to the west of about 109° E and to the east of about 107° 30' E, leaving a 'channel' of about one degree width at about 108° 30' E. Most of the pack ice zone is under clouds in the attached Figure 2, but it provides a clear view of Vincennes Bay.

- **Commonwealth Bay** The sea ice and fast ice conditions in Commonwealth Bay has not changed much since our last reporting. B09B appears still locked firmly in place, while the northern fragments, now named B09D and B09F, appear to swivel only very slightly clockwise. The fast ice in the bay itself has not changed in the last week, while an area of open water seems to be maintained to the west of the bergs at about 142° E. However, north of 66° S is still a wide band of large floes of consolidated pack ice.

With best regards,

Jan, for the sea ice group.

Addendum 02/12/2011:

a quick interjection re: ice situation in Commonwealth Bay:

ASAR imagery from 30/11 (wasn't available yesterday) shows that all three bergs, that is B09B, B09D, and B09F, are on the loose now, heading generally in a north-easterly direction. The effect on the sea ice remains to be seen ... but there will be some.



Figure 1: ENVISAT ASAR WSM image, acquired 29/11/2011 and provided by www.polarview.aq

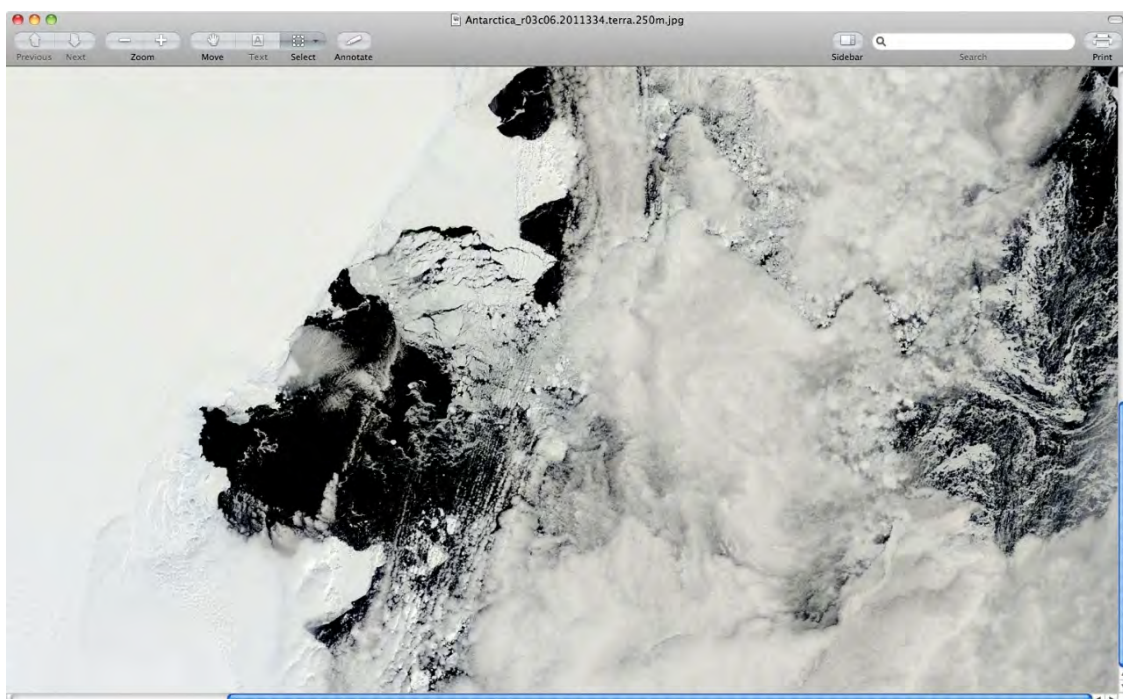


Figure 2: MODIS VIS image, acquired 30/11/2011 and provided by NASA

Sea Ice Report #02/2011

by the AAD/ACE CRC Sea Ice Group

08/12/2011

There are three regions in the focus of this report:

- **Mawson Station**

Sea ice conditions off Mawson Station feature about four distinct ice zones at the moment (see Figure 1). The outer zone north of 65° S shows loose filaments of sea ice. Further south follows a zone of loose pack ice with larger scale eddies apparent in the pack ice and indicated by yellow arrows in the image. Between about 66° 25' S and the fast ice edge roughly at 67° S is a zone of compact pack ice, interspersed with some massive floes as visible in the ASAR image. South of that reaching to the coast is a wide fast ice zone denoted by the black line in the image. The transition from the compact pack ice to the adjacent fast ice in the south shows a narrow strip of very rough sea ice, indicating a shear zone.

The western polynya with its centre at about 67° S and 62° E shows some recently refrozen sea ice attached to the multi-year fast ice, as well as presumably wind roughened open water west of 62° E.

- **Casey Station**

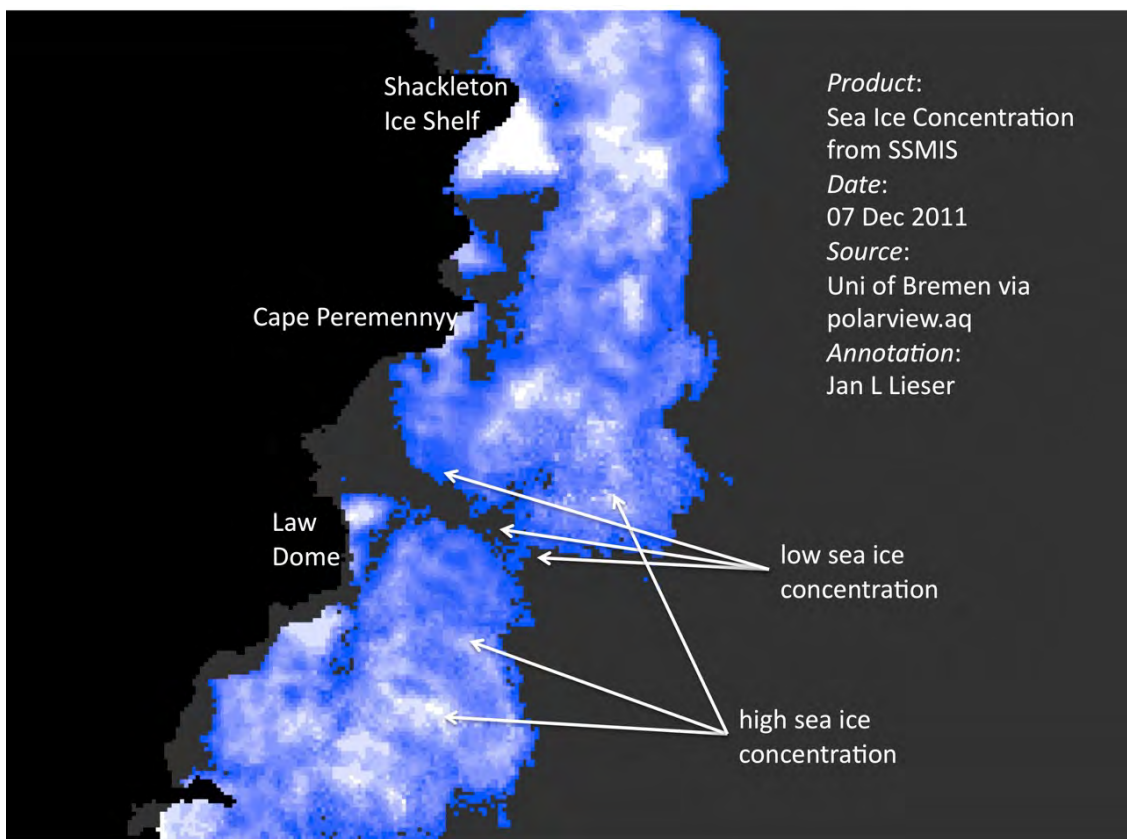
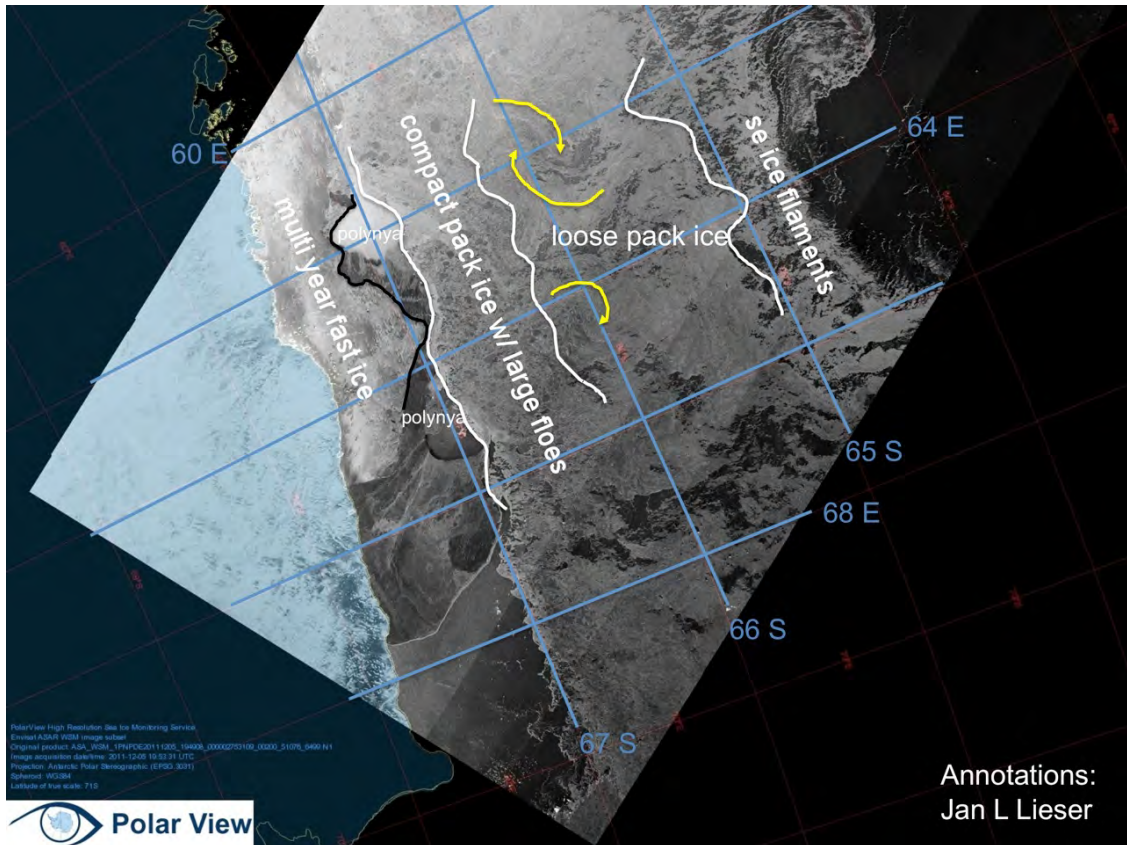
Vincennes Bay appears to be largely sea ice free now. Filaments of broken sea ice reach to about 62° S in the sector between 110° E to 120° E, but much further north to the west of 109° E. The zone of reduced sea ice concentration at about 109° E is still detectable in the ASAR imagery, as well as the sea ice concentration map from Bremen University (see Figure 2). NB: This imagery is now available on a regular basis, unfortunately not yet integrated in the Sea Ice View Tool. There is one major iceberg (and a few smaller ones) crossing this open water 'channel', current location is about 64° 43' S and 109° 03' E.

- **Commonwealth Bay**

Sea ice conditions in Commonwealth Bay do not show much change during the last week. Still the three bergs appear to be moving only very slightly, over the last few days back in a southwesterly (anti-clockwise) direction. The land-fast sea ice in the bay itself exhibits no change at all. Also the pack ice to the north of the bergs appears still compact, as it is diverted in its westward drift from the east around the bergs to the north and then further west (see Figure 3). Interestingly, there is a banana-shaped iceberg (annotated 'large berg') to the immediate east of B09B, almost touching it, moving wildly on the spot, potentially causing havoc in the sea ice around it.

With best regards,

Jan, for the sea ice group.



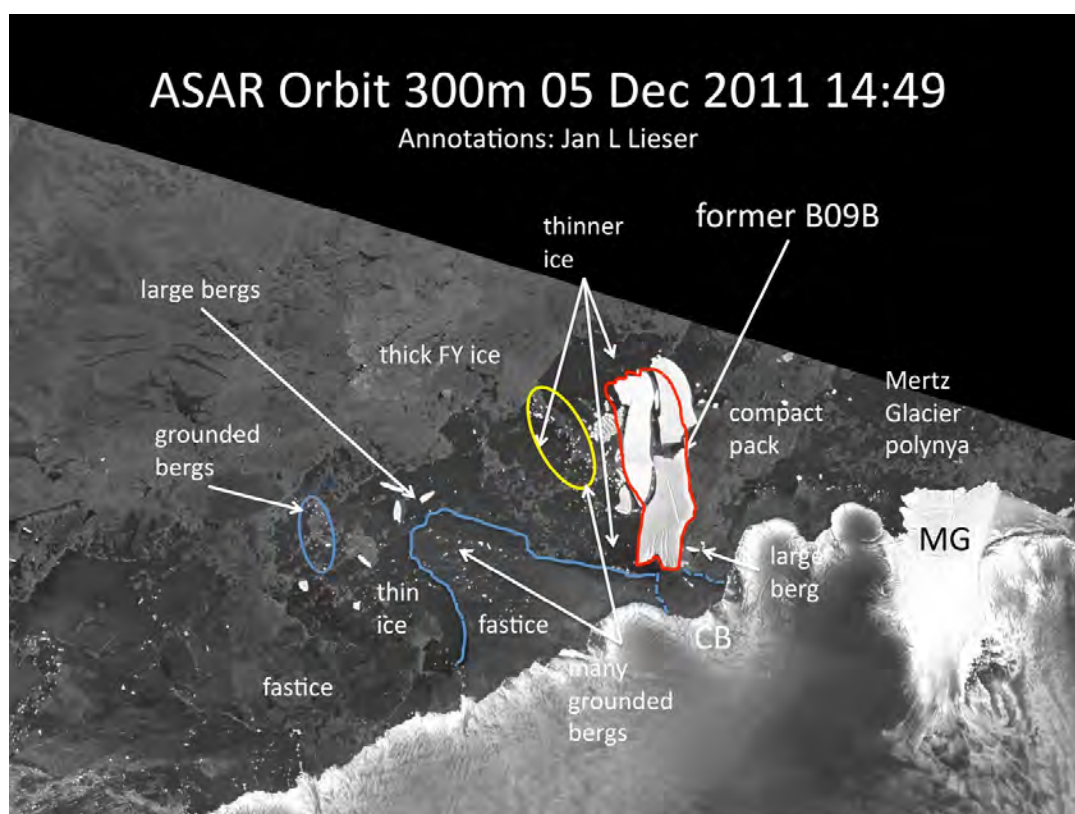


Figure 3: ENVISAT ASAR image, acquired 05/12/2011 and provided by www.polarview.aq

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Sea Ice Report #03/2011

by the AAD/ACE CRC Sea Ice Group

15/12/2011

There are three regions in the focus of this report:

- **Mawson Station**

The sea ice conditions off Mawson Station are undergoing some changes at the moment. The pack ice has virtually detached from the fast ice and is drifting freely now in northerly directions. Oceanographic eddies are clearly visible in Figure 1 at various length scales. The fast ice edge started to retreat towards the coast, and the typical arching shows up nicely also at various scales. Once loose, the fast ice decays and gets transported out of the embayments. A nice example for this process is at 67° S and 63° 43' E.

Since the last report the fast ice edge retreated about 6 nm at about 61° 45' E, but remains still quite stable in the sector between 62° E and 63° E. However, the large open ocean areas between the fast ice and the pack allow for wind action to build up and resulting waves and potentially swell, together with summer temperatures, will have a further impact on the fast ice edge.

- **Casey Station**

Off Casey Station the microwave sea ice concentration data show a massive gap between 105° E and 110° E, see Figure 2 for reference. This indicates sea ice concentration of less than 15% per 6.25 km x 6.25 km grid cell in that area. However, there are still a few icebergs in that area and the 300 m resolution RADAR image from Tuesday (13/12/2011 16:36 UT) suggests that there is still at least some sea ice on the wind roughened ocean surface.

- **Commonwealth Bay**

See Figure 3 for illustration: The three major bergs to the north of Commonwealth Bay are still wiggling, since the last report in northeasterly direction again. The pack ice to the north of those bergs appears to be loosening up, but there is still a band of about 50 nm (in latitudinal direction) of denser pack (up to about 100 nm out the bay), interspersed with some large floes. Adjacent to the north is a large meander of ice filaments in the marginal ice zone, again up to 60 nm wide, as indicated by yellow arrows in Figure 3. However, the front of Mertz Glacier appears to be almost sea ice free in yesterday's ASAR image. To the north of Mertz Glacier is an area stretching about 90 nm in latitude of minimal ice cover, which is separated from the open ocean only by the above mentioned meander of filaments. There are regions with many icebergs marked with 'A' in the image.

The fast ice to the west of the B09B, B09D, and the bay shows some signs of retreat at the polynya (eastern) side. Likewise, the fast ice in the bay itself, which connects the shore of the bay with the southern end of B09B shows minor signs of possible retreat, but the pack ice back-fill to the east of the bay marked with 'B' is still dense, although the banana-shaped berg mentioned in last week's report still manages to 'spin'.

Regions marked with 'C' appear to be wind roughened open water with only minor grease ice, if at all.

With best regards,

Jan, for the sea ice group.

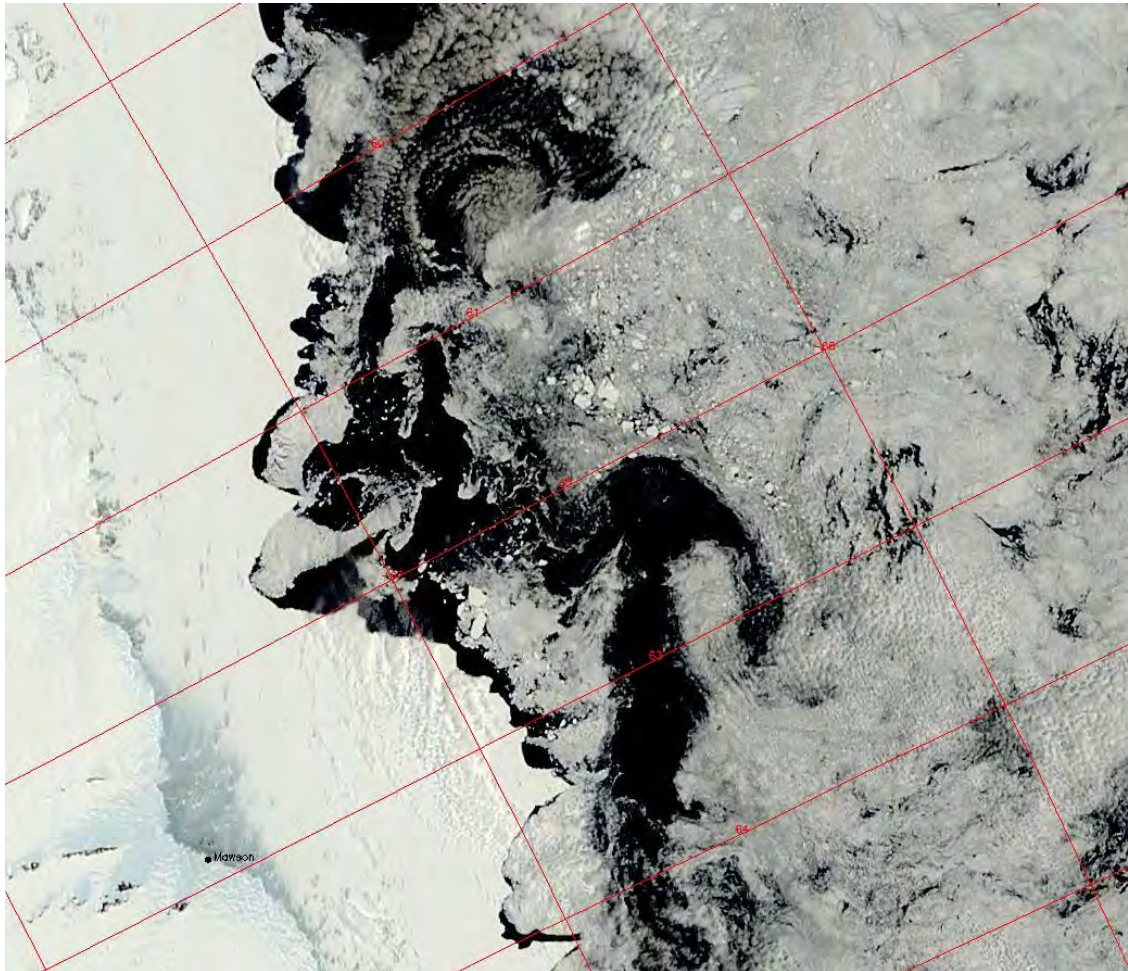


Figure 1: MODIS VIS image, acquired 13/12/2011 and provided by NASA.

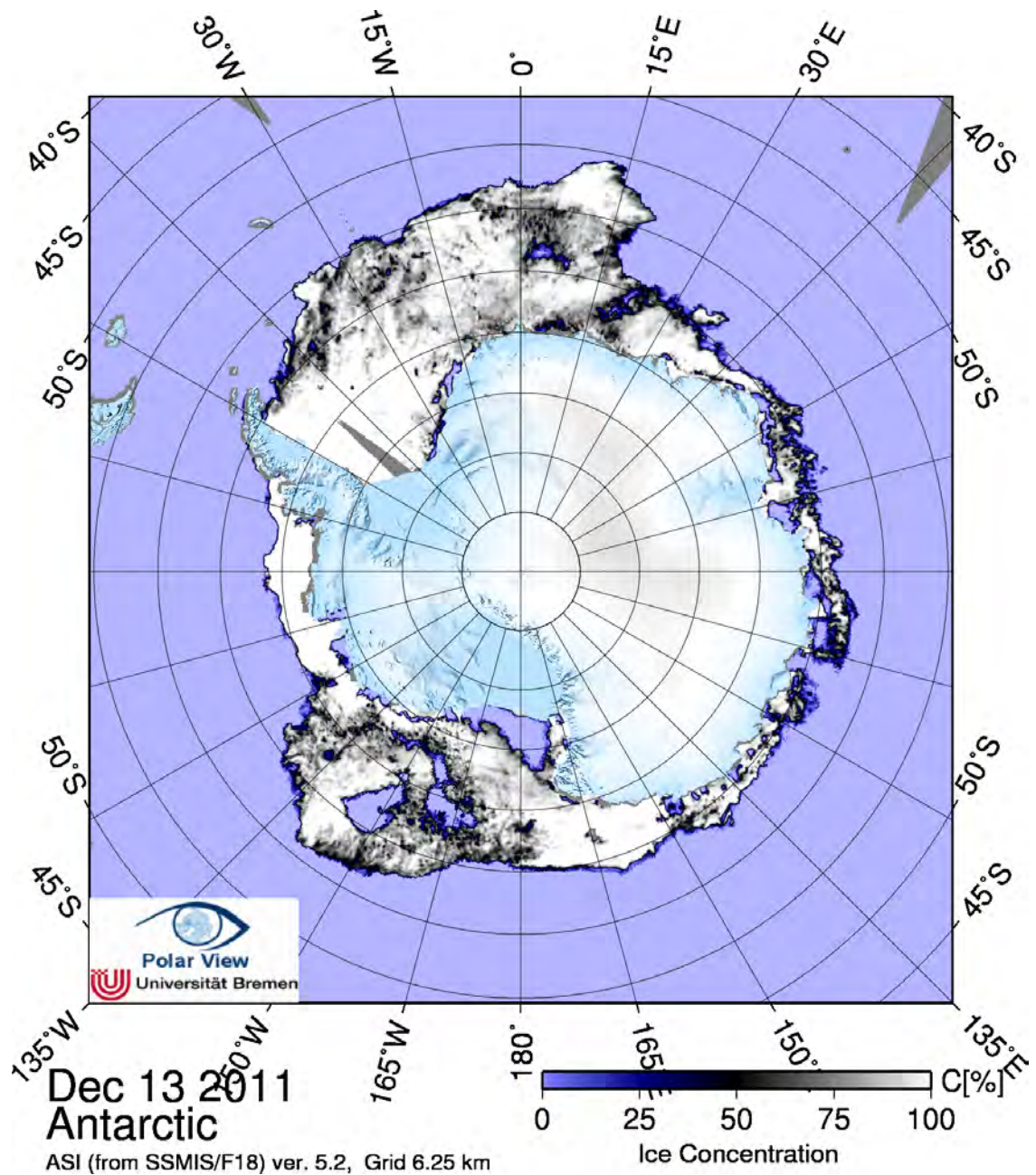


Figure 2: SSMIS passive microwave image, acquired 13/12/2011 and provided by Bremen University.

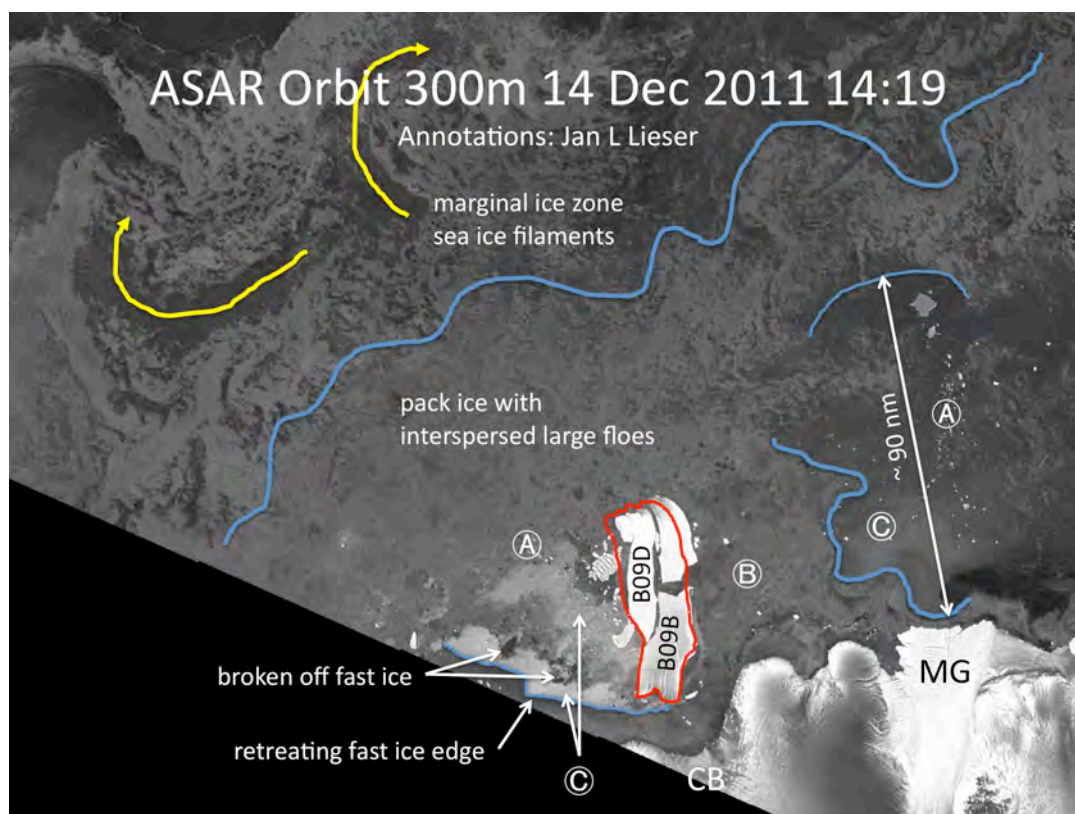


Figure 3: ENVISAT ASAR image, acquired 14/12/2011 and provided by www.polarview.aq

Sea Ice Report #04/2011

by the AAD/ACE CRC Sea Ice Group

22/12/2011

There are three regions in the focus of this report:

- **Mawson Station**

Off Mawson Station, the pack ice has drifted even further north and there appears to be a wide corridor of ice concentration of less than 50% between 63° E and 66° E and 65° S and 66° S. This is evident from SSMIS data provided by Bremen University for yesterday. To the south of that low ice concentration follows an area of less than 15% ice concentration up to the fast ice edge. The fast ice edge itself showed only little signs of retreat over the last week. At about 61° 37' E the edge moved about a mile toward the continent, the shattered fast-ice still remained in the bight yesterday (see red loop in Figure 1). We note similar ranges of break-up/retreat in the sector between 62° E and 63° E, with the new fast ice edge indicated by the blue line in the image.

- **Casey Station**

Over the last week, sea ice has moved back into Vincennes Bay from the east around Petersen Bank. The area of less than 15% ice concentration has shifted slightly to the west and is now roughly between 107° E and 108° 30' E. But sea ice concentration in Vincennes Bay is still moderately low (see Figure 2). The northern edge of the sea ice zone off Casey Station is at about 65° S.

- **Commonwealth Bay**

Sea ice conditions in Commonwealth Bay have changed a bit during the last week. While all three bergs are still close to each other and in front of the bay, they have managed to separate quite a bit (up to a few kilometres in places). However, the southernmost, B09B, exhibits the least movement and its southern tip is still connected to the fast ice that is filling the bay. But the sea ice to the east of the bergs has detached from them and is now drifting in a northeasterly direction and decaying, although there are still some massive and consolidated floes incorporated in that mix. Open water is now visible (see Figure 3) to the east and west of B09B, which means that winds and waves can now act on the fast ice in the bay from both sides, while there is probably still a mutual stabilising effect between B09B and the fast ice in the bay. The fast ice between Commonwealth Bay and Dumont D'Urville Station shows further minor signs of break-up. However, to the northwest of Dumont D'Urville Station is still a band of large floes and consolidated pack.

To the north of Commonwealth Bay and the Mertz Glacier sea ice conditions appear to ease further.

Merry Christmas,

Jan, for the sea ice group.

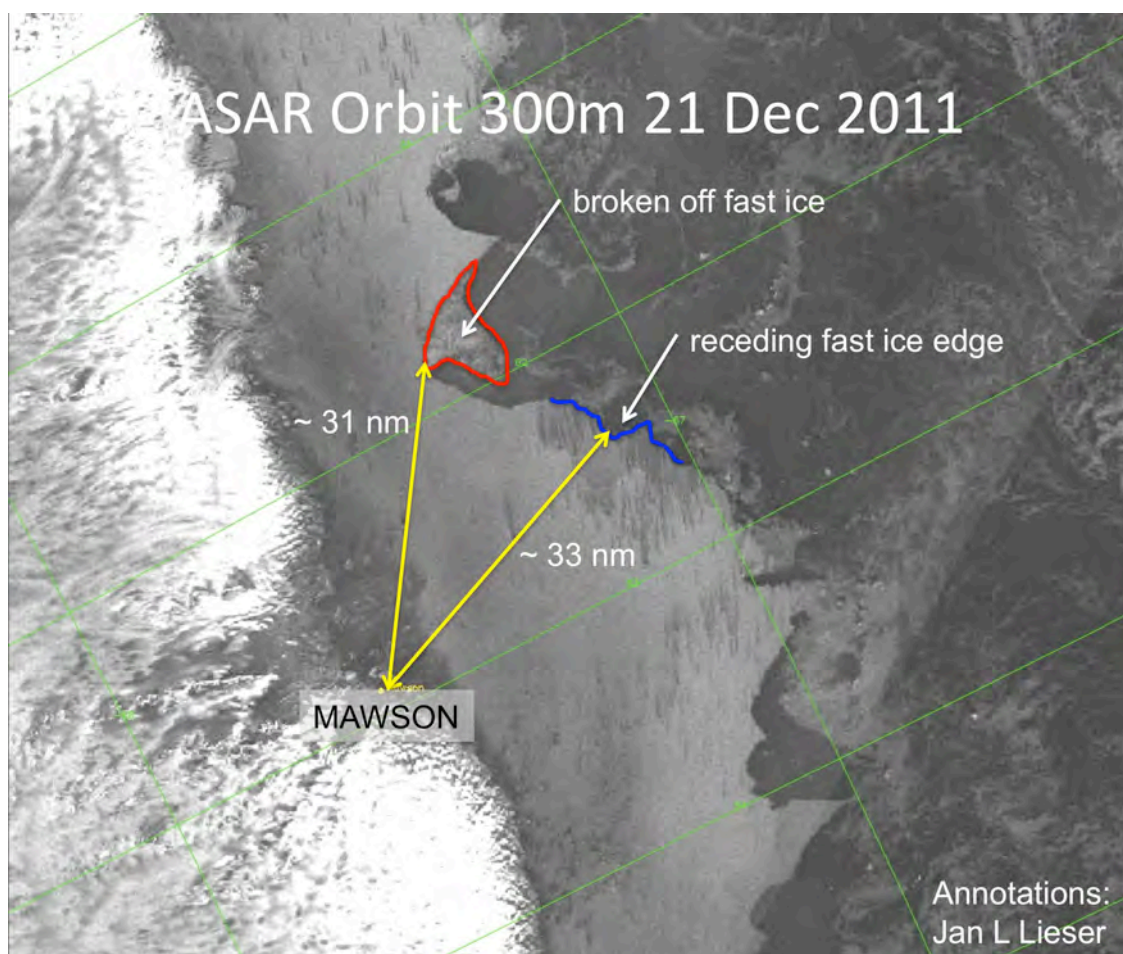


Figure 1: ENVISAT ASAR image, acquired 21/12/2011 and provided by PolarView.

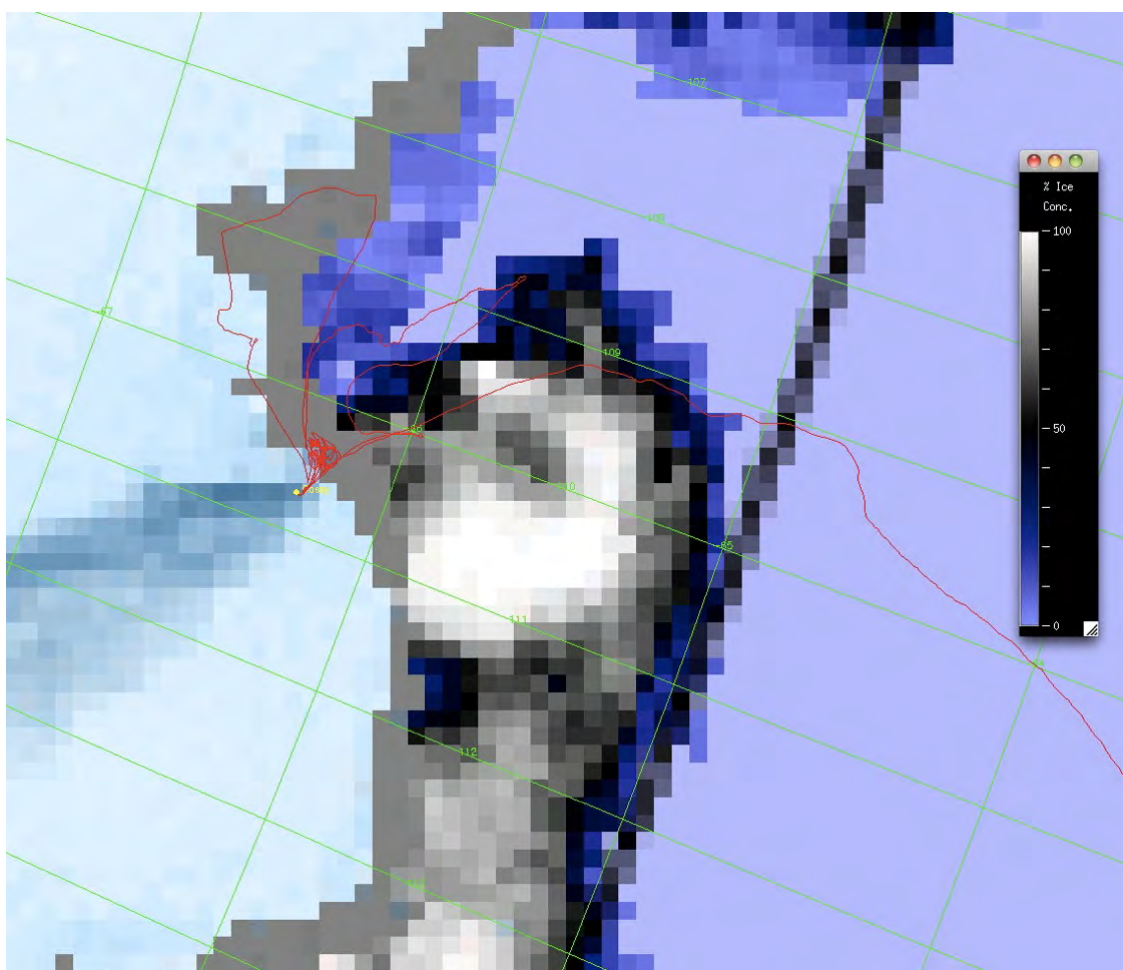


Figure 2: SSMIS passive microwave image, acquired 21/12/2011 and provided by Bremen University (NB: the red line in the image denotes RSV *Aurora Australis*' cruise track so far).

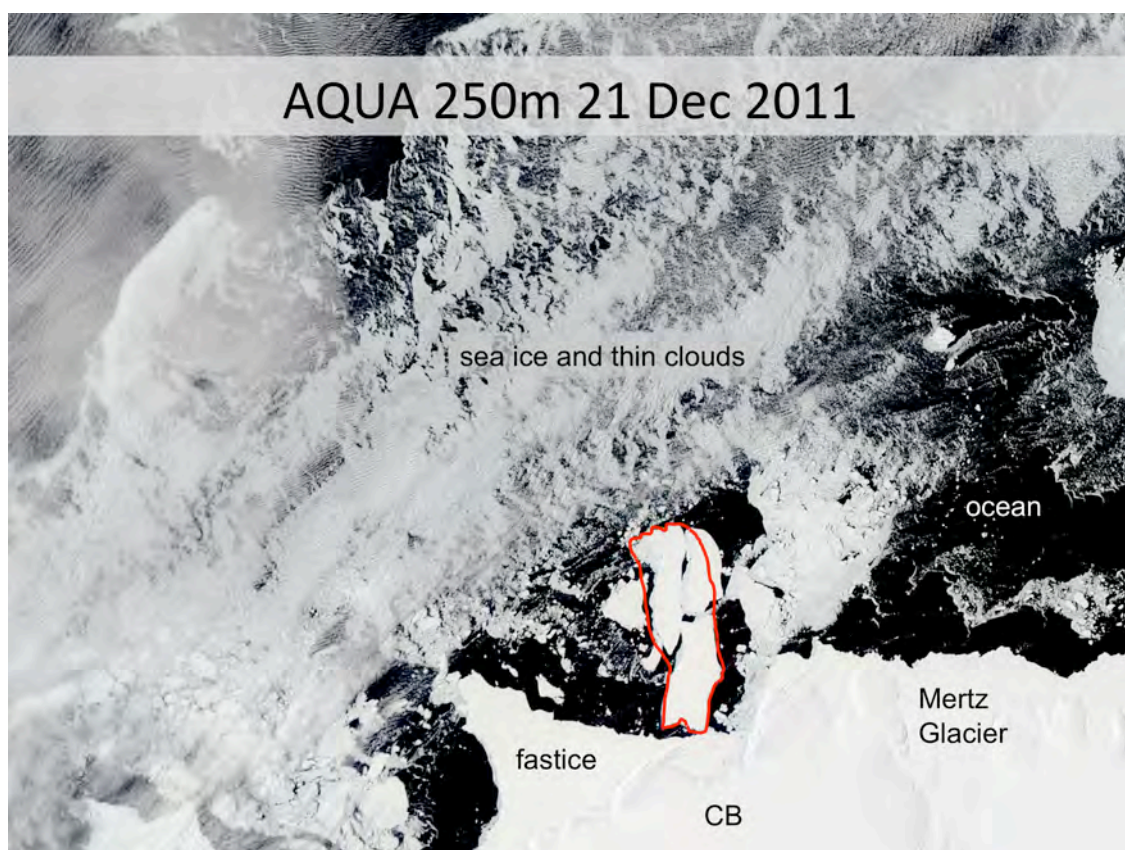


Figure 3: AQUA MODIS image, acquired 21/12/2011 and provided by NASA.

Sea Ice Report #05/2011

by the AAD/ACE CRC Sea Ice Group

29/12/2011

The sea-ice report #05/2011 with focii on Mawson, Casey, and Commonwealth Bay.

- **Mawson Station**

The equatorward extent of the fast ice near Mawson Station has changed little over the last week (since Sea Ice Report #4). The band of fast ice north-east of Mawson Station remains largely unchanged in extent (see Figure 1). There has been some minor loss of fast ice to the northwest, in the area of fast-ice breakout highlighted in Sea Ice Report #4. Based on Bremen University's SSMIS image (27/12/2011) the pack ice is separated from the fast ice by a band of low concentration ice (<20%). To the north of this a belt of pack ice, centered at approximately 65° S, remains. This belt with a range in concentration of 30%-70% to the northeast of Mawson Station connects to the consolidated ice tongue, which originates at northeast of Cape Darnley. To the northwest of Mawson Station SSMIS indicates a narrow band of unconsolidated ice (approximate concentrations range from 20% to 50%).

- **Casey Station**

Since Sea Ice Report #4, the concentration of the pack ice in northeastern Vincennes Bay has eroded and its extent has slightly reduced (see Figure 2) with heaviest ice encountered in a zonal band cantered around 66° S, as seen in Bremen University's SSMIS image (27/12/2011). Lowest concentration (down to open water) are encountered in the easternmost quarter of the exit of Vincennes Bay.

No suitable recent ASAR image available for Casey Station region.

- **Commonwealth Bay**

No suitable ASAR WSM imagery has been received recently, and all MODIS imagery after 25/12/2011 have been adversely affected by clouds. Hence this report on the sea-ice situation in Commonwealth Bay is largely based on AQUA MODIS imagery from 25/12/2011.

SSMIS data indicate a decaying band of pack ice (about 140 nm across) is found north of the Commonwealth Bay region, cantered around 66° S. In the west of this band, ice concentrations are up to 100%, while in the eastern part they seem to peak around 70%. To the south of this, SSMIS data indicate near ice-free conditions until the near-coastal ice is encountered. Some bands of pack ice encroach to the region from the east, but the region immediately north of the Mertz Glacier and directly west of it are ice free. Conditions in this region are likely to vary highly until the supply of pack ice from further east is shut off close to the annual minimum in ice extent. The three mega icebergs remain in the same configuration as previous week, albeit the northeastern iceberg having moved slightly to the north leaving a wider gap to B09B in the south, which remains connected to the southern fast ice. Sea-ice debris have filled in the southeastern region to the east of B09B clogging up that region. Some bay-like breakouts have occurred along the fast-ice edge all along (see Figure 3).

Wishing you all a fantastic New Year.

Petra, for the sea ice group.

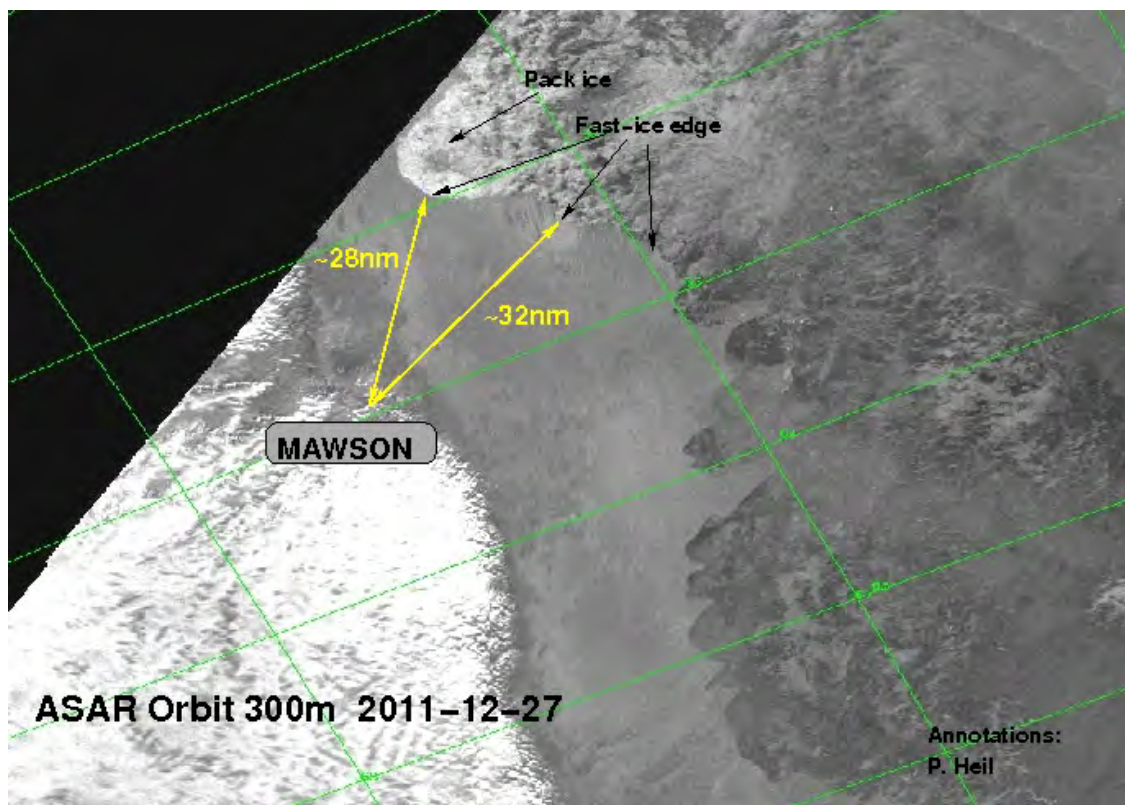


Figure 1: ENVISAT ASAR WSM image, acquired 27/12/2011 and provided by PolarView.

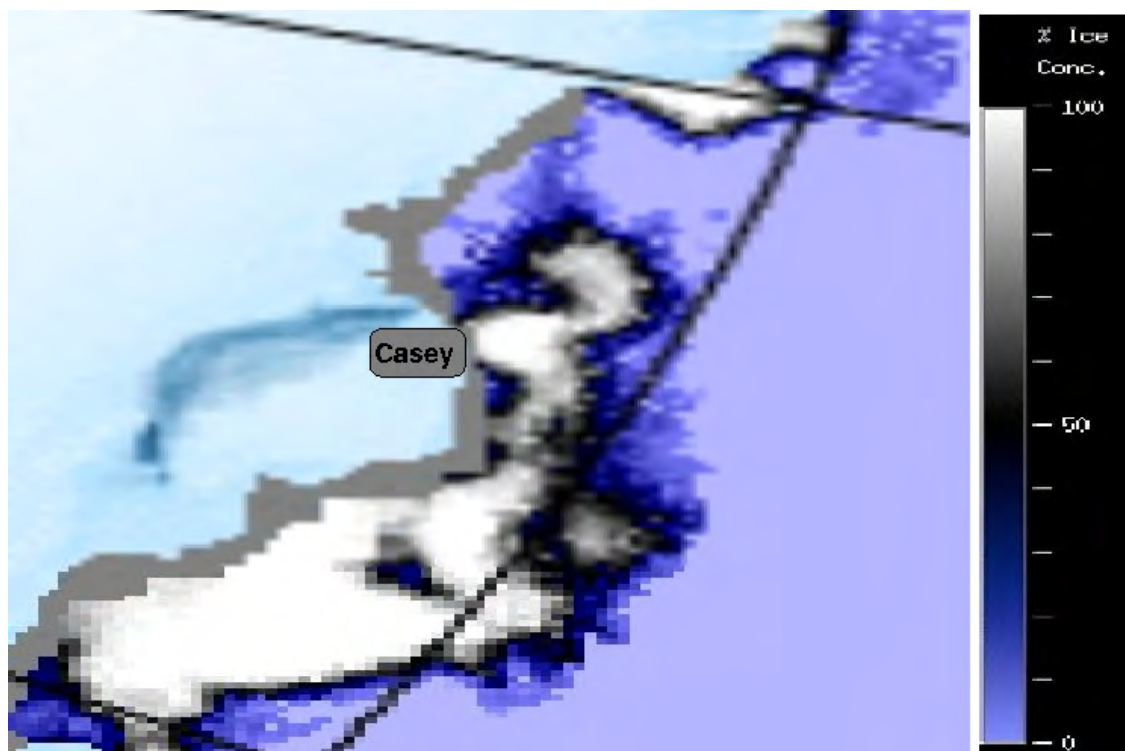


Figure 2: SSMIS passive microwave image, acquired 27/12/2011 and provided by Bremen University.

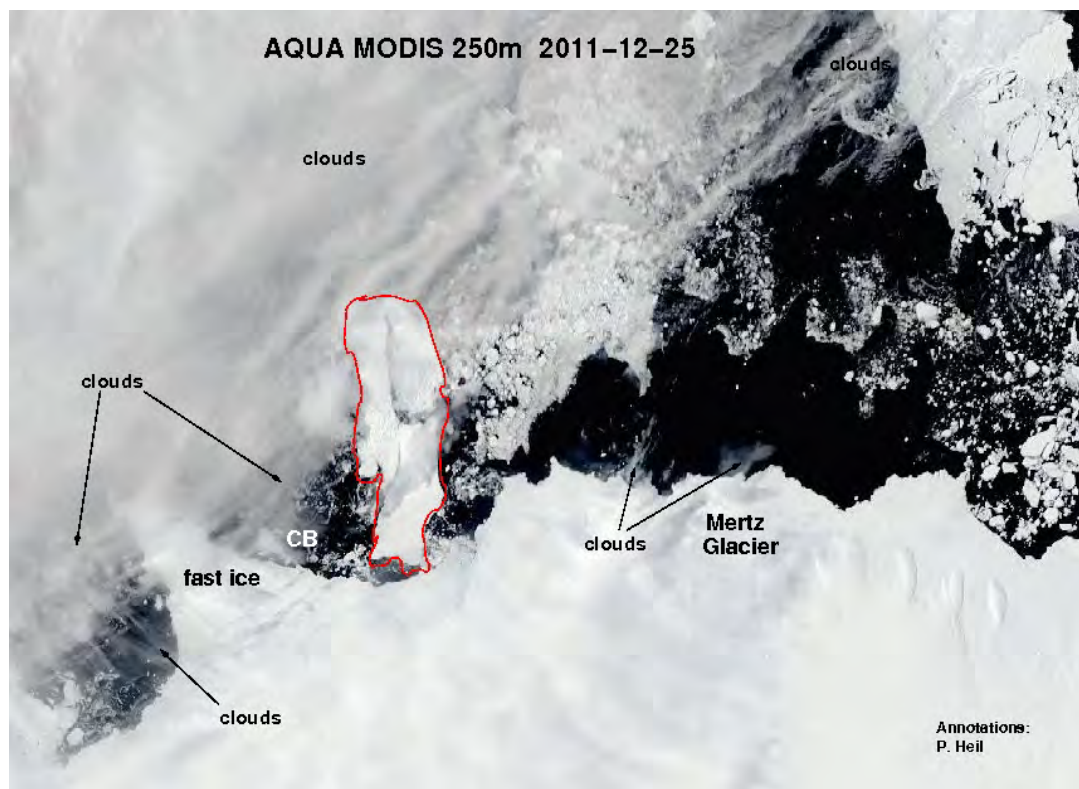


Figure 3: AQUA MODIS image, acquired 25/12/2011 and provided by NASA.

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Sea Ice Report #01/2012

by the AAD/ACE CRC Sea Ice Group

05/01/2012

There are three regions in the focus of this report:

- **Mawson Station**

For illustration refer to Figure 1: The fast ice off Mawson Station appears to be breaking away bit by bit, at least to the west of 62° E. While the pack ice has mostly disappeared in that whole sector of East Antarctica, there is still a fair quantity of land-fast ice. However, a spear like bit of fast ice which was located at about 67° 06' S and 61° 25' E by the end of last year, has completely disintegrated and the current edge at this longitude is about 7 nm further south now at approximately 67° 13' S. A lot of the fast ice debris is transported westward. Also, high resolution ASAR imagery suggests that fast ice in a the bay centred at about 62° 20' E retreated by 2 nm between 03/01/2012 and 04/01/2012. The eastern flank of that bay shows weak signs of break up too, but positive visual confirmation of this is not possible due to a massive cloud band in the area. The shortest distance between open water and Mawson Station is about 16 nm at the moment.

- **I9S/Casey Station**

While Vincennes Bay remains largely sea ice free now, there is still a band of loose sea ice clutter at about 65° S. The SSMIS image for today (05/01/2012) shows minimal ice concentration, mostly below 50%.

For further illustration of the southern end of I9S see the attached higher resolution visible image from TERRA (Figure 2). Off Cape Poinsett remains an area filled with decaying sea ice and to the east and west of it two regions with slightly higher concentrations. Further to the east is still a relatively large fast ice area intact and blocking off/diverting pack ice in its coastal westward drift. This pack ice is breaking away in the north of Totten Glacier. Again, the pack ice edge (15% ice concentration) appears to be at about 65° S.

- **Commonwealth Bay**

Sea ice conditions in Commonwealth Bay have slightly changed recently. While the bay itself is still filled with fast ice, iceberg B09B has now rotated in a way that it is detached from the fast ice of the bay, this happened sometime around New Year's Eve. The gap is now filled with pack ice and the new fast-ice edge is denoted by the yellow line in Figure 3. To the immediate east and west of the three bergs is still decaying pack ice. To the north of Mertz Glacier are some larger floes scattered in the polynya. The same holds for the polynya the west of the bergs. All three bergs still appear wiggling in animated image sequences.

Since New Year's Day the region is under thicker clouds (preventing acquisition of VIS imagery), and only one suitable high resolution RADAR image was acquired on 04/01/2012. This RADAR image shows in principle the same situation as the attached AQUA image.

With best regards,

Jan, for the sea ice group.

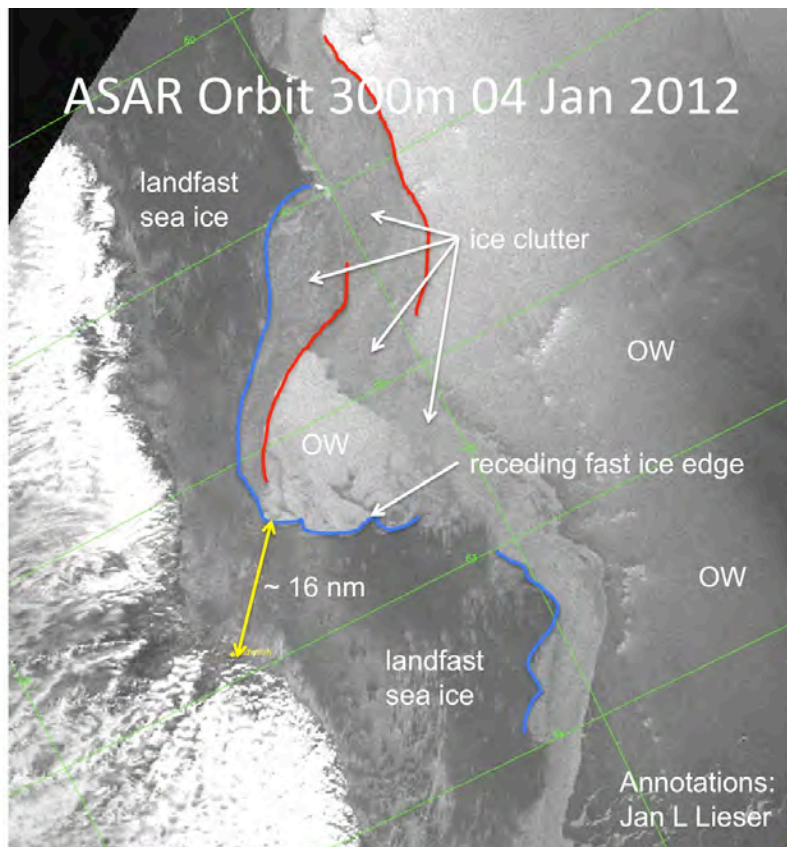


Figure 1: ENVISAT ASAR image, acquired 04/01/2012 and provided by PolarView

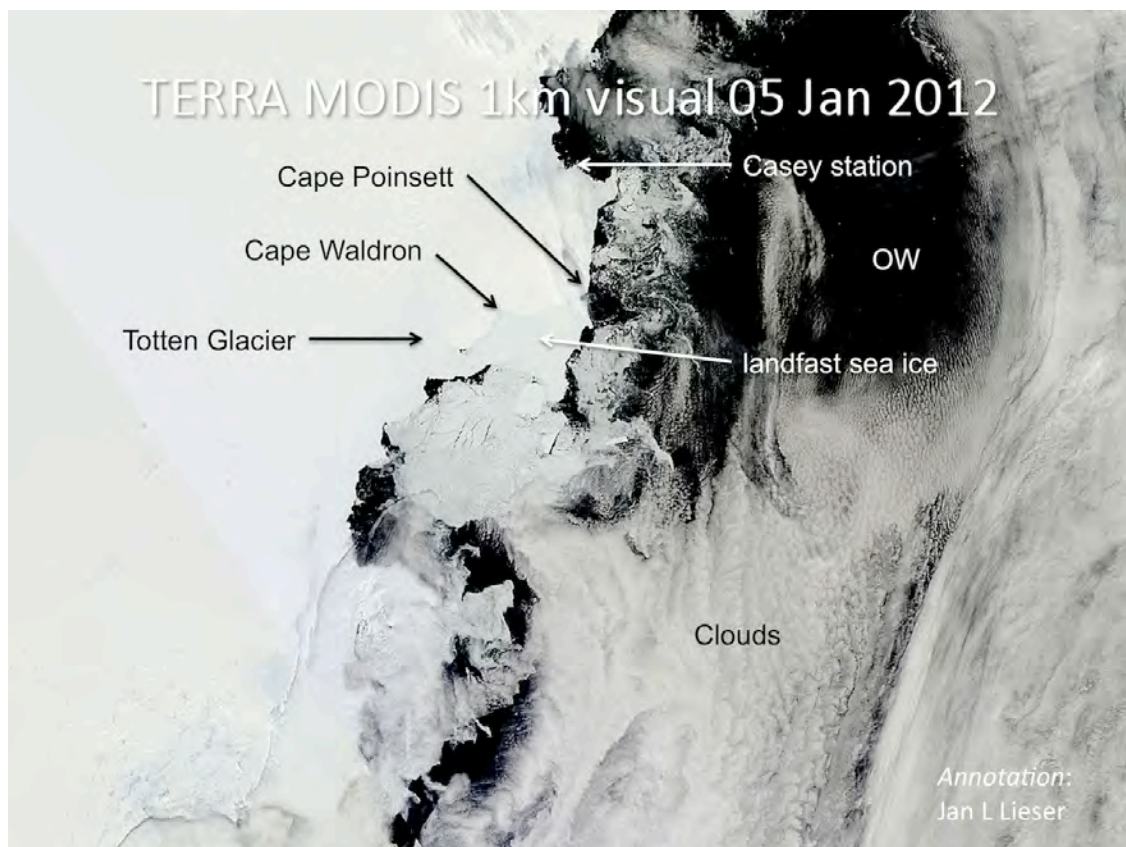


Figure 2: TERRA MODIS image, acquired 05/01/2012 and provided by NASA

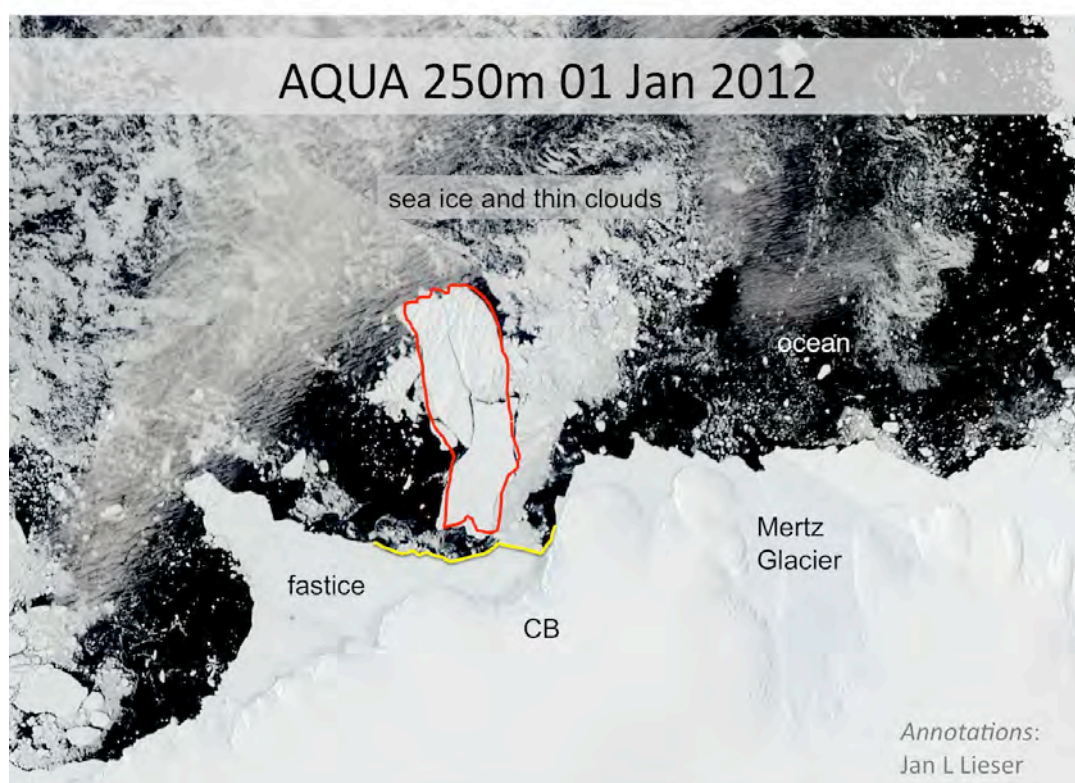


Figure 3: AQUA MODIS image, acquired 01/01/2012 and provided by NASA

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Sea Ice Report #01a/2012

by the AAD/ACE CRC Sea Ice Group

09/01/2012

This is an update on the Commonwealth Bay region:

This assessment is based on imagery acquired last Saturday 07/01/2012. There has been no more recent acquisition of suitable images since.

- **Commonwealth Bay**

To the north of the Mertz Glacier/Commonwealth Bay region is a band of loose pack ice with ice concentrations around 50% to 60%. It is located between about 140° E and 150° E and centred at about 65° S. This is evident from SSMIS imagery, that has a 6.25 km x 6.25 km grid. Sub-gridscale ice concentration may vary from these values locally. To the east of 150° E and to the west of 140° E are, however, still regions of higher ice concentration of up to 90% and 100% spanning from the continent to the open ocean.

At about 65° 40' S is a band of smaller floes/lower ice concentration between about 143° 30' E and 147° E. Further to the south from there and to the east of the former B09B icebergs is an area of higher ice concentration with larger floes incorporated again, annotated as dense pack in Figure 1.

Immediately northeast of Mertz Glacier is an area stretching about 60 nm (in latitude) with minimal ice concentration, but a few scattered icebergs. A proposed CTD location (66° 55' S, 145° 24' E) is marked in Figures 1 and 2. This location is at the boundary between a small, local group of larger floes reaching about 10 nm to the west from the CTD location, and open water with only scattered smaller floes to the east (see Figure 2 for illustration).

The sea ice conditions in Commonwealth Bay itself remain unchanged since the last report (#01/2012). The bay itself is still filled with land-fast sea ice, and the eastern fast-ice edge has not retreated significantly over the last few days. There is still a lot of pack ice in this enclosure between the continent in the southeast, the fast ice in the southwest, and B09B in the north. To the east of the three bergs, the fast-ice edge facing the Commonwealth Bay polynya (as marked in Figure 2) appears quite stable for the last ten days as well. The polynya itself is largely sea-ice free, but scattered icebergs are abundant.

Figure 2 provides the visual counterpart for the RADAR imagery of Figure 1. The northern part of the area is under thin and scattered clouds, allowing for only a fuzzy delimitation of open ocean and the sea ice zone.

In Figure 1, the position of *Akademic Shokalski* (09/01/2012 at 0730 hrs) is marked only a few miles south of the sea-ice edge, as is her turn-around position (08/01/2012 at 0900 hrs).

With best regards,

Jan, for the sea ice group.

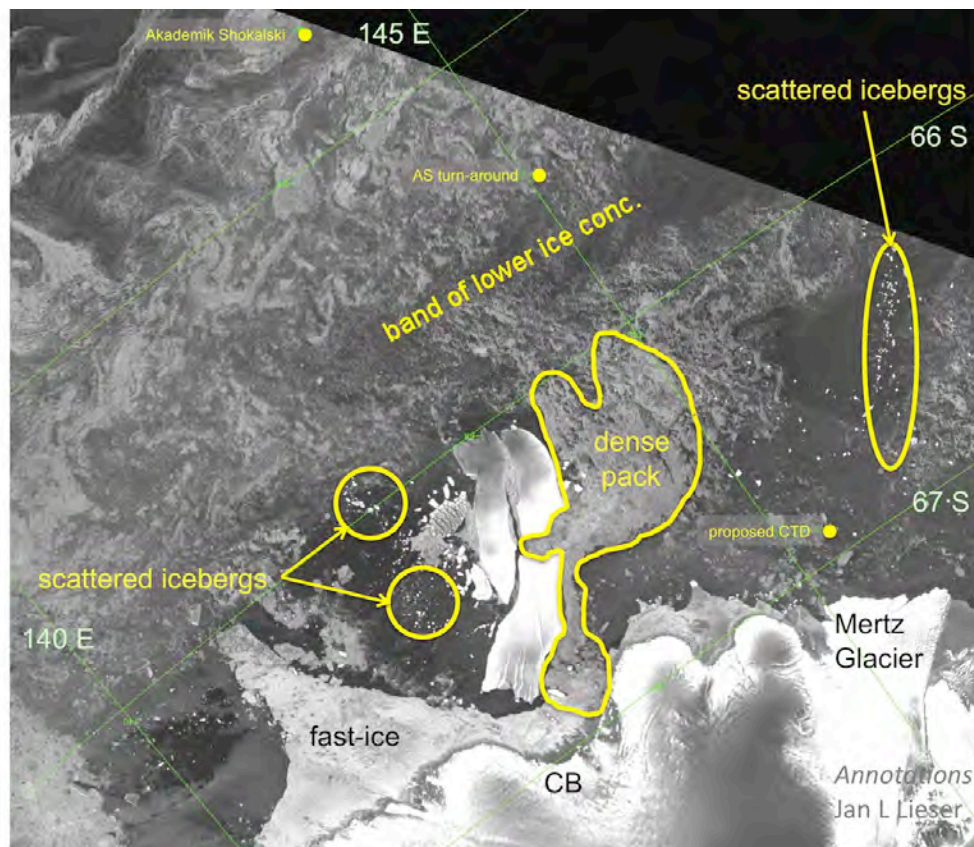


Figure 1: ENVISAT ASAR image, acquired on 07/01/2012 and provided by PolarView.

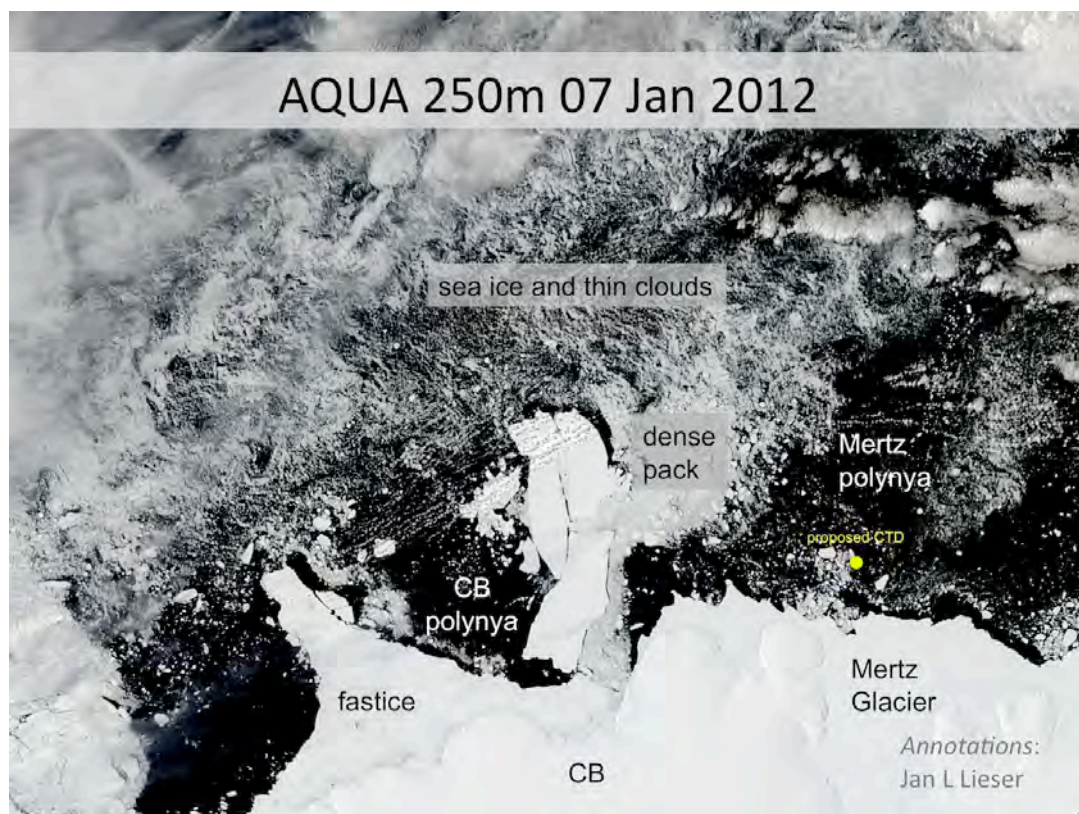


Figure 2: AQUA MODIS image, acquired on 07/01/2012 and provided by NASA.

Sea Ice Report #02/2012

by the AAD/ACE CRC Sea Ice Group

12/01/2012

There are three regions in the focus of this report:

- **Mawson Station**

Over the past week, sea ice conditions off Mawson Station have substantially ameliorated between 62° E and 63° 15' E. For illustration refer to Figure 1. The fast ice to the west of the station has retreated and exposed about 5 km of Antarctic coast immediately east of 62° E (as indicated by the white line in Figure 1). It appears however that fast ice remains offshore from the station with the shortest distance to open water (OW) being about 6 nm. The break-out of fast ice has resulted in shattered ice floating northwards, partly still as substantial floes. There is a band of ice 'debris' between about 66° 55' S and 67° 12' S with a fuzzy northern edge extending out northward to about 66° 47' S at the moment. This band closes off the polynya off the station and connects the fast ice in the east (east of 63° E) and the west (west of 62° E).

It is also interesting to note that the fast ice between the large tabular iceberg B15T (at about 65° 51' S and 57° 09' E) and the coast is retreating and decaying as well, which potentially removes the lock-in point for the remaining fast ice between Mawson Station and the berg.

- **I9S/Casey Station**

The most recent high resolution ASAR image was acquired on 09/01/2012 for the region east of Casey Station and the southern end of I9S (see Figure 2). There have been no usable visible images since, because the area has been under clouds.

Like last week, Vincennes Bay is still largely sea-ice free with only a band of ice 'clutter' northwest of the station centred at about 65° 30' S. However, the sea ice conditions to the north of Law Dome now show a few localised high concentration areas, as demarcated by red lines in Figure 2. One of these fields is also currently centred on 65° 20' S and 113° E. The approximate ice edge is marked with a yellow line in Figure 2. Between the sea ice edge and the localised high concentration areas are only filaments of loose and decaying sea ice.

- **Commonwealth Bay**

Sea ice conditions in and to the north of Commonwealth Bay have not changed significantly during last week. To the east of the B09 bergs, there remains a large area of high concentration, compacted sea ice, as marked with a yellow line in Figures 3 and 4. Yesterday's AQUA MODIS image (Figure 4) shows a quite narrow sea-ice free entrance from the east into the bay itself, but this feature is likely to be subject to quickly changing dynamics and can close off rapidly. The Commonwealth Bay polynya to the west of the B09 bergs is still largely sea-ice free, but many scattered icebergs are in that area. The fast ice between Commonwealth Bay and Dumont D'Urville Station shows signs of further disintegration, with the northern tip now broken off and into pieces, drifting westward.

With best regards,

Jan, for the sea ice group.

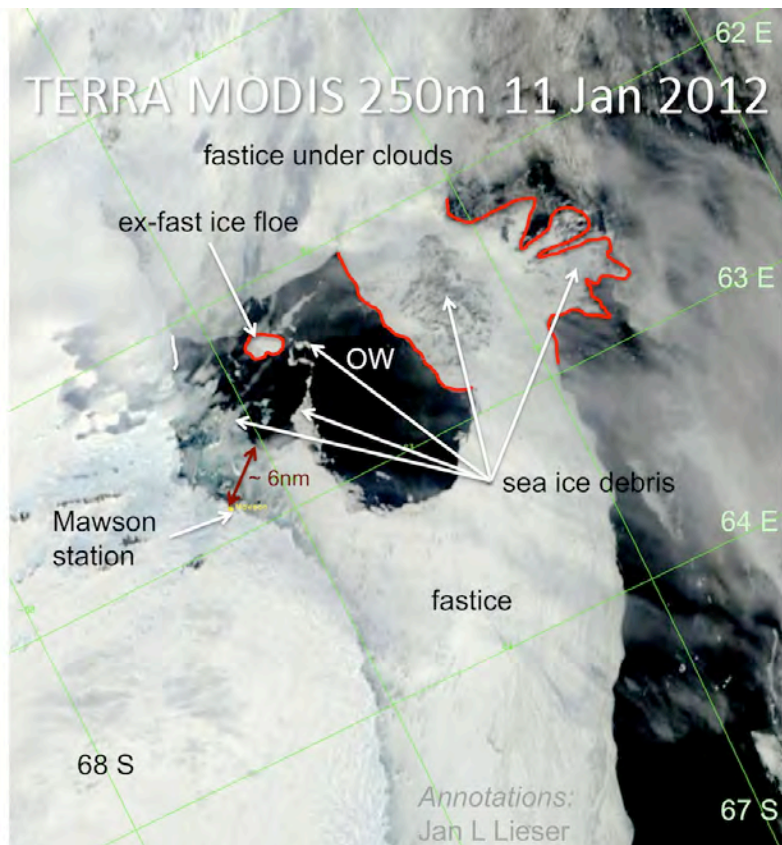


Figure 1: TERRA MODIS image, acquired 11/01/2012 and provided by NASA.

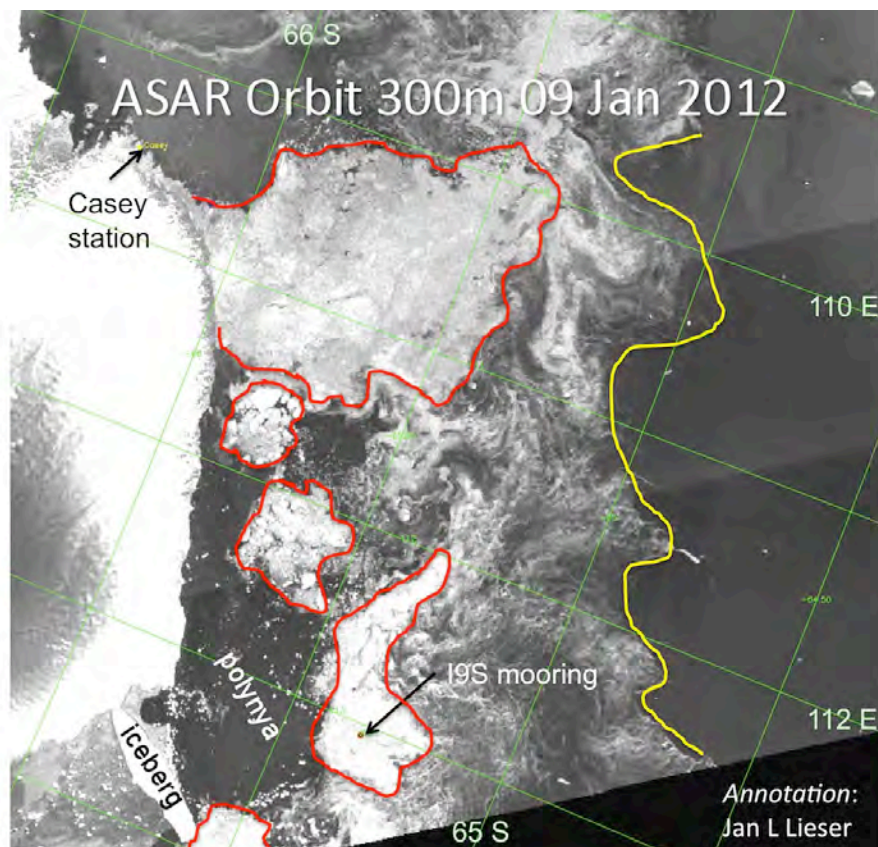


Figure 2: ENVISAT ASAR image, acquired 09/01/2012 and provided by PolarView.

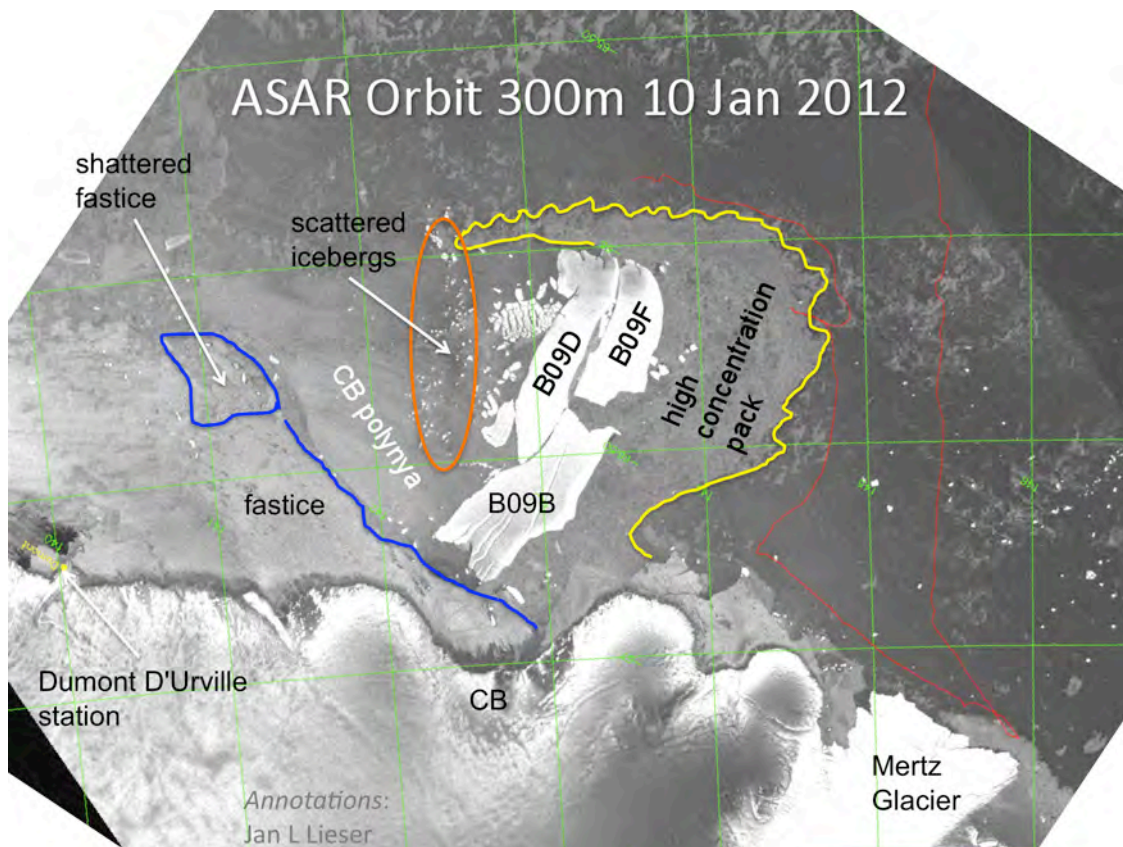


Figure 3: ENVISAT ASAR image, acquired 10/01/2012 and provided by PolarView. The thin red lines denotes the cruise track of RSV *Aurora Australis* up until 12/01/2012 noon.

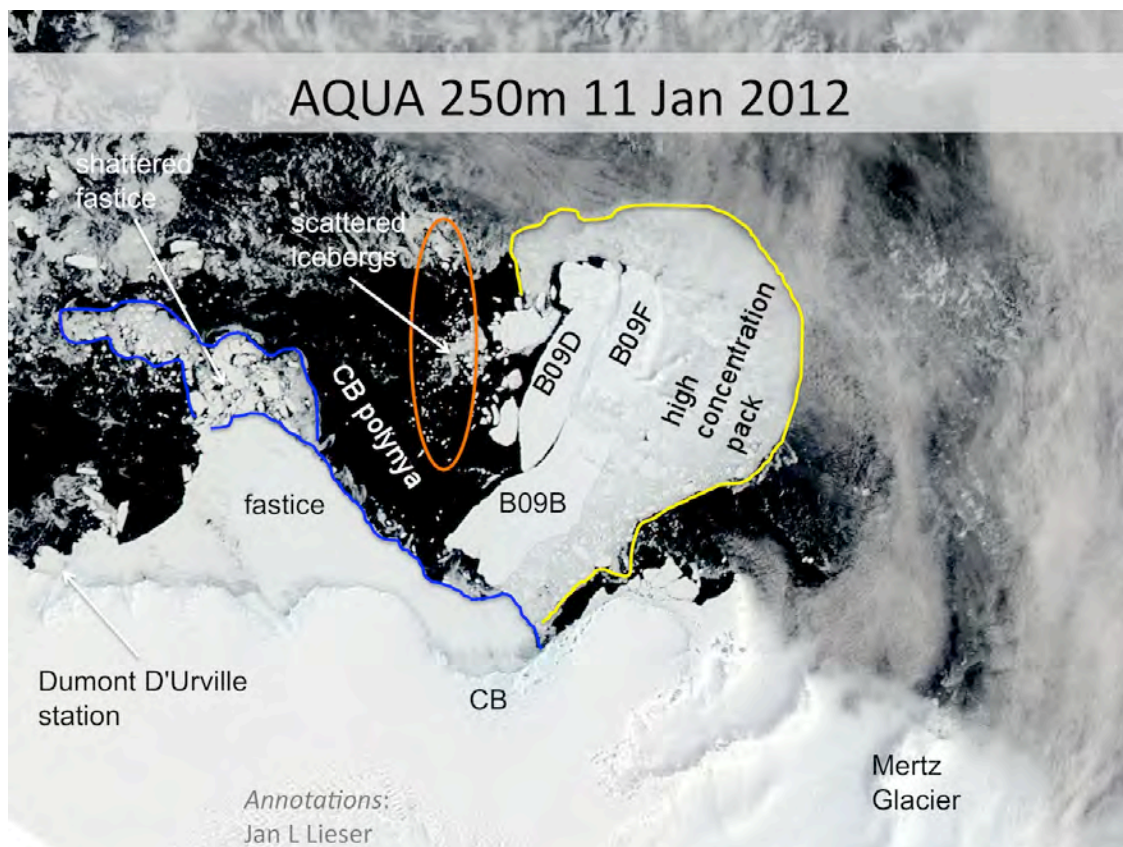


Figure 4: AQUA MODIS image, acquired 11/01/2012 and provided by NASA.

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Sea Ice Report #03/2012

by the AAD/ACE CRC Sea Ice Group

19/01/2012

There are two regions in the focus of this report:

- **Mawson Station**

Sea-ice conditions in the immediate vicinity of the station have eased further during the last week. Webcam images from Mawson Station (and most recent loops) show occasional open water as close to the station as Entrance Island. Although the region was under clouds yesterday (Figure 1), an approximately 5 nm wide open water channel is detectable off Mawson Station, extending about 22 nm in east-northeasterly direction from the station. But there is now a band of high concentration shattered former fast ice of variable width between 5 nm and 18 nm extending north from this channel, with filaments of sea ice reaching as far north as about 66° 50' S.

Further to the west of the station, the fast ice is largely retreating as well, since the lock-in point at iceberg B15T disintegrated.

- **I9S**

Yesterday's high resolution ASAR image (Figure 2) displays only minimal sea ice in the region to the north of Law Dome. SSMIS data show this region to be 50% ice concentration or less at the 6.25 km × 6.25 km scale. Figure 2 shows a few clusters of higher concentration ice drifting westwards past the southernmost I9S location. There is a group of icebergs (yellow circle in Figure 2) to the east of the mooring location with the largest (inside the circle) appearing to be trapped behind smaller bergs, but with some of the smaller bergs drifting slowly westward and across 113° E. The approximate sea-ice edge is denoted by the red line in Figure 2. The region is under clouds today, therefore no visible MODIS imagery is available.

With best regards,

Jan, for the sea ice group.

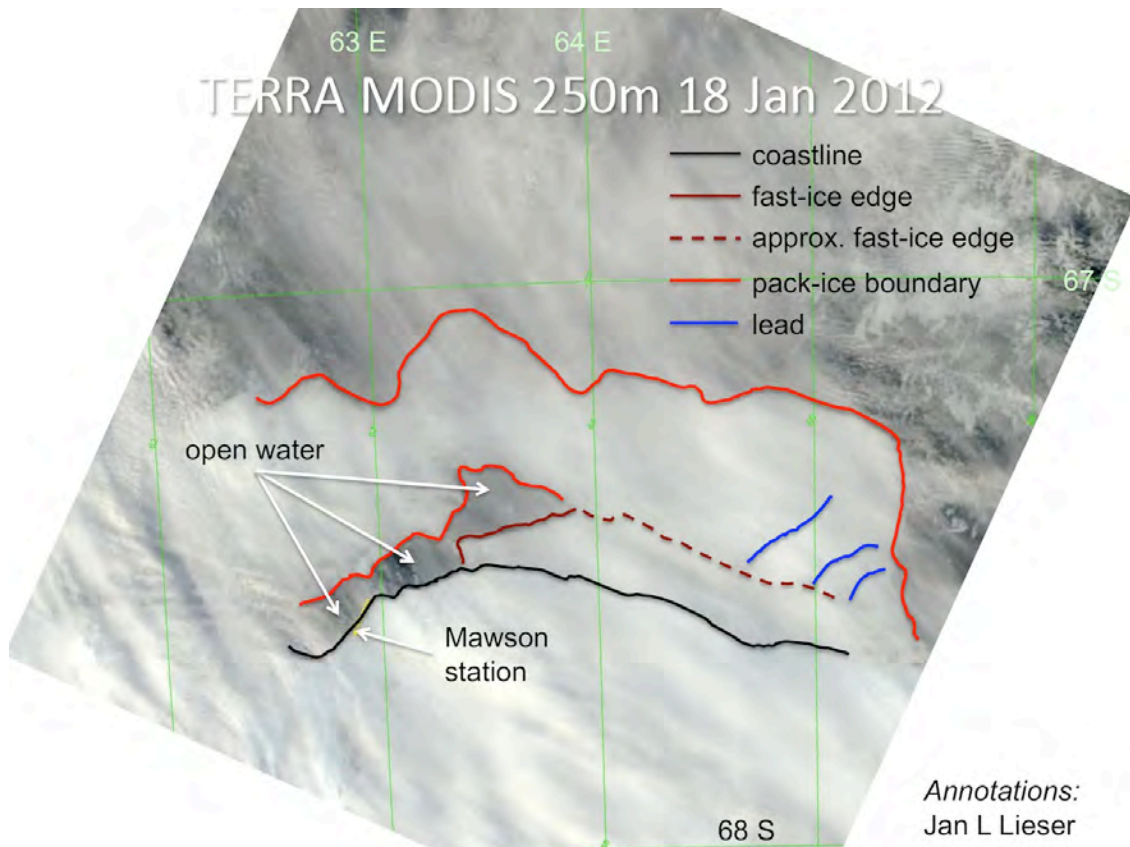


Figure 1: TERRA MODIS image, acquired 18/01/2012 and provided by NASA.

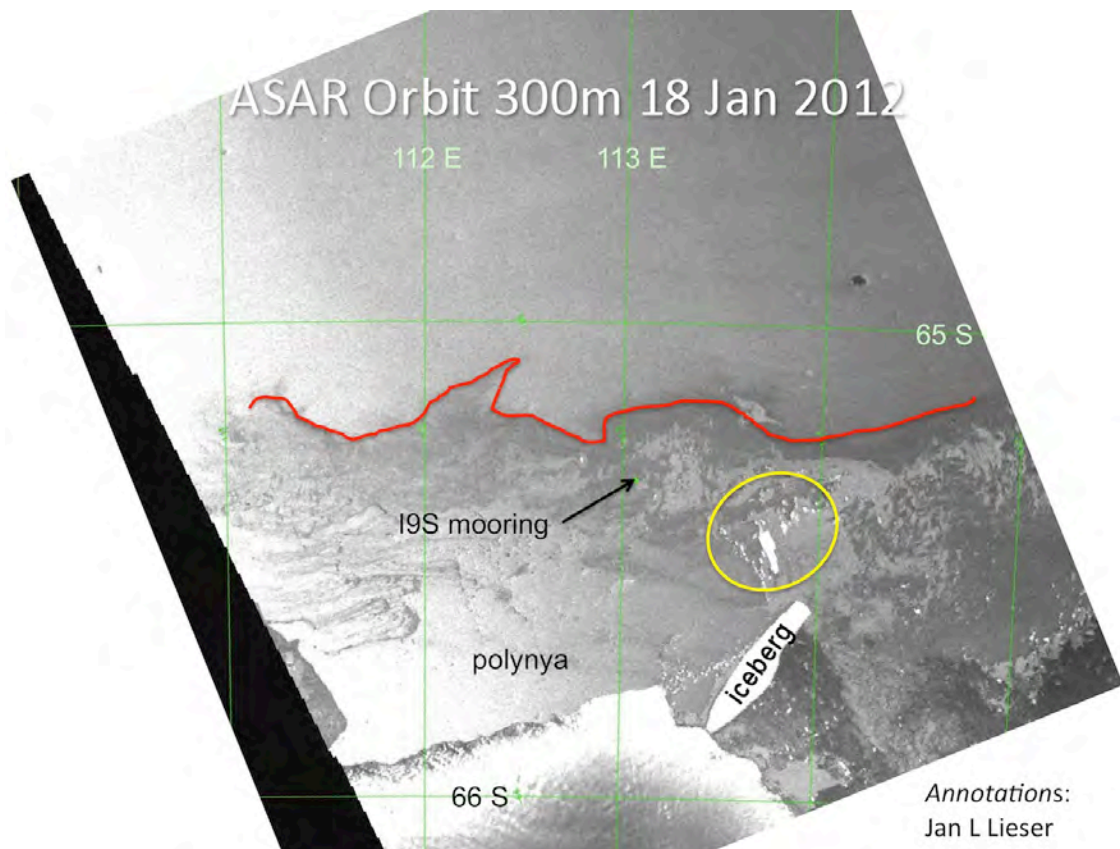


Figure 2: ENVISAT ASAR image, acquired 18/01/2012 and provided by PolarView.

Sea Ice Report #03a/2012

by the AAD/ACE CRC Sea Ice Group

24/01/2012

This is a quick interjection regarding Commonwealth Bay:

- **Commonwealth Bay**

Figure 1 shows the Commonwealth Bay region yesterday. It is a visible high resolution image from MODIS instrument on AQUA satellite.

There are clouds to the north of 66° S and in Commonwealth Bay, but it is evident that B09B has separated from the other two B09s and rotated in a way that it is blocking off the bay now in east-west direction. It is sheltering the bay and keeping the broken pack ice as well as the remaining fast ice inside the bay.

The thin red line shows RSV *Aurora Australis*' recent cruise track in the area.

With best regards,

Jan, for the sea ice group.

PS: 25/01/2012

Quick addendum to yesterday's note: Over the past week B09B has averaged 1 nm/day in south-southeasterly direction.

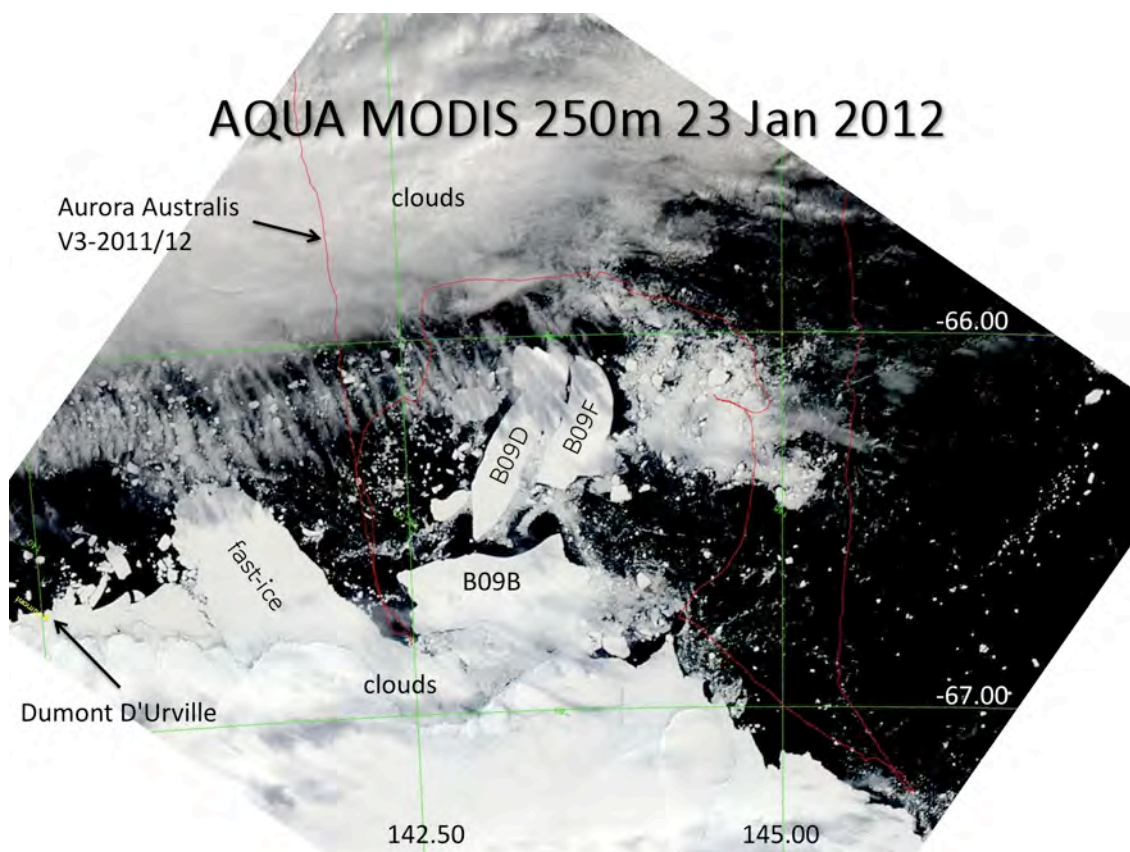


Figure 1: AUQA MODIS image, acquired 23/01/2012 and provided by NASA. The thin red line shows RSV *Aurora Australis*' recent cruise track in the area.

Sea Ice Report #04/2012

by the AAD/ACE CRC Sea Ice Group

25/01/2012

There remains one region in the focus of this report:

- **Mawson Station**

Figure 1 shows yesterday's MODIS image of the Mawson Station region. The whole scene is under clouds, but some sea ice features are clearly detectable. The last high resolution ASAR image of the area was only acquired on 20/01/2012.

The overall sea-ice conditions have not changed dramatically during the last week. Webcam images (and loops) from the station show a highly dynamic pack off the station. On a larger scale, this is also evident from a satellite perspective (Figure 1), where the approximate northern ice edge exhibits many undulations. Although the region is obscured by clouds, some indications of smaller scale dynamic features are detectable within the pack ice (as indicated by yellow lines in Figure 1), especially at about 62° E and 64° 25' E, but also at about 63° E. There are two regions marked in the figure as open water (OW), but it is expected that there is still some sea-ice cover in these areas. The diurnal katabatic activity at the station seems to help maintain the nearshore polynya; however the sea ice further offshore remains persistent. The channel that was mentioned in last week's report has closed again as of yesterday.

- **Outlook: Davis & Casey Stations**

The immediate vicinity of both stations appears to be largely sea ice free.

In the Davis Station region, some sea ice is being diverted in its eastward drift around iceberg D15 (grounded at the eastern end of the West Ice Shelf) between 66° S and 66° 45' S.

About 50% and less sea-ice concentration is reported for the area to the north of Casey Station between 65° 30' S and 66° S.

Happy Australia Day!

With best regards,

Jan, for the sea ice group.

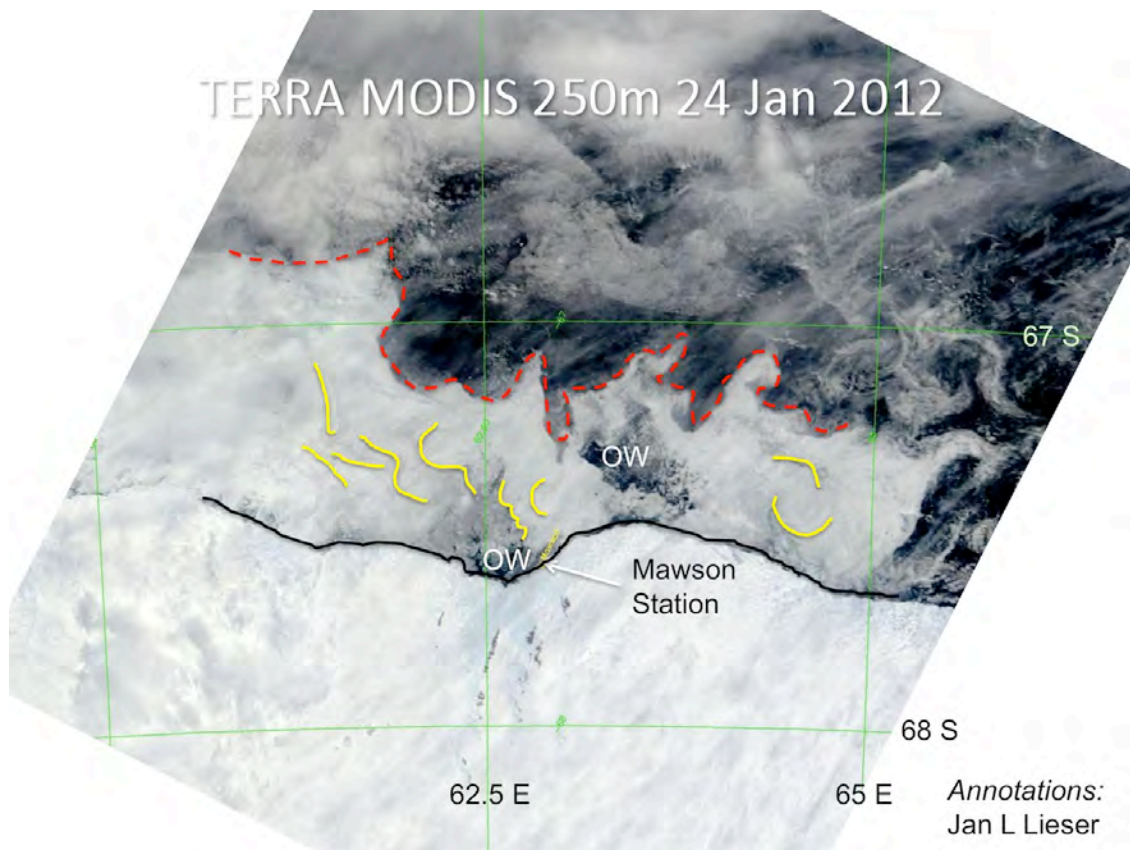


Figure 1: TERRA MODIS image, acquired 24/01/2012 and provided by NASA. The black line denotes the coastline, the dashed red line the approximate sea ice edge.

Sea Ice Report #05/2012

by the AAD/ACE CRC Sea Ice Group

02/02/2012

There remains one region in the focus of this report:

- **Mawson Station**

Figure 1 shows a MODIS image of the Mawson Station region from 31/01/2012.

The immediate vicinity of the station appears now largely free of sea ice. There remains only a band of variable width of ex-fast ice to the northeast of the station. This is loosely connected to a larger field of pack ice (presumably ex-fast as well) to the west of approximately 62° 45' E. The massive low pressure system that passed to the north of the station yesterday has presumably loosened the above mentioned sea ice even further, but the region is under clouds now and no recent high resolution RADAR image is available.

- **Outlook: Davis & Casey Stations**

The immediate vicinity of both stations appears to be largely free of sea ice. Prydz Bay is almost entirely free of sea ice at the moment.

To the north of Casey Station between 65° 30' S and 66° S is a band of loose pack ice stretching from the coast at approximately 111° E in northwesterly direction to about 108° 30' E, with ice concentrations less than 50% west of 110° E.

- **Encore: Commonwealth Bay**

Commonwealth Bay is now completely blocked by B09B. The berg has slowed down to about 0.5 nm/day, but is still charting almost due west. B09F however is moving almost due north at just under 1 nm/day now. The bay itself remains full of fast ice and trapped pack ice. For illustration see Figure 2.

With best regards,

Jan, for the sea ice group.

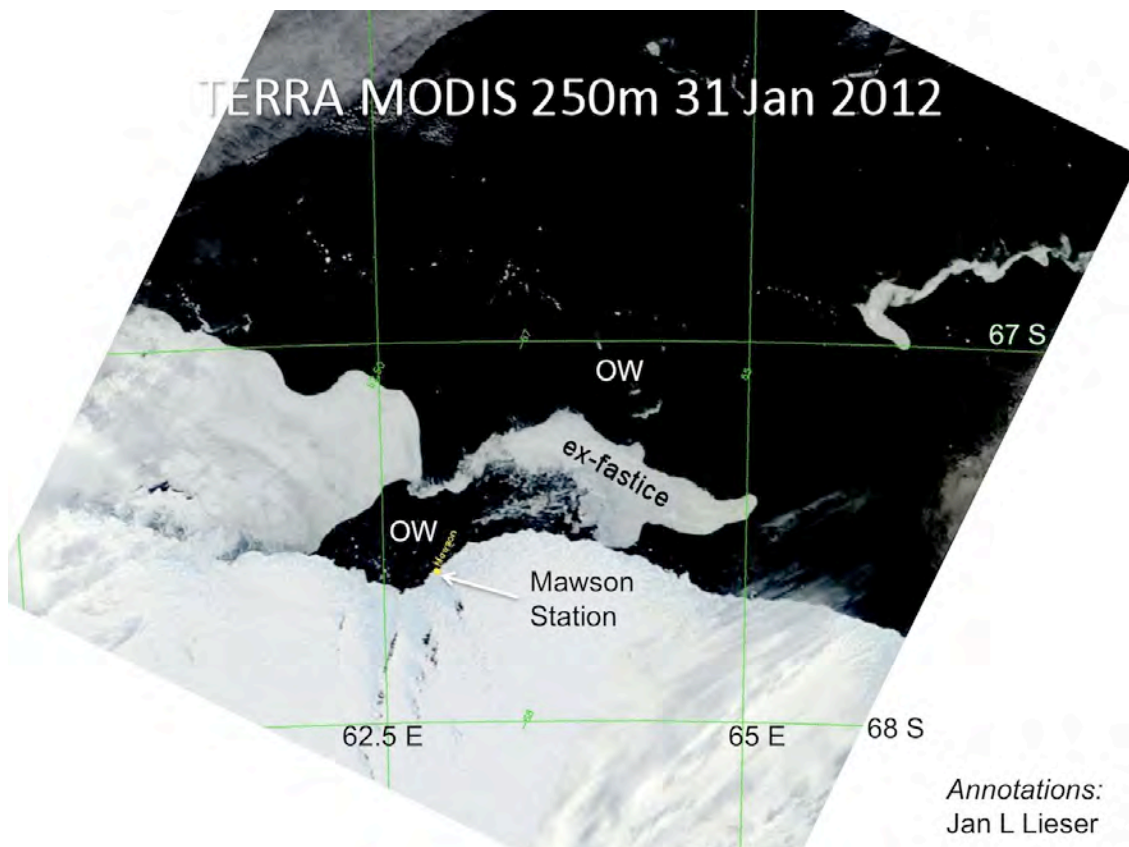


Figure 1: TERRA MODIS image, acquired 31/01/2012 and provided by NASA.

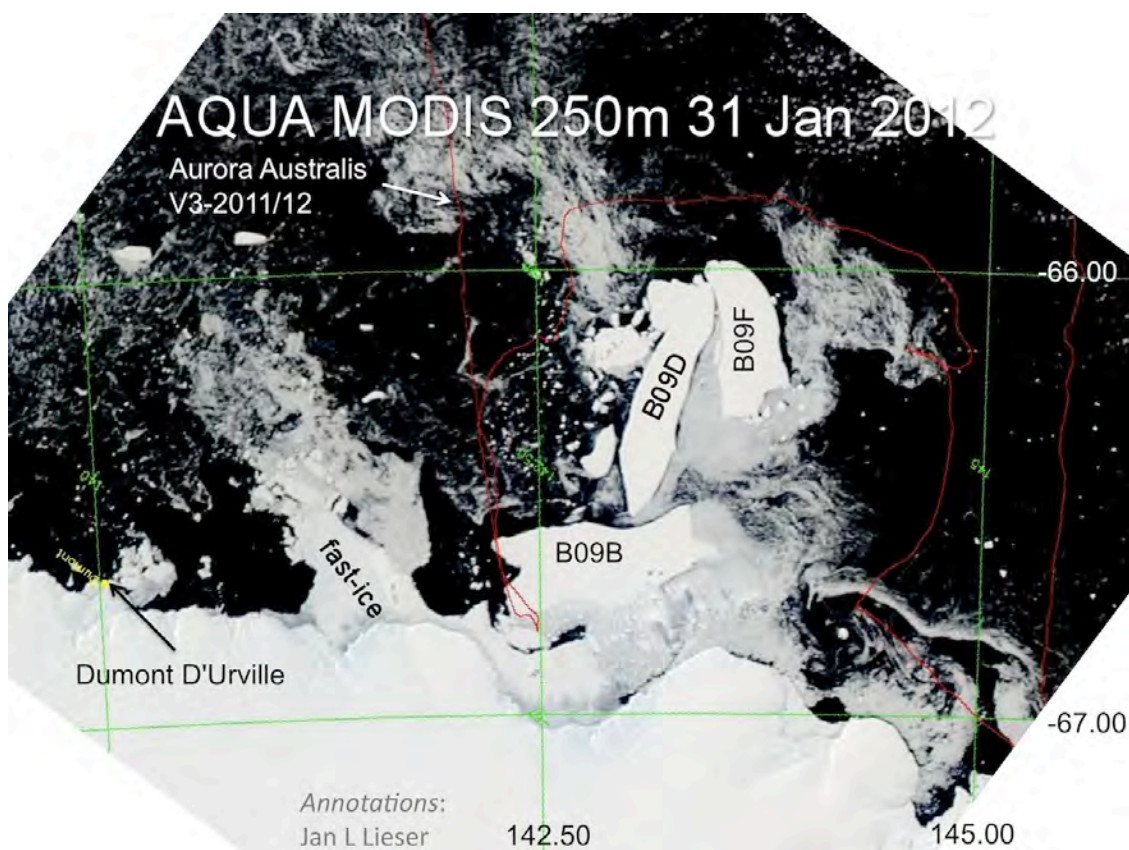


Figure 2: AQUA MODIS image, acquired 31/01/2012 and provided by NASA. The thin red line denotes the cruise track of Voyage 3 of RSV *Aurora Australis*.

Sea Ice Report #06/2012

by the AAD/ACE CRC Sea Ice Group

09/02/2012

There remains one region in the focus of this report:

- **Mawson Station**

Figure 1 shows a high resolution ASAR image of the Mawson Station region from 08/02/2012.

The harbour and the wider vicinity of the station are now largely free of sea ice. Only a narrow band of sea-ice filaments remains to the northeast of the station. A larger field of coastal pack ice sits to the west of approximately 61° 45' E. The eastern edge of this area has retreated westward about one degree during the last week.

A range of icebergs is still detectable to the north of the area (see Figure 1). Offshore, north of 67° S, a few large bergs are around, while closer to the shore many smaller bergs are visible.

- **Outlook: Davis & Casey Stations**

The immediate vicinity of both stations appears to be largely free of sea ice.

Prydz Bay is almost entirely free of sea ice at the moment, with only a few icebergs scattered. To the northeast of the station and west of iceberg D15 are loose bands of sea-ice filaments.

To the north of Casey Station between 65° 40' S and 66° S is an area of retracting pack ice stretching from the coast at approximately 111° E in north-westerly direction to about 110° E. Filaments of loose sea ice circulate in the outer Vincennes Bay.

With best regards,

Jan, for the sea ice group.

Sea Ice Report #07/2012

by the AAD/ACE CRC Sea Ice Group

16/02/2012

There remains one region in the focus of this report:

- **Mawson Station**

Figure 1 shows a high resolution MODIS image of the Mawson Station region from 15/02/2012.

The harbour and the wider vicinity of the station are still largely free of sea ice. Minor bands of sea ice filaments remain to the northeast of the station, detectable under scattered clouds in the image. The field of coastal pack ice to the west has retreated further westward and has shown more signs of disintegration over the past week.

A range of different size icebergs is still detectable offshore to the north of the station area.

- **Outlook: Davis & Casey Stations**

Sea-ice conditions at both stations haven't changed much during the last week.

Prydz Bay is almost entirely free of sea ice at the moment, with only a few scattered icebergs present. West of iceberg D15 are minor bands of sea-ice filaments entering the area.

Iceberg C28A, a part of the former Mertz Glacier Tongue believed to still be carrying one of B. Legresy's GPS units, is currently located at 65° 45' S and 79° E, directly north of Davis Station (about 175 nm away).

As in the previous report, to the north of Casey Station between 65° 40' S and 66° S is an area of retracting pack ice stretching from the coast at approximately 111° E in north-westerly direction to about 110° E. Filaments of loose sea ice circulate in the outer Vincennes Bay.

- **NB: Commonwealth Bay**

Iceberg B09F, the smallest of the B09-troika in front of Commonwealth Bay, has freed itself northward and is now drifting westward by about 16 nm between 12/02/2012 and 14/02/2012 (that is at almost 0.2 kn.).

The fast ice inside the bay (marked by the red line in Figure 2) is showing signs of disintegration now with a large piece of it shattered recently and transported westward out of the bay.

With best regards,

Jan, for the sea ice group.

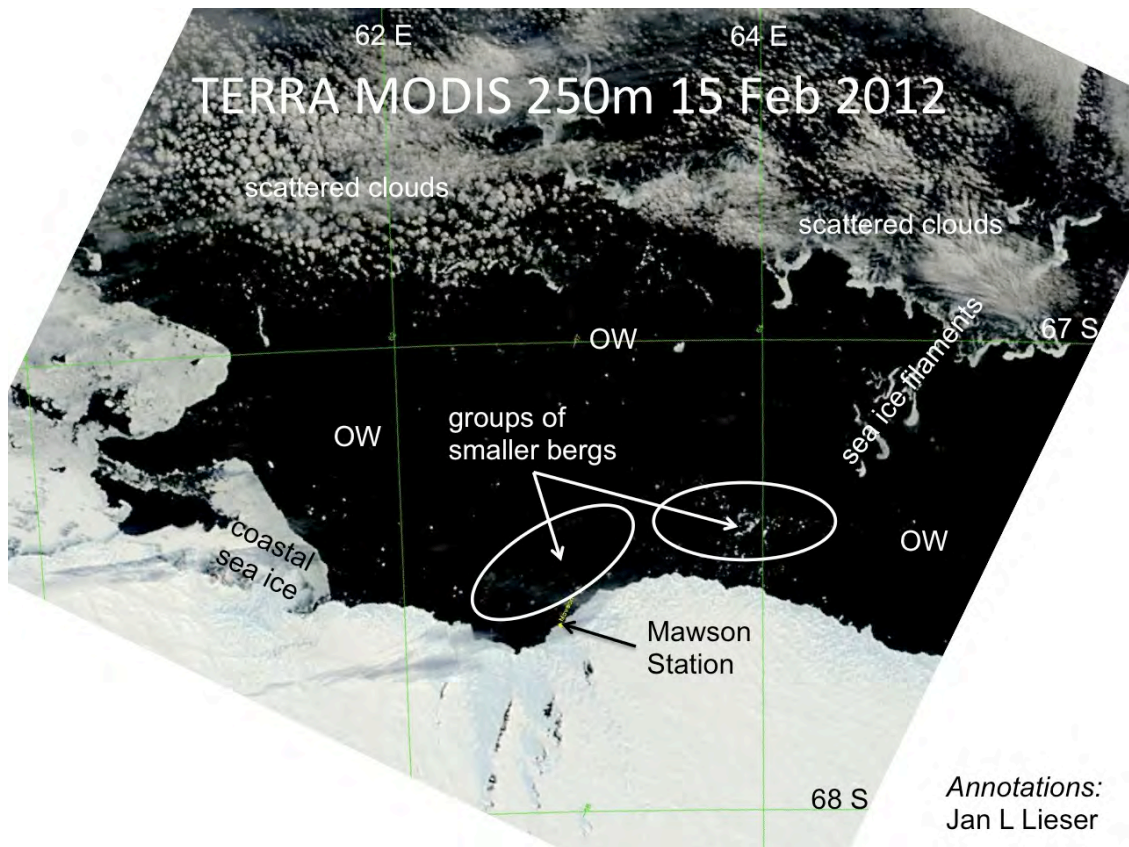


Figure 1: TERRA MODIS image, acquired 15/02/2012 and provided by NASA.

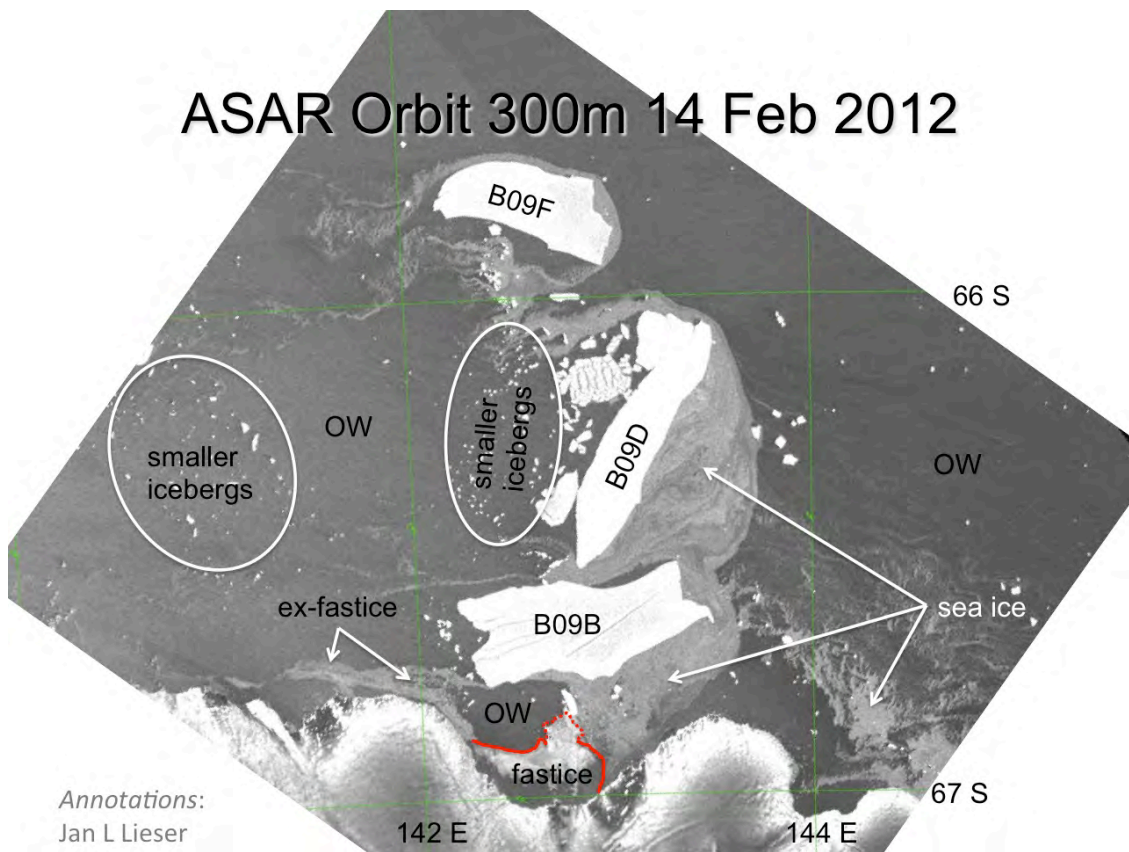


Figure 2: ASAR image, acquired 14/02/2012 and provided by PolarView.

Sea Ice Report #08/2012

by the AAD/ACE CRC Sea Ice Group

23/02/2012

There remains one region in the focus of this report:

- **Mawson Station**

Figure 1 shows a high resolution ASAR image of the Mawson Station region from yesterday.

Horseshoe Harbour and the wider vicinity of the station are largely free of sea ice. Minor bands of sea-ice filaments remain to the north and northeast of the station. The field of coastal pack ice to the west has collapsed further with its eastern edge now at about 59° E.

A range of different size icebergs is still detectable offshore to the north of the station area, mainly north of 67° S. There is only one larger iceberg at about 62° 38' E and 67° 21' S at the moment.

- **Outlook: Davis & Casey Stations**

Sea ice conditions at both stations have not changed much during the last week.

Prydz Bay is still almost entirely free of sea ice at the moment, with only a few scattered icebergs present. West of iceberg D15 are minor bands of sea-ice filaments entering the area.

Iceberg C28A has moved slightly to the northeast and is currently located at 65° 42' S and 79° 16' E, still about 176 nm northeast of Davis Station.

North of Casey Station between 65° 40' S and 66° S remains an area of breaking up pack ice stretching from the coast at approximately 111° E in northwesterly direction to about 110° E. Bands of loose sea ice (indicated by red lines in Figure 2) circulate in the outer Vincennes Bay and to the east of the patch.

With best regards,

Jan, for the sea ice group.

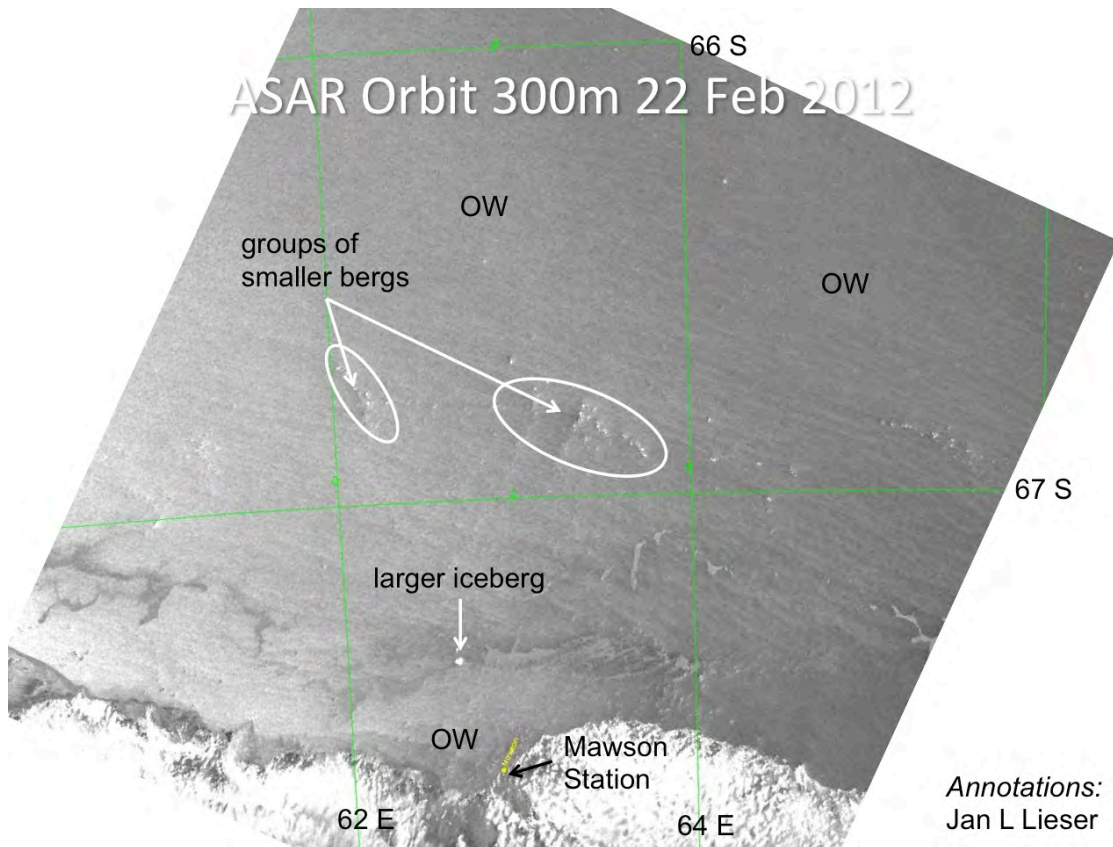


Figure 1: ASAR image, acquired 22/02/2012 and provided by PolarView.

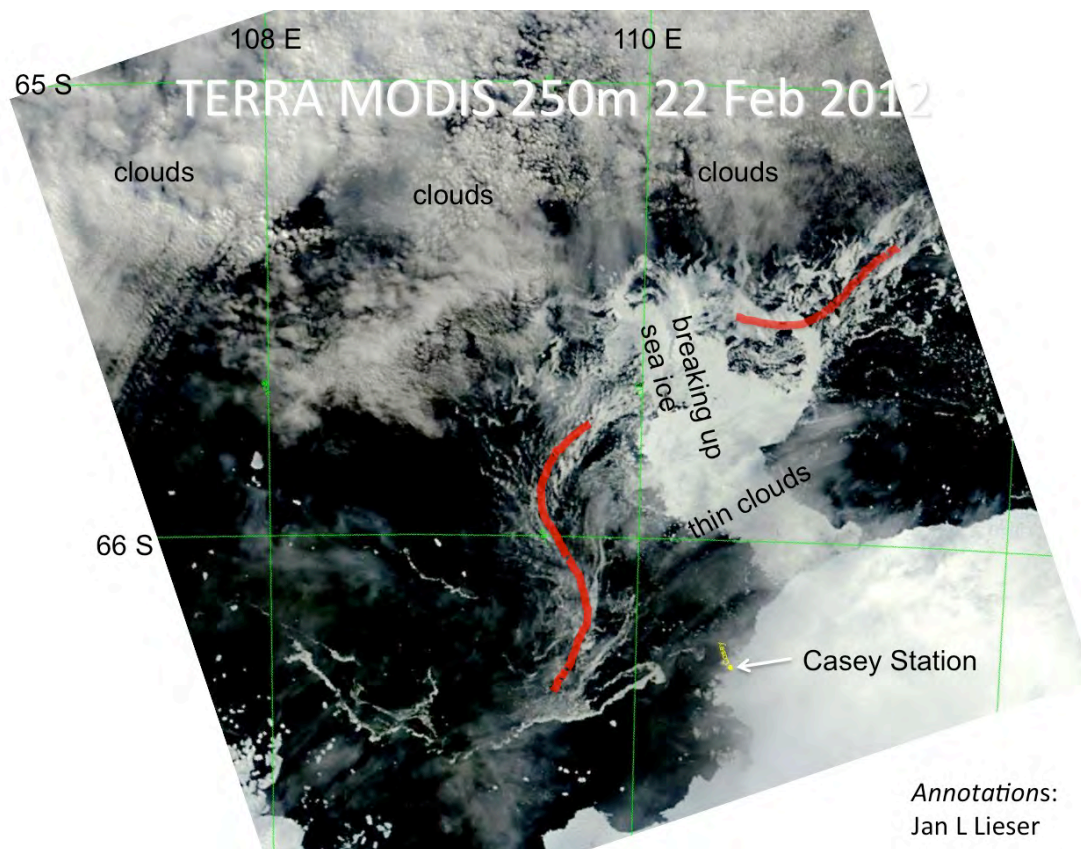


Figure 2: TERRA MODIS image, acquired 22/02/2012 and provided by NASA.

Sea Ice Report #09/2012

by the AAD/ACE CRC Sea Ice Group

01/03/2012

This report is concerned with all three Australian Antarctic stations:

- **Mawson Station**

The area at Mawson Station and to the north remains largely free of sea ice. There are only occasional icebergs in the region.

An unusual sight is shown in Figure 1 with large scale biomass-laden sea ice obvious as 'green sea ice' in the visible composite MODIS image (indicated by the yellow ellipse) to the north and west of Cape Darnley. This sea ice spans about 100 nm longitudinally, and almost 50 nm latitudinally.

- **Davis Station**

The region off Davis Station remains also largely free of sea ice, with only minor filaments of decaying sea ice entering Prydz Bay around iceberg D15 from the east. Further to the west, the region off the Larsemann Hills and the Amery Ice Shelf is virtually free of sea ice as well.

Iceberg C28A has moved slightly to the southeast and is currently centred at 65° 46' S and 79° E, about 172 nm northeast of Davis Station.

- **Casey Station**

The sea-ice tongue to the north of Casey Station between 65° 40' S and 66° S, stretching from the coast at approximately 111° E in northwesterly direction, has disintegrated during the last week. Bands of loose sea ice (indicated by red lines in Figure 2) circulate in outer Vincennes Bay now.

- **NB: Commonwealth Bay**

The most recent high resolution VIS or RADAR image was acquired by ENVISAT's ASAR on 25/02/2012, and is shown in Figure 3.

The B09 troika has separated a fair distance now, with B09B still blocking Commonwealth Bay in an east-west direction, sheltering the fast ice inside the bay. B09D has managed to wiggle northward and appears to be about to follow B09F in its course westward. Over the past week, the long axis of B09D has rotated about 30 degrees anticlockwise and moved about 9 nm almost due west. B09F has drifted about 17 nm almost due west as well in the same time.

In the area spanning between the three bergs and Dumont D'Urville Station, many icebergs are scattered and loose sea ice is present.

With best regards,

Jan, for the sea ice group.

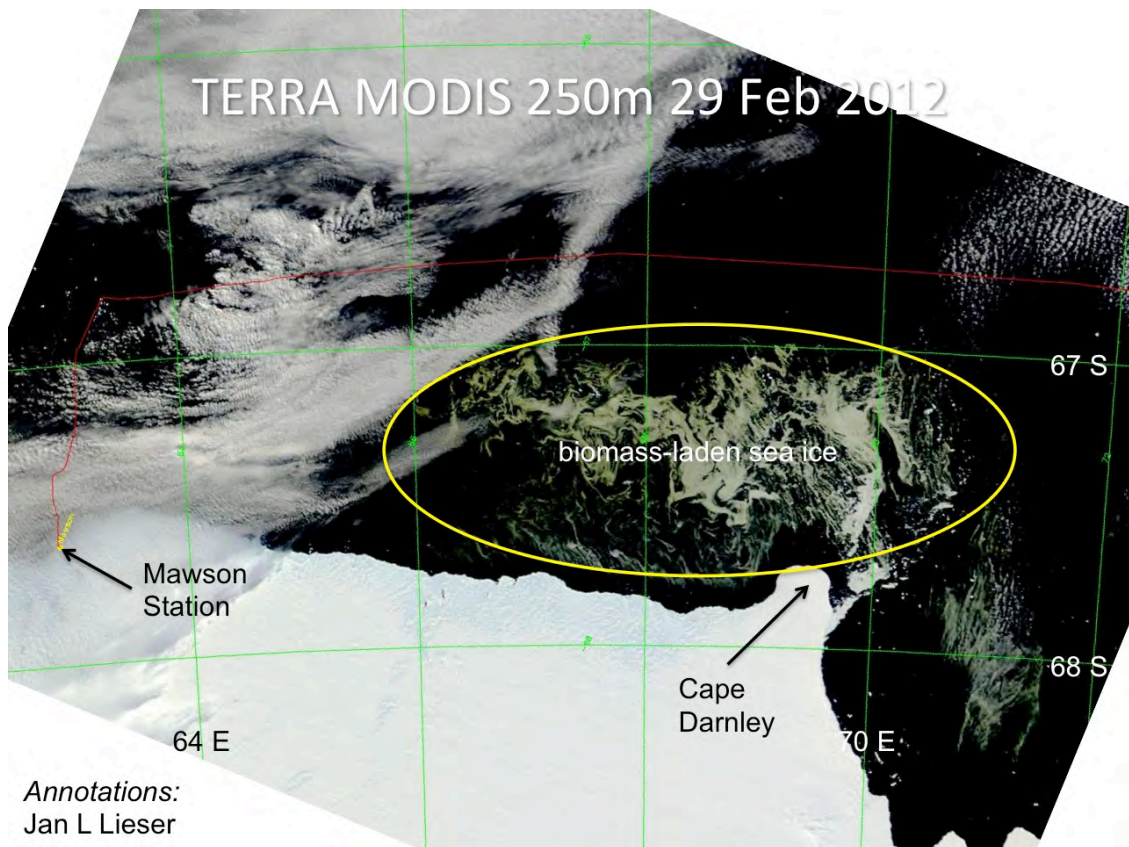


Figure 1: MODIS image, acquired 29/02/2012 and provided by NASA. The thin red lines denotes RSV *Aurora Australis*' current track towards Mawson Station.

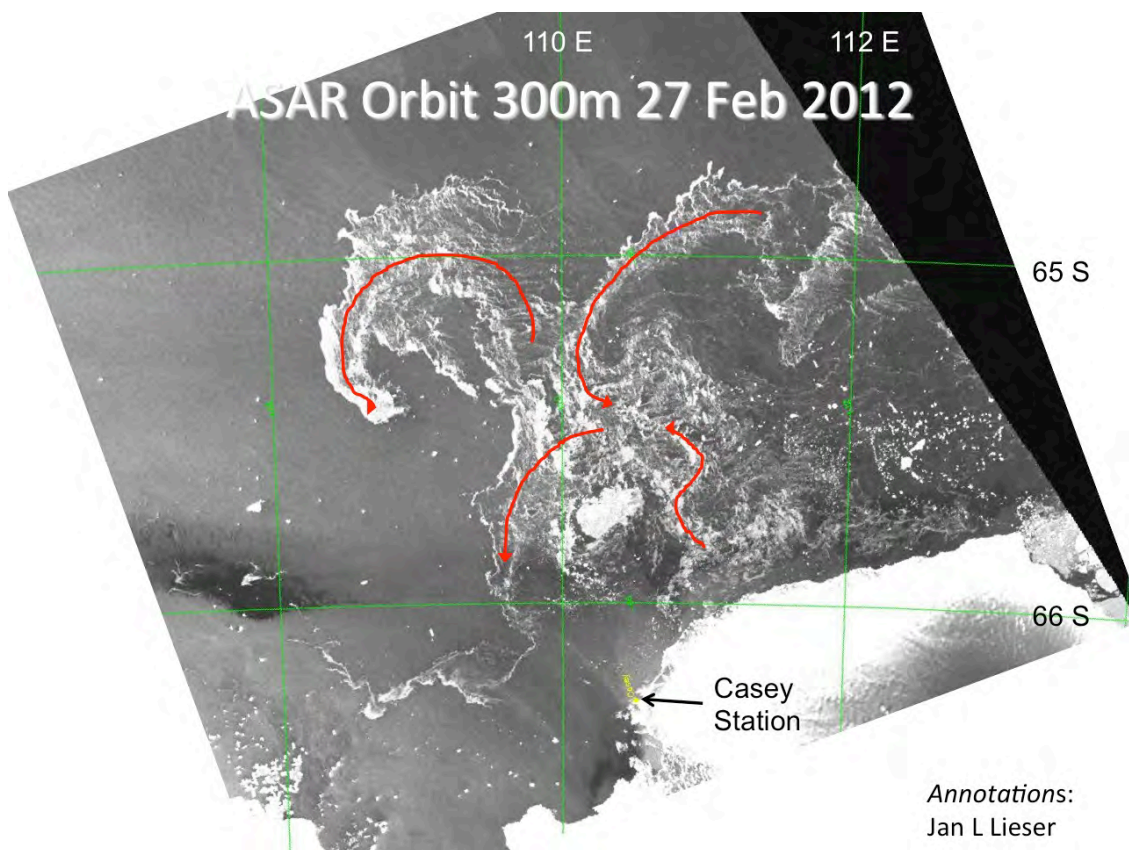


Figure 2: ASAR image, acquired 27/02/2012 and provided by PolarView.

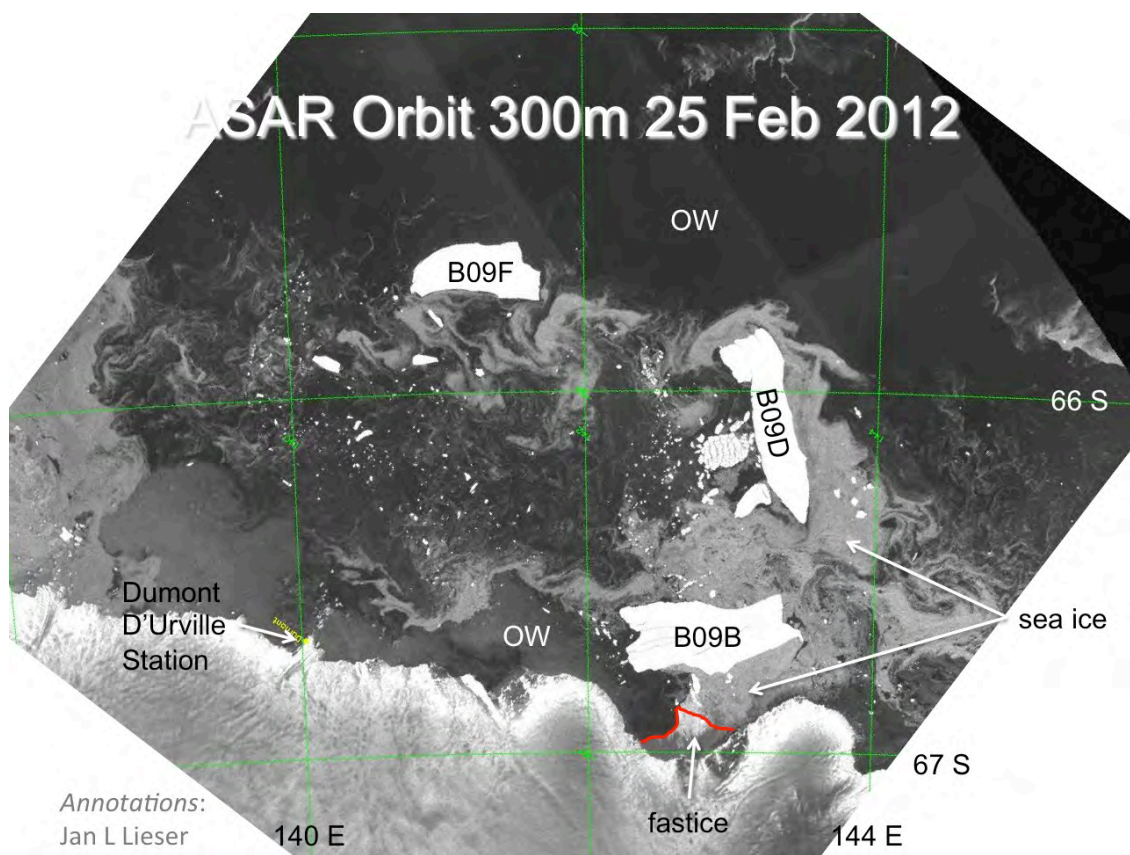


Figure 3: ASAR image, acquired 25/02/2012 and provided by PolarView.

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Sea Ice Report #10/2012

by the AAD/ACE CRC Sea Ice Group

07/03/2012

This report is concerned with all three Australian Antarctic stations:

- **Mawson Station**

The area at Mawson Station and to the north remains largely free of sea ice, although the 'green sea ice' is now almost reaching into the region from the east. There are only a few icebergs around.

Figure 1 shows yesterday's MODIS image with diverging biomass-laden sea ice (indicated by the yellow ellipse) to the north and west of Cape Darnley. This sea ice spans now almost 130 nm longitudinally, and still about 50 nm latitudinally. Even though the scene is partly under clouds, the dimensions of the patch are observable.

- **Davis Station**

The visible MODIS image shows Prydz Bay still has low reflectivity (very dark colours) indicating no or only very thin ice on the ocean surface. However, the high resolution ASAR image from 05/03/2012 (not shown) indicates that a change in surface properties is currently occurring, that means on a very small scale the surface is getting rougher, which can indicate freezing conditions.

Iceberg C28A is currently centred at 65° 48' S and 78° 40' E, and RSV *Aurora Australis* has just passed it about 14 nm to the north.

- **Casey Station**

A mixture of icebergs and sea ice is circulating in outer Vincennes Bay at present (see Figure 2). While it appears to be still diverging and dispersing, the ocean surface enclosed by this mélange seems to be relatively rough, indicating change as described in the previous section.

- **NB: Commonwealth Bay**

Yesterday's high resolution MODIS image is shown in Figure 3.

The conditions have changed over the previous week. B09D has its long axis now aligned in an east-west direction as well, and has almost caught up with B09F, while B09B remains where it was last week. The area between the coast and about 65° 30' S is now rapidly filling up with sea ice advected from the east. The region north of Dumont D'Urville Station appears to be covered only by loose sea ice, but heavy, compact sea ice (as indicated by the white arrows in Figure 3) is entering from the east.

With best regards,

Jan, for the sea ice group.

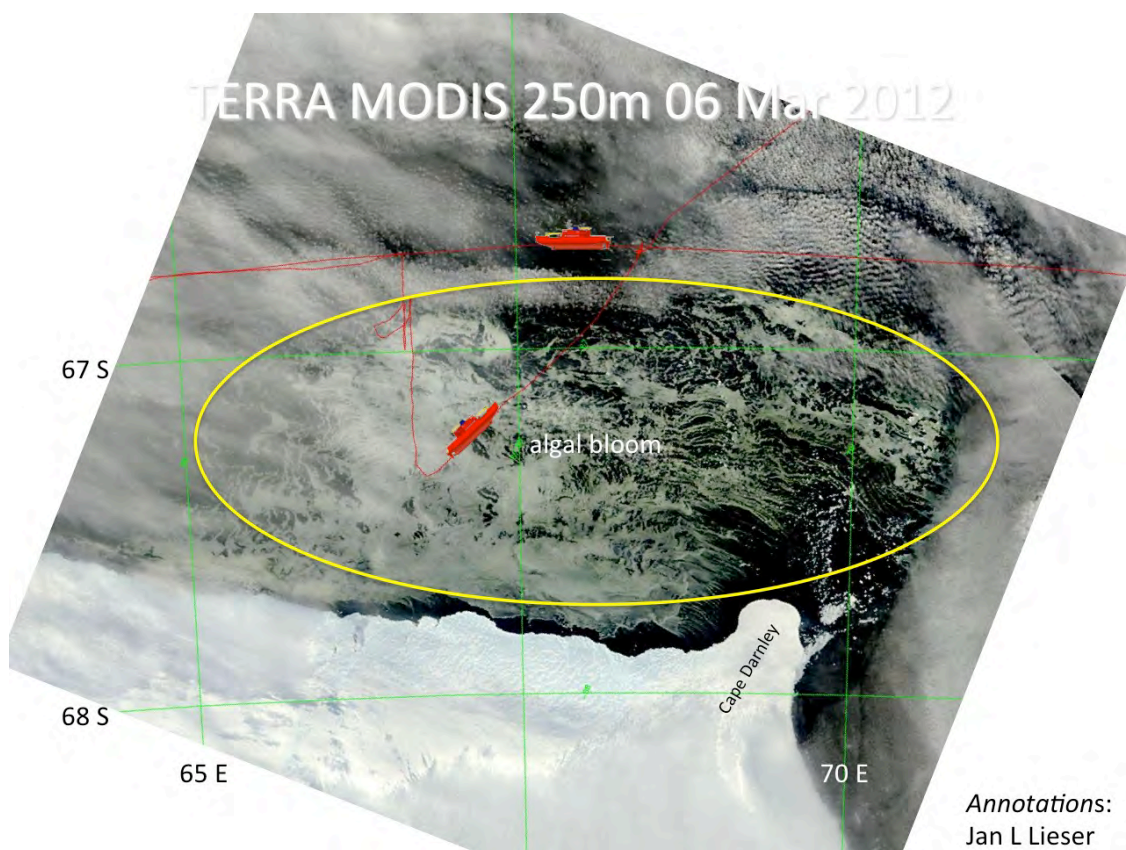


Figure 1: MODIS image, acquired 06/03/2012 and provided by NASA. The thin red lines denotes RSV *Aurora Australis*' current track in the region.

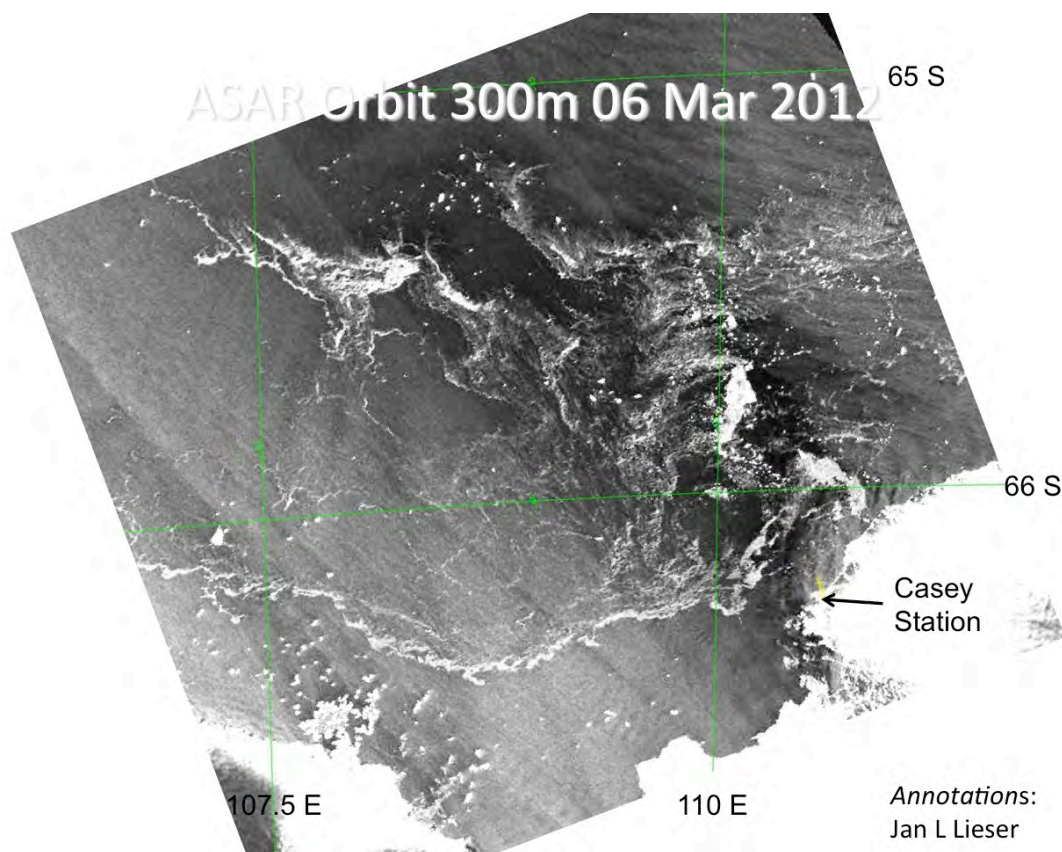


Figure 2: ASAR image, acquired 06/03/2012 and provided by PolarView.

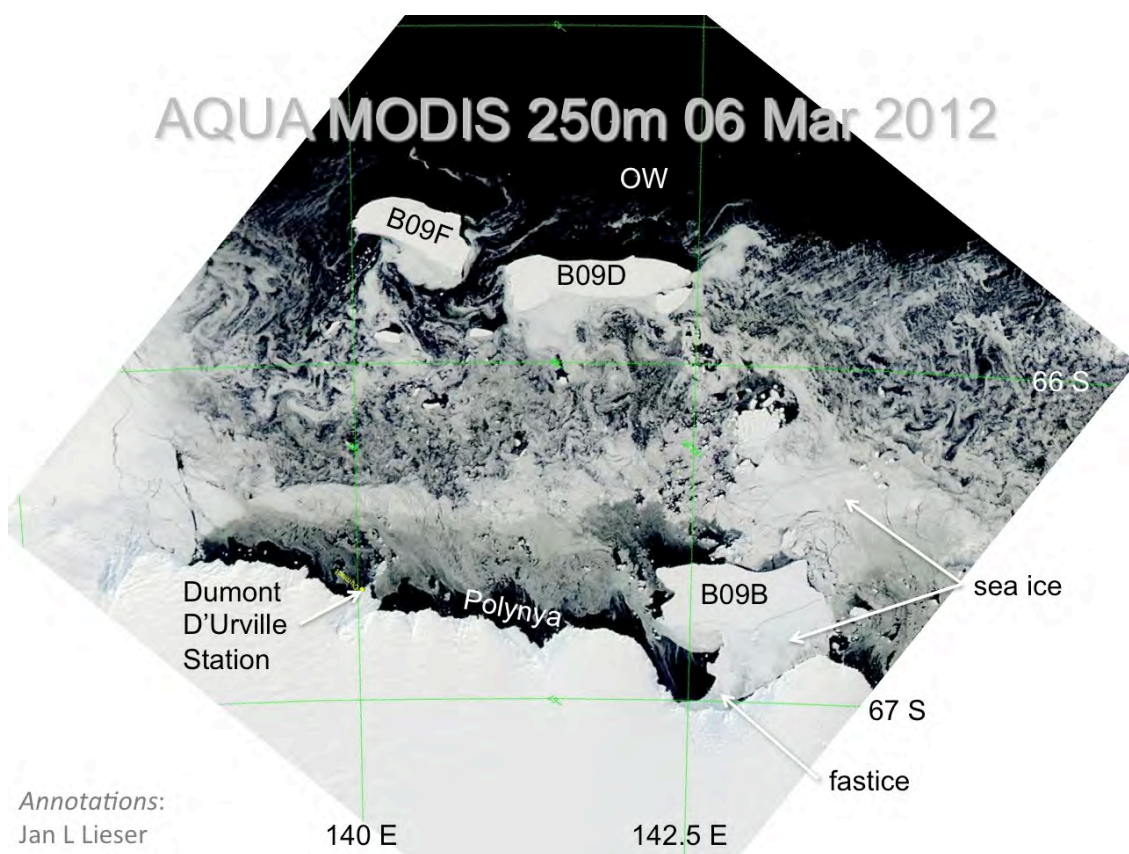


Figure 3: MODIS image, acquired 06/03/2012 and provided by NASA.

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Sea Ice Report #11/2012

by the AAD/ACE CRC Sea Ice Group

15/03/2012

This report is concerned with all three Australian Antarctic stations.

The freezing season has arrived in Antarctica.

- **Mawson Station**

Figure 1 shows the latest suitable high resolution ASAR image for the Mawson Station region acquired three days ago. Due to persistent cloud cover the ocean surface is obscured at the moment. Sea-ice formation is well under way in the area. The ice cover appears to be still thin, but highly dynamic, with signs of larger floe formation and consolidation detectable in the region of 67° E. In yesterday's coarse resolution ASAR image the northern ice edge appears to be at about 66° 30' N. However, ice concentration is only reported to be about 50% locally.

Horseshoe Harbour appears still mainly free of sea ice in the web-cam images, but grease ice formation is visible and under quiescent conditions the harbour freezes over.

- **Davis Station**

The immediate vicinity of Davis Station appears to be covered by sea ice now, as evident in web-cam imagery. Yesterday's high resolution ASAR image fails to cover the Vestfold Hills, but Figure 2 shows the region between about 77° 30' E and the West Ice Shelf and iceberg D15 covered by forming sea ice. As well as to the east of Mawson Station, floe formation and consolidation can be detected.

Iceberg C28A is currently centred at 66° S and 77° 50' E, rotating anti-clockwise and moving slightly to the southwest recently.

- **Casey Station**

The same conditions as for Mawson Station (overcast, and less than optimal ASAR coverage) apply for Casey Station. Figure 3 shows the latest suitable ASAR image acquired 12/03/2012. Freezing conditions, but a highly dynamic ice cover at the moment, can be detected. The ice edge is roughly oriented in east-west direction at about 66° 20' S. Ice concentration is reported to be less than 50% by the coarse resolution SSMIS.

With best regards,

Jan, for the sea ice group.

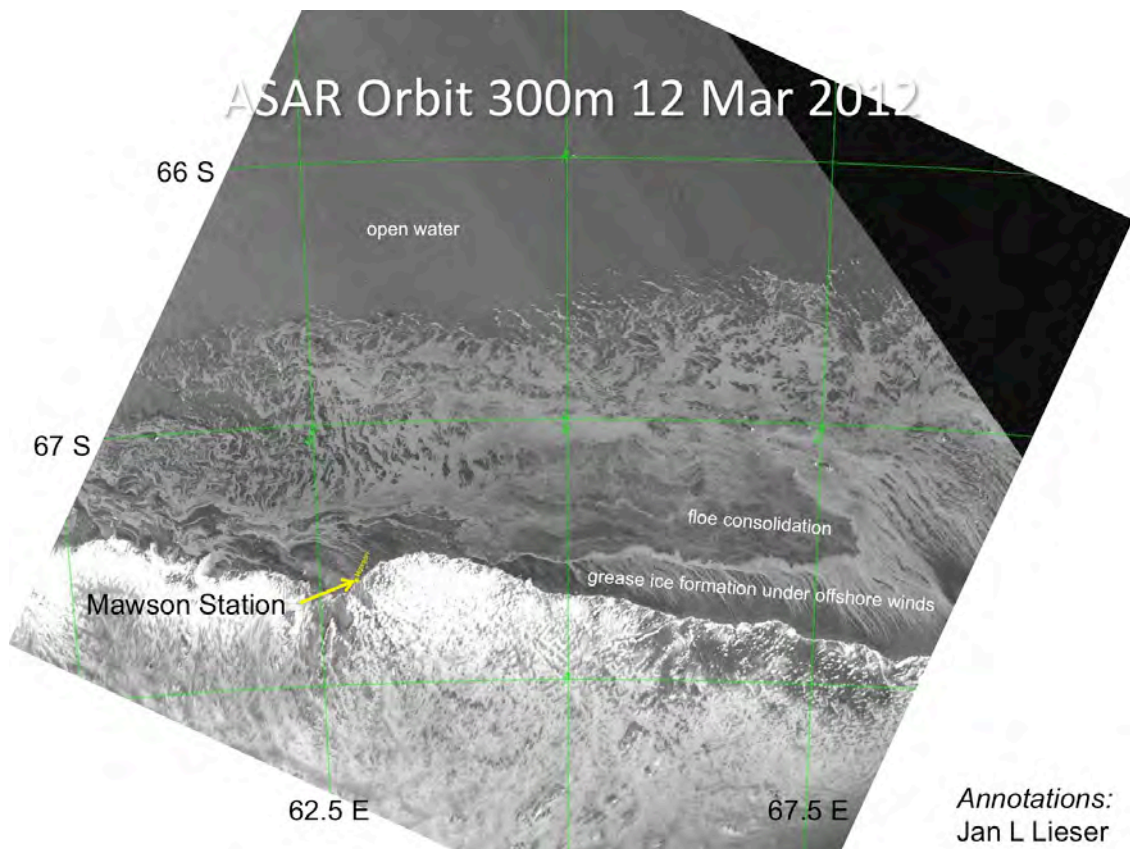


Figure 1: ASAR image, acquired 12/03/2012 and provided by PolarView.

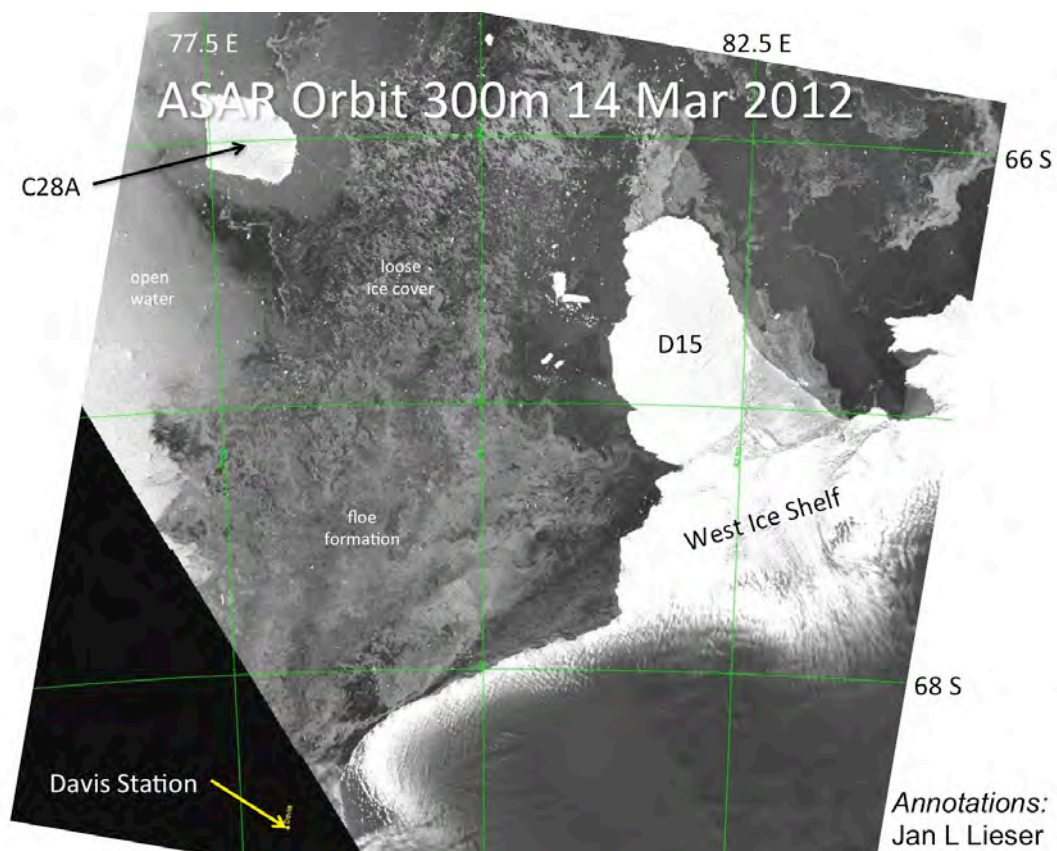


Figure 2: ASAR image, acquired 14/03/2012 and provided by PolarView.

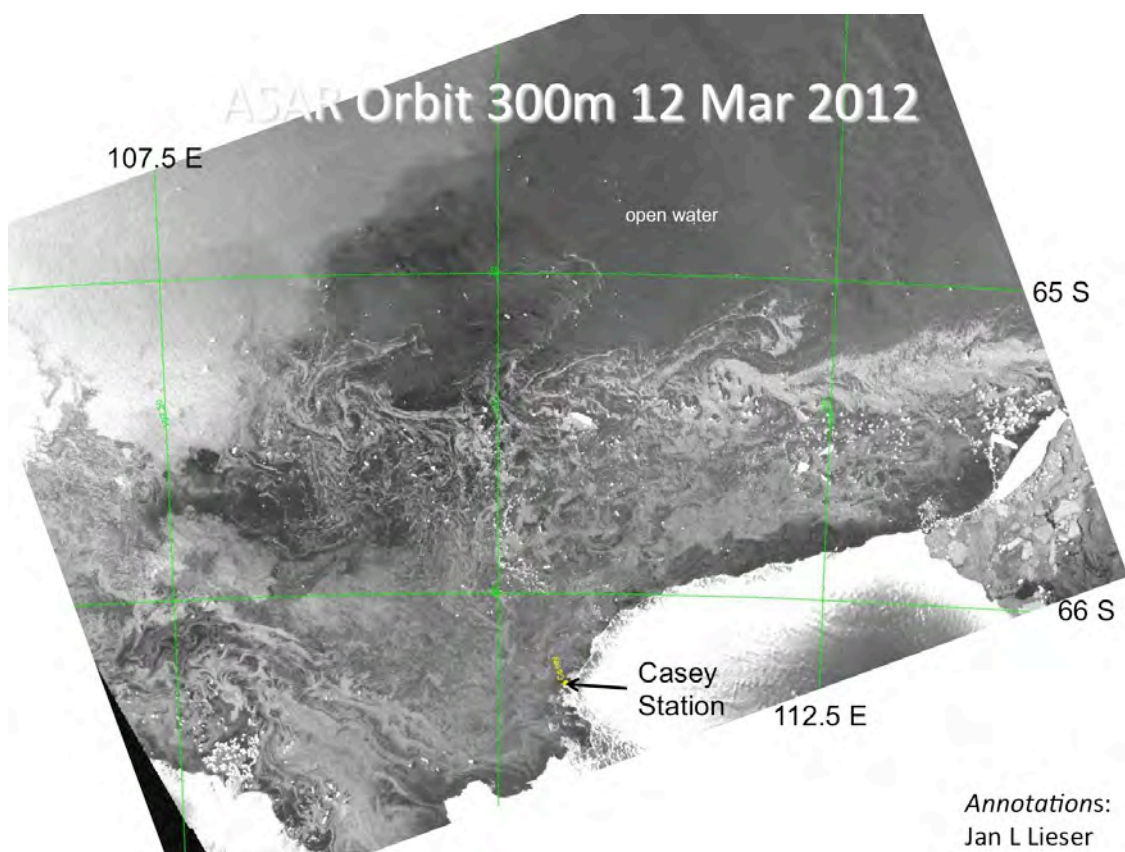


Figure 3: ASAR image, acquired 12/03/2012 and provided by PolarView.

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Sea Ice Report #12/2012

by the AAD/ACE CRC Sea Ice Group

22/03/2012

This report is concerned with all three Australian Antarctic stations.

- **Mawson Station**

Figure 1 shows the most recent MODIS image for the region between Mawson Station and Davis Station.

A band of newly formed sea ice spans from eastern Prydz Bay westward beyond Mawson Station and from the continent to just north of 66° S. In the centre of this band, sea-ice concentrations are reported by SSMIS to be up to 100% locally, but a coastal polynya that is a few hundreds of meters wide is a pretty persistent feature over the last week. It seems to be maintained by relatively strong offshore winds between Cape Darnley and Mawson Station (and beyond), and can also be detected off the Amery Ice Shelf. However, many icebergs can be identified in the region in high resolution ASAR imagery, especially in the western Prydz Bay region at the moment.

Judging from the web-cam images, Horseshoe Harbour appears to start to freeze over.

- **Davis Station**

Immediately offshore Davis Station, the sea-ice cover appears to be consolidated, as evident in the web-cam imagery. The whole of Prydz Bay is now filling with sea ice and the northern ice edge north of Davis Station is now around 66° S as well. Again, SSMIS reports lower ice concentrations nearshore, that is less than 50%, to the west of the West Ice Shelf and iceberg D15. This region is under clouds in Figure 1.

Also shown in Figure 1, iceberg C28A is currently centred at 66° 07' S and 77° 42' E, still rotating slightly anti-clockwise and moving slowly in southerly direction recently.

- **Casey Station**

New sea ice is forming in Vincennes Bay and many icebergs are distributed in the region. Directly north of Casey Station and north of 66° S is a larger area of consolidating pack ice, but the region to the west of 109° 20' E is still largely sea-ice free down to about 66° S, see Figure 2 for reference. Nearshore Casey Station appears to be still free of sea ice, although a thin ice cover may be present.

With best regards,

Jan, for the sea ice group.

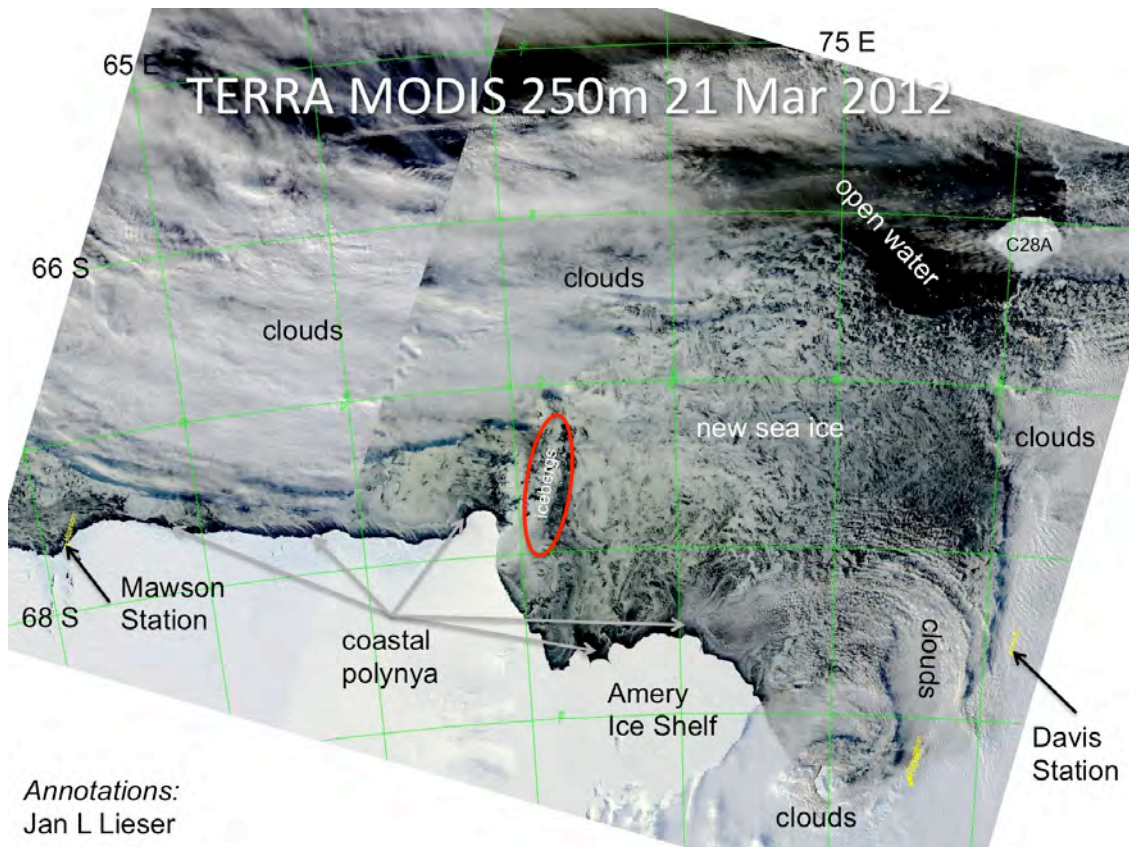


Figure 1: TERRA MODIS image, acquired 21/03/2012 and provided by NASA.

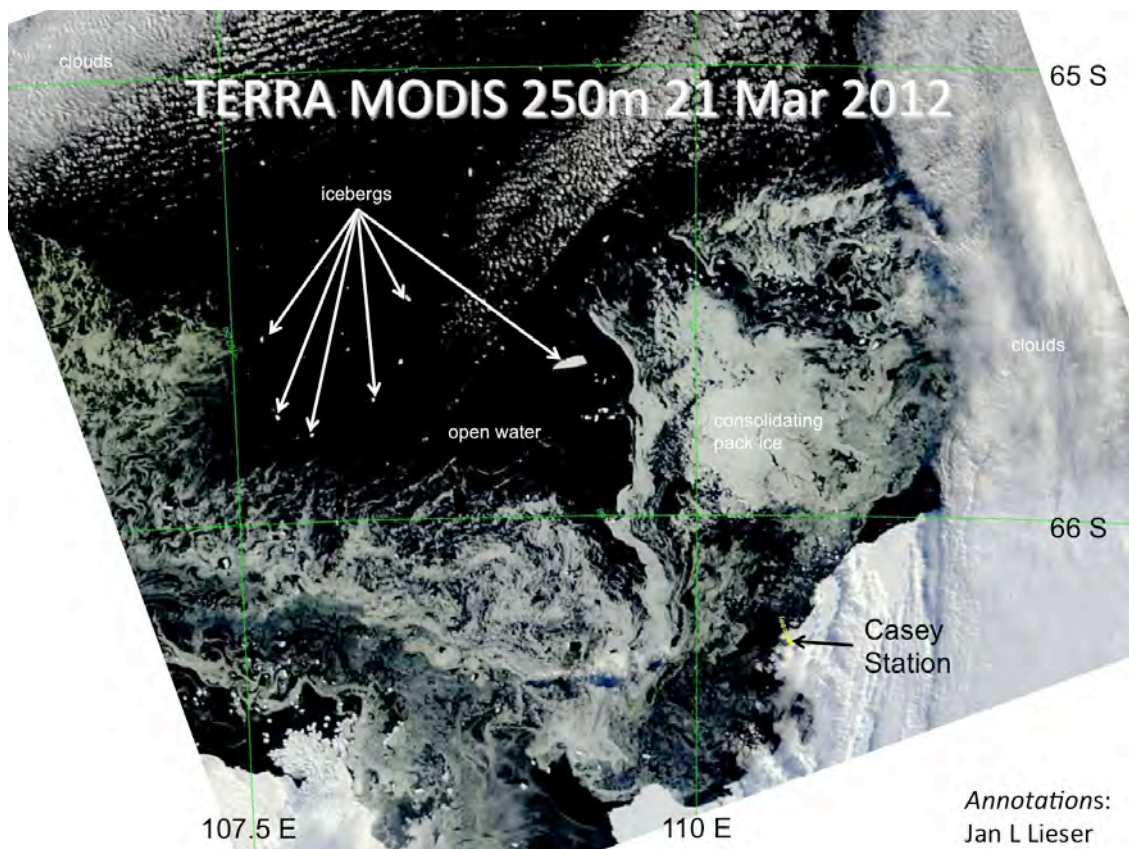


Figure 2: TERRA MODIS image, acquired 21/03/2012 and provided by NASA.

Sea Ice Report #12a/2012

by the AAD/ACE CRC Sea Ice Group

26/03/2012

This is an update on the greater Prydz Bay region. Due to the lack of suitable high resolution imagery recently, Figure 1 shows the coarse resolution ASAR for the area between Mawson Station and Davis Station. The dashed, red line denotes the approximate sea ice edge.

Figure 2 shows the region of interest as seen by the SSMIS instrument.

- **Mawson Station**

The region between Mawson Station and Davis Station is increasingly filling up with sea ice. The sea ice edge to the north of Cape Darnley is now at approximately 65° 20' S, with loose filaments of sea ice possibly reaching even further north. To the north of Mawson Station this edge is still at about 65° 50' S. Between about 67° S and the ice edge the sea ice appears quite loose, but closer to the continent larger floes start to form and consolidate. But offshore winds still seem to maintain a coastal polynya between Cape Darnley and Mawson Station. However, grounded icebergs to the east of Mawson Station (at about 67° 24' S and 63° 53' E) and elsewhere are acting as sea-ice catcher already, accumulating sea ice up-drift.

- **Davis Station**

Sea-ice conditions to the north of Davis Station can be roughly separated into two regimes: to the north of 67° S and south of that (yellow, dotted line in Figure 1). Loose, forming sea ice is found predominantly to the north of 67° S, with the ice edge just shy of 65° S around iceberg C28A. This berg is currently centred at 66° 06' S and 77° 45' E, still rotating anti-clockwise and moving slightly in southwesterly direction recently. To the south of 67° S, sea ice is consolidating and forming larger floes. Sea ice concentration reaches 100% locally.

With best regards,

Jan, for the sea ice group.

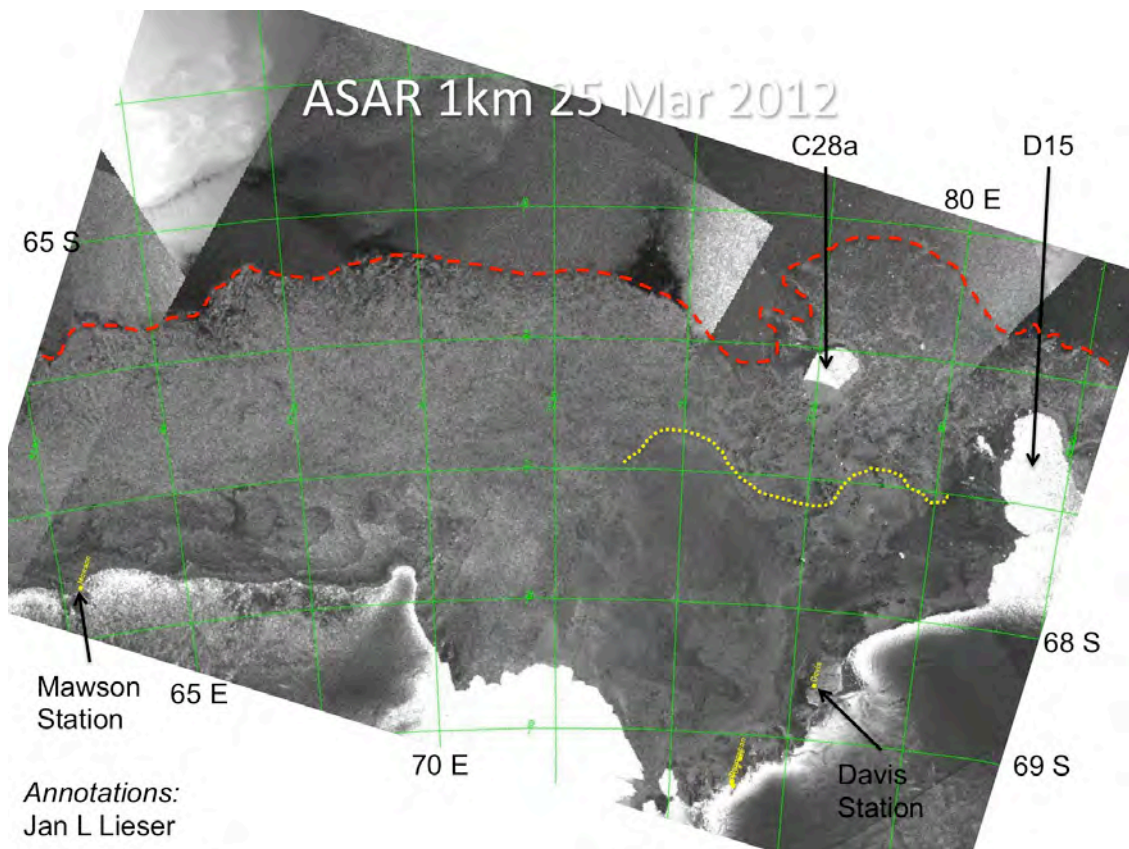


Figure 1: ASAR 1 km composite, acquired 25/03/2012 and provided by PolarView.

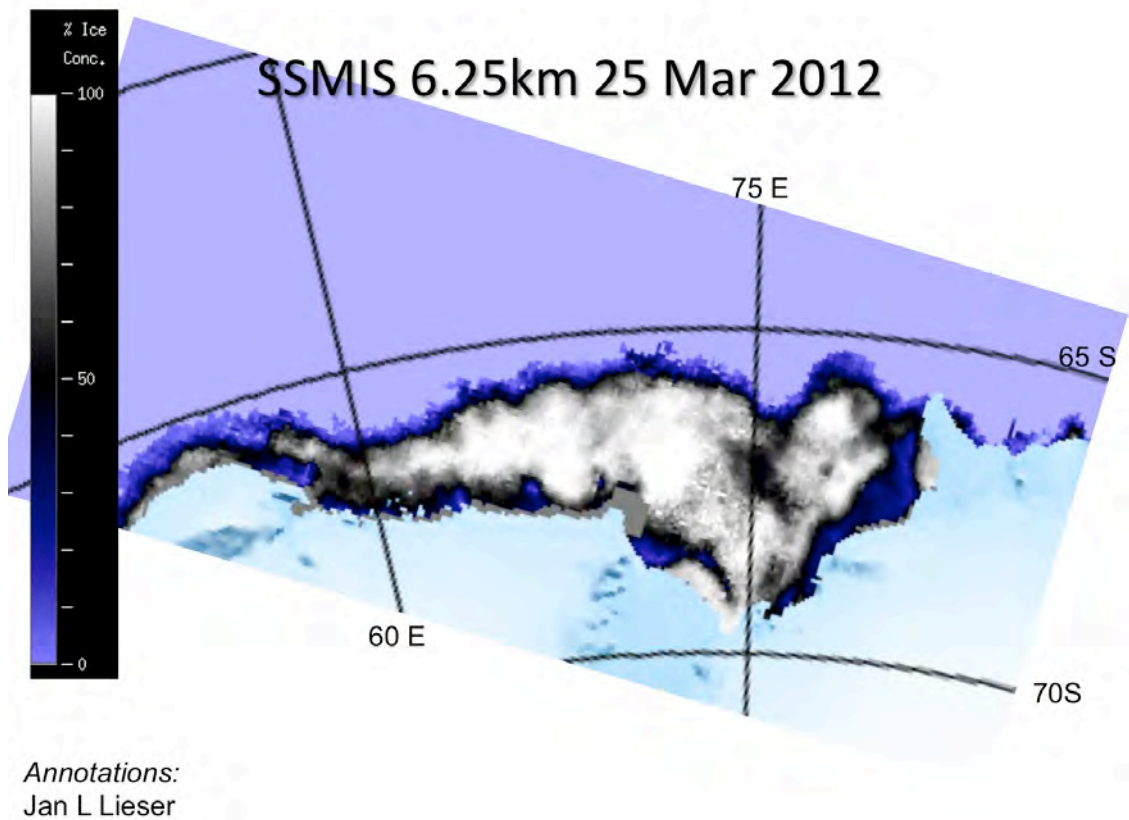


Figure 2: SSMIS 6.25 km composite, acquired 25/03/2012 and provided by Bremen University/PolarView.

Sea Ice Report #13/2012

by the AAD/ACE CRC Sea Ice Group

29/03/2012

This report is concerned with all Australian Antarctic stations.

- **Mawson Station**

Sea ice in front of and to the north of Mawson Station is forming rapidly, and is reaching as far north as 66° 20' S now. Even though it is still early stages of freezing and some parts of the sea ice in the area appear relatively smooth in the latest high resolution ASAR image, icebergs in the region are already acting as anchor points and obstacles and piling up sea ice in the up-drift side, typically the eastern side where closer to the shore. This is particularly obvious near the so-called iceberg alley and the eastern side of Cape Darnley (see Figure 1 for reference).

- **Davis Station**

Prydz Bay is steadily filling up with sea ice as well. In the cloud free western part of Figure 2, lots of cracks and substantial leads are still clearly visible. The region around iceberg C28A is partially covered by newly forming sea ice, but cumulus shaped clouds are confusing the interpretation here. Unfortunately, no high resolution ASAR imagery is available today to assist in a positive detection of the ice edge.

In Figure 2, the thin red line with the ship heading south denotes the recent inbound track in to Davis Station of RSV *Aurora Australis*' Voyage 5. The thin red line crossing in the north is part of the previous return leg of Voyage 4.

- **Casey Station**

Vincennes Bay is now almost entirely covered by sea ice, too. To the west of 110° E and to the north of about 66° S sea ice is consolidating behind a barrier of icebergs. While sea ice conditions in the immediate vicinity of Casey Station might still be light at the moment, the bay to the south of about 65° 15' S is dominated by forming sea ice. At this stage, the forming sea ice closer to the coast around the Windmill Islands appears to be transported offshore to the west, while to the north of about 66° S and to the west of 110° E more turbulent conditions appear to be dominant with more open water patches in the mix.

With best regards,

Jan, for the sea ice group.

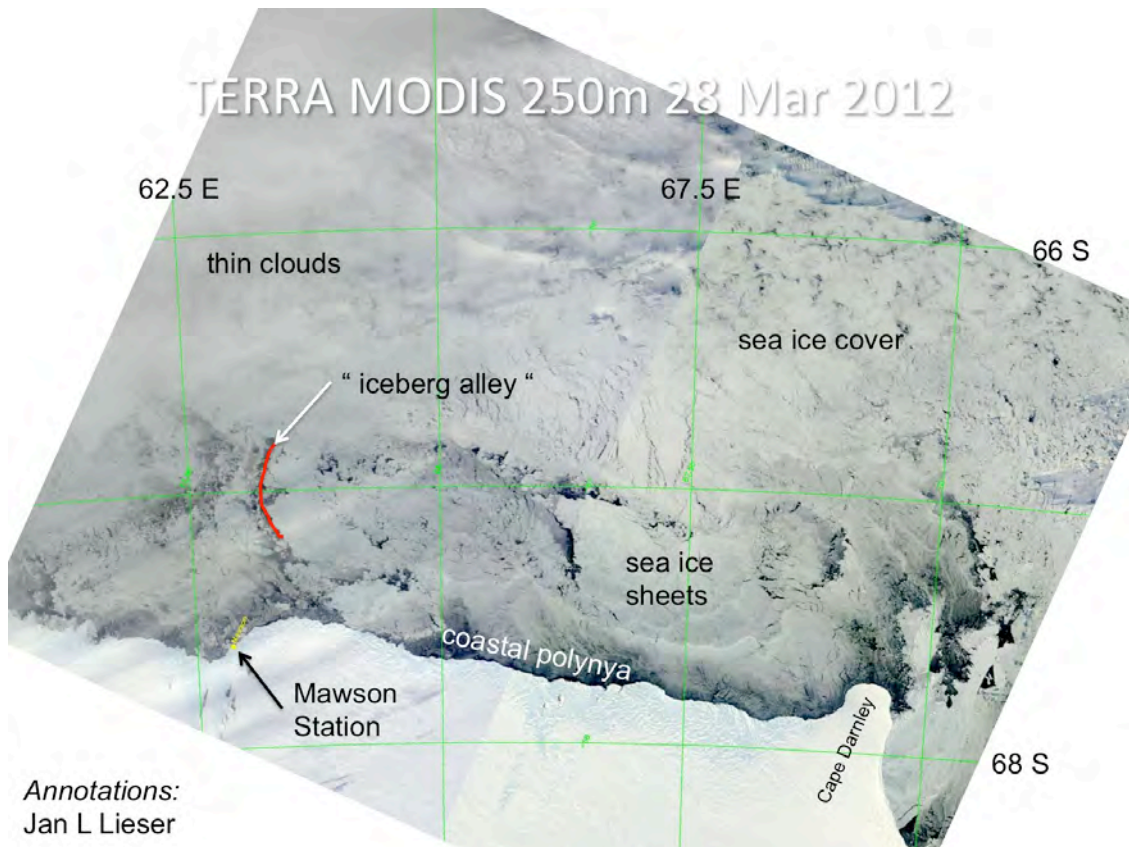


Figure 1: TERRA MODIS image, acquired 28/03/2012 and provided by NASA.

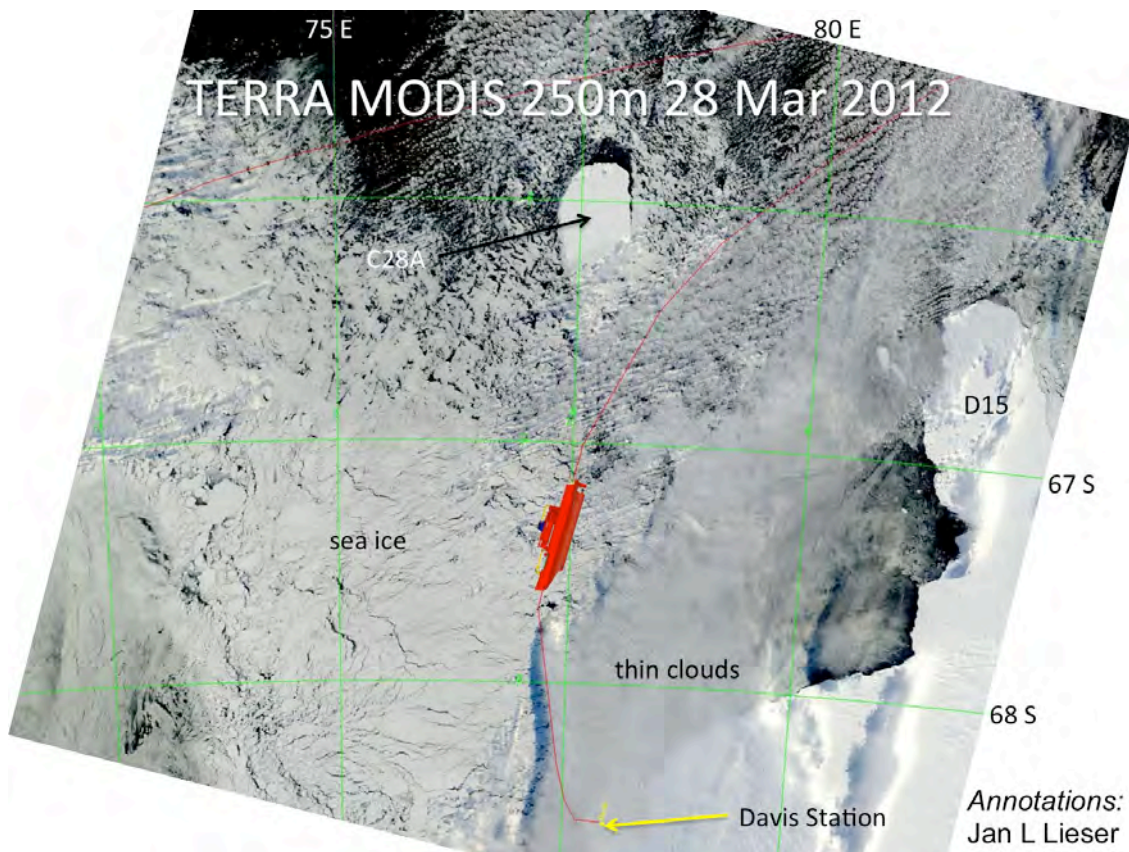


Figure 2: TERRA MODIS image, acquired 28/03/2012 and provided by NASA.

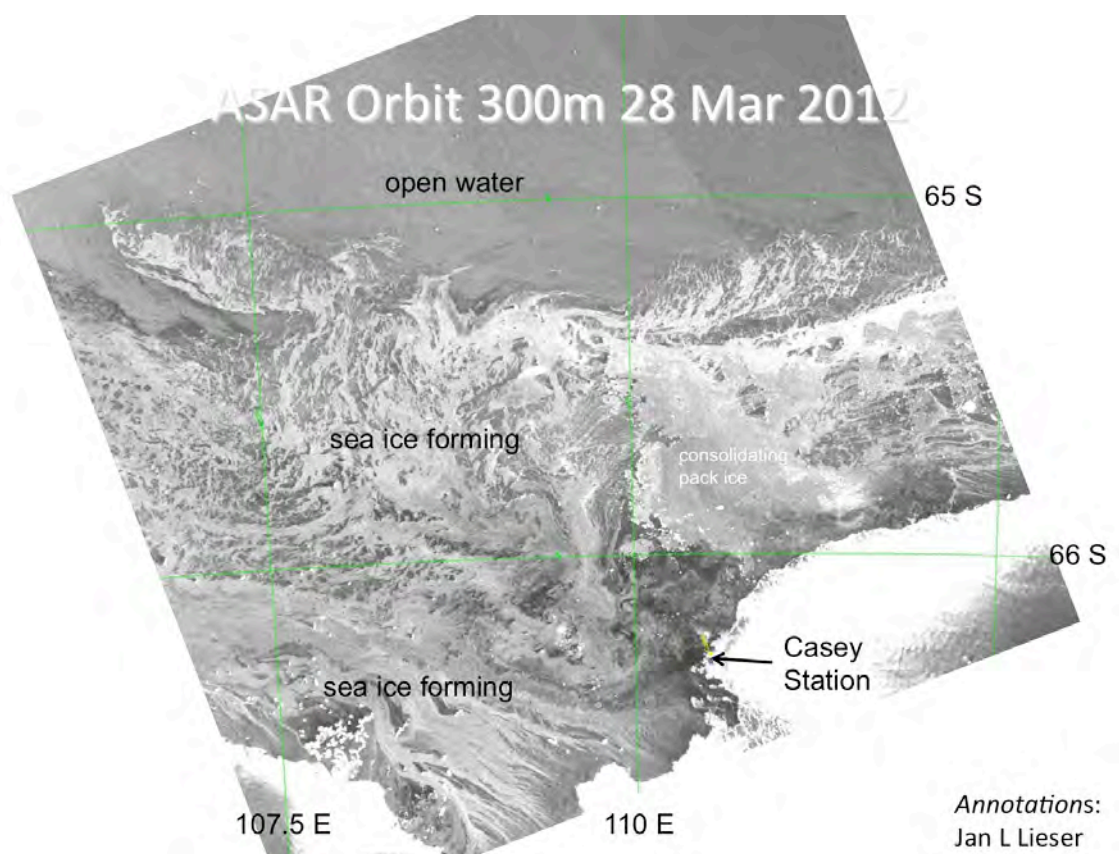


Figure 3: ASAR Orbit 300m image, acquired 28/03/2012 and provided by PolarView.

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Sea Ice Report #14/2012

by the AAD/ACE CRC Sea Ice Group

05/04/2012

This report is concerned with all Australian Antarctic stations.

- **Mawson Station**

Sea ice to the north of Mawson Station can be categorised largely into three major regions: a near-shore polynya region with minimal or thin sea ice, the consolidating central pack ice roughly between 66° S and 67° S, and the outer pack ice to the north of 66° S (see Figure 1). The ice edge appears to be quite diffuse and dynamic in the area.

- **Davis Station**

Prydz Bay continues to fill up with sea ice. However, the region is still quite dynamic, enabling coastal polynyas to form, for example at the western side of the West Ice Shelf and iceberg D15, off the Vestfold and Larsemann Hills, as well as at the front of the Amery Ice Shelf. Many large leads and openings are still detectable in the entire sea ice filled Prydz Bay in recent high resolution ASAR and MODIS imagery.

In Figure 2, the thin red line denotes the recent track of RSV *Aurora Australis*' Voyage 5 in to Davis Station, then crossing Prydz Bay towards Cape Darnley and continuing northeast en-route to Casey Station, passing narrowly past iceberg C28A.

- **Casey Station**

Relatively light sea ice conditions are currently present off Casey Station and in Vincennes Bay. As can be seen in Figure 3, RSV *Aurora Australis* was able to follow an open water channel from the open ocean north of 65° S into the station area. This open water stretch is surrounded by consolidating pack ice, but again the whole region appears to be highly dynamic. Only minor filaments of sea ice circulate in Vincennes Bay at present, but changing atmospheric conditions can allow freezing over and filling up with sea ice quickly.

Happy Easter,

Jan, for the sea ice group.

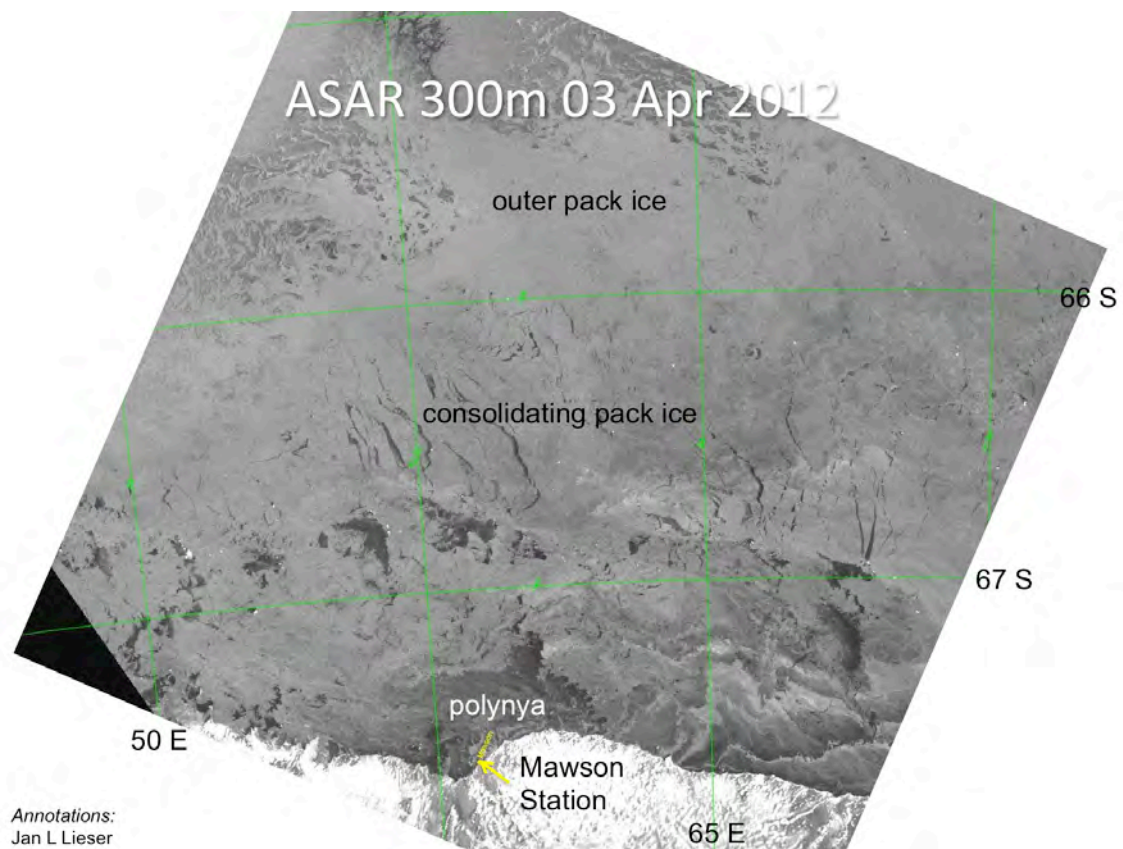


Figure 1: ASAR Orbit 300m image, acquired 03/04/2012 and provided by PolarView.

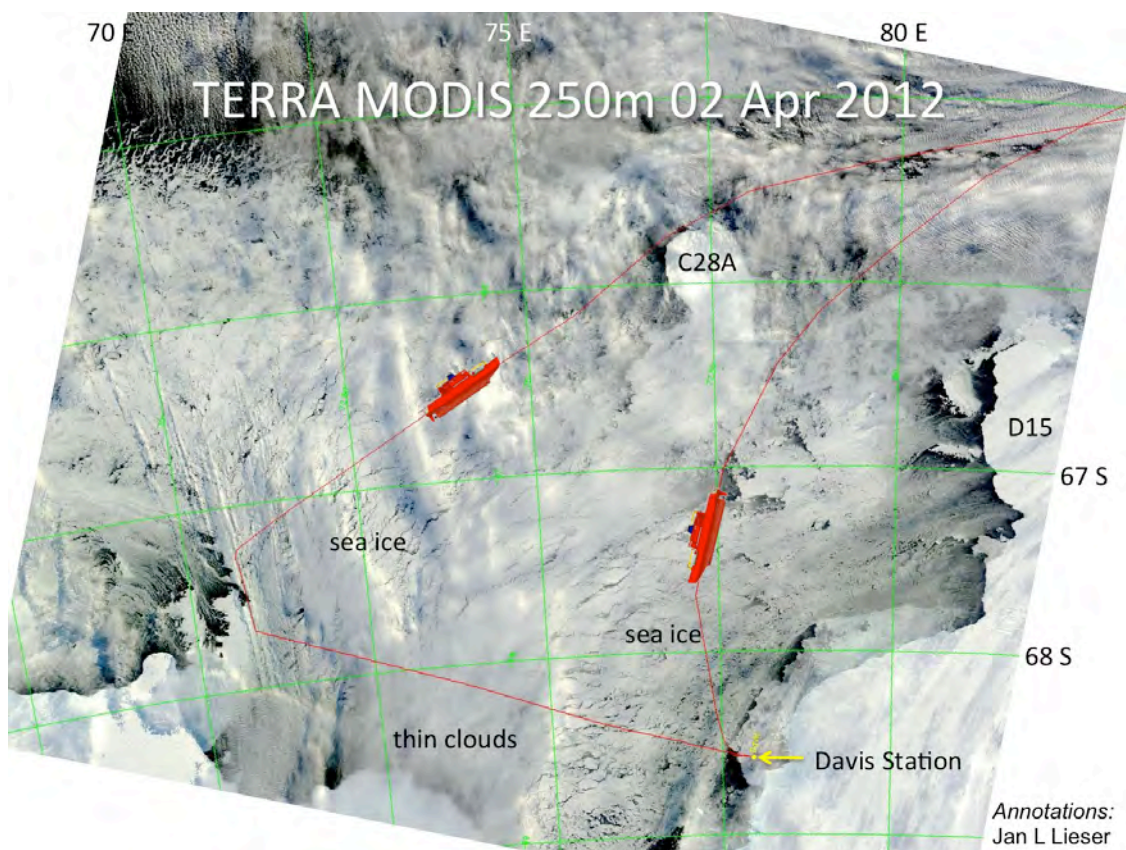


Figure 2: TERRA MODIS image, acquired 02/04/2012 and provided by NASA.

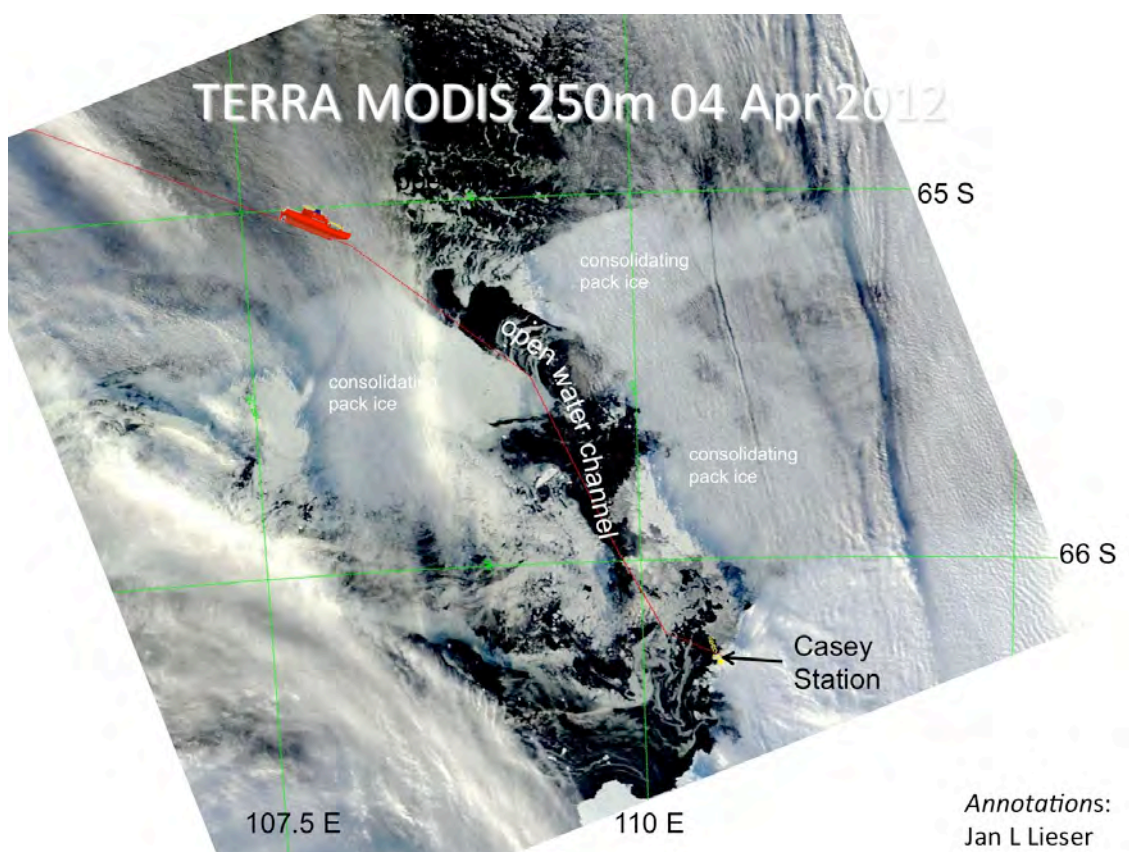


Figure 3: TERRA MODIS image, acquired 04/04/2012 and provided by NASA.

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Sea Ice Report #15/2012

by the AAD/ACE CRC Sea Ice Group

12/04/2012

We have not received any high resolution images via PolarView recently. The latest full set of high resolution ASAR data is dated 05/04/2012, with only one update for Davis Station on 08/04/2012. During the last week, constantly overcast conditions prevented visible images of the surface.

The images provided with this report cover all three Australian Antarctic stations (see Figures 1 and 2); the thin red line denotes the recent cruise track of RSV *Aurora Australis*' Voyage 5 in the region.

The sea ice freezing season is well established in East Antarctica. The ice cover is expanding northward, in most places beyond 65° S already. Only minimal sea ice cover and a more southern sea ice edge is found in the region off the Russian Mirny Station between about 81° E and 95° E. In other locations, for example near Cape Darnley, to the west of the West Ice Shelf, and off Law Dome, coastal polynyas appear to be maintained at the moment.

With best regards,

Jan, for the sea ice group.

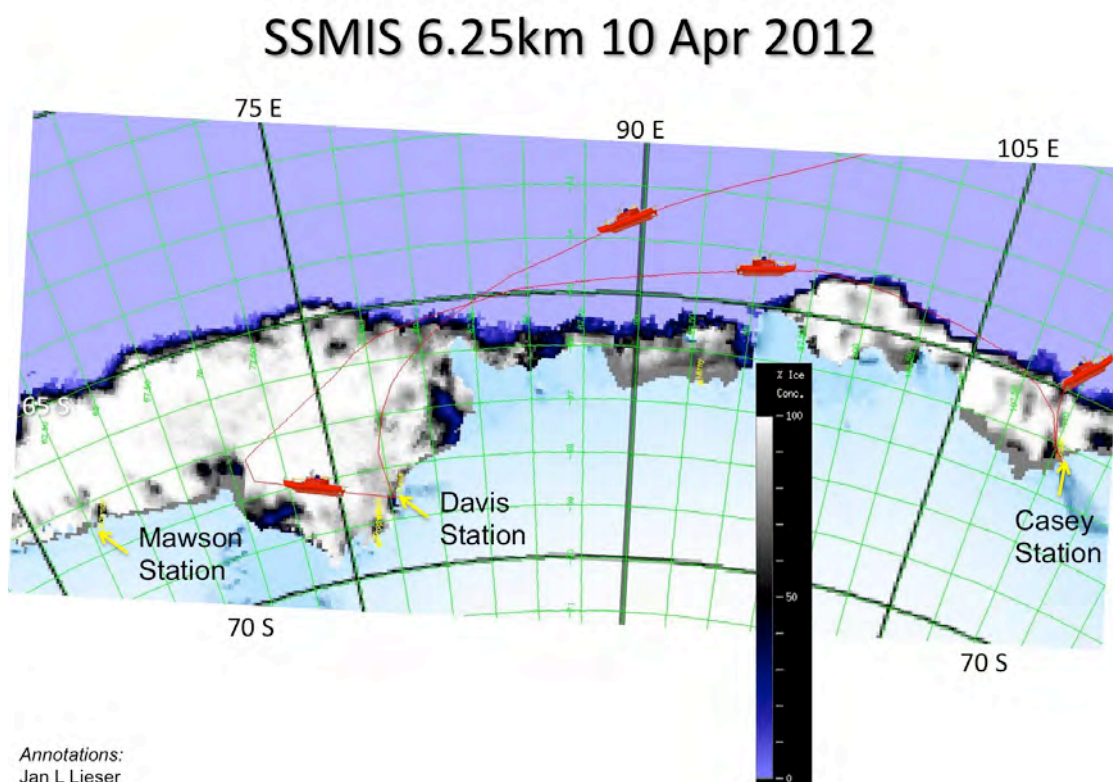
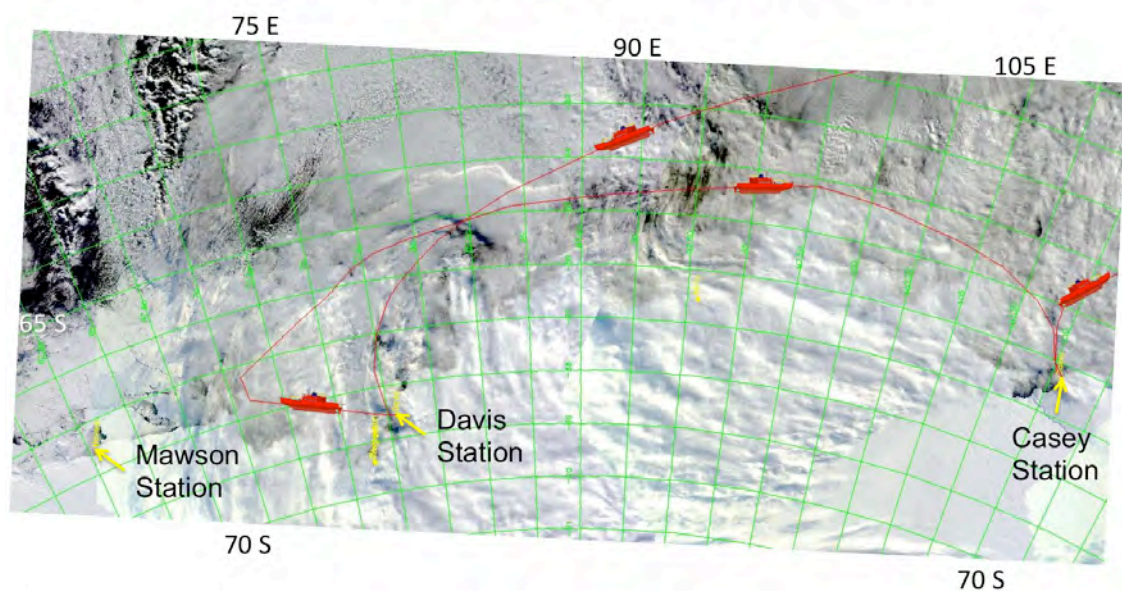


Figure 1: SSMIS image, acquired 10/04/2012 and provided by PolarView.

TERRA MODIS 250m 10 Apr 2012



Annotations:
Jan L Lieser

Figure 2: TERRA MODIS image, acquired 10/04/2012 and provided by NASA.

The Sea Ice Group:

Jan L Lieser



Dr Lieser is a meteorologist and marine glaciologist in the Cryosphere Program of the Antarctic Climate & Ecosystems CRC. Jan's research interest is airborne imaging techniques using digital aerial photography and scanning LiDAR to estimate sea ice thickness. This information is used to check remote sensing data collected by satellites like ICESat and CryoSat-2, which is used by other Antarctic research programs.

Jan has researched *in-situ* polar meteorological observations and sea ice geophysical properties, as well as numerical modelling of Arctic sea ice and Antarctic sub-glacial Lake Vostok, and the interpretation of remote sensing data. He was a wintering scientist at the German Neumayer Station and participated in several field research programs in both the Arctic Ocean and Antarctica.

Robert A Massom



With over 30 years experience in a broad spectrum of polar-related research, Dr Rob Massom has worked extensively both in Arctic (1980-1992) and Antarctic (1986-present) research. His current research interests include changes in Antarctic sea ice and polar oceans and their physical and ecological significance, and bipolar comparisons; the impact of modes of large-scale anomalous atmospheric circulation and extreme events on sea ice properties and ecology; remote sensing of

sea ice and its validation; snow cover on sea ice (characteristics and impacts); sea ice as a habitat; and interactions between the Antarctic Ice Sheet and sea ice (including ice-shelf breakup processes). Rob has participated on three Arctic and nine Antarctic major international multi-disciplinary sea-ice research field studies.

Petra Heil



Dr Heil works as a senior research scientist within the Climate Processes and Change Program of the Australian Antarctic Division, and the Cryosphere Program of the Antarctic Climate & Ecosystems CRC. Her research concerns physical sea-ice processes, which she investigates using *in-situ* or remotely sensed information and numerical modelling. Her current research interests include the investigation of sea-ice drift and deformation; sea-ice modelling (stand-alone and coupled

codes, decadal modelling and short-term forecasting); fast-ice studies, including mixed-layer processes; spatio-temporal variability in Antarctic and Arctic sea ice, and their interaction with polar oceans and atmosphere; and polar atmospheric processes. She has participated on several Antarctic and Arctic major multi-disciplinary sea-ice and marine-science research field campaigns, and wintered at Davis Station working on a multi-disciplinary fast-ice study.



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