SOURCES AND FATES OF MARINE OIL SPILLS

Jamie Gathercole - OSRL

GI WACAF WEBINAR SERIES – JUNE 2020

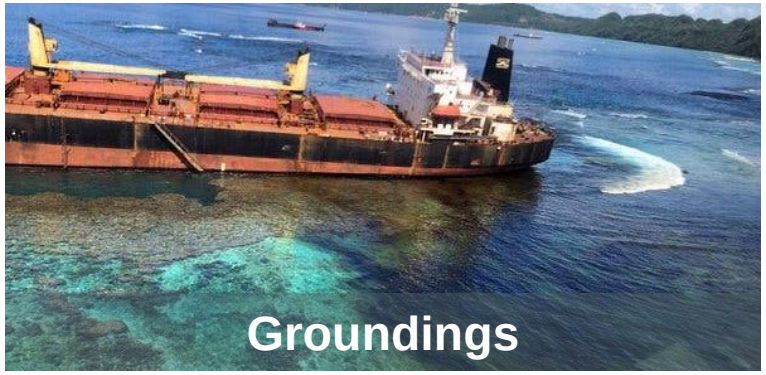
Oil Spill Response

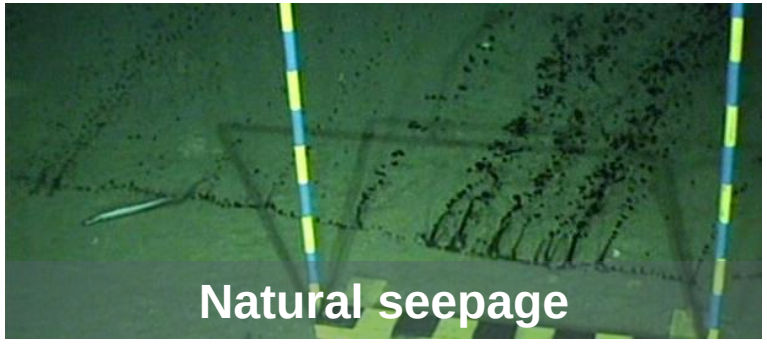
Session Objectives

The objectives are:

- To understand the key sources of oil spills into the marine environment
- To understand the likely fates and weathering processes of spilled oil

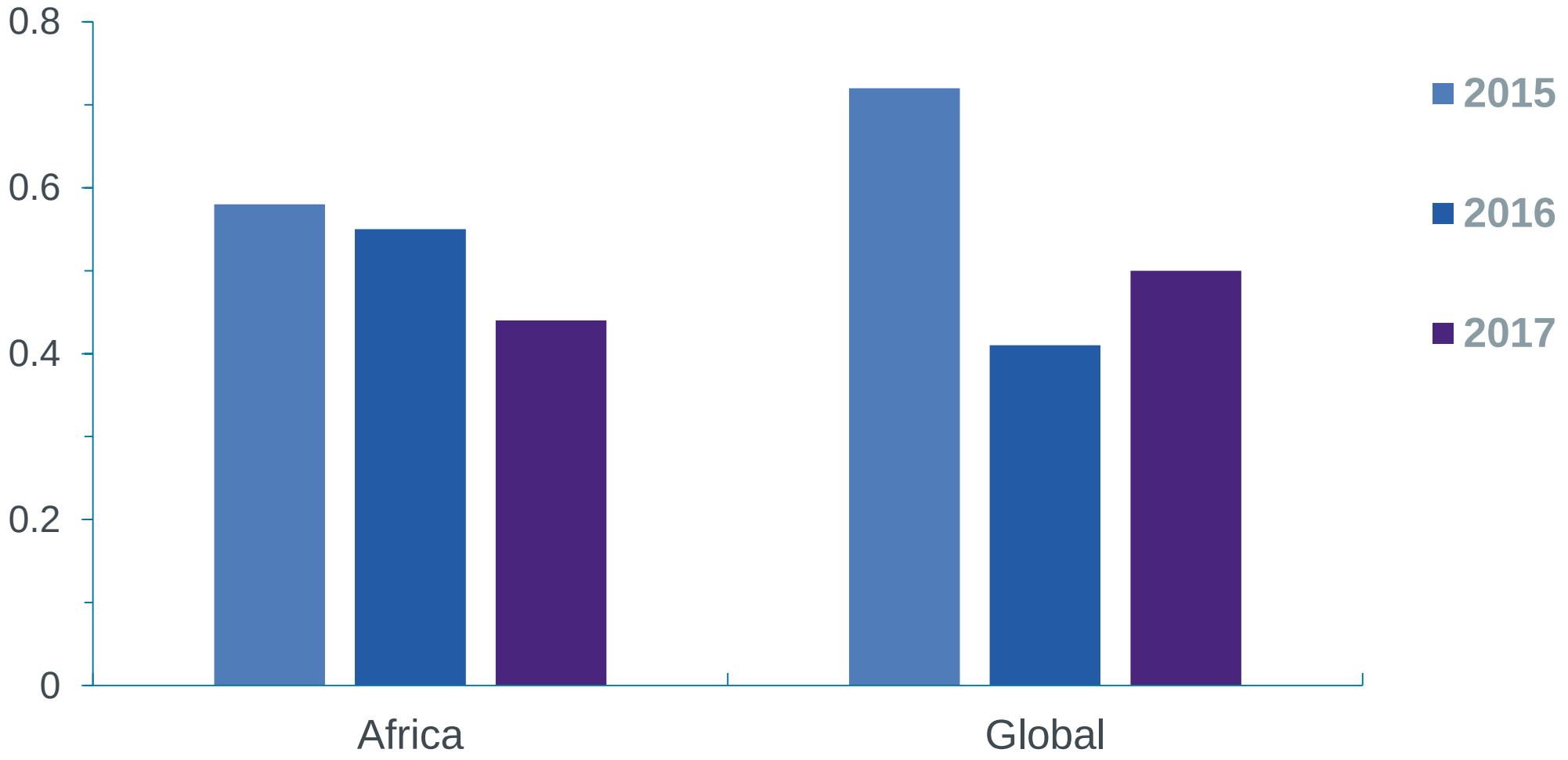
Main sources / causes of marine oil spills around the world





E&P – ***Number of oil spills*** per million tonnes production (2015-2017)

Spills >1 bbl



https://www.iogp.org/bookstore/product/2017e-environmental-performance-indicators-2017-data/

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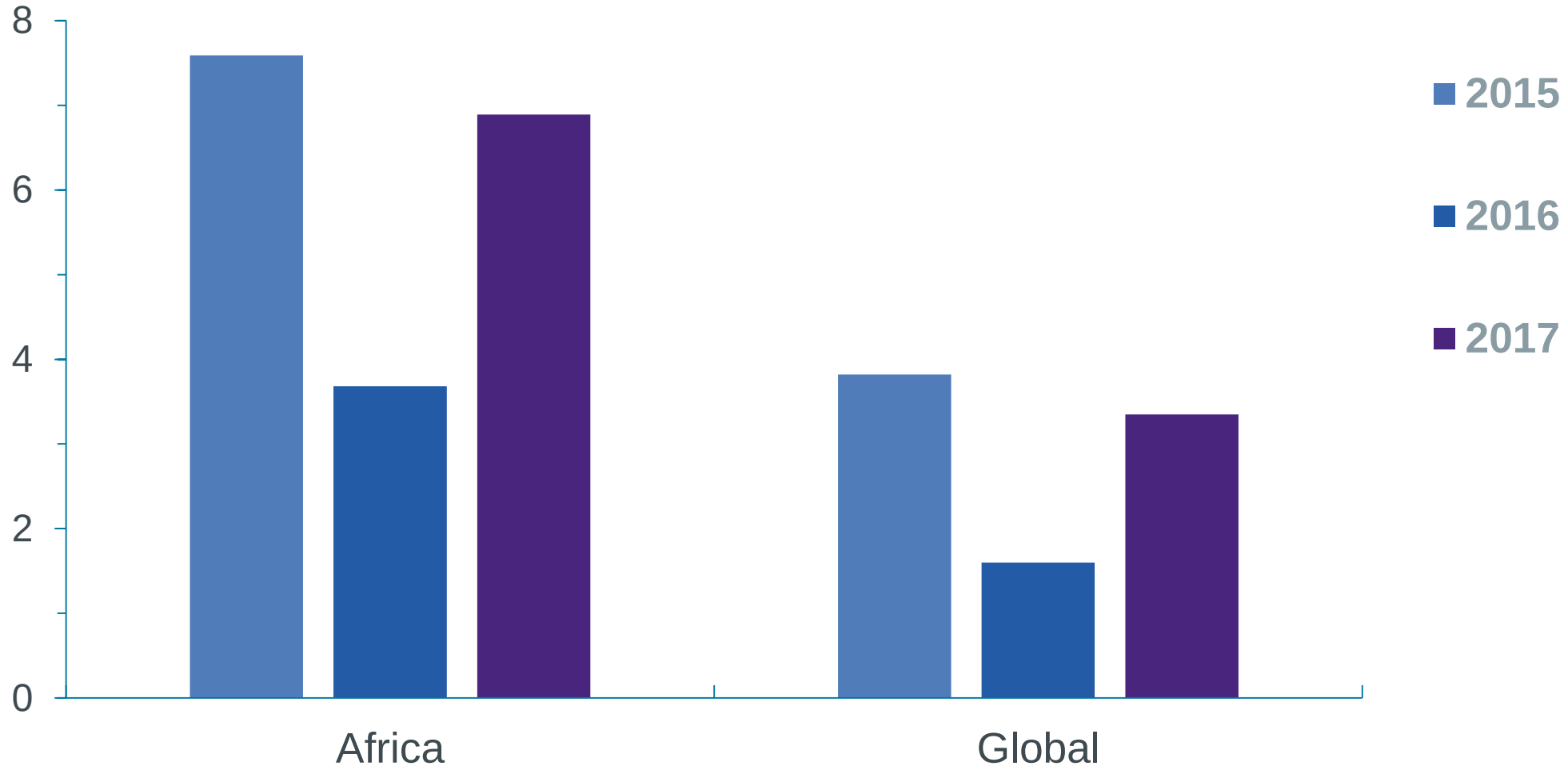

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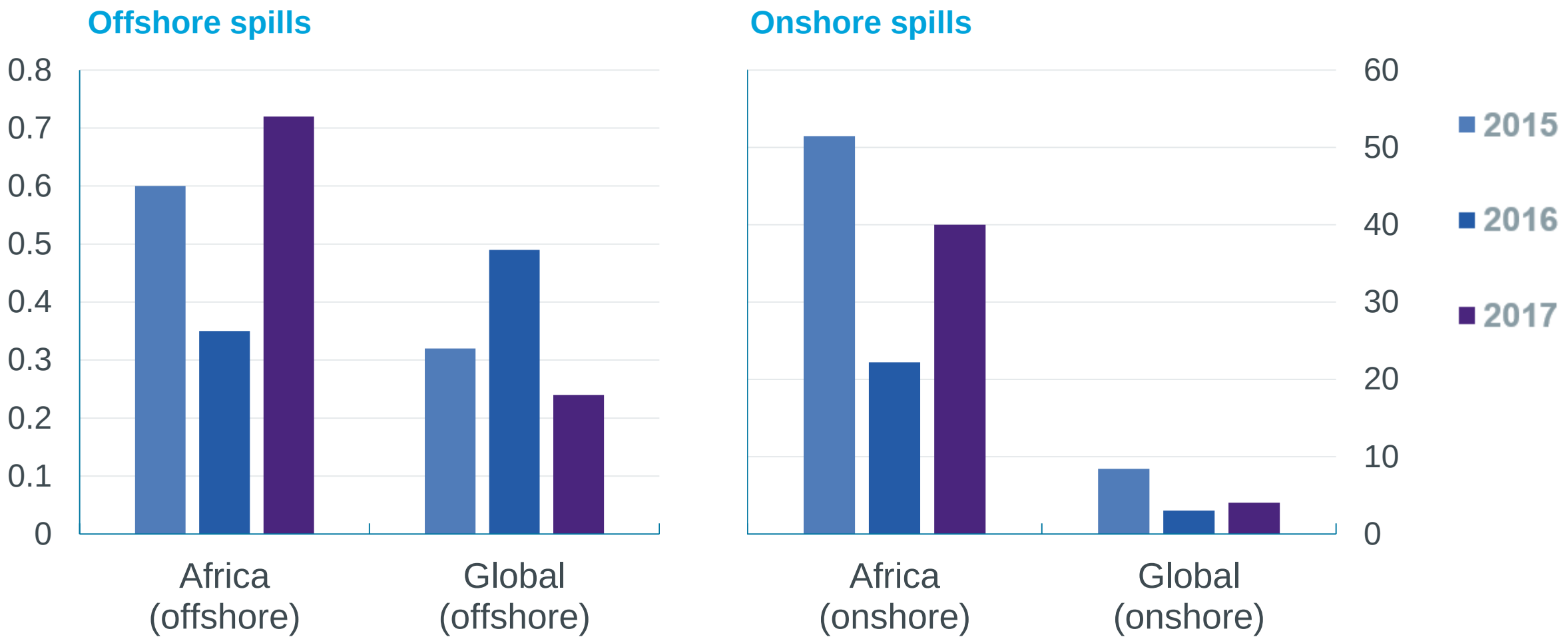

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Exploration and Production Spill Causes (Global Data; 2017)

- 35 reported spills in which more than 100 bbl of oil was released
- Cause also reported in 31 out of 35 (88%) reported incidents

Cause	Number of incidents	Percentage of incidents	Percentage of volume spilled
Corrosion	11	31%	18%
Equipment failure	3	9%	3%
Operator / technical error	1	3%	4%
Third party damage	16	46%	68%
Other	4	11%	7%

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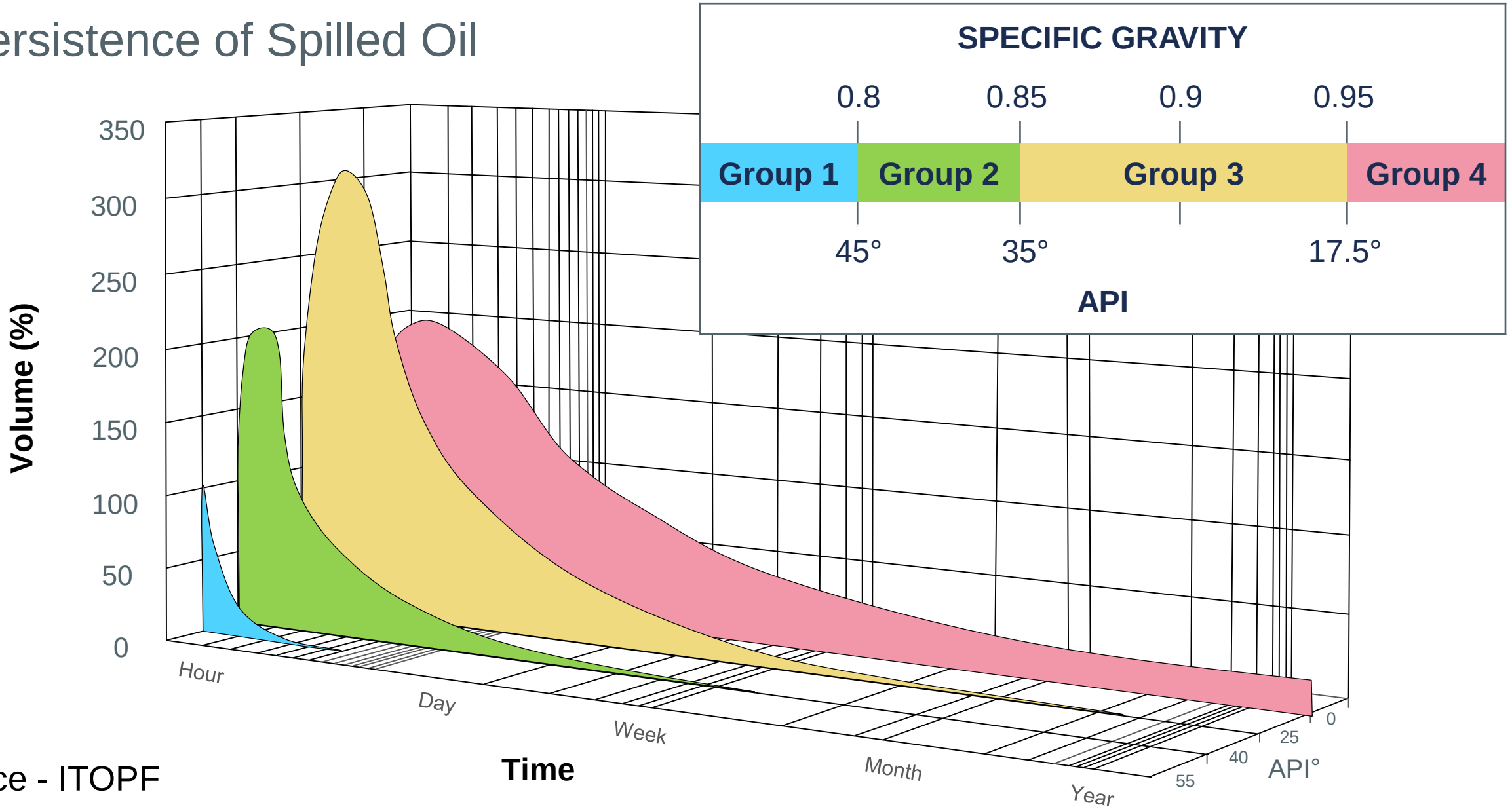
The Key Properties of Oil

Specific Gravity / API°	• How heavy; density
Viscosity	• How thick; resistant to flow
Pour Point	• Temperature below which oil does not flow
Volatility	• Propensity to evaporate (% @ 200°C)
Asphaltene Content	• Propensity to emulsify (~0.5%)

Persistence of Spilled Oil



Source - ITOPF

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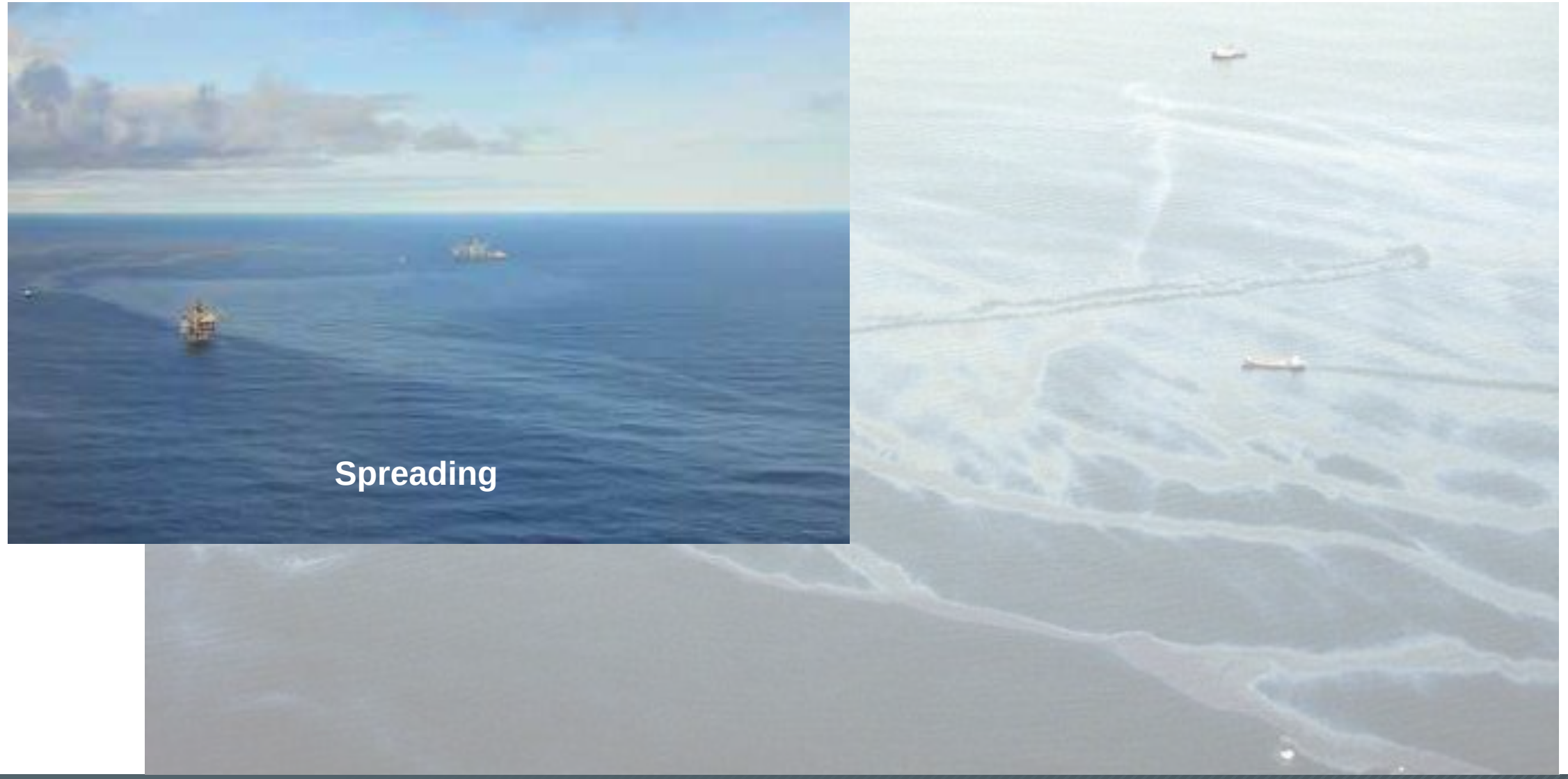

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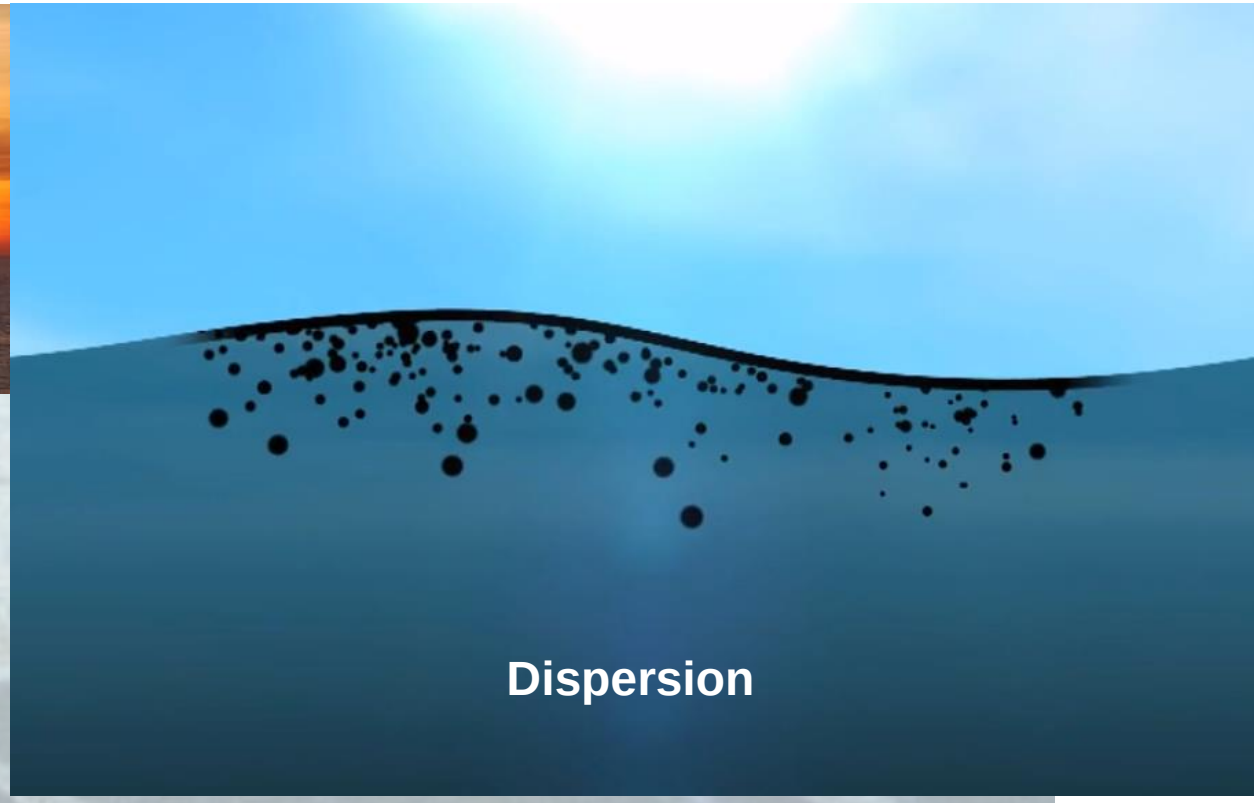

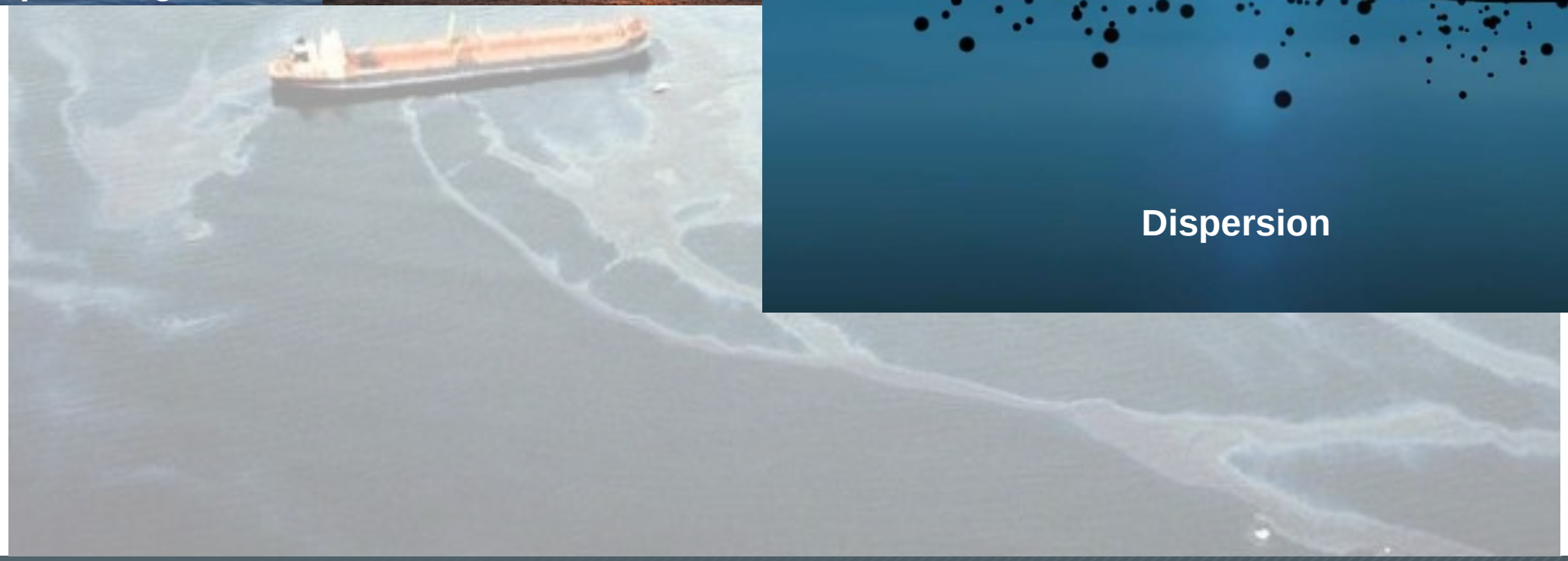

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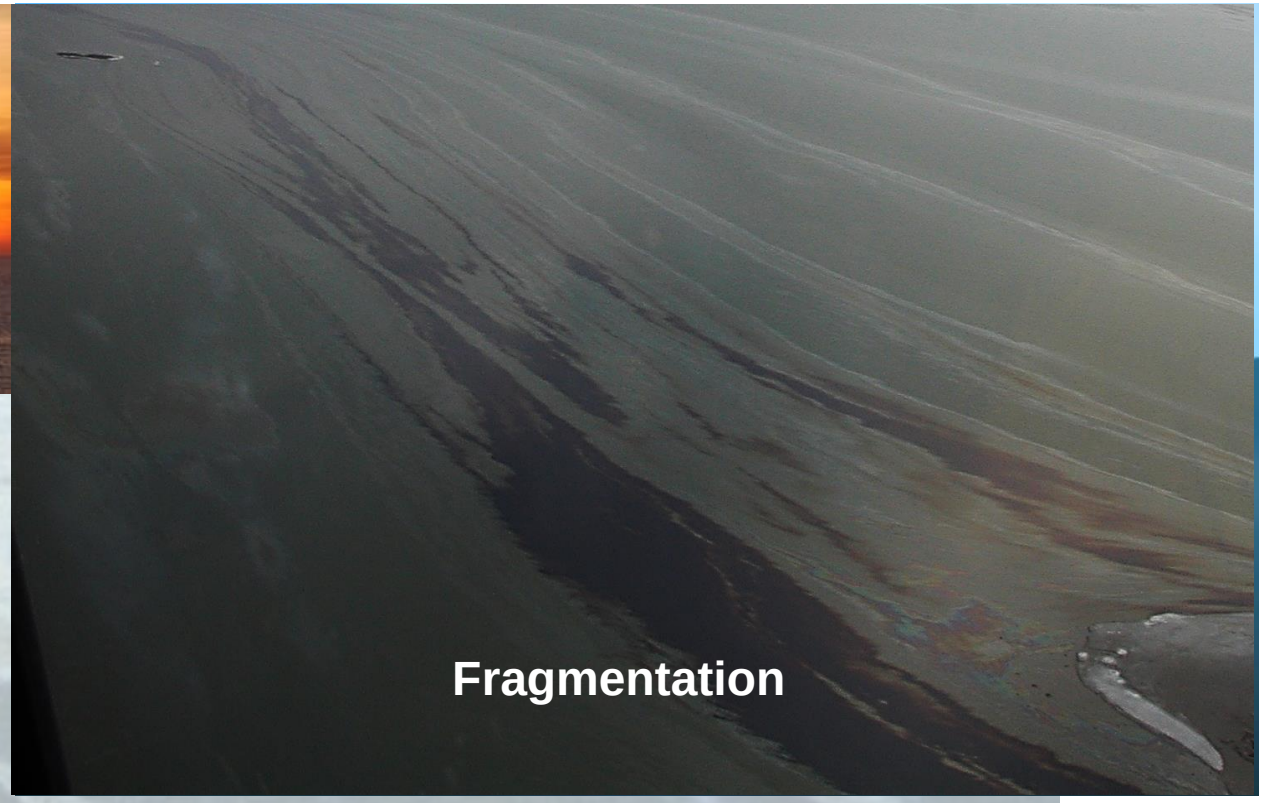

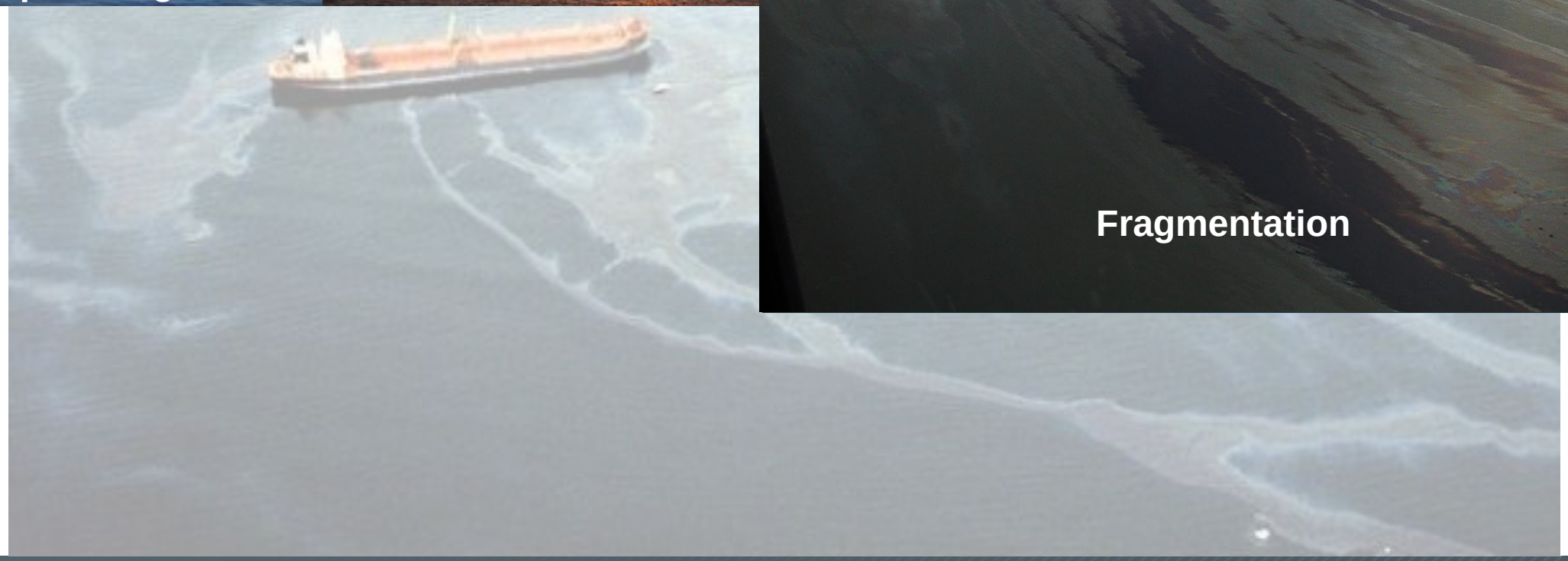

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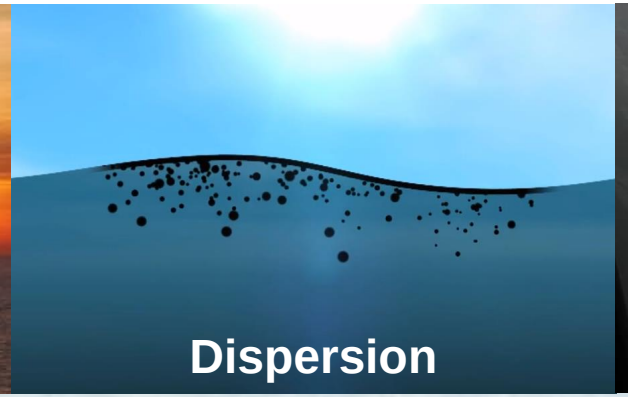
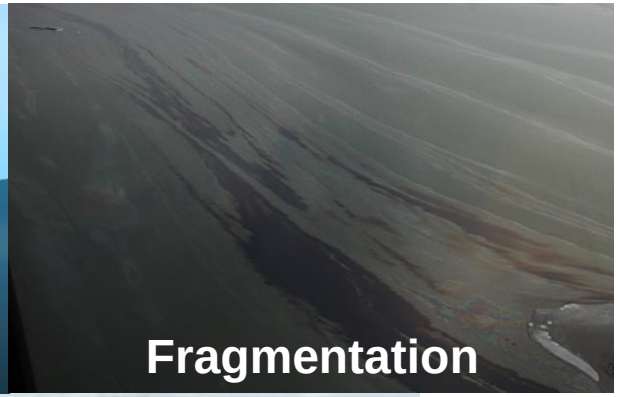


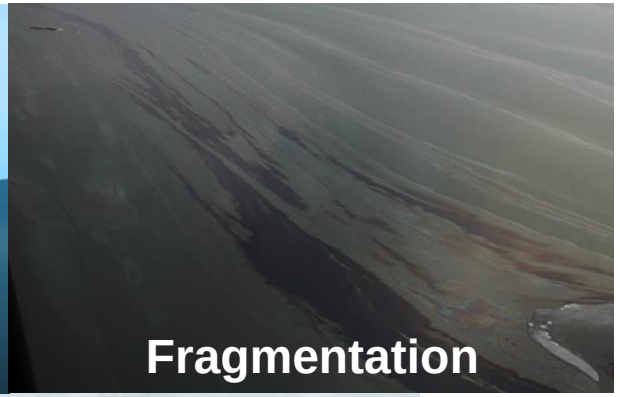
Dispersion



Fragmentation

Emulsification

Fates of Spilled Oil



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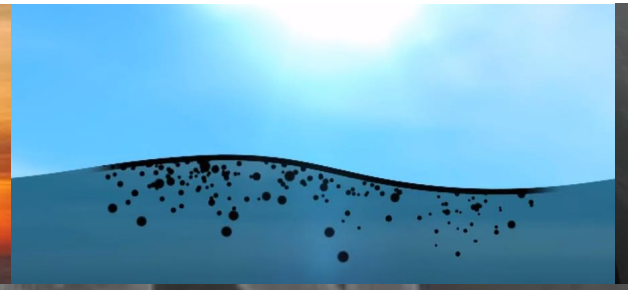

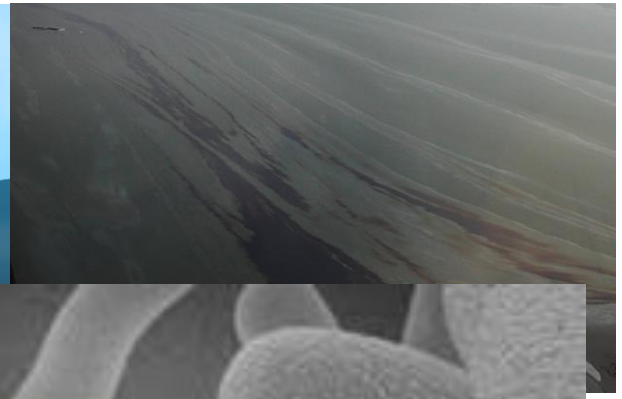

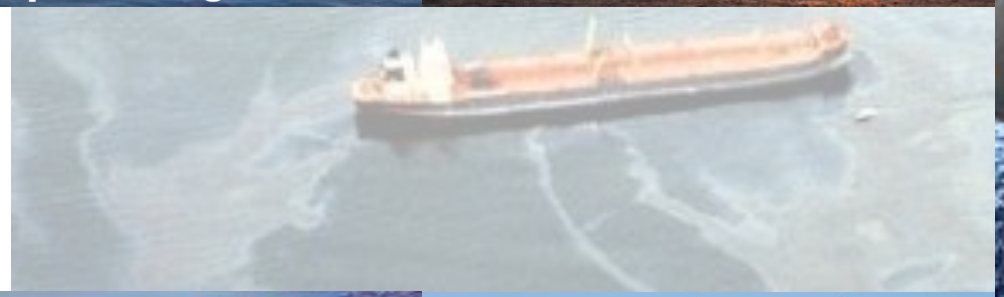

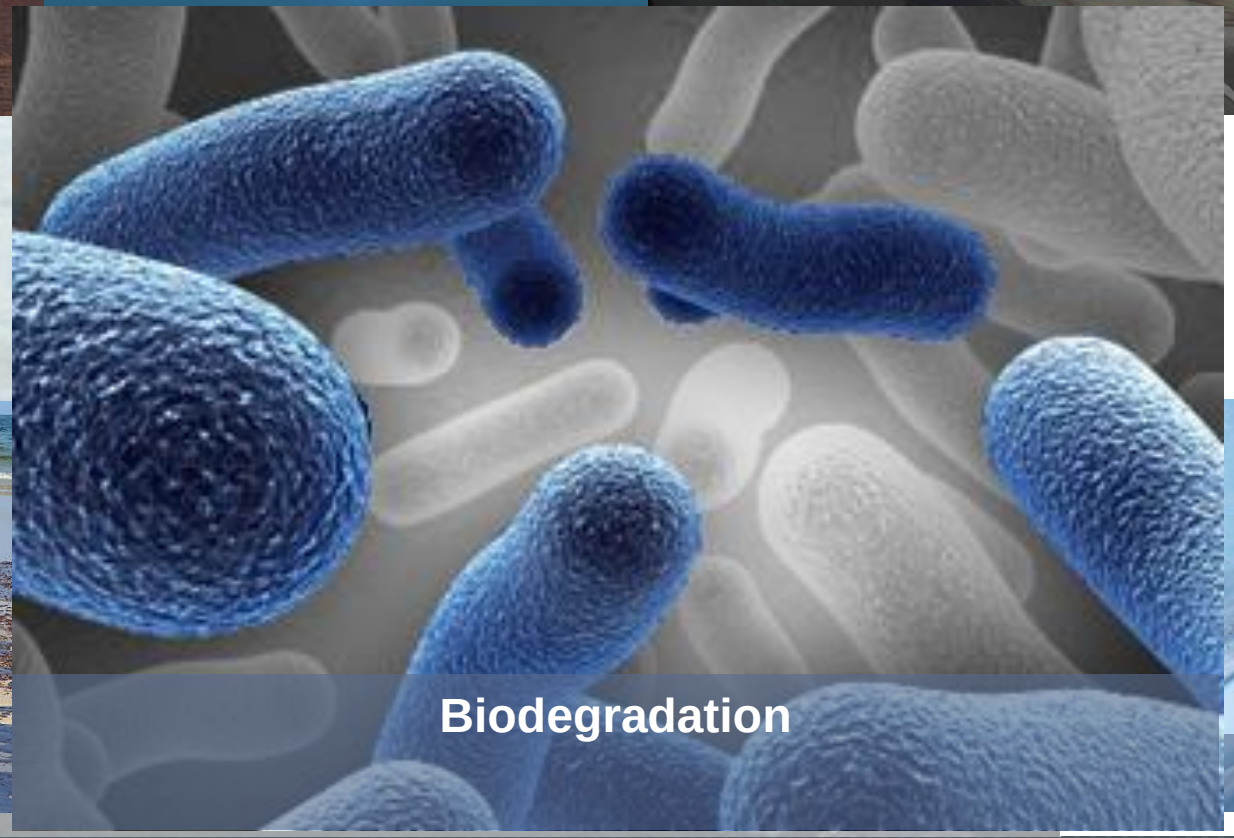

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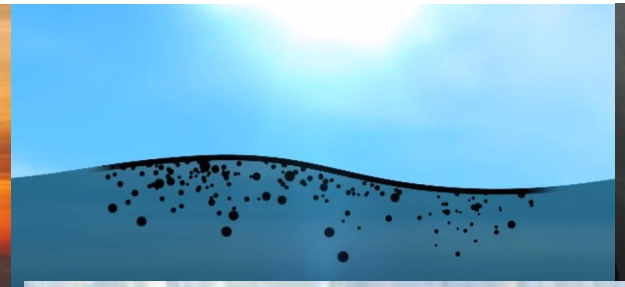

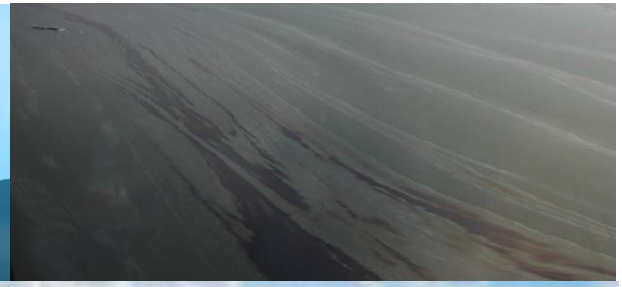

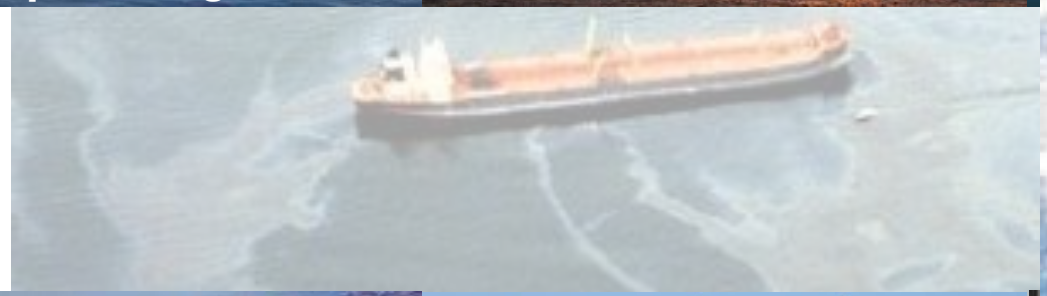

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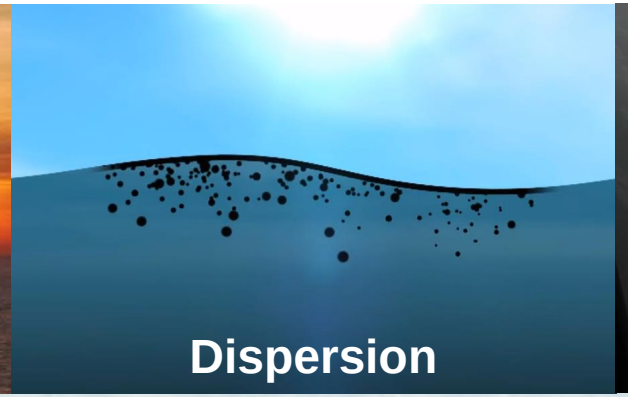

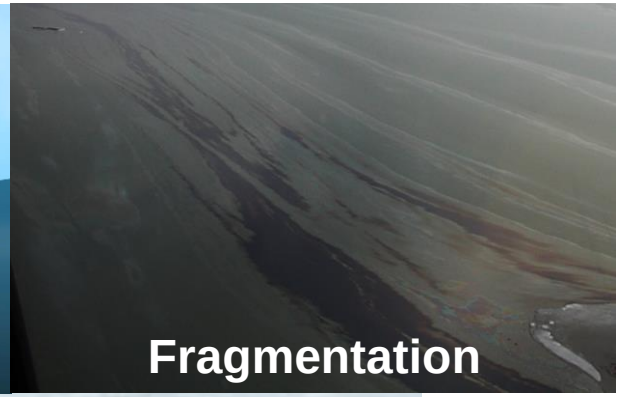

Response Perspective

- Key oil properties inform the early actions of an Incident Management Team
- Oil spill experts / computer models can provide guidance on response strategy

Low Persistence **High Persistence**

Summary

- There are global trends around spill numbers and causes
  - The less frequent incidents often offer the largest impact
- Key oil properties can greatly influence the behaviour of the oil
  - Safety and Operational consequences
- Take samples as early as possible after a release

Thank you

jamiegathercole@oilspillresponse.com