



# SEA ICE

## *Observations*

This CD-ROM has been produced by the ASPeCt program of SCAR GLOCHANT (Global Change and the Antarctic). It contains a tutorial and support material for ice observers recording sea ice thickness and characteristics from vessels operating in the Antarctic pack ice.

Use the esc key to exit at any time

click arrow to proceed






Ice breaking vessels provide a unique platform for gathering detailed information on the thickness, distribution and characteristics of the Antarctic pack ice.

Your sea ice observations will help develop a seasonally and regionally varying climatology of sea ice thickness and characteristics around Antarctica. This is one of the major objectives of ASPeCt.



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In addition to the sea ice observation tutorial, this CD-ROM contains information about:

- Sea ice and climate
- Image library of sea ice types and terminology
- SCAR and ASPeCt
- Observation forms
- Software and user guide for entering and processing sea ice observations
- Where to send your data

You can access this information from anywhere in the tutorial using the menu button. The menu also has tutorial shortcuts.

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**SEA**  
*Observations*  
**ASPeCt ICE**

sea ice observations  
**tutorial** 

# START TUTORIAL



This tutorial will help you make accurate assessments of sea ice thickness and characteristics and show you how to record these on the Observation form. [Click the 'OBS FORM' button to view the Observation form.](#)



This form will be completed as you progress through the tutorial. You will also find essential information when you click the 'handy hint' button.



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# OBS

## GETTING STARTED

Sea ice observations should be made hourly from the ship's bridge as the ship moves through the pack ice. This tutorial will characterise the pack ice conditions in the image below as an example of how the observations should be conducted.



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# OBS STANDARDISE

Record the pack ice conditions in the immediate vicinity of the ship by limiting your observations to about a 1 km radius. Ensure your observations are consistent with those of other observers by comparing simultaneous observations and resolving any differences.



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# OBS

## TIME, DATE & POSITION

For each observation you must record the time (GMT), latitude and longitude. Record the date at the top of the page. Click the 'obs form' button to see how this is recorded.



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OBS FORM

click

# ICE

## TOTAL CONCENTRATION (c)

Total ice concentration is the fraction of the ocean covered by any type of sea ice. Estimate this value in tenths (to the nearest 10%).



hint

**Total ice concentration = 9/10**

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## ICE

## CATEGORIES &amp; CONCENTRATIONS

Estimate the concentration of the three dominant ice types present in the pack. The thickest ice is recorded as the 'primary' ice type, and the thinnest as the 'tertiary' ice type.



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# ICE

## TYPE (ty)



The common ice types are listed here with their codes. Record the ice type for each category. Use the image library (via the MENU page) or click the round buttons ● to view examples of each ice type.

view

**Frazil** 10 ●

**Shuga** 11 ●

**Grease** 12 ●

**Nilas** 20 ●

**Pancakes** 30 ●

**Young grey ice** 40 ●

**Young grey-white ice** 50 ●

**First-year, 0.3–0.7 m** 60 ●

**First-year, 0.7–1.2 m** 70 ●

**First-year, >1.2 m** 80 ●

**Multi-year floes** 85 ●

**Brash** 90 ●

**Fast ice** 95 ●

60

12

20

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# ICE THICKNESS (z)

Estimate the thickness of each ice category by suspending a buoy of known diameter over the side of the ship and comparing it with the thickness of floes that turn sideways along the ship's hull. The example image below shows the thickness for each ice category.



PLAY MOVIE



Tertiary 2 cm

Primary 30 cm

Secondary 10 cm

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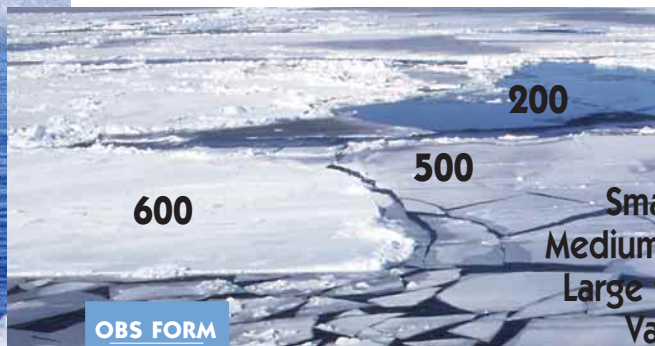
# ICE









## FLOE SIZE (f)

The ice floe categories are listed here. In general, cracks and leads delineate a floe but ridges do not.



view



Pancake ice	<b>100</b>	
New sheet ice	<b>200</b>	
Brash/broken ice	<b>300</b>	
Cake ice < 20 m	<b>400</b>	
Small floes 20–100 m	<b>500</b>	
Medium floes 100–500 m	<b>600</b>	
Large floes 500–2000 m	<b>700</b>	
Vast floes > 2000 m	<b>800</b>	

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tutorial

# ICE

## TOPOGRAPHY (t)

Estimate the topography of each ice category.

If the ice is ridged, also estimate the areal extent (x) and mean sail height (y) of ridges as described on the following two pages.

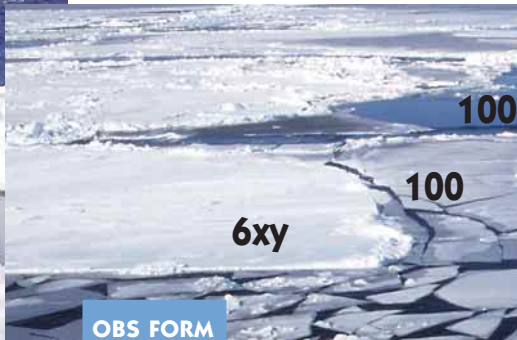


view

<b>Level ice</b>	<b>100</b>	●
<b>Rafted pancakes</b>	<b>200</b>	●
<b>Cemented pancakes</b>	<b>300</b>	●
<b>Finger rafting</b>	<b>400</b>	●

### RIDGES

<b>New unconsolidated ridges (no snow)</b>	<b>5xy</b>	●
<b>New ridges filled with snow or snow cover</b>	<b>6xy</b>	●
<b>Consolidated ridges (no weathering)</b>	<b>7xy</b>	●
<b>Older, weathered ridges</b>	<b>8xy</b>	●



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# TOPOGRAPHY

## AREAL COVERAGE (X)

This is the fraction of the ice category that is ridged, estimated to the nearest 10%.

The values for areal coverage (x) are: –



0–10%	<b>0</b>
10–20%	<b>1</b>
20–30%	<b>2</b>
30–40%	<b>3</b>
40–50%	<b>4</b>
50–60%	<b>5</b>
60–70%	<b>6</b>
70–80%	<b>7</b>
80–90%	<b>8</b>
90–100%	<b>9</b>



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# TOPOGRAPHY

## AVERAGE SAIL HEIGHT (Y)

The minimum recorded height is 0.5 m, but this is an average. The values for average sail height (y) are: –



0.5 m	<b>1</b>
1.0 m	<b>2</b>
1.5 m	<b>3</b>
2.0 m	<b>4</b>
3.0 m	<b>5</b>
4.0 m	<b>6</b>
5.0 m	<b>7</b>

y=1

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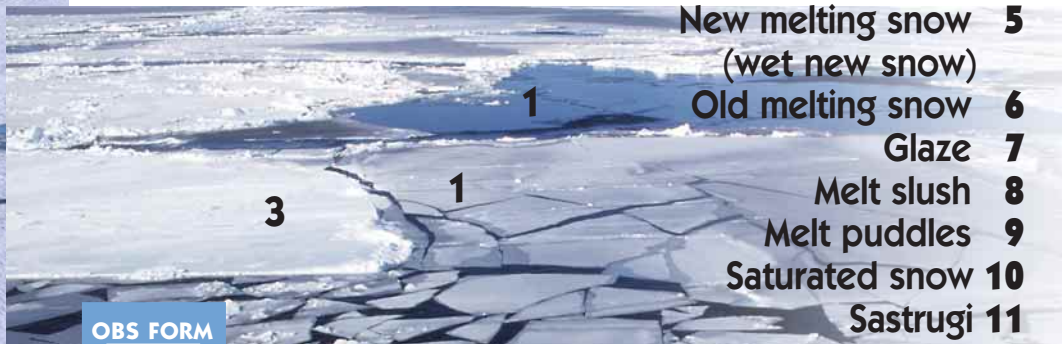
# SNOW

## TYPE (s)

The common snow types are listed. Choose the snow cover type for each ice category.



No snow observation	<b>0</b>
No snow, no ice or brash	<b>1</b>
Cold new snow <1 day old	<b>2</b>
Cold old snow	<b>3</b>
Cold wind-packed snow	<b>4</b>
New melting snow	<b>5</b>
(wet new snow)	
Old melting snow	<b>6</b>
Glaze	<b>7</b>
Melt slush	<b>8</b>
Melt puddles	<b>9</b>
Saturated snow	<b>10</b>
Sastrugi	<b>11</b>



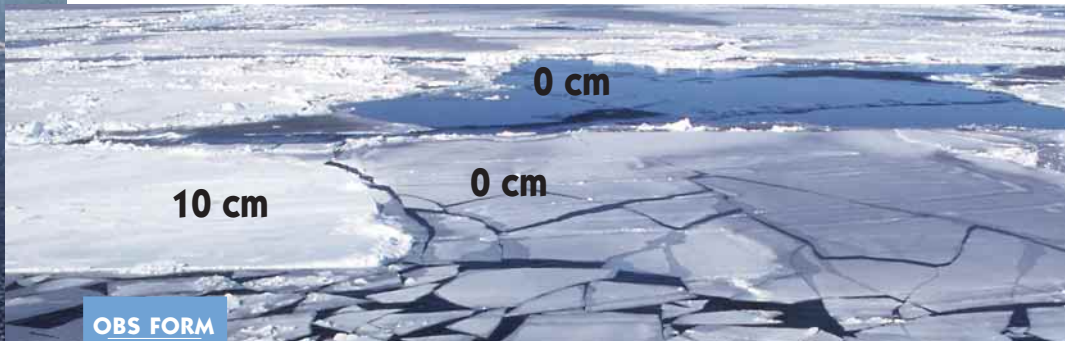
OBS FORM

click

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# SNOW THICKNESS (sz)

For each ice category, estimate the snow thickness in cm.



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click

# OPEN WATER (O/W)

The open water classification describes the size of the cracks and leads between floes.



view

**open water = 1**

- No openings **0**
- Small cracks **1**
- Very narrow breaks < 50 m **2**
- Narrow breaks 50–200 m **3**
- Wide breaks 200–500 m **4**
- Very wide breaks > 500 m **5**
- Lead / coastal lead **6**
- Polynya / coastal polynya **7**
- Water broken only by small scattered floes **8**
- Open sea **9**

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# OBSERVATION FORM

The completed sea ice observation form looks like this. Remember that it is easier to record the **concentration (c)** and **type (ty)** for all three ice categories first and then record your observations one category at a time.

Day/Date (Z): 20/9/98

	POSITION			SEA ICE OBSERVATIONS																						
hr (Z)	Lat (°S) dd mm	Long (°E/W) ddd mm	Conc (tenths)	PRIMARY							SECONDARY							TERTIARY							O/W	hr (Z)
				c	ty	z	f	t	s	sz	c	ty	z	f	t	s	sz	c	ty	z	f	t	s	sz		
01	66 <sup>0</sup> 27'S	75 <sup>0</sup> 04'E	9	4	60	30	600	611	3	10	3	20	10	500	100	1	0	2	12	200	2	100	1	0	1	01

The next stage is to complete the meteorological observations (met obs) and the comments.