Potential and limitations in use of dispersants under various oil spill conditions

Per. Daling@sintef.no

Examples from some recent R&D studies:

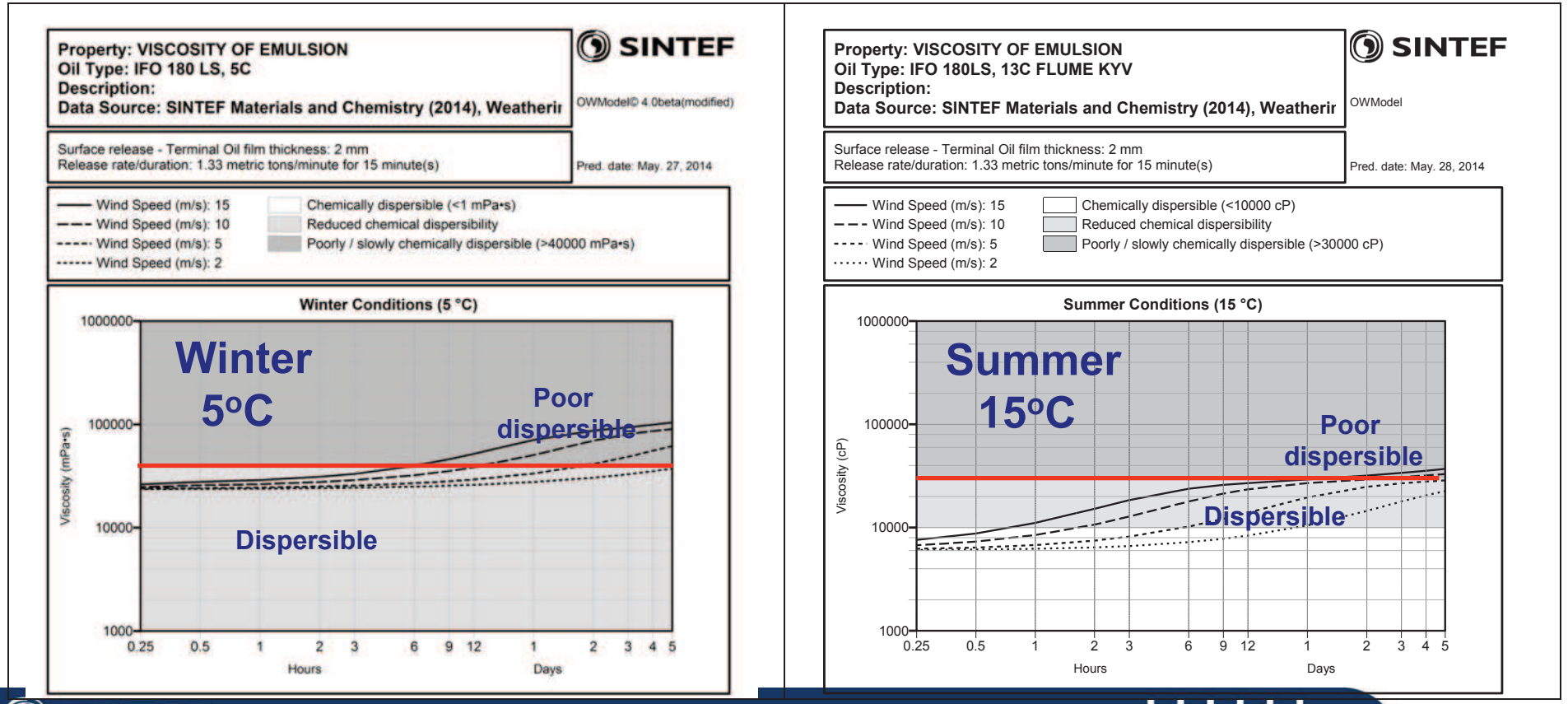
- Use of dispersant on bunker fuel oils
- Use of dispersant in Ice-covered area / application strategies
- Injections of dispersant in underwater releases
- R&D gaps / further documentation needed to perform robust contingency planning (NEBA approach)

Recent project at SINTEF for Norwegian Coastal Administration (2013 – 2014):

"Potential for using dispersants on HFO-Bunker fuel oil"

→ Better documentation for estimating for the "time-window" for using dispersants on different HFO under different conditions

Example: IFO- 180 LS Bunker fuel



During the SINTEF Oil in Ice JIP (2006 – 2010):

Novel Spray arm for dispersant application in ice

Learnings from the SINTEF Oil in Ice JIP field experiments (2009):

Dispersant application strategy in ice:

Dispersant treatment followed mechanical turbulence by vessel thrusters and MOB-water jet

grafisk/admtegner/div-PSD/bonnex-filmthickness examples-nov-01.ppt

Ongoing Meso-scale Flume Basin testing at SINTEF, SLRoss and CEDRE (Arctic OGP JIP- project, 2015)

Dispersant effectiveness of different oils weathered in ice

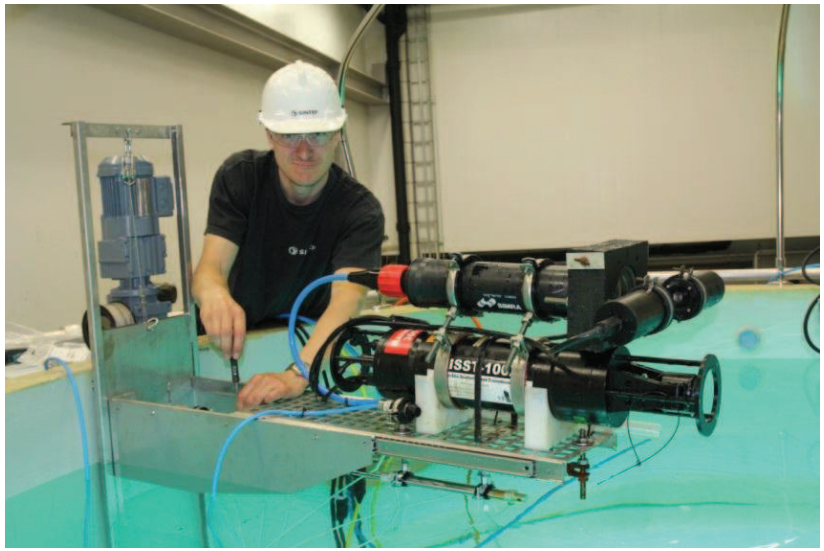
Dispersant application

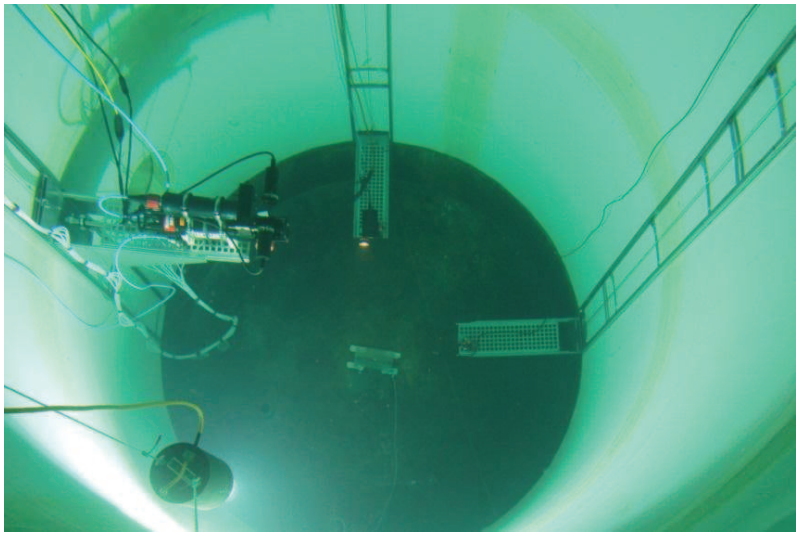
Energy /prop. washing

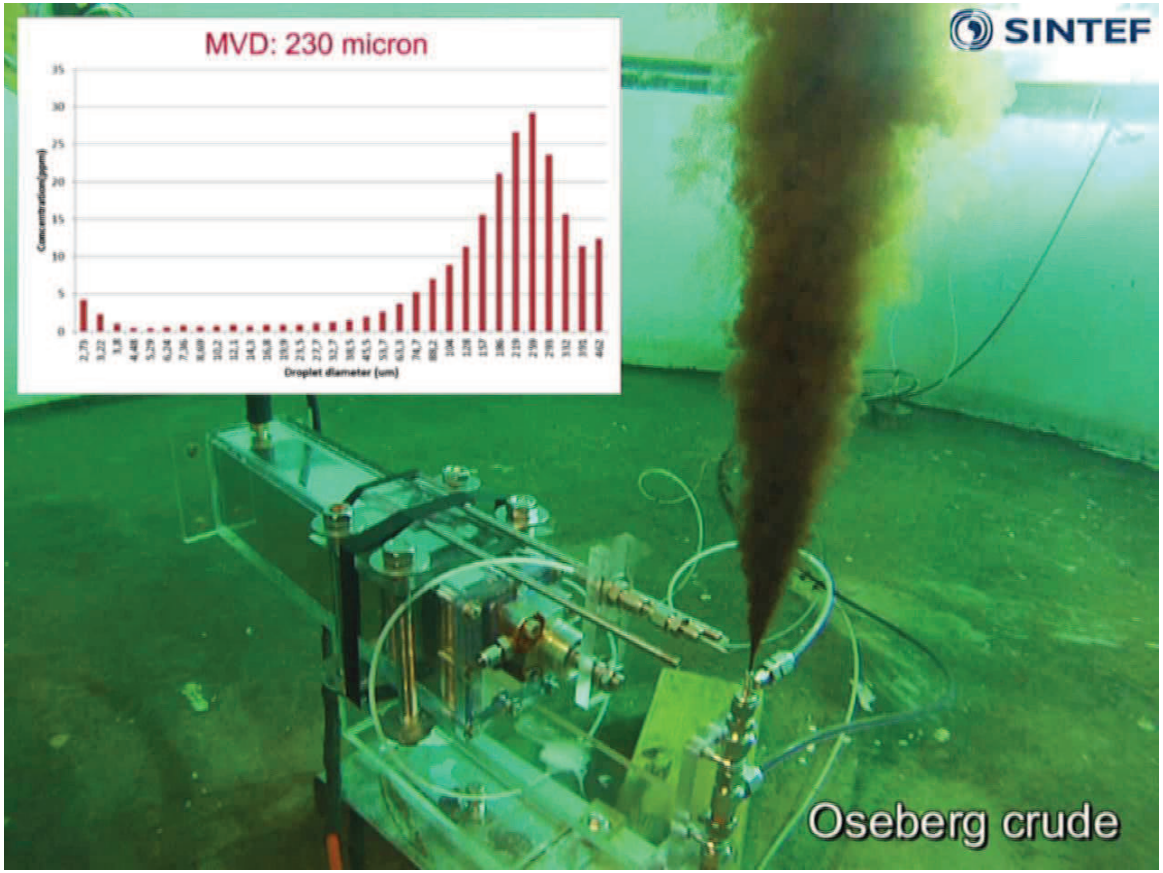
After termination of experiment

Ongoing experiments in SINTEF tower Basin (6 m high, 3m diam.):

Sub-Surface Dispersant Injection (SSDI) testing







Experiments performed in SINTEF Tower basin facility

Bench-scale testing of SSDI
for e.g. screening dispersants effectiveness

SINTEF MiniTower:

Height.: 80 cm
Diam.: 35 cm
80 L of seawater

0.5 mm nozzle – 0.1 L/min

0.5 mm nozzle – 0.1 L/min + C9500 (1:100)

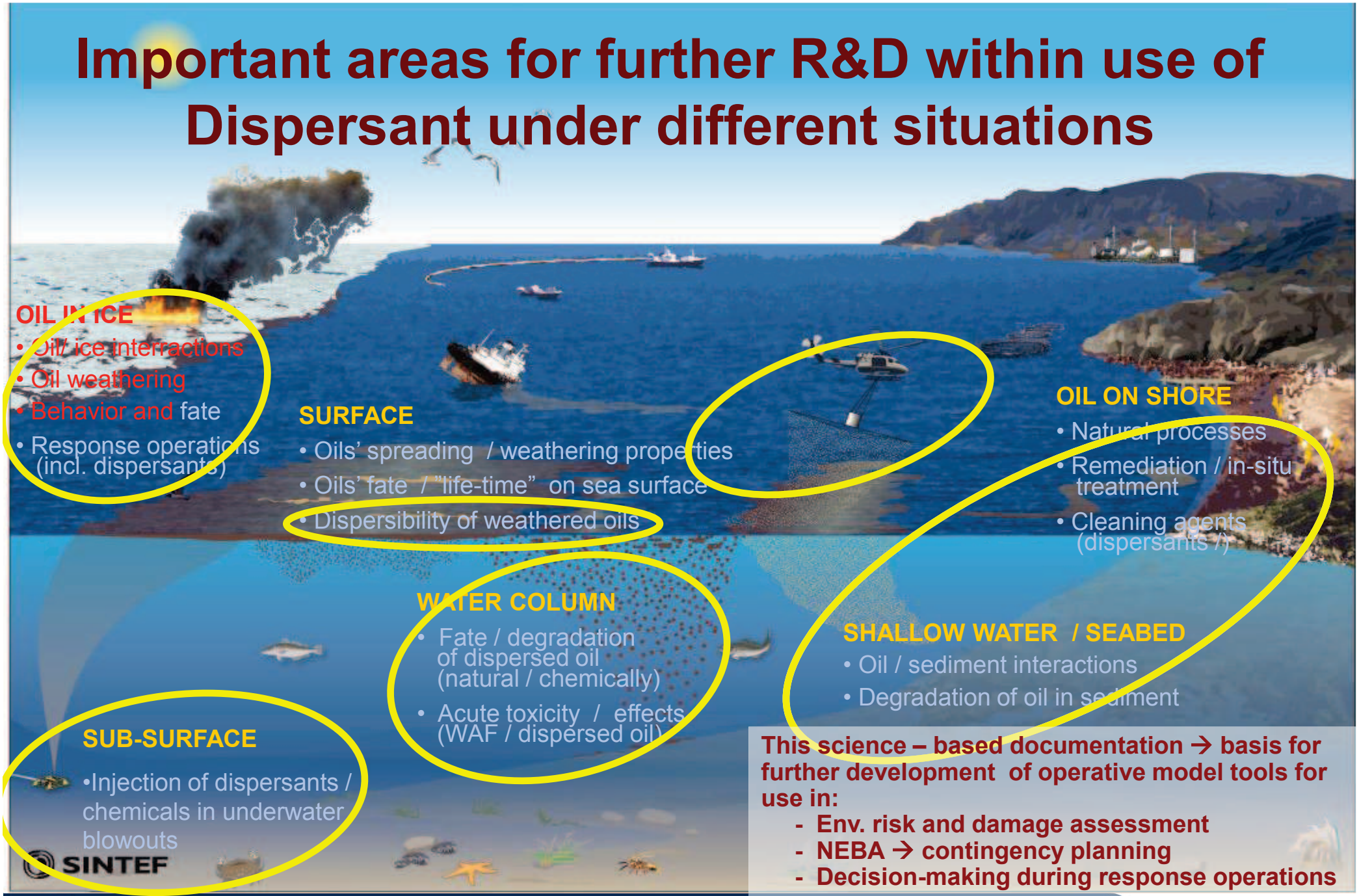
What now ?

How to "lift" dispersants to an even more operational / acceptable oil spill response ?

"The aim should be that decision-making for using dispersant should be founded in rational science-based documentation"

- **Such documentation will lead to:**
  Better criteria for when and where to use / not to use dispersants → robust contingency planning (NEBA approach)

Important areas for further R&D within use of Dispersant under different situations



OIL IN ICE
- Oil/ ice interractions
- Oil weathering
- Behavior and fate
- Response operations (incl. dispersants)

SURFACE
- Oils' spreading / weathering properties
- Oils' fate / "life-time" on sea surface
- Dispersibility of weathered oils

OIL ON SHORE
- Natural processes
- Remediation / in-situ treatment
- Cleaning agents (dispersants /)

WATER COLUMN
- Fate / degradation of dispersed oil (natural / chemically)
- Acute toxicity / effects (WAF / dispersed oil)

SHALLOW WATER / SEABED
- Oil / sediment interactions
- Degradation of oil in sediment

SUB-SURFACE
- Injection of dispersants / chemicals in underwater blowouts

SINTEF

This science – based documentation → basis for further development of operative model tools for use in:
- **Env. risk and damage assessment**
- **NEBA → contingency planning**
- **Decision-making during response operations**