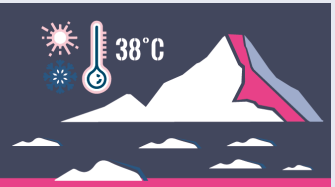
Black carbon emissions from shipping: a special threat in the Arctic

The Arctic is changing rapidly



What happens in the Arctic doesn't stay in the Arctic – the impacts of climate change in the Arctic are global.

Temperatures north of the Arctic Circle soared to 38°C in June 2020, the highest ever recorded

Arctic sea ice, glaciers, permafrost and the Greenland ice sheet are all decreasing rapidly with global impacts such as sea-level rise and extreme weather patterns in Europe and North America.

In 2020, the Northern Sea Route along Russia's Arctic coast opened in July for the first time.

In September 2020, the Arctic summer sea ice minimum reached its second lowest extent since records began over 40 years earlier.

The ice took longer than usual to reform and in late October sea ice coverage was significantly lower than in previous years.

Arctic sea ice is disappearing much faster than climate models predicted with impacts across the Arctic and the globe.

1

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Black Carbon emissions from shipping are a special threat for the Arctic

Ships burning HFO produce climate pollutants, including black carbon (BC), which lead to intense warming when in the atmosphere over snow and ice.

Black carbon is a powerful short-lived climate pollutant

BC's warming impact is 7 to 10 times greater when it lands on ice and snow, leading to even more melting.

As snow and ice melt exposing darker and less reflective land and water, warming is accelerated as the sun's rays are absorbed.

2% of BC in the Arctic comes from shipping, BUT it has a much greater heating impact as other BC sources are high in the atmosphere with less chance of depositing onto ice and snow.

Most BC from Arctic shipping deposits in the Arctic so the impact is disproportionally large, especially as most ships operate close to glaciers, snow-covered coasts, or sea ice margins – all vulnerable to intensified melting from BC.

As shipping in the Arctic grows, continued use of heavy fuel that emit BC, will accelerate the disintegration and collapse of Arctic ice and permafrost.

2

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Ships' black carbon emissions are an increasing threat

Global black carbon (BC) emissions from ships have grown approximately 12% between 2012 - 2018. In the Arctic, the rate of growth is dramatically faster.

Reductions of black carbon lead to quick reductions in global warming potential

The International Council on Clean Transportation (ICCT) found that BC emissions from Arctic shipping increased 85% between 2015 - 2019.

The ICCT concluded that IMO's Arctic HFO ban regulation will only reduce BC emissions by 5% in July 2024.

Further reductions are not likely until exemptions and waivers to the Arctic HFO ban expire in July 2029.

BC remains in the atmosphere for a short period of time, so reducing emissions leads to quick reductions in warming potential.

In 2017, the Arctic Council set a target to reduce BC emissions by 25 - 33% below 2013 levels by 2025, and in 2019 called for reductions in particulate matter and BC emissions from shipping.

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Black carbon emissions from shipping: rapid action is needed for the Arctic

Black carbon is harmful to human health

Ambient air pollution (particles and gases) kills an estimated 4.2 million people worldwide every year.

Particulate matter (PM), including black carbon (BC), can cause premature death and harmful effects on the cardiovascular system

BC consists of very fine, partly carcinogenic particles, which are small enough to enter the bloodstream and reach other organs.

One cruise ship in a port emits as many PM particles as 5,000 cars per second.

Levels of PM including BC on the decks of a cruise ship can be very high.

Arctic communities living close to shipping lanes and ports are at greater risk from Arctic shipping BC emissions due to their proximity to the source.

Action to reduce BC emissions will improve human health and mitigate the near-term warming impacts of climate change.

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Reducing black carbon emissions is effective and achievable

Black carbon (BC) emission reductions could be achieved rapidly if ships using heavy fuel oil (HFO) switched to distillate fuel.

Reducing BC emissions in the Arctic will reduce climate warming and the risks to human health

IMO's 4th GHG Study showed that switching to distillate reduces BC emissions by up to 79% in 2-stroke engines and 48% in 4-stroke engines.

ICCT's analysis found that switching to distillate could reduce BC emissions from the Arctic HFO-fuelled fleet by 44%.

Switching to distillate means particulate filters could be installed, which would further reduce BC emissions by over 90%.

The Arctic HFO ban will only reduce BC emissions by 5% in 2024.

For rapid reductions in BC emissions, Arctic shipping should switch to distillate fuel and install a particulate filter or choose a cleaner form of propulsion.

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Measures to reduce black carbon emissions from Arctic shipping

A voluntary switch to distillate or alternative cleaner fuels should be quickly followed by a mandatory measure.

A switch to distillate fuel will reduce ships' black carbon (BC) emissions in the Arctic by 44%

Installation of a particulate filter will further reduce BC emissions by over 90%.

Alternatively, switching to cleaner forms of propulsion will also reduce or remove BC emissions.

IMO Members have concluded that a fuel switch policy, including a switch to cleaner fuels would not require a BC measurement protocol.

Action to reduce BC emissions from ships impacting the Arctic should include:

- An MEPC Resolution for a recommendatory switch to distillate.
- A mandatory measure to require a switch to distillate and installation of a particulate filter.
- An emission standard to reduce BC emissions globally.

Urgent action is needed to reduce BC emissions from ships.

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