



August, 2017

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INTEGRATING DISPERSANTS IN OIL SPILL RESPONSE
IN ARCTIC AND OTHER ICY ENVIRONMENTS



Field trials and spill response in the Arctic and other icy environments

Large mesocosm experiments in icy environments

Field trials and spill response in the Arctic and other icy environments

These tables are not comprehensive since many of the studies led to a significant number of publications. But they do provide an entry into the research.

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1 FIELD TRIALS AND SPILL RESPONSE IN THE ARCTIC AND OTHER ICY ENVIRONMENTS

Release of oil at sea			
Year	Location	Release	Reference
1970	Chukchi Sea	Multiple 55-100 gallon spills on ice	1
1975	Cape Parry, Inuvik	9 discharges of 45 m ³ crude oil under ice	2
1978	Tromsøflaket, Norwegian Sea	25 tons of crude oil at sea	3
1979	Cabot Strait, Nova Scotia	Wreck of <i>Kurdistan</i> ; 29,662 tons Bunker C	4
1979	Beaufort Sea	19 m ³ crude oil under ice	5
1979	Prudhoe Bay, AK	1-20 gallons crude oil and diesel under ice	6
1979	Eastern Baltic Sea	Grounding of <i>Antonia Gramsci</i> ; 5500 tons crude oil	7
1980	Cape Hutt, Baffin Island	15 m ³ crude oil and 15 m ³ dispersed crude oil close to shore	8,9
1985	Helsinki Harbor, Finland	180 L of oil in broken ice	10
1986	Beaufort Sea, AK	Dispersion of 2.5m ³ weathered oil slicks	11
1986	Chedabucto Bay, Nova Scotia	Three 1m ³ spills of crude oil in pack ice	12
1987	Gulf of Finland	Collision of <i>Antonio Gramsci</i> ; 500 tons crude oil	10
1989	Arthur Harbor, Antarctica	Wreck of <i>Bahia Paraiso</i> . 68 tons of Arctic diesel fuel	13,14
1993	Adélie Land, Antarctica	Diesel spill in ice	15
1993	Barents Sea	26 tons of crude oil in marginal ice zone	16
1996	Gulf of Finland	200 l crude oil under ice	17
2004	Svea, Svalbard	Range of crude oils on ice	16
2006	Gulf of Finland	Wreck of <i>Runner 4</i> ; 102 tonnes of heavy fuel oil, 35 tonnes of light fuel oil, and 600 litres of lubricant oil on the ship.	18,10
2006	Svea, Svalbard	3400 liters Statfjord crude oil released under ice	19
2008	Barents Sea	0.7 tons of crude oil at sea	3

2009	Barents Sea	20 tons crude, 5 tons IF30 emulsion at sea	20,21
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2 LARGE MESOCOSM EXPERIMENTS IN ICY ENVIRONMENTS

Mesoscale experiments			
Year	Scale	Goal	Reference
1979	Prudhoe Bay & 0.2m ³ tanks, Anchorage, AK	Oil migration in ice	1
1982	3m ³ tanks and 0.3m ² enclosures on Morbihan Bay, Iles Kerguelen	Microbial response	2,3
1989	3.5m ³ tanks at -1.6C, Rimouski, St. Lawrence seaway	Microbial response	4,5
1996	40 l oil in booms, Calgary	Dispersants in broken ice	6
2000	180m ² basin, Trondheim	Oil spreading in broken ice	7
2001	210 m ³ mesocosm, Tokyo	Spreading of oil under rough and smooth ice	8
2002	12 large tests of dispersant in cold seawater (-0.5 to 2.5°C), Ohmsett, NJ	Oil dispersion	9
2004	1, 11 and 10,000 m ³ mesocosms, Ottawa and Ohmsett, NJ	Spreading on Ice and in Snow, Evaporation in Ice and Snow, Slick Thickness on Cold Water, Migration Rates through Brine Channels, Formation of Water-in-Oil Emulsions	10
2005	Circulating plume cut into ice, Svalbard	Evaporation, emulsification, spreading etc. with different ice conditions (slush ice, 30% and 90% ice coverage)	11
2005	502m ² mesocosm, Helsinki	Icebreaker-enhanced chemical dispersion	12,13
2006 & 2007	10,000 m ³ mesocosm, Ohmsett, NJ	Dispersant testing in cold water (1°C)	14

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3 FIELD TRIALS OF OIL BIODEGRADATION ON ARCTIC SHORELINES

Year	Location	Experiment	Reference
1978	Ny Ålesund, Svalbard	Experimental plots with Forcados crude oil	1
1981	Cape Hutt, Baffin Island	Experimental plots with Lago Media crude oil	2
1987	Ny Ålesund, Svalbard	Experimental plots and response to a 80,000 L spill of marine gas oil	3
1990	Davis Station, Antarctica	Experimental plots with diesel and lubricating oil	4
1997	Svea, Svalbard	Experimental plots with IF380 fuel oil	5

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