

Black Carbon Emissions from Arctic Shipping: A Review of Main Emitters and Time Trends

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Objectives

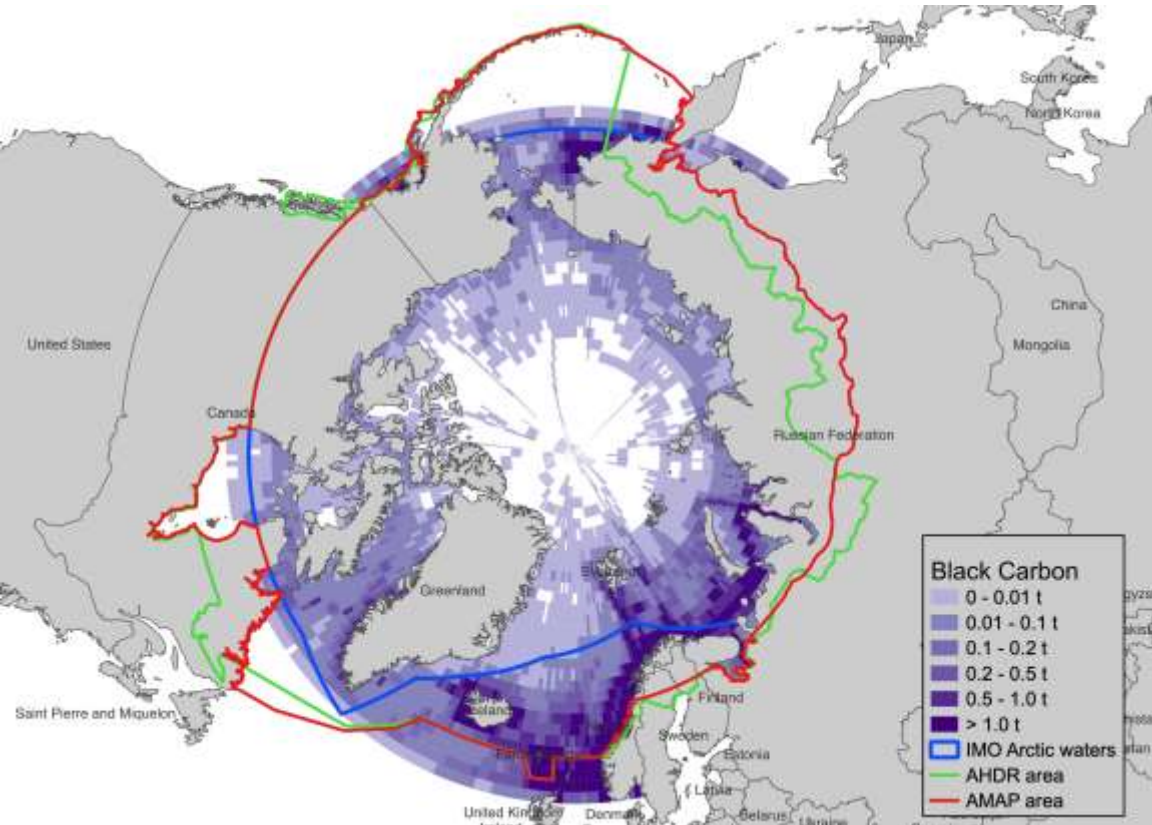
Quantifying and mapping BC shipping emissions in the Arctic

Analysis of the different types of ships and fuels that contribute to BC emissions in the Arctic

Tracking changes in BC shipping emissions over time

Arctic definitions

Arctic definitions



The Geographic Arctic
At or above 58.95°N

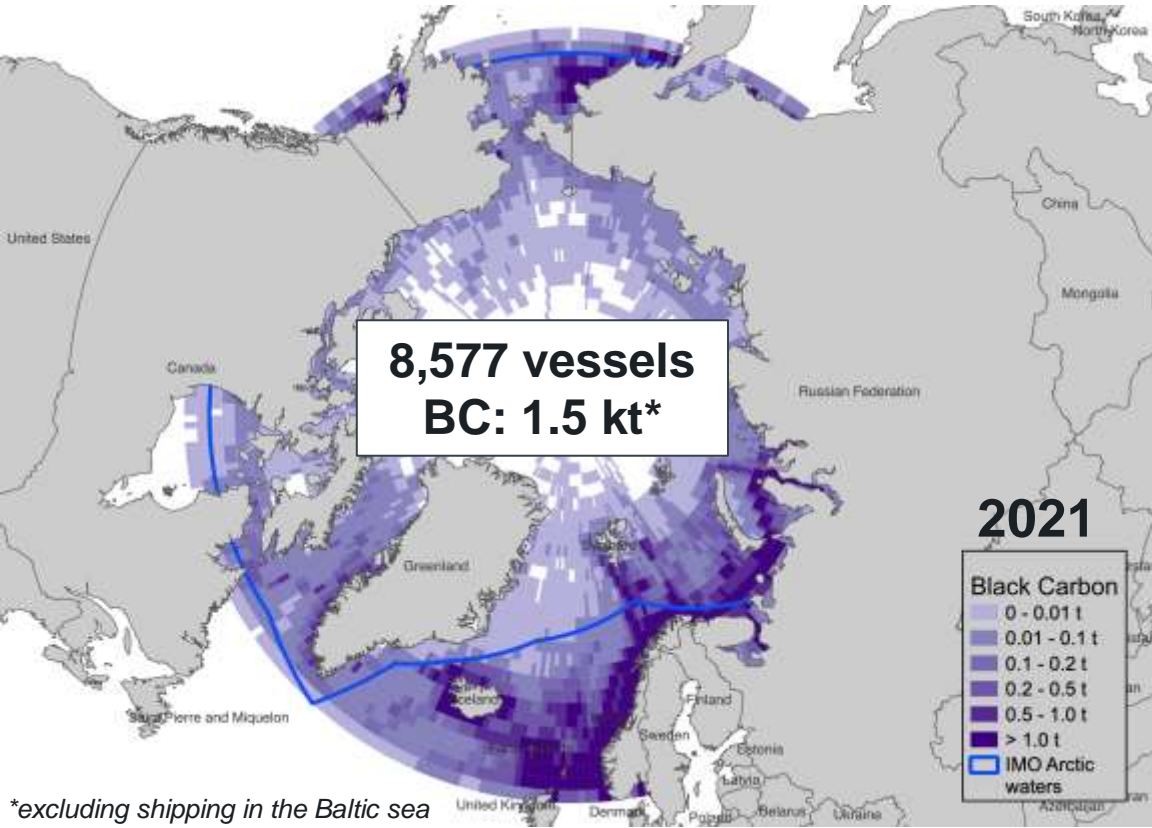
The IMO Arctic Waters
As defined in the Polar Code

AMAP and AHDR boundaries
As defined by the Arctic Monitoring and Assessment Program and by the Arctic Human Development Report.

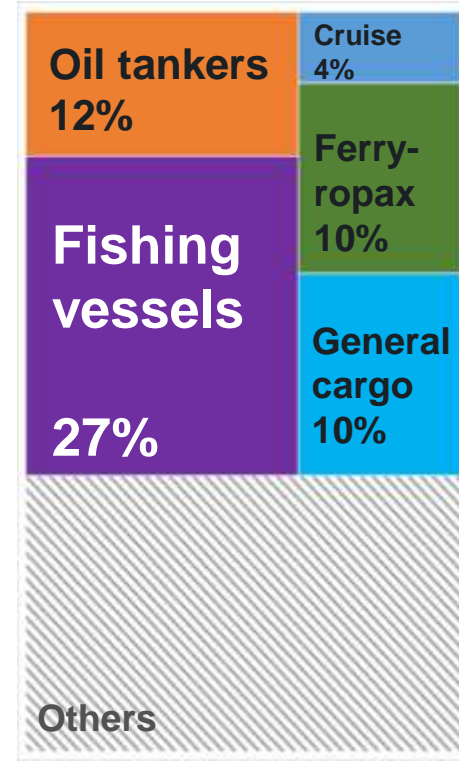
Geographic Arctic

Black carbon emissions

Geographic Arctic. Black carbon emissions



Black carbon emissions

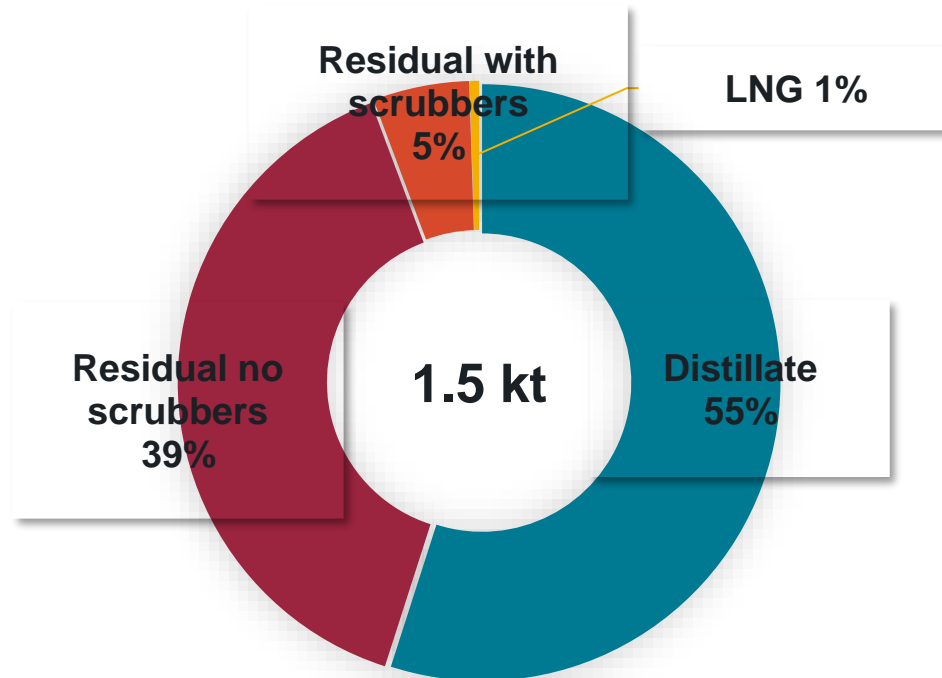


*excluding shipping in the Baltic sea

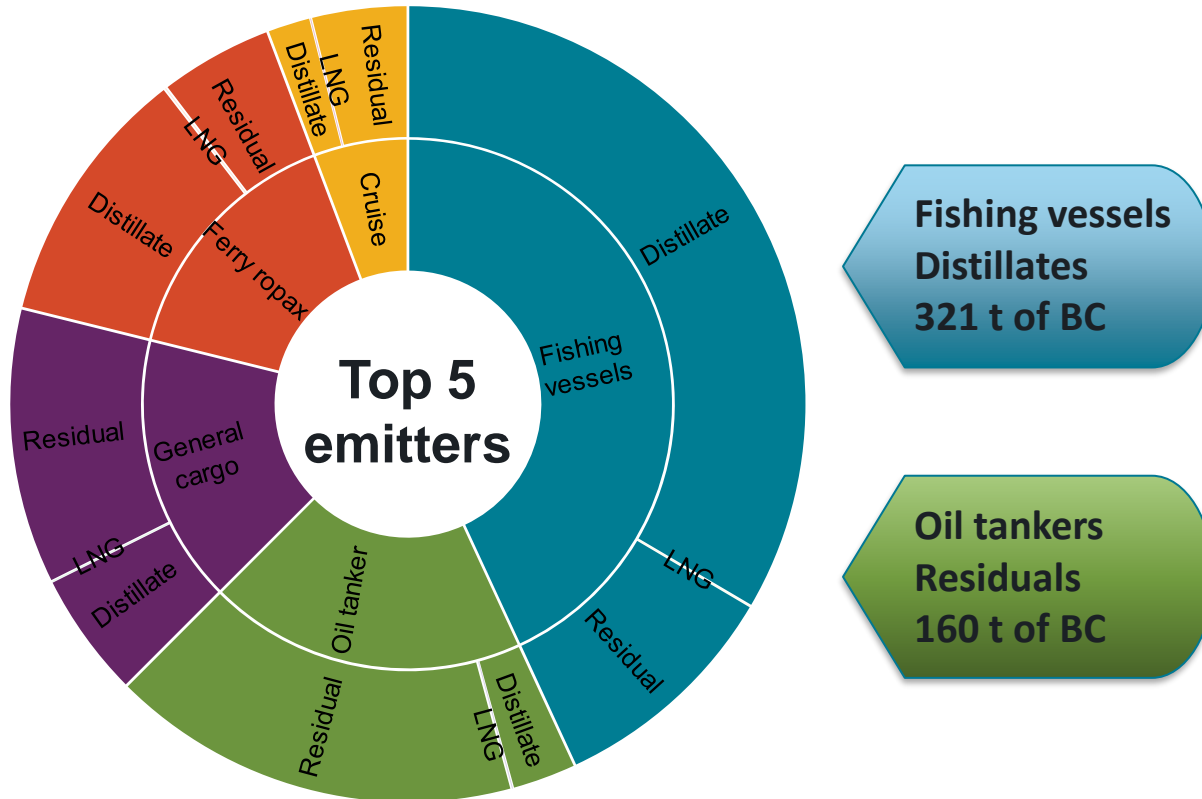
Geographic Arctic. Black carbon emissions



Black carbon emissions



Geographic Arctic. Black carbon emissions



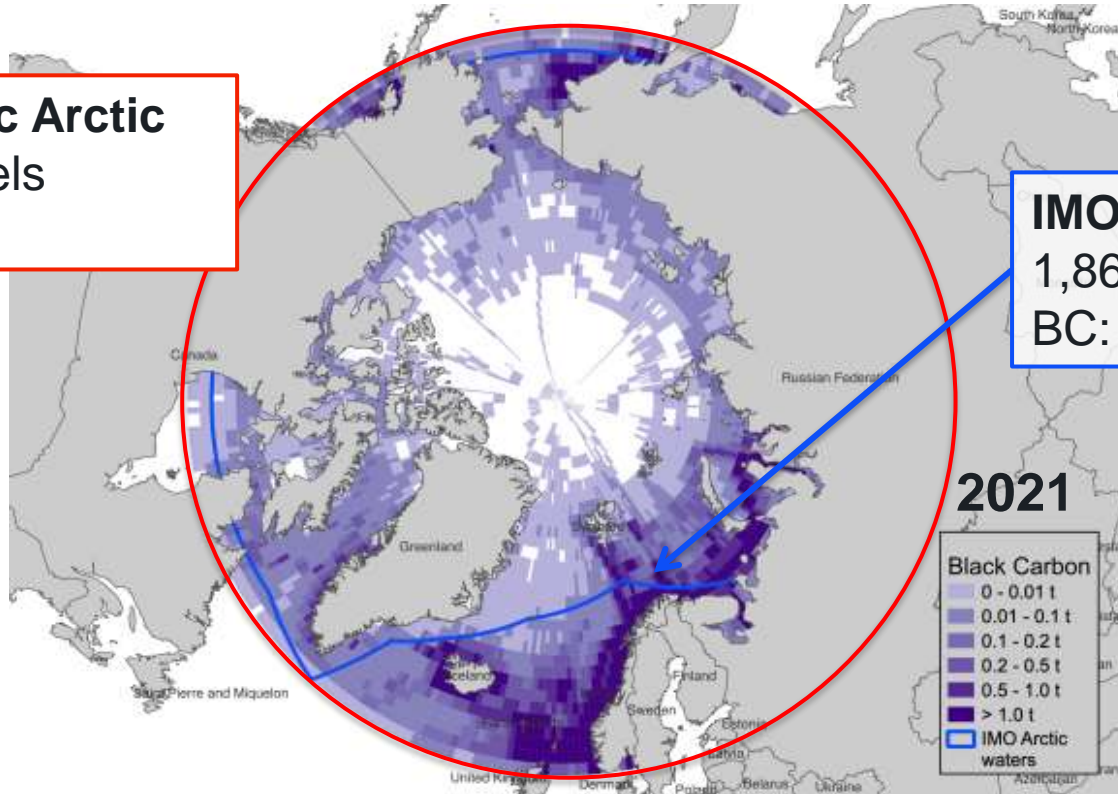
IMO Arctic waters

Time trends in black carbon emissions

IMO Arctic waters

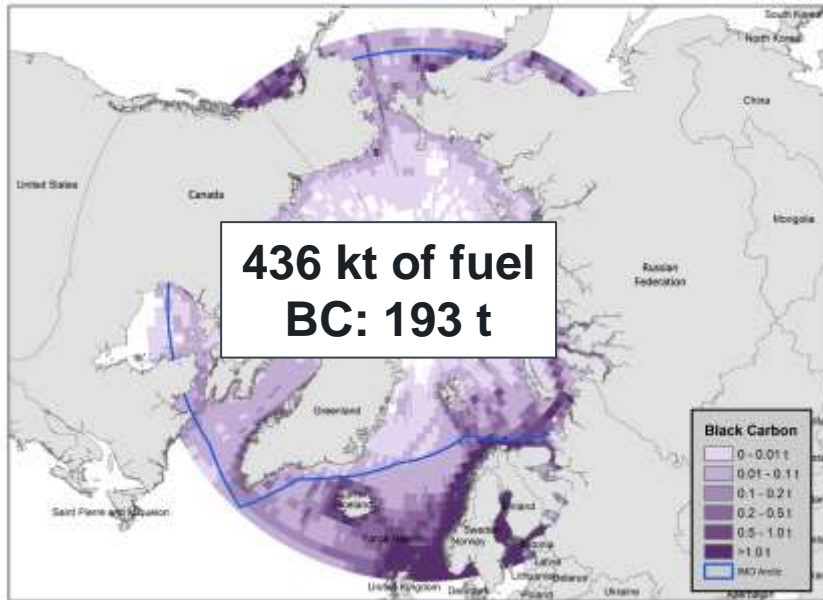
Geographic Arctic
8,577 vessels
BC: 1.5 kt*

IMO Arctic waters
1,866 vessels (22%)
BC: 413 t (27%)

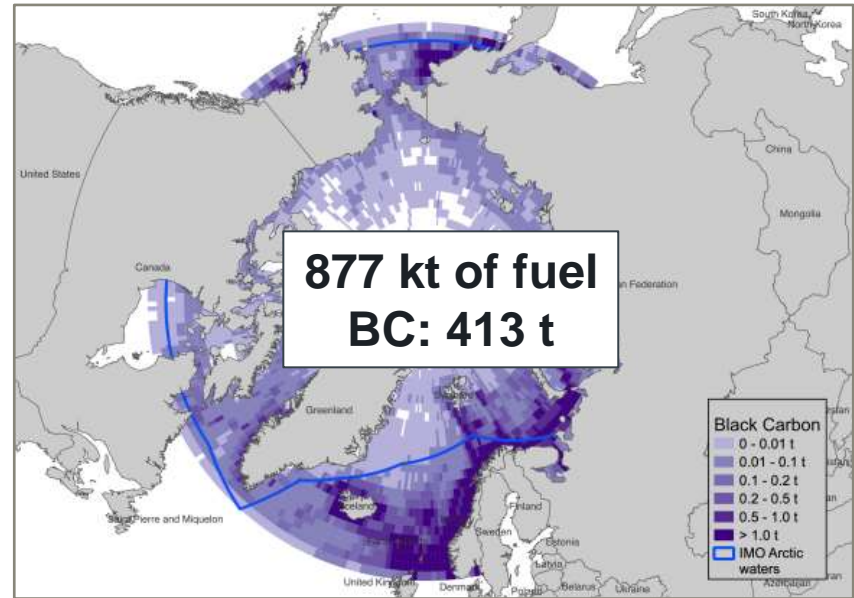


IMO Arctic waters

2015

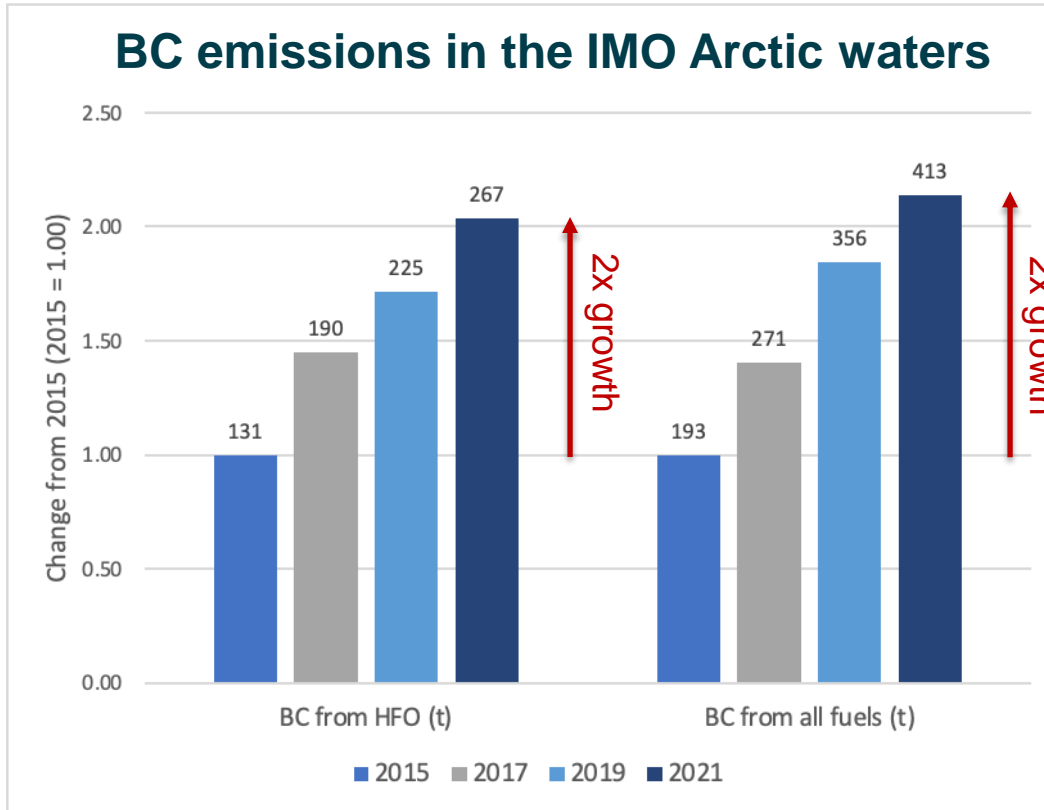


2021



<https://theicct.org/publication/prevalence-of-heavy-fuel-oil-and-black-carbon-in-arctic-shipping-2015-to-2025/>

IMO Arctic waters



BC emissions

2015

Residual: 68%

Distillate: 32%

LNG: 0%

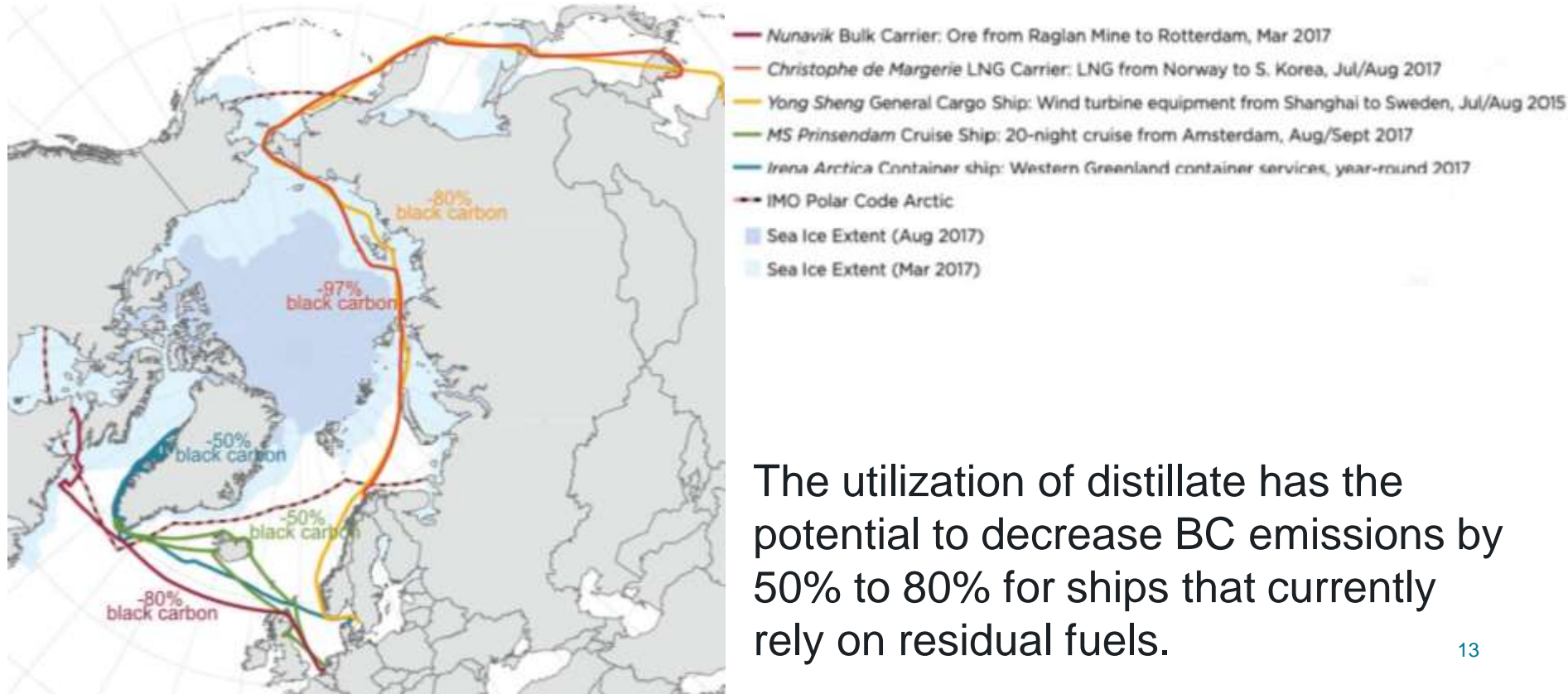
2021

Residual: 64%

Distillate: 35%

LNG: 1%

Switch to distillate: potential benefits



The utilization of distillate has the potential to decrease BC emissions by 50% to 80% for ships that currently rely on residual fuels.

Summary and Conclusions

Geographic Arctic

8,577 ships emitted 1.5 kt of black carbon in the Geographic Arctic in 2021

Top black carbon emitters are fishing vessels, oil tankers, and cargo ships, contributing 50% of emissions mainly from burning distillate fuels

IMO Arctic waters

IMO's Polar Code covers only 22% of vessels and 27% of black carbon emissions in the Geographic Arctic

BC emissions in IMO Arctic Waters have doubled since 2015, with residual fuels being the biggest contributor

