

# SEA ICE

## FRAZIL ICE



Frazil ice  
near the  
ice edge

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# SEA ICE

## SHUGA

With the interaction of surface winds and waves, shuga may line up along the wind direction and form characteristic ice bands.



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# SEA ICE

## GREASE ICE



Grease ice  
forming  
under  
turbulent  
conditions

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# SEA ICE

## NILAS



A thin elastic crust of ice, easily bending on waves and swell and under pressure, thrusting in a pattern of interlocking "fingers" (finger rafting).

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# SEA ICE

## PANCAKE ICE



Large,  
loose  
pancakes  
(up to  
1.5 m  
diameter)

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# SEA ICE

## YOUNG GREY ICE



Less elastic than nilas and breaks on swell. Usually rafts under pressure.

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## GREY-WHITE ICE



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# SEA ICE

## FIRST-YEAR ICE



For all first-year ice types, estimate the ice thickness as floes turn sideways along the ship's hull. A calibrated scale (eg 0.5 m diameter buoy) should be placed as close to the ice surface as possible.

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# SEA ICE

## MULTI-YEAR ICE



Ridged  
multi-year ice  
trapped near  
the coast  
off East  
Antarctica

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# SEA ICE BRASH



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# SEA ICE

## FAST ICE



Fast ice  
pinned by  
grounded  
icebergs  
(aerial  
photography  
from  
approx.  
5000 ft)

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# SEA ICE

## PANCAKE ICE



Cemented  
pancakes  
with raised  
rims

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# SEA ICE

## NEW SHEET ICE



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# SEA ICE

## BRASH ICE



Brash is common between colliding floes or in regions where pressure ridges have collapsed.

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# SEA ICE

## CAKE ICE



Floes less than 20 m across are called “cake ice”.

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# SEA ICE

**SMALL FLOES 20 – 100 m**



A floe is any contiguous piece of sea ice of similar ice type.

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# SEA ICE

## MEDIUM FLOES

100 – 500 m



Aerial  
photograph  
taken from  
approx  
1000 ft

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# SEA ICE

**LARGE FLOES 500 – 2000 m**



A floe is any contiguous piece of sea ice of similar ice type (aerial photograph from approx. 3000 ft).

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# SEA ICE

## VAST FLOES



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# SEA ICE

## LEVEL ICE



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# SEA ICE

## RAFTED PANCAKE ICE



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# SEA ICE

## CEMENTED PANCAKE ICE



Cemented  
pancakes  
with raised  
rims

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# SEA ICE FINGER RAFTING



Finger rafting is a type of rafting whereby interlocking thrusts are formed, each floe thrusting "fingers" alternately over and under each other.

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# SEA ICE

## NEW UNCONSOLIDATED RIDGES

A ridge is a line or wall of broken ice forced upward by pressure.



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# SEA ICE

**NEW RIDGES FILLED WITH SNOW**



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## CONSOLIDATED RIDGE



A considerable percentage of ice mass is contained within the ridged component of the Antarctic pack.

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# SEA ICE

## OLD WEATHERED RIDGE

Ridges will eventually consolidate and become weathered.

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# SEA ICE

## NO OPENINGS



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## SMALL CRACKS



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# SEA ICE

**VERY NARROW BREAKS < 50 m**



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## NARROW BREAKS 50–200 m



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## WIDE BREAKS 200–500 m



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**VERY WIDE BREAKS > 500 m**

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## LEAD



Leads may aid the navigation of vessels moving through the pack ice

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## POLYNIA



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# SEA ICE

## SMALL SCATTERED FLOES



Open water  
broken only  
by small  
scattered  
floes.

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