

imaros₂

Beredskapsforum

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29.4.2025

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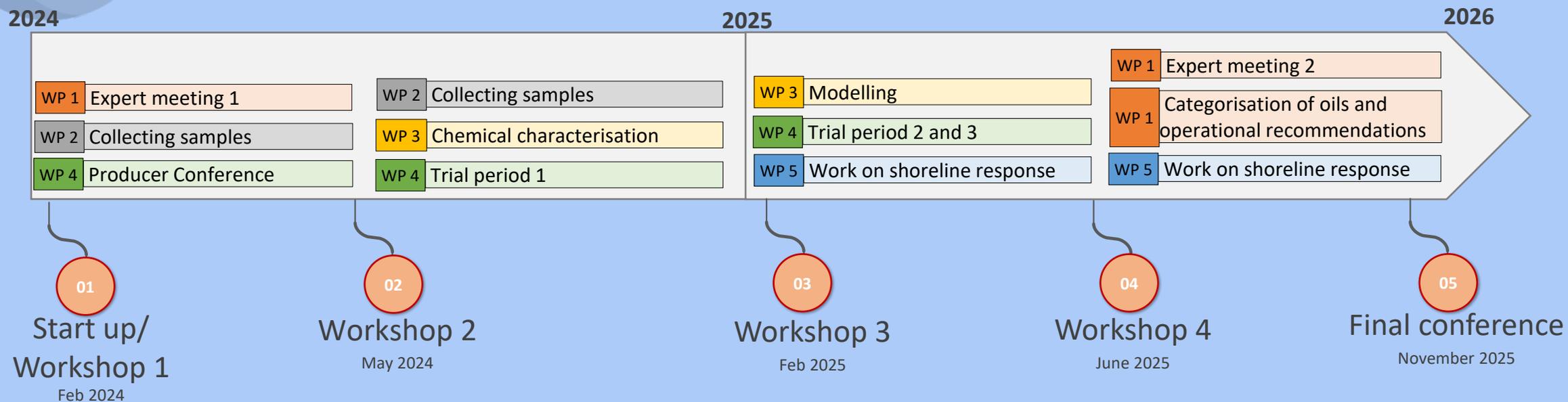


imaros₂ Main objectives

- Improve understanding of oil spill behaviour of LSFOS, and consequently decision making on all levels of oil spill response operations
- Improve capacities of mechanical recovery and shoreline response



Timeline for the project



Project partners



Rijkswaterstaat
Ministry of Infrastructure
and Water Management



KYSTVERKET
NORWEGIAN COASTAL ADMINISTRATION



KUSTBEVAKNINGEN



Background

- Previous tests and observations
- Results and recommendations from IMAROS project and incidents



WP 1 Project management and cross-cutting

Lead: Norwegian Coastal Administration

Participants: All partners

Duration: Month 1-24

Objectives:

- Project management
- Crosscutting activities
- Communication
- Synthesis of results from all WPs

WP 2 Trends and samples

Lead: Rijkswaterstaat

Participants: All partners

Duration: Month 1-18

Objectives:

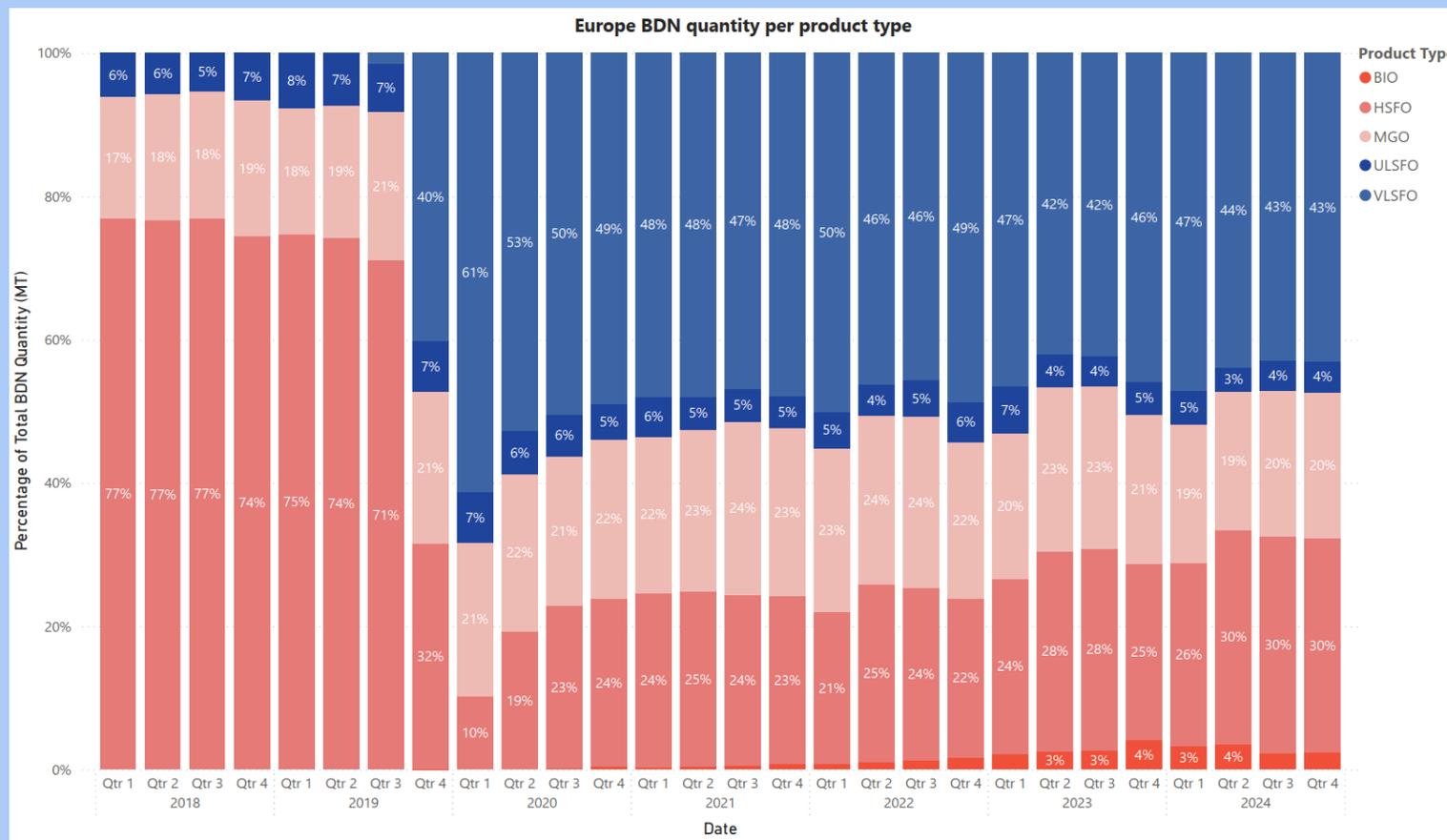
- Update knowledge on ship fuels in European waters
- Collect representative oil samples

Oil samples

- ~60 different oil companies, bunker suppliers and ports contacted for samples
- Residual LSFOS – different blends
- 15 “small” samples for WP3 chemical characterization
- 3 “large” samples for response testing 2 VLSFO, 1 ULSFO



Bunker delivery



Graph reproduced from Veritas Petroleum Services data (VPS PortStats)

WP 3 Characterization and impacts

Lead: CEDRE

Participants: Royal Belgian Institute of Natural Sciences, Rijkswaterstaat

Duration: Month 6-22

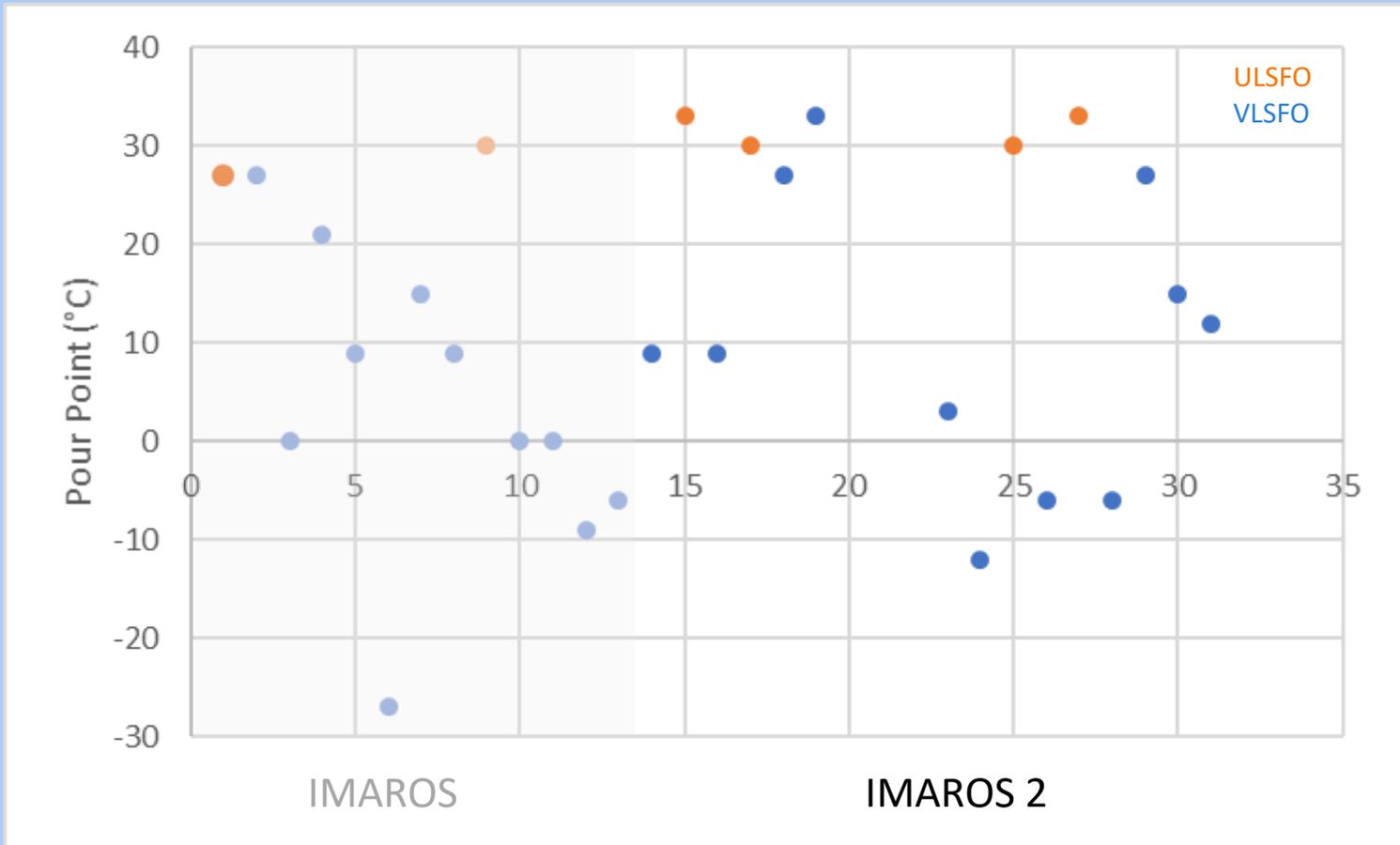
Objectives:

- Screening and characterisation of samples
- Improve understanding of properties of LSFO affecting recovery and shoreline response, including wax-components and interfacial tension
- Improve understanding of behaviour of LSFO in marine and fresh waters
- Improve understanding of behaviour and response options in the Mediterranean



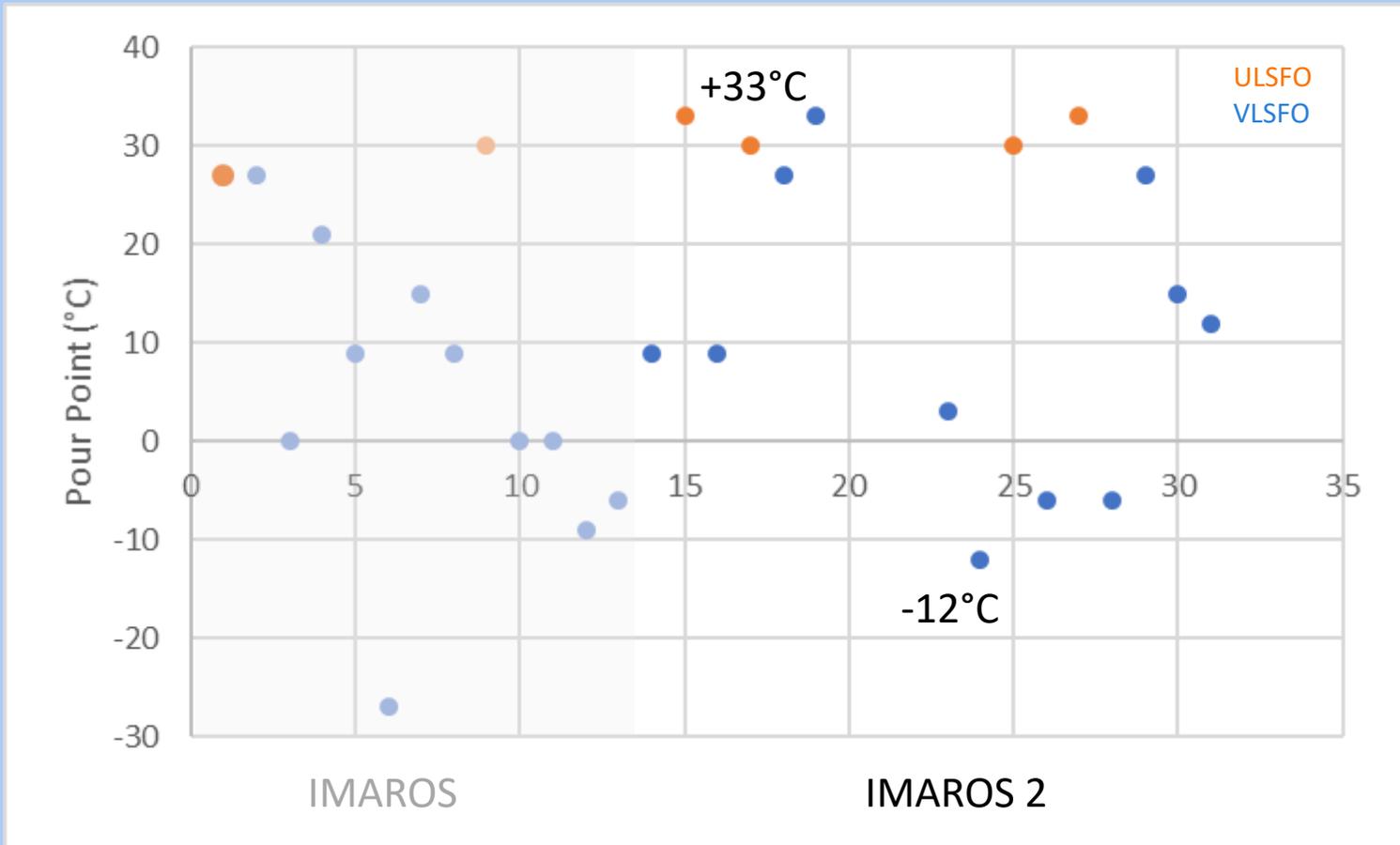
Pour Point

Small samples



Pour Point

Small samples



WP 4 Mechanical recovery

Lead: Norwegian Coastal Administration

Participants: All partners

Duration: Month 2-22

Objectives:

- Test applicability of different mechanical recovery systems to on the of LSFOS with challenging behaviour
- Promote innovation and improvement of existing equipment

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WP 4 Mechanical recovery

- Producer involvement conference, hosted by Swedish Coast Guard
- Invitation to participate in the project:
 - applications from 11 companies
- Process with all project partners to select the most promising approaches:
 - 3 concepts for testing in Horten (2 trail periods)
 - 2 concepts for testing in Kotka (ice conditions)
 - 1 concept for testing in Horten with modified test procedure
- Measurement of exposure to workers (STAMI)





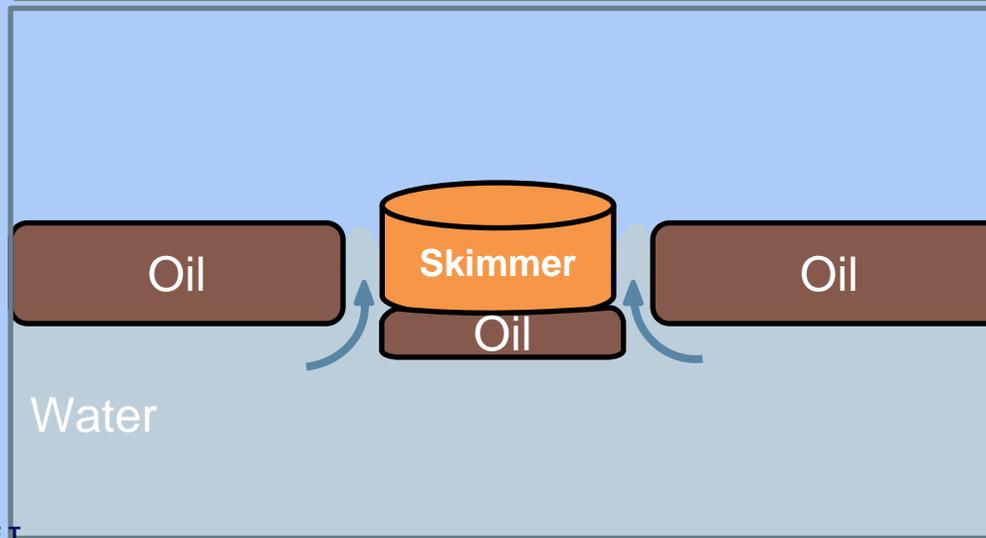
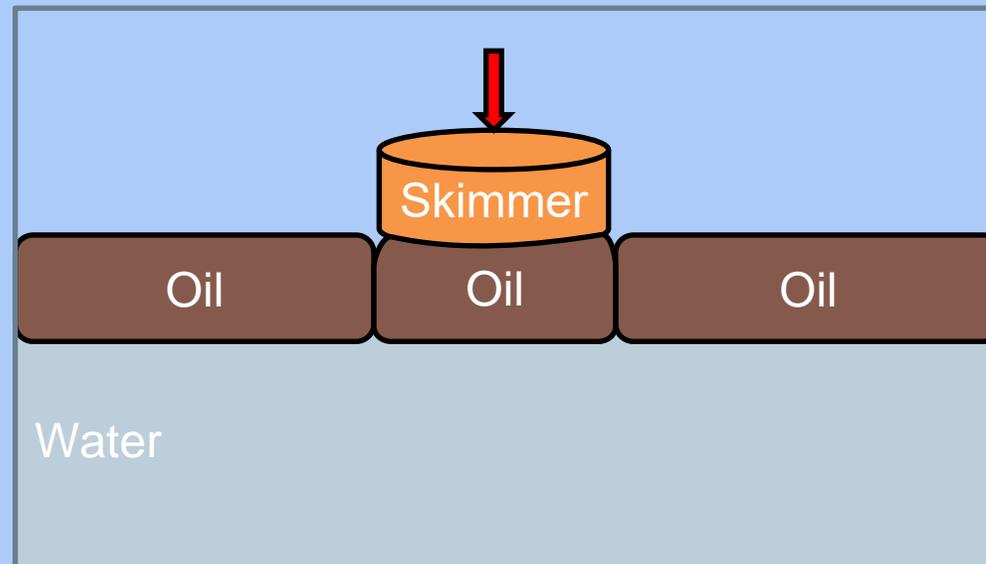
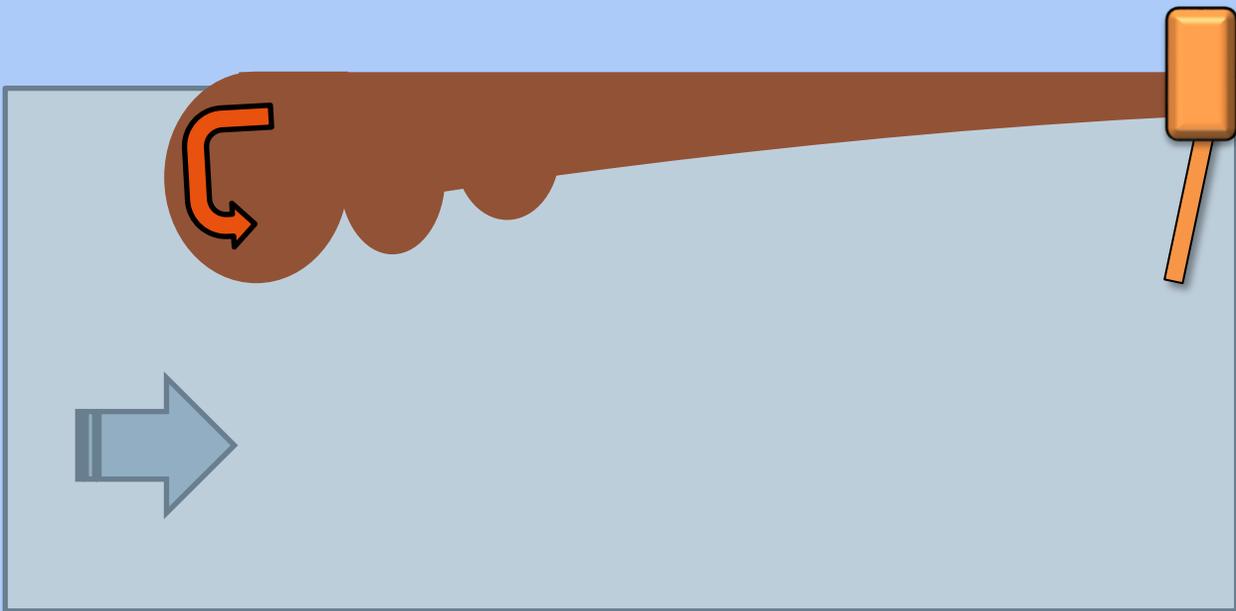
Oil samples

| Imaros 2 ID | Oil type | Viscosity of fresh oil, temp sweep (cP) | | Viscosity of emulsion at 10°C (10s ⁻¹) | Pour point of fresh oil (with max. and min.) |
|-------------|----------|---|------|--|--|
| | | 10°C | 50°C | | |
| IM-27 | VLSFO | 23104 | 282 | 9998 – 42548 | 21 (9, 21) |
| IM-28 | VLSFO | 36277 | 110 | 21386 – 54734 | 30 (21, 27) |
| IM-29 | ULSFO | 932 | 9.6 | 12173 – 18492 | 21 (15, 24) |

Observations on oil behavior



Observations



VLSFO IM-28



ULSFO IM-29



Oil in Ice tests - Kotka, Finland



- Testing of oil skimmers in winter conditions
- Recovery of LSFO from broken ice
- Test conditions mimicking solid ice field that has a fairway broken in the sea
 - Air temperature: $-2,0^{\circ}\text{C}$
 - Water temperature: 0°C

Oil in Ice tests - Kotka, Finland



Trial period 3

- Lessons learned
- Ongoing improvements by the equipment manufacturers
- New trails from April - June

WP 5 Shoreline response

Lead: CEDRE
Participants: CEDRE,
Norwegian Coastal Administration,
Transport Malta
Duration: Month 7-23
Objectives:

- Identify possible gaps and solutions within shoreline clean-up methods and/or equipment
- Give operational recommendation by categorizing the different types of LSFO and associated response options
- Study the potential toxicity of LSFO absorbed in rocks on marine organisms



WP5 – Shoreline responses



T5.1 - Rock cleaning



T5.2 - Efficiency of cleaning agents



T5.3 - Natural recovery and rock colonisation by biota

WP5 – Shoreline responses



T5.1 - Rock cleaning

Assessment of oil adhesion on granite tiles and of efficiency of cleaning with high pressure water washer



T5.2 - Efficiency of cleaning agents

Cleaning agent added to polluted tiles and processed with cleaning procedure



T5.3 - Natural recovery and rock colonisation by biota

Field tests over one year: Oil remobilisation, chemical composition and tiles recolonisation

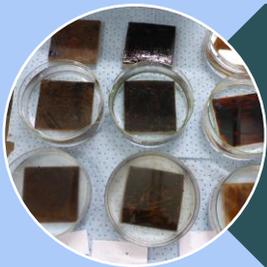
WP5 – Shoreline responses



T5.4 - Interaction with sediments



T5.5 - Observations on practical cleaning techniques



T5.6 - Release and toxicity of oil absorbed in rocks

WP5 – Shoreline responses



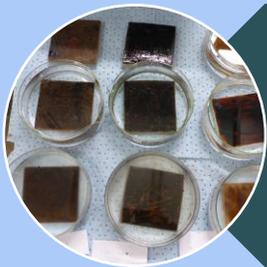
T5.4 - Interaction with sediments

Shoreline test bench: Assessment of oil adhesion / penetration on sand, rock, cobble



T5.5 - Observations on practical cleaning techniques

Assessment of different practical cleaning techniques (manual removal, use of sorbents in « field boxes »)



T5.6 - Release and toxicity of oil absorbed in rocks

Tests on algae and copepods. Culture media: water in contact with polluted tiles

Testing of practical cleaning techniques



Shoreline clean-up
simulation container

Adjustable angle of the shoreline

Artificial shoreline

VLSFO IM-28, 15 °C



IM-28, polluted shoreline



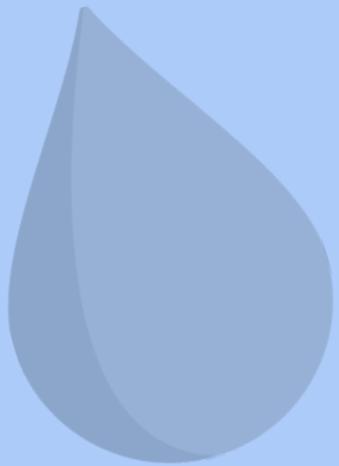
Low pressure water flow



Flushing



Application of sorbent



Thank you for your attention

Visit IMAROS 2:

<https://civil-protection-knowledge-network.europa.eu/projects/imaros-2>

Acknowledgements:

LAMOR, DESMI, VIKOMA and NEW NAVAL

The IMAROS 2 project is co-funded by the EU under the call UCPM-2023-KAPP, project number 101140015

