



ᓄᓇᑭᑦ ᐃᓚᑎᓕᓕᓂᑦᐅᑦ ᑲᑎᑎᑦᑲᑦᑲᑦ ᑕᑲᑦᑲᑦᑲᑦ ᑲᑲᑲᑦᑲᑦᑲᑦ #125690
Shipping Emissions in the Arctic and North Atlantic Atmosphere

ᑕᑲᑦᑲᑦᑲᑦᑲᑦᑲᑦ
ᑲᑲᑲᑦᑲᑦᑲᑦᑲᑦ: New

ᐱᓕᓕᓂᑦᑲᑦᑲᑦᑲᑦᑲᑦ
ᑲᑲᑲᑦᑲᑦᑲᑦᑲᑦ: Scientific Research

ᑲᑲᑲᑦᑲᑦᑲᑦᑲᑦᑲᑦ: 4/26/2022 1:51:13 PM

Period of operation: from 0001-01-01 to 0001-01-01

ᑲᑲᑲᑦᑲᑦᑲᑦᑲᑦᑲᑦᑲᑦ: from 0001-01-01 to 0001-01-01

ᐱᓕᓕᓂᑦᑲᑦᑲᑦᑲᑦᑲᑦ: Zongbo Shi
University of Birmingham
School of Geography Earth and Environmental Sciences
BIRMINGHAM West Midlands B17 8PS
United Kingdom
ᑲᑲᑲᑦᑲᑦᑲᑦᑲᑦ: 00447548132896, ᑲᑲᑲᑦᑲᑦᑲᑦ:

ᓕᓂᓴᓐᓯᓐ ᐱᓂᓐᓂᓂᓐ ᓂᓴᓯᓴᓐᓂᓂᓐ

ᓂᓴᓯᓴᓐᓂᓂᓐ ᐱᓕᓂᓂᓐᓂᓐᓂᓐᓂᓐ ᓂᓴᓯᓴᓐᓂᓂᓐ:

Transboundary
South Baffin

ᓕᓂᓴᓐᓯᓐ ᐱᓂᓐᓂᓂᓐ ᓂᓴᓯᓴᓐᓂᓂᓐ

ᓂᓴᓯᓴᓐᓂᓂᓐ ᓂᓴᓯᓴᓐᓂᓂᓐ ᓂᓴᓯᓴᓐᓂᓂᓐ ᓂᓴᓯᓴᓐᓂᓂᓐ ᓂᓴᓯᓴᓐᓂᓂᓐ ᓂᓴᓯᓴᓐᓂᓂᓐ ᓂᓴᓯᓴᓐᓂᓂᓐ ᓂᓴᓯᓴᓐᓂᓂᓐ	ᓂᓴᓯᓴᓐᓂᓂᓐ ᓂᓴᓯᓴᓐᓂᓂᓐ ᓂᓴᓯᓴᓐᓂᓂᓐ ᓂᓴᓯᓴᓐᓂᓂᓐ ᓂᓴᓯᓴᓐᓂᓂᓐ ᓂᓴᓯᓴᓐᓂᓂᓐ ᓂᓴᓯᓴᓐᓂᓂᓐ ᓂᓴᓯᓴᓐᓂᓂᓐ	ᓂᓴᓯᓴᓐᓂᓂᓐ ᓂᓴᓯᓴᓐᓂᓂᓐ ᓂᓴᓯᓴᓐᓂᓂᓐ ᓂᓴᓯᓴᓐᓂᓂᓐ ᓂᓴᓯᓴᓐᓂᓂᓐ ᓂᓴᓯᓴᓐᓂᓂᓐ ᓂᓴᓯᓴᓐᓂᓂᓐ ᓂᓴᓯᓴᓐᓂᓂᓐ	ᓂᓴᓯᓴᓐᓂᓂᓐ ᓂᓴᓯᓴᓐᓂᓂᓐ ᓂᓴᓯᓴᓐᓂᓂᓐ ᓂᓴᓯᓴᓐᓂᓂᓐ ᓂᓴᓯᓴᓐᓂᓂᓐ ᓂᓴᓯᓴᓐᓂᓂᓐ ᓂᓴᓯᓴᓐᓂᓂᓐ ᓂᓴᓯᓴᓐᓂᓂᓐ	ᓂᓴᓯᓴᓐᓂᓂᓐ ᓂᓴᓯᓴᓐᓂᓂᓐ ᓂᓴᓯᓴᓐᓂᓂᓐ ᓂᓴᓯᓴᓐᓂᓂᓐ ᓂᓴᓯᓴᓐᓂᓂᓐ ᓂᓴᓯᓴᓐᓂᓂᓐ ᓂᓴᓯᓴᓐᓂᓂᓐ ᓂᓴᓯᓴᓐᓂᓂᓐ
Information is not available				

Project transportation types

Transportation Type	ᓂᓴᓯᓴᓐᓂᓂᓐ ᓂᓴᓯᓴᓐᓂᓂᓐ	Length of Use
Water	RRS Discovery	

Project accomodation types

ᓂᓴᓯᓴᓐᓂᓂᓐ,

ᐊᐅᓚᐅᓂᐊᖅᐅᓂᐊᖅ

ᐱᖅᐅᓂᐊᖅ ᐊᐅᓂᐅᓂᐊᖅ ᐃᓂᖅᐅᓂᐊᖅ ᐃᐅᐅᓂᐊᖅ, ᐱᓂᐅᓂᐊᖅ, ᖅᓂᓚᐅᓂᐊᖅ, ᓂᓂᓂᐅᓂᐊᖅ ᐊᓂᓂᓂᐊᖅ

ᐊᓂᓂᓂᐊᖅ ᐱᖅᐅᓂᐊᖅ ᐊᐅᓂᐅᓂᐊᖅ ᖅᓂᓂᓂᐊᖅ	ᖅᓂᓂᓂᐊᖅ	ᐊᓂᓂᓂᐊᖅ - ᐊᓂᓂᓂᐊᖅ	ᓂᓂᓂᐅᓂᐊᖅ ᐊᐅᓂᐅᓂᐊᖅ
Research Ship RRS Discovery	1	96 m long	To carry out scientific research on the sources of airborne particles that are important for the clouds and climate in the Arctic

ᐱᓂᓂᓂᐊᖅ ᐊᓂᓂᓂᐊᖅ ᐊᓂᓂᓂᐊᖅ ᐊᐅᓂᐅᓂᐊᖅ

ᓂᓂᓂᐅᓂᐊᖅ ᐊᐅᓂᐅᓂᐊᖅ	ᖅᓂᓂᓂᐊᖅ ᐊᓂᓂᓂᐊᖅ	ᖅᓂᓂᓂᐊᖅ ᐊᓂᓂᓂᐊᖅ	ᐊᓂᓂᓂᐊᖅ ᐊᓂᓂᓂᐊᖅ	ᓂᓂᓂᐅᓂᐊᖅ	ᐊᓂᓂᓂᐊᖅ ᐊᓂᓂᓂᐊᖅ	ᓂᓂᓂᐅᓂᐊᖅ ᐊᐅᓂᐅᓂᐊᖅ
Chemical - acids	hazardous	3	1	3	Liters	Chemical reagents for research
chemicals - organic solvents	hazardous	6	2	12	Liters	For use within different instruments
Diesel	fuel	14	14	196	Cubic Meters	low sulphur fuel
chemicals - bases / neutral	hazardous	8	1	8	Kg	For use in the lab

ᐊᓂᓂᓂᐊᖅ ᐊᐅᓂᐅᓂᐊᖅ

ᐊᓂᓂᓂᐊᖅ ᐊᐅᓂᐅᓂᐊᖅ	ᖅᓂᓂᓂᐊᖅ ᐊᓂᓂᓂᐊᖅ	ᓂᓂᓂᐅᓂᐊᖅ ᐊᐅᓂᐅᓂᐊᖅ
0		

ᐱᑦᑕᑦᑕᑦ

ᐱᑦᑕᑦᑕᑦ ᑕᑦᑕᑦᑕᑦ

ᐱᑦᑕᑦᑕᑦ ᑕᑦᑕᑦᑕᑦ ᐱᑦᑕᑦᑕᑦ ᑕᑦᑕᑦᑕᑦ	ᑕᑦᑕᑦᑕᑦ ᐱᑦᑕᑦᑕᑦ	ᑕᑦᑕᑦᑕᑦ ᐱᑦᑕᑦᑕᑦ ᑕᑦᑕᑦᑕᑦ ᑕᑦᑕᑦᑕᑦ	ᑕᑦᑕᑦᑕᑦ ᐱᑦᑕᑦᑕᑦ ᑕᑦᑕᑦᑕᑦ	ᑕᑦᑕᑦᑕᑦ ᑕᑦᑕᑦᑕᑦ ᑕᑦᑕᑦᑕᑦ
Scientific/International Polar Year Research	ᐱᑦᑕᑦᑕᑦ ᐱᑦᑕᑦᑕᑦ ᑕᑦᑕᑦᑕᑦ	500 kg	incinerated at sea	N/A
Scientific/International Polar Year Research	ᐱᑦᑕᑦᑕᑦ ᐱᑦᑕᑦᑕᑦ ᑕᑦᑕᑦᑕᑦ	3000kg	Stored and disposed when back to the UK (Southampton port)	N/A
Scientific/International Polar Year Research	ᐱᑦᑕᑦᑕᑦ ᑕᑦᑕᑦᑕᑦ	50 kg	Safely stored on the ship and disposed appropriately when returned to the UK (Southampton port)	N/A
Scientific/International Polar Year Research	ᐱᑦᑕᑦᑕᑦ ᐱᑦᑕᑦᑕᑦ ᑕᑦᑕᑦᑕᑦ	5000kg	Stored and disposed of upon arrival in Southampton port in the UK	N/A
Scientific/International Polar Year Research	ᐱᑦᑕᑦᑕᑦ ᑕᑦᑕᑦᑕᑦ	1500kg	Stored safely onboard and disposed when back to the UK (Southampton port)	N/A

ᐱᑦᑕᑦᑕᑦ ᑕᑦᑕᑦᑕᑦ ᐱᑦᑕᑦᑕᑦ

The ship will release air pollutants from the fuel burning. The impact is negligible due to the huge air volume in the study area. Chemicals: All chemicals will have accompanying COSHH and risk assessments. They will be stored, handled and disposed of appropriately as per standard NMF procedure. Ship's waste: All cardboard and paper products are incinerated at sea on the Discovery. Recyclable items are stored for appropriate recycling upon arrival into port. Any non-burnable or non-recyclable waste (e.g. batteries) is stored appropriately and disposed of upon arrival into port. Incidental waste: It is intended that all equipment will be recovered. Acoustic-based data collection The potential impacts associated with acoustic data collection relate to marine mammals. The primary concerns to marine mammals as a result of acoustic systems are considered to be masking effects, behavioural changes, and physiological effects such as temporary threshold shift (TTS) and permanent threshold shift (PTS). While it is difficult to be certain of the potential for physiological damage as a result of various acoustic activities, localised behavioural disturbance is considered a possibility. These concerns are considered below. Deep-water multibeam echosounder: The effects of multibeam echosounders on marine mammals has not been widely studied, such that it is unclear what impacts these may have on them. While Lurton and DeRuiter (2011) suggested that the risk of the sounds causing physiological auditory damage to marine mammals is likely to be low, a few studies have observed potential behavioural changes as an apparent result of

the operation of multibeam echosounders (Quick et al 2016; Cholewiak et al 2017). Due to this uncertainty, the JNCC have created a set of best-practice guidelines to follow in the case of deep-water multibeam echosounder surveys (see MEMP). With the proposed mitigation recommendations outlined in the MEMP, the effects of the multibeam echoso

Additional Information

SECTION A1: Project Info

SECTION A2: Allweather Road

SECTION A3: Winter Road

SECTION B1: Project Info

SECTION B2: Exploration Activity

SECTION B3: Geosciences

SECTION B4: Drilling

SECTION B5: Stripping

SECTION B6: Underground Activity

SECTION B7: Waste Rock

SECTION B8: Stockpiles

SECTION B9: Mine Development

SECTION B10: Geology

SECTION B11: Mine

SECTION B12: Mill

SECTION C1: Pits

SECTION D1: Facility

SECTION D2: Facility Construction

SECTION D3: Facility Operation

SECTION D4: Vessel Use

SECTION E1: Offshore Survey

SECTION E2: Nearshore Survey

SECTION E3: Vessel Use

SECTION F1: Site Cleanup

SECTION G1: Well Authorization

SECTION G2: Onland Exploration

SECTION G3: Offshore Exploration

SECTION G4: Rig

SECTION H1: Vessel Use

SECTION H2: Disposal At Sea

SECTION I1: Municipal Development

ᐱᓐᓇ ᐱᓕᓂᐅᓕ ᖃᓄᐃᓕᓂᓐᓇ ᓇᓂᐅᓕ ᖃᓄᐃᓕᓂᓐᓇ

This research will primarily be on air composition. The ship will sail in open water with no sea ice or less 1/10 of sea ice. Air quality in the area is usually predicted to be extremely clean and that is the reason we are studying it. We expect that in the future when there are more ships, the emissions from the ships could significantly affect the sensitive Arctic environment and climate. It is predicted that sea ice will be completely melted in the summer long the Northwester Passage. This makes Arctic shipping possible. The single ship we will use will have minimum impact on the noise level in the study area.

ᐱᓐᓇ ᐱᓕᓂᐅᓕ ᖃᓄᐃᓕᓂᓐᓇ ᓇᓂᐅᓕ: ᐅᐱᐱᓕᖃᓕᖃᓕᓂᓐᓇ

The research cruise will sail in the David Strait and will be far away from wildlife species

ᐱᓐᓇ ᐱᓕᓂᐅᓕ ᖃᓄᐃᓕᓂᓐᓇ ᓇᓂᐅᓕ: ᐃᓄᓕᓂᓐᓇ ᐱᓕᓂᐅᓕ-ᐱᓕᓂᐅᓕ ᐱᓕᓂᐅᓕ ᐱᓕᓂᐅᓕ

Not applicable - no direct engagement identified

Miscellaneous Project Information

ᓇᓄᓇᐃᓕᓂᓐᓇ ᐱᓕᓂᐅᓕ ᐱᓕᓂᐅᓕ ᓇᓂᐅᓕ ᐱᓕᓂᐅᓕ ᐱᓕᓂᐅᓕ

The ship will release air pollutants from the fuel burning. The impact is negligible due to the huge air volume in the study area. Chemicals: All chemicals will have accompanying COSHH and risk assessments. They will be stored, handled and disposed of appropriately as per standard NMF procedure. Ship's waste: All cardboard and paper products are incinerated at sea on the Discovery. Recyclable items are stored for appropriate recycling upon arrival into port. Any non-burnable or non-recyclable waste (e.g. batteries) is stored appropriately and disposed of upon arrival into port. Incidental waste: It is intended that all equipment will be recovered. Acoustic-based data collection: The potential impacts associated with acoustic data collection relate to marine mammals. The primary concerns to marine mammals as a result of acoustic systems are considered to be masking effects, behavioural changes, and physiological effects such as temporary threshold shift (TTS) and permanent threshold shift (PTS). While it is difficult to be certain of the potential for physiological damage as a result of various acoustic activities, localised behavioural disturbance is considered a possibility. These concerns are considered below. Deep-water multibeam echosounder: The effects of multibeam echosounders on marine mammals has not been widely studied, such that it is unclear what impacts these may have on them. While Lurton and DeRuiter

(2011) suggested that the risk of the sounds causing physiological auditory damage to marine mammals is likely to be low, a few studies have observed potential behavioural changes as an apparent result of the operation of multibeam echosounders (Quick et al 2016; Cholewiak et al 2017). Due to this uncertainty, the JNCC have created a set of best-practice guidelines to follow in the case of deep-water multibeam echosounder surveys (see MEMP). With the proposed mitigation recommendations outlined in the MEMP, the effects of the multibeam echoso

Cumulative Effects

Impacts on the environment and wildlife is minimal.

