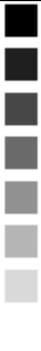
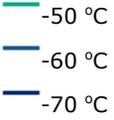
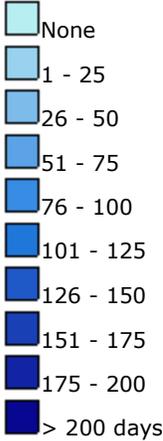
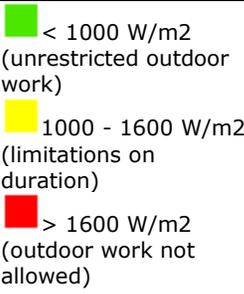
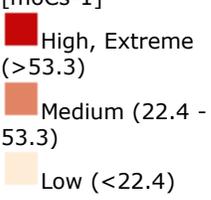
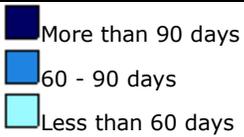


Data/ Theme	Scale/ Symbology	Source	Comment
Meteorology			
Daylight, hours per day	 <p>< 3 3 - 6 6 - 9 9 - 12 12 - 15 15 - 18 18 - 21 > 21</p>	US Naval Observatory website	Nr. of hours sunlight per day at N° North
Horizontal visibility, % of observations with horizontal visibility < 500m	 <p>0% - 5% 5.1% - 10% 10.1% - 15% 15.1% - 20% 20.1% - 25% 25.1% - 30% 30.1% - 50% 50.1% - 100%</p>	CISL Research Data Archive National Climatic Data Center/NESDIS/NOAA/U.S. Department of Commerce, Data Support Section/Computational and Information Systems Laboratory/National Center for Atmospheric Research/University Corporation for Atmospheric Research, Earth System Research Laboratory/NOAA/U.S. Department of Commerce, and Cooperative Institute for Research in Environmental Sciences/University of Colorado. 1984, updated monthly. <i>International Comprehensive Ocean-Atmosphere Data Set (ICOADS) Release 2.5, Individual Observations</i> . Research Data Archive at the National Center for Atmospheric Research, Computational and Information Systems Laboratory.	Limitations on helicopter operations and FSPO offloading.
Vertical visibility (cloud height) % of observations with ceiling < 200m	 <p>0% - 5% 5.1% - 10% 10.1% - 15% 15.1% - 20% 20.1% - 25% 25.1% - 30% 30.1% - 50% 50.1% - 100%</p>	CISL Research Data Archive National Climatic Data Center/NESDIS/NOAA/U.S. Department of Commerce, Data Support Section/Computational and Information Systems Laboratory/National Center for Atmospheric Research/University Corporation for Atmospheric Research, Earth System Research Laboratory/NOAA/U.S. Department of Commerce, and Cooperative Institute for Research in Environmental Sciences/University of Colorado. 1984, updated monthly. <i>International Comprehensive Ocean-Atmosphere Data Set (ICOADS) Release 2.5, Individual Observations</i> . Research Data Archive at the National Center for Atmospheric Research, Computational and Information Systems Laboratory.	Limitations on helicopter operations
Contours for 100-years minimum temperature	 <p>-10 °C -30 °C -40 °C</p>	NCEP_Reanalysis 2 data provided by the NOAA/OAR/ESRL PSD, Boulder, Colorado, USA, from their Web site at http://www.esrl.noaa.gov/psd/	Design criteria and material selection

			
Number of days per year below -20 °C		<p>NCAR/CISL Arctic System Reanalysis (ASR) Project Daily Means for 2010</p> <p>Byrd Polar Research Center/The Ohio State University. 2012. <i>Arctic System Reanalysis (ASR) Project</i>. Research Data Archive at the National Center for Atmospheric Research, Computational and Information Systems Laboratory. http://rda.ucar.edu/datasets/ds631.0/ Accessed January 2014.</p>	Operational aspects
Wind Chill Index, average per month		<p>NCAR/CISL Arctic System Reanalysis (ASR) Project Daily Means for 2010</p> <p>Byrd Polar Research Center/The Ohio State University. 2012. <i>Arctic System Reanalysis (ASR) Project</i>. Research Data Archive at the National Center for Atmospheric Research, Computational and Information Systems Laboratory. http://rda.ucar.edu/datasets/ds631.0/ Accessed January 2014.</p>	NORSOK S-002 criteria for limitations on outdoor operations
Marine icing conditions on vessels, average per month. Calculated from Øverland algorithm.	<p>[moCs-1]</p> 	<p>NCAR/CISL Arctic System Reanalysis (ASR) Project Daily Means for 2010</p> <p>Byrd Polar Research Center/The Ohio State University. 2012. <i>Arctic System Reanalysis (ASR) Project</i>. Research Data Archive at the National Center for Atmospheric Research, Computational and Information Systems Laboratory. http://rda.ucar.edu/datasets/ds631.0/ Accessed January 2014.</p>	Safety and operational aspects, ice accretion on structures and safety systems.
Ocean data			
Ice extent in 2011, per month	>10% ice concentration	Provided by National Ice Center Monthly mean sea ice extent 2011	Limit for ice interactions with operations
Duration of open water season, 2012, longest consecutive period with open water.		<p>Arctic Ocean Physics Analysis and Forecast / MyOcean Product: ARCTIC ANALYSIS FORECAST PHYS 002_001_a</p>	Limitation for operations requiring ice free conditions, such as drilling

		This study has been conducted using MyOcean Products	activities. 60 days assumed to be representative to drill an exploration well.
Biology and wildlife			
Ecological activities for fish, per month	Spawning Nursery Wintering Unspecified	AMAP/CAFF/SDWG, Identification of Arctic marine areas of heightened ecological and cultural significance: Arctic Marine Shipping Assessment (AMSA) IIc. Arctic Monitoring and Assessment Programme (AMAP), Oslo. 2013	Basis for vulnerability assessment
Ecological activities for sea mammals, per month	Breeding Feeding Molting Calving Whelping Habitat Haul-out Migration Wintering Unspecified	AMAP/CAFF/SDWG, Identification of Arctic marine areas of heightened ecological and cultural significance: Arctic Marine Shipping Assessment (AMSA) IIc. Arctic Monitoring and Assessment Programme (AMAP), Oslo. 2013	Basis for vulnerability assessment
Ecological activities for sea birds, per month	Breeding Feeding Molting Migration Staging Wintering Unspecified	AMAP/CAFF/SDWG, Identification of Arctic marine areas of heightened ecological and cultural significance: Arctic Marine Shipping Assessment (AMSA) IIc. Arctic Monitoring and Assessment Programme (AMAP), Oslo. 2013	Basis for vulnerability assessment
Search and rescue			
Satellite coverage, limitations on geostationary satellite coverage	75 ° - reduced satellite coverage from geostat. 81.3 ° - no satellite coverage from geostat.	Data produced by DNV GL	Limitations on communication and data transfer for vessels and mobile units.
SAR-resources			
Helicopter bases with SAR-capacity		Sources of information: Hovedredningssentralen i Bodø Bristow Norway AS Lufttransport AS Icelandic Coast Guard Arktisk Kommando Air Greenland/Peterson Air Force Base RCAF, v/Kevin Grieve JRCC Halifax JRCC Trenton	SAR-coverage

		JRCC Victoria CASARA US Coast Guard North Slope Borough DNV Arkhangelsk/North Western Aviation Search and Rescue Center	
Cities, airports, hospitals		ESRI World Data/Qualified by DNV GL	General infrastructure and external support.
Activity			
Oil – and gas	Discoveries Oil and gas by assessment unit	<p>Discoveries</p> <ul style="list-style-type: none"> • Based on “Table 1.1 A comparison of the wildcat wells, discoveries, discovered resources and yet-to-find resource estimates for the regions of the Arctic” in article Chapter 1 An overview of the petroleum geology of the Arctic. • Downloaded from http://mem.lyellcollection.org/content/35/1/1.full.pdf+html • Section I Arctic overviews: Anthony M. Spencer, Ashton F. Embry, Donald L. Gautier, Antonina V. Stoupakova, and Kai Sørensen, Chapter 1 An overview of the petroleum geology of the Arctic Geological Society, London, Memoirs, 2011, 35:1-15, doi:10.1144/M35.1 <p>Oil and gas by assessment unit</p> <ul style="list-style-type: none"> • Based on excel file 1169467TableS1s.xls accompanying the article Assessment of Undiscovered Oil and Gas in the Arctic. • Downloaded from http://www.sciencemag.org/content/324/5931/1175/suppl/DC1 • Assessment of Undiscovered Oil and Gas in the Arctic, Donald L. Gautier et al., Science 324, 1175 (2009); DOI: 10.1126/science.1169467 • Downloaded the boundaries Geologic Provinces of the Circum-Arctic, 2008 (north of the Arctic Circle) from USGS http://certmapper.cr.usgs.gov/geoportal/catalog/search/resource/details.page?uuid={7C1E0B46-4DAF-4FE7-901F-48EBA5492B06} • Format: Shapefile • Downloaded September 2013 	
Arctic shipping 2012	Vessel size categories Vessel types Ice class/ce breakers Fuel type	AIS Ship traffic data is received from Norwegian Coastal Authority, processed and prepared for visualization by DNV GL.	For all categories also sailed distance and operational discharges to air.