

2019 in the High Arctic

A dossier from the Eurodefense Arctic ICE Observatory (EWG 25) – Draft
version 3

SITREP

All-year Arctic sea ice has been reaching measured minimum levels over the last 20 years. Russia has established and reopened military bases on land, and invested heavily in icebreakers/ice capable ships. Other nations have not made any significant response until very recently. The Northern Sea Route has been open for longer, and greater tonnages have been shipped to and from Asia as a consequence (saving around 10 days sailing time) International organisations exist but there is a juxtaposition of national and international waters. Analysis suggests the presence of substantial deposits of hydrocarbons and minerals under the Arctic Ocean, much currently unreachable.

MILITARY

(OCTOBER 2018 NATO's Operation Trident Juncture in northern Norway largest war games since the cold war. 50,000 troops, 10,000 vehicles and 250 aircraft from 31 countries took part in a four-week long exercise close to the country's border with Russia. This exercise continued to reverberate politically throughout 2019)

JANUARY : Russia announced that it plans to utilise its new and upgraded Arctic bases to continue to conduct military flights over the Arctic – over 100 in 2018. These flights include strategic bombers, patrol and anti-submarine warfare aircraft, and tactical reconnaissance.

U.S. Navy says it plans to conduct a freedom of navigation operation in Arctic waters for the first time sometime in the coming month. It intends to utilise an old base in Adak, Alaska to station resources for future operations such as surface ships and patrol aircraft

FEBRUARY : Around 800 Royal Marines undergo Arctic training near Bardufoss, Norway in Exercise Clockwork. Apache attack helicopters and Wildcats deployed. UK makes a 10-year commitment to Arctic training.

Russian Backfire strategic bomber crash-lands in the Murmansk region of the Arctic, resulting in the deaths of 3 of its 4-person crew with the last crew member badly injured. The Russian Defense Ministry stated that the crash occurred during

a blizzard while the plane was trying to land. No weapons were being carried by the bomber at the time.

MARCH : Northern Wind war games exercise in Sweden involves around 10,000, in which British, Norwegian and US forces play the role of an invading “force from the east”.

According to news agency Izvestiya, all foreign military ships will be obliged to notify Russian authorities 45 days prior to using the Northern Sea Route, providing information on the name of the ship, its captain, the route and its duration, the purpose of sailing, as well as the technical characteristics of the vessel. The ships will also have to take aboard a Russian maritime pilot.

US Navy Secretary and the Commander of US European Command say the increased shipping traffic in the Arctic region requires an increased US navy presence and the area is important to US interests. The Navy Secretary noted that Russia’s increasing presence requires the US to plan accordingly.

Commander of the Russian Northern Fleet announces plans to put Tor-M2DT short-range missile defense system in the village of Tiksi (71.39 North, 128.52 East) to protect airspace above the Northern Sea Route

APRIL : Russian warships on manoeuvres the Barents Sea. Frigate from the Northern Fleet fire rockets to shoot down cruise missiles launched from one of its own anti-submarine warships.

US announces it has ordered its first icebreaker for more than two decades, spending \$746m on a ship to be ready in 2024

US Coast Guard releases updated Arctic Strategic Outlook for the first time since 2013. Stressing the growing role of the Arctic as a “strategically competitive space” due to ice melting, the outlook addresses the significant change in power relations in the Arctic and puts a special emphasis on Russian and Chinese extensive economic activities in the region. USCG aims to follow three main principles : partnership, unity of effort, and a culture of continuous innovation.

MAY : Aerial war games over Arctic skies by jets from U.S, Denmark, Finland, Germany, Sweden, Norway and the Netherlands. In total 140 aircraft and 1,000 personnel participate, and the British provide refuelling capabilities

JUNE : According to the Russian Northern Fleet, more than 100 training exercises were held offshore and in coastal bases on the Kola Peninsula, as close as 10 miles from the Norwegian border, this month. In 57 of the cases, use of

weapons was included. In the Barents Sea, three nuclear powered submarines fire torpedoes on underwater and surface targets and several anti-submarine vessels engaged in firing of rocket-propelled depth charges. Il-38 aircraft and Ka-27 helicopters also deployed anti-submarines weapons in the area.

US DoD revised Arctic strategy published. It notes that the current era for the Arctic is one of “strategic competition.” The U.S. rejects China’s claim that it is a “near Arctic State,” further claiming that China’s economic interests in the area could become aggressive as observed elsewhere in the world. The strategy also warns of Russia’s increased military presence in the area, and its desire to continue to build more military bases. The U.S. DoD will continue to enforce freedom of navigation and overflight, reserving the right to challenge any claims that threaten these two norms.

On June 11, the Russian Federal Security Forces and the U.S Coast Guard conduct a joint patrol in the Bering Sea. The focus of the joint operation was to improve communication and to work together in securing the area from illegal maritime activities.

The Russian Northern Fleet hold a live fire exercise at the Kapustin Yar practice range to test a new Arctic surface-to-air missile system, the Arctic Tor-M2DT. It is capable of enhanced target detection and consists of 16 surface-to-air vertically launched missiles, with a striking range of up to 12 km and can reach altitudes up to 10,000 metres

AUGUST : Five Russian nuclear engineers die and three are severely injured during tests on a liquid propulsion system involving isotopes at a Russian Navy testing range. Debate whether this was a new missile failure or retrieval of previously lost device from sea. Weeks later reports on the high level of radiation near Nyonoksa in Arkhangelsk region (64.37 N 39.10 E). Two radio active pontoons were found abandoned on the shores of the White Sea, with levels several times above the norm

SEPTEMBER : Russian and multi national Exercise Tsentr 2019 starts. 6 day event including 128,000 troops. Reported that anti-submarine vessel «*Vice-Admiral Kulakov*» and landing ships «*Kondopoga*» and «*Aleksandr Otrakovsky*» exercised in air defence combat and weaponry deployed included the nuclear-capable air-launched ballistic missile Kinzhal. On 16 September, Russian troops are deployed on Bolshevik Island, proceeding towards Uyedineniya Island in the Kara Sea. A Russian defence official describes the local exercises as a “serious testing of the battle capacities of the Arctic troops”.

Cargo vessel «*S. Kuznetsov*» halted by Russian marines after suspicions of shipping violations on 13th September north of the Taymyr Peninsula.

The «*Vice-Admiral Kulakov*» stops the small sailing vessel «*Pangaea*» to inspect its documents in the vicinity of Franz Joseph Land - it was on its way through the area to deploy foot explorers.

On a cape situated 81.5 N 59.1 E, the northernmost point of Europe, Eurasia, and Russia and 911 kilometres (566 mi) from the North Pole, on the island of Rudolf, called Cape Fligeli, Russia's Northern Fleet installs its flag.

OCTOBER : Russia's state military shipping delivered more than 30,000 tonnes of goods to its Arctic military base in first three quarters of 2019. This is a 172% increase over deliveries in 2018, reports the Moscow Times 2 October 2019

Russian 8,500 tonne ice-rated warship Ivan Papinin launched in St Petersburg. Due in service 2022 or 2023. Can deal with ice 50 cm thick. Armed with Kaliber cruise missiles, 76.2mm naval gun, helipad and bays for 2 raptor-class speedboats. RT reports its missions include interception and support ship in battle group.

6 Italian F-35s on Icelandic Air Patrol for first time (with tanker). The mission has previously been flown by Canada, the Czech Republic, Denmark, France, Germany, Norway, Portugal, and the US.

UK takes delivery of the first of nine US-made Poseidon P-8A maritime patrol planes which are intended to resume monitoring the Russian submarine activity in the Arctic.

Norwegian intelligence says two Russian submarines have been guarding the entrance to the Barents Sea; two were located west of Bear island in the Svalbard archipelago; recently in-service Prince Vladimir submarine test-fired a Bulava ballistic missile from the White Sea near Arkhangelsk across 10 time zones to the Kamchatka peninsula across from Alaska; two Sierra class nuclear submarines in the Norwegian Sea conducting dives at their maximum depths and testing new weapons; some believed to have passed through G-I-UK gap.

Russian Foreign Minister Sergei Lavrov says NATO's increasing training activities in Norway are destabilising to the northern European security. Norwegian Foreign Minister Ms Søreide expresses concern about Russian naval exercises off the coast of northern Norway in August, the largest since 1985.

The U.S. Air Force announces that secure communications in the polar regions is now possible. The *Enhanced Polar System (EPS)* provides highly secure and anti-

jamming signal capabilities. EPS fills a gap in the previous lack of capability for communications over the polar regions. The system consists of two satellites with one solely dedicated to US military north of 65 degrees latitude

Prime Minister of Norway and Russia's Minister of Foreign Affairs commemorate the Soviet liberation of Kirkenes, the Norwegian border town was once strategically important to Hitler's bridgehead in the advance on Murmansk. On the 25th of October 1944, Soviet forces had pushed Nazi German troops out.

NOVEMBER : UK Royal Marines start cold weather training in Scotland to prepare for Arctic exercises next year.

26 tanks model T-80BVM are now deployed at a Russian base located at Pechenga on the Kola Peninsula near the border to Norway and Finland. Among the local units are the 61st Naval infantry brigade and the 200th Motorized Rifle Brigade. Along with the 80th Independent Motorized Rifle Brigade in Alakurtti, they are a core part of Russia's new Arctic Brigade.

Russia's new nuclear-powered ballistic Borei-class submarine successfully test fires its torpedoes in the White Sea. After successfully completing all its tests the submarine will be transferred into the Russian Northern Fleet, the second one to be deployed to northern waters

DECEMBER : Russia's Northern Fleet aims to test its new Tsirkon scramjet-powered cruise missile soon in the White Sea area. The missile is designed to enemy ships at a range of 400 kilometres and can travel at Mach 9. The Tsirkon will be one of the weapons on Russia's new class of frigates

Russia is setting up a new, long-range over-the-horizon radar system in the Russian Arctic that will provide early warning and general monitoring coverage of potential threats, including aircraft, cruise missiles and hypersonic weapons. The radar system will be linked to the larger Russian integrated air defence network

The Strategic Arctic Naval Focus Act of 2019, co-sponsored by Senators Dan Sullivan and Lisa Murkowski, Alaska (Rep), and Sen. Angus King, Maine (Ind) introduced in the U.S. Senate which would require the Navy to have a greater presence in the Arctic, in collaboration with the Coast Guard. No provision for funding however.

The National Defense Authorisation Act 2020 signed into law by President Trump. It has two major provisions which are Arctic-specific : *Chinese Foreign Direct Investment in Countries of the Arctic Region and Plan to Increase and Expand Cold-Weather Training*

(JANUARY 2020 : Royal Marines 45 Commando join NATO Exercise Cold Response in Norway)

COMMERCIAL

20 million tonnes of cargo was transported in ships from 20 nations via the Northern Sea Route (NSR) in 2018 and is estimated at 30 million tonnes this year. (c.f. 7.3 million in 2016) Russia expects the volume to at least quadruple by 2025. Regular updates can be found at <https://arctic-lia.com/>

Shipment is 40% faster eastward from Europe to China via the NSR, compared with the Suez Canal

MARCH : Russian natural gas producer *Novatek* and French multinational oil and gas company *Total S.A.* sign deal with implied a sale of 10% - 15% of participation interest as well as an agreement on Total's future participation in Novatek's projects in the Russian Arctic.

Norway plans to expand the offshore oil and gas acreage it offers for exploration to companies during its annual licensing rounds. It will offer 90 new blocks (up from 83 in 2018), 48 in the Barents Sea, 37 in the Norwegian Sea, and five blocks in the North Sea. This will be considered a record amount of production licenses to offer.

Russia inaugurates gas field called *Kharasaveyskoye*, operated by the public joint stock company *Gazpromis* located on the Yamal peninsula at 67 N 74 E About 20% offshore

China General Nuclear Power Group announces details of first nuclear-powered icebreaker. It is to be 152 meters long, with a displacement of 30,000 tons, which will make it the world's second largest nuclear-powered icebreaker after Russia. Possible test bed for future Chinese nuclear aircraft carrier

MAY : Russia launches the nuclear-powered icebreaker *Ural* (due in service 2022) Third and currently last of Project 22220 class. It is a type LK-60Ya ship capable of traveling the Northern Sea Route all year long. The icebreaker is the largest and most powerful ever constructed, and can operate in deeper waters as well as coastal and river areas. The ship has more than 81,000 horsepower, two nuclear reactors, and can break through three metres of ice

Canada ratifies an agreement to ban commercial fishing in the Arctic for 16 years. The deal will not be enforceable until the other nine governments that have signed onto it ratify it. Those governments include Norway, the United States, China, Iceland, Japan, the Republic of Korea, and Denmark. The EU, Russia, and Canada are the only ones that have ratified the agreement so far. It also seeks to

include the participation of Arctic indigenous peoples, recognizing that their local knowledge is of critical importance for the conservation of the region

Rosnedra claims record oil find in the Yenisey River delta where the Yenisey flows into the Kara Sea (one of largest 3 rivers emptying into Arctic at 72N 81 E). It is estimated that the Payakha fields, located about 130 km north of the port town of Dudinka, may hold up to 1.2 billion tons of oil

Russian company *Novatek* signed further contract towards integrated LNG facility for its Arctic LNG 2 project, due in 2023

JUNE : *Space Norway HEOSAT AS* to launch two satellites in 2022 to ensure internet availability in its northernmost regions and improve conditions for search and security operations, as well as for military and exploration activities. The project will be carried out in close cooperation with US military officials.

In the Barents Sea, *Equinor Energy AS* finishes drilling another wildcat well, which turns out to be dry. Korp fjell gas discovery is several hundred kilometres away from the city of Vardø. The well was permanently plugged and abandoned. Meanwhile *Shtokman Development AG*, which was supposed to run the exploration and future operation of the Shtokman field, one of the world's largest offshore natural gas reserves also in the Barents Sea, has been shut down – believed to be unviable in light of US shale oil developments.

JULY : Reported continuation of illegal mining operations for anthracite on the Taimyr peninsula (74N 98E) in Russia. Despite owing some hundred millions for environmental law violations, *Vostok Coal* and its *Arctic Mining* company is operating close to the Big Arctic National park. Backed by the government, the controversial mining project implies constructing two new port terminals and a railway, and is seen as a crucial part of the development of the Northern Sea Route. (Later, in October the company receives permission from Russian Government to expand into the National Park.)

Republican Governor Mike Dunleavy decides to make substantial budget cuts in higher education in Alaska in favour of extractive industries. University of Alaska's state appropriations have been slashed by more than 40 % of its general fund

AUGUST : A seven-year Inuit Impact and Benefit Agreement between Qikiqtani Inuit Association and the Government of Canada signed, establishing the Tallurutiup Imanga National Marine Conservation Area and the creation of another marine protected area, Tuvaijuittuq.

The journal *Nature Climate Change* publishes a new study which combines observations over the past 40 years with results from climate modelling experiments. Concludes that reduced Arctic sea ice only has minimal influence on severe cold winter weather across Asia and North America. Instead the scientists found that reduced regional sea ice and cold winters often coincide with each other. This is because the reduced ice and extreme winters are driven by the same, large-scale atmospheric circulation patterns.

The Greenland ice sheet experiences its largest single-day volume loss on record

Shipping company *CMA CGM S.A.* announces that it will not use the Northern Sea Route for shipping because of projected environmental consequences.

SEPTEMBER : At the XX Russian-Indian Summit, India's Modi and Russia's Putin discuss cooperation in the Arctic and Indian active engagement in Russian LNG projects, including *Novatek's Arctic LNG 2*. *Novatek* and Indian *Petronet LNG Limited* signed a memorandum of understanding regarding LNG supplies, electrical grid construction, as well as joint marketing. *Novatek* recently given 40 billion roubles in tax cuts for the LNG 2 megaproject on the Gydan peninsula (70 N 79E)

OCTOBER : Ministry for the Development of the Russian Far East set the target of 120 million tons of cargo annually along the Northern Sea Route in 15 years. Half of this amount will be shipped via Murmansk. The construction of a year-round trans-shipment hub begins in the ice-free Kola Bay.

Nike signs the *Arctic Shipping Corporate Pledge* which encourages businesses to commit to not ship goods through the Arctic Ocean. Currently, 10 other companies have signed. Russian considering creation of a state-run container ship operator company that will cover the risk costs of shipping through Arctic waters.

The Japanese government plans to build an icebreaker in 2020 to ensure the safe navigation of its vessels in the Arctic.

To ensure the safety of navigation along the Northern Sea Route, Russian Federal Agency "Roshydromet" plans to expand the network of weather stations from Vladivostok to Murmansk in 2020.

Canadian Liberal government releases its new Arctic and Northern policy framework. First phase of process to replace 2009 Northern Strategy and 2010 Statement on Canada's Arctic Foreign Policy. The core of the framework revolves around 8 goals and 10 principles focusing on local and regional

economic development, infrastructure, indigenous rights, environmental protection, national defence and foreign policy.

U.S House of Representatives votes 225-193 in favour of reinstating a decades-long ban on oil and gas drilling in Alaska's Arctic National Wildlife Refuge. The Republican led Senate is not expected to back it.

Finland considering increase in the guarantee fees paid by mining to offset any environmental damage their operations may cause; however, in many cases, taxpayers are shouldering the burden of failed mining operations

NOVEMBER : Following a meeting of the State Commission for the Arctic Development, Russian Deputy Prime Minister Yuri Trutnev recommends Rosatom pay more attention to the construction of infrastructure for the Northern Sea Route, and not just building and operating icebreakers

The Association of Arctic Expedition Cruise Operators a coalition of around 50 ships and 10 yachts, has formalized a self-imposed ban on the most polluting heavy fuel oils (HFO) in an attempt to protect the Arctic environment. Despite this, Russia and China, who account for nearly 2/3 of HFO use, have yet to commit to the *International Maritime Organization's* official ban.

Rosatom, Russia's nuclear power company, reports that their shipping as of mid month exceeded 26 million tons. This is more than a 63% increase relative to the same period last year, mostly attributed to Russian industrial projects, including LNG from Novatek's natural gas installation in the Yamal Peninsula and oil from Gasprom's *Neft's Novy Port project*

The Russian government has approved construction plans for the Pavlovskoye seaport in the remote and heavy militarized Arctic archipelago in northern Russia. The seaport will be serving the zinc and lead mine located in Novaya Zemlya, formerly the site of Soviet nuclear tests, and still home to military establishments. The mine also includes a processing plant and will be one of the northernmost mining operations in the world. The Pavlovsky mine holds an estimated 2.48 million tons of zinc, 549,000 tons of lead and other metals. The mine, the northernmost in the world at the moment, is projected to deliver up to 3.5 million tons of ore per year

The Russian Finance Ministry releases its 2020 draft budget, which does not include any of Novatek's desired natural gas projects. The firm has been pushing the government to invest 1.9 billion in Arctic liquid natural gas (LNG) projects in

Gydan and Murmansk. The Finance Ministry is not confident in natural gases profitability as the price of LNG has decreased to its lowest point in several years. Novatek has been pressuring the Russian government to increase investments in its projects as it aims to increase LNG production up to 70 million tons by 2030

DECEMBER : The lead nuclear icebreaker of project 22220 "Arktika" went on sea trials on December 12, according to builders Baltic Shipyard in St. Petersburg. She is expected to be in commercial operation within two years. Atomflot has placed orders for the construction of three universal nuclear-powered icebreakers of project 22220 – Arktika, Siberia and Ural – with another 2 expected in the class. The ships can break through ice 2 metres thick.

"Plan on the Development of the Northern Sea Route until 2035," published by the state-owned nuclear energy corporation Rosatom (Atomic-energy.ru, December 23, 2019). The document recognizes the strategic importance of the NSR to the Russian economy and national security.

Greenland's main airport, Kangerlussuaq Airport, formerly a US military airbase 50 km north of the Arctic Circle, will be closed to commercial airlines by mid-2024 due to shorter runways from rapidly melting permafrost. Greenland intends to divert commercial traffic to Nuuk (liable to bad weather) in the south and the tourist destination Ilulissat in the north. Both runways have yet to be built.

The \$55 billion natural gas pipeline, "*Power of Siberia*," is officially opened between Russia and China. The 3000 km pipeline stretches from Russia's Siberian fields to China's northeast, and is expected to yield Russia \$400 billion over a period of 30 years. The pipeline is operated by Russia's state-owned company Gazprom and is expected to deliver 4.6 bcm of natural gas in 2020, 10 bcm in 2021, 16 bcm in 2022, 21 bcm in 2023, and reach the full capacity of 38 bcm by 2025

ENVIRONMENTAL AND POLITICAL

JANUARY : The Earth's north magnetic pole is shifting at a rate of 50 km per year, faster than previous estimates. This impacts upon precise navigation.

FEBRUARY : United States House of Representatives introduced a bill that would block oil and gas drilling in Alaska's Arctic National Wildlife Refuge north of the Arctic Circle . The bill seeks to repeal a provision in the Tax Cuts and Jobs Act. Unlikely Trump will sign it.

Operating license granted to Nussir ASA for copper mining in Kvalsund municipality, Northern Norway (70 degrees). Along with mining works, the government also approved of eventual mine waste dumping in the nearby Repparfjord. Arctic Railway project shelved by Finland. Indigenous peoples opposed both projects.

MARCH : Russian government allocates \$13.2 million to the Transarktika-2019 programme which aims to improve the country's meteorological security by conducting scientific experiments and reviewing the level of pollution in the region. Four Arctic research vessels will be utilised with three having very specific tasks; the *Akademik Tryoshnikov* will be stuck in the ice and left to float with the current, the *Mikhail Somov* will conduct research along the Arctic coast, and the third one, the *Professor Mulyaovskiy* will be utilised as a training platform

Canadian Prime Minister Justin Trudeau goes to Nunavut's capital city Iqaluit to deliver an official apology for Canada's crimes against the Inuit people. In mid-20th century, thousands of them were taken away from their communities for controversial tuberculosis treatment.

District Court of Finland rules that the four members of the Sámi community, accused in 2017 for violating the Fishing Act, were exempt from acquiring any special license for fishing in the area since they were exerting their constitutionally protected basic rights to pursue their traditional culture.

Research shows Arctic waters are now producing nitrogen resulting from a microbial process called "nitrogen fixation." This is creating increased levels of phytoplankton, which require metabolically useful nitrogen to thrive, as well as absorbing ocean carbon.

Brazil considering whether to accede to the Svalbard Treaty and whether it wants to apply for observer status at the Arctic Council.

APRIL : Canadian Parliament report

<https://www.ourcommons.ca/DocumentViewer/en/42-1/FAAE/report-24/page-ToC>

International Arctic Forum with international participants from business, politics and science in St. Petersburg, Russia.

Alaska State Senate passes Bill advocating railway construction between Alaska and Alberta, Northern Canada.

MAY : Arctic Council meeting ends without a joint final statement from council members, the first time since 1996, after the US delegation refused to include the phrase "climate change"..

Arctic Circle China Forum in Shanghai demonstrates China's mounting interest in Arctic governance and affairs despite it not being an Arctic state

International Maritime Organization Marine Environmental Protection Committee meeting in London discusses issues like black carbon emissions and heavy fuel oil in the Arctic.

Underwater forests of large brown seaweeds (kelps) in the Arctic are expanding, providing shelter and food for fish and maritime organisms, and help protect coastlines by decreasing the power of waves during storms and reducing coastal erosion

JUNE : Arctic Council Working Group on Black Carbon and Methane updated its recommendations for mitigating the impacts of “powerful short-lived climate pollutants”. Along with four major points listed in 2015 – mobile and stationary diesel-powered sources, oil and gas sector, residential combustion and solid waste – two more recommendations were added, for better wildfire management and improved agricultural practices

A special committee of the Canadian Senate publishes a study “*Northern Lights: A Wake-Up Call for the Future of Canada.*” The study emphasises that the country has neglected its Arctic regions, and notes that greater investment, support, and attention from the Government is required in this region. The Senate committee in the study states that at a time of increased competition in the region, a failure for the government to protect its sovereignty in its Arctic territory can have a large negative impact on the future of the country.

The Canadian government gives Royal Assent to the Indigenous Language Act. It is intended to “reclaim, revitalize, strengthen and maintain Indigenous languages in Canada.” According to state officials, the act is an outcome of long-term collaboration with Canada's indigenous communities, who are said to have played a major role in developing the new legislation. Not so say Inuit representatives.

AUGUST : Germany publishes its Arctic Policy Guidelines, including a chapter on security policy

SEPTEMBER : UK polar research ship RRS Sir David Attenborough formally named

Arctic sea ice likely reached its minimum extent for the year, at 4.15 million square kilometers (1.60 million square miles) on September 18, according to scientists at the National Snow and Ice Data Center (NSIDC) at the University of Colorado Boulder. 4th lowest on record. (On both September 19 and 23 2018, Arctic sea ice dropped to its minimum extent of 1.77 million square miles (4.59 million square km). The 2018 minimum equalled the 6th-lowest in the satellite record)

Mosaic Expedition leaves Tromsø, Norway for a 390 day research trip. Crew of 600 people will be drifting towards northern Greenland on a ship locked up in the ice.

The Intergovernmental Panel on Climate Change releases its final Special Report, *The Special Report on the Ocean and Cryosphere in a Changing Climate*. It is the work of 104 scientists from 36 countries. It evaluates what impacts the changing climate already has had on the world's oceans, polar regions, and high altitude regions, and what can be expected until the end of the 21st century. Arctic related examples include how permafrost temperatures have increased to record high levels, how Arctic sea ice shrinkage has been observed during all months of the year over the last 40 years, and how there is a 35 percent chance that the Arctic will see an ice-free summer by 2100 even if the world manages to limit future temperature rises to 2°C

OCTOBER : On the Transarktika 2019 expedition, Russian scientists discover that the whole Northern Sea Route is littered with microplastics. Microplastics in the sea and ice may inhibit sea ice formation and permit greater absorption of sunlight.

NOVEMBER : *The Center for Support of Indigenous Peoples of the North/Russian Indigenous Training Center* has been disbanded by the Moscow city court.

A Congressional Research Service report *Changes in the Arctic: Background and Issues for Congress* released in the United States.

DECEMBER : reports of large numbers of polar bears at village of Ryrkaypiy (north of 68 degrees, 179 degrees west) in Chukotka region of Russia. Reported and re-reported attracted by dead walruses but enabled by lack of sea ice (climate change). Detailed analysis suggests numbers of both bears and walruses in the area have been increasing.

Floating nuclear power plant Akademik Lomomosov operating at Pevek, a town of about 5,000 people, and most northerly town in Russia (Chukotka 69.42 N 170.17E Northernmost settlement in Russia is Dikson 73.30 N 80.31 E population less than 1000) . Two 35 Mw reactors can supply power and hot water for 100,000 people. Replaces on shore nuclear power and coal fired power stations.

Blog arctic-news.blogspot.com publishes article saying human race could become extinct next year (2020). #hysteria

Sanctions ban western companies from assisting Russia's Rosneft in exploring deepwater and Arctic offshore fields or helping Rosneft extract shale oil. They also limit Rosneft's ability to raise long-term financing in Western markets.

Nevertheless Rosneft and Norway's Equinor (formerly Statoil) announce on 23rd December they intend to extract about 250 million barrels of oil (much of it heavy

viscous, the worst environmentally) and 23 billion cubic metres of gas in the first stage of developing the Severo-Komsomolskoye oilfield (at 64.73 N, 75.35 E – although south of Arctic Circle reported as possible trend. The most northerly oil field in Russia, the Timan-Pechora Basin overlies the Arctic Circle, extending across 61°-72° N latitude and 44°-66° E longitude south of the Pechora Sea/Barents Sea)