

4TH GEO

BLUE PLANET SYMPOSIUM

4-6 July 2018 – Toulouse, France

IMarEST, UK



Offshore oil and gas: Overview of industry and ocean information needs

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#GEOBluePlanet4

The Oil and Gas Industry



Upstream

- Exploration
- Development
- Production



Midstream

- Transportation
- Distribution
- Processing



Downstream

- Retail
- Petrochemical

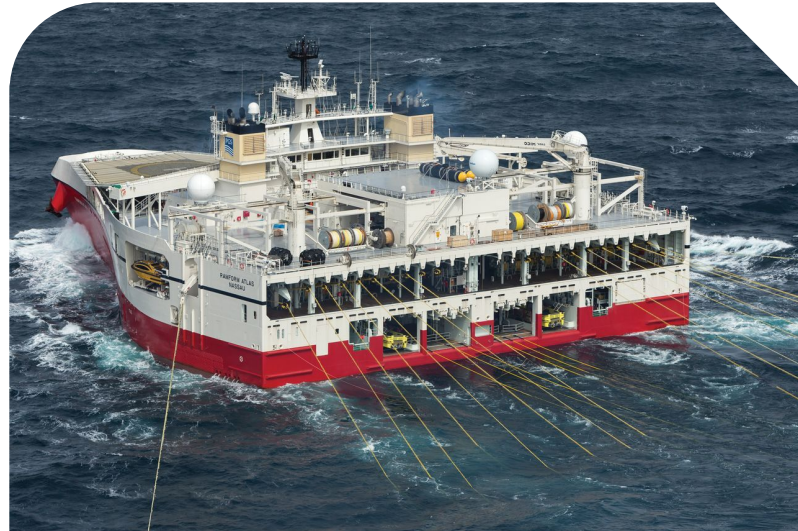
Oil and Gas – Cyclical Nature



Upstream Activities - Exploration

Seismic Exploration

- Massive reduction in fleet capacity



Upstream Activities - Exploration

Seep Hunting

- Innovative means to reduce exploration costs

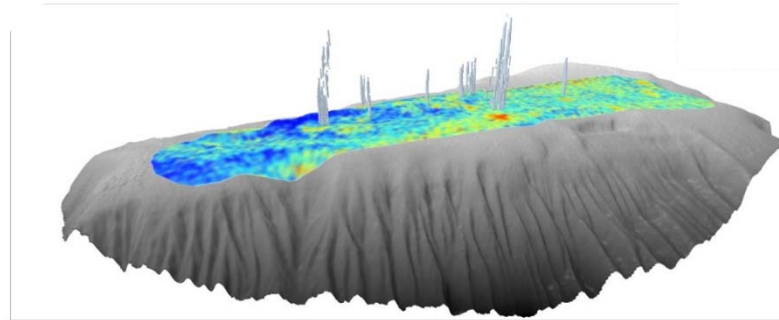


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Upstream Activities - Exploration

Exploration drilling

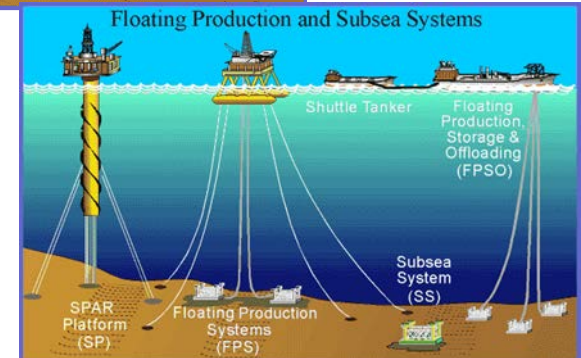
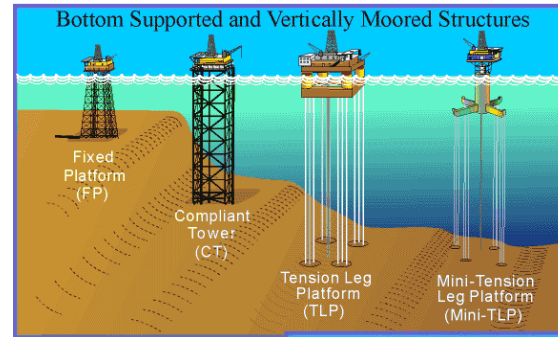
- Day rates typically USD100-300k.
- Efficient operations critical.
- Site specific data collection often commissioned at this stage.



Upstream Activities - Development

Engineering Design

- CAPEX costs of up to USD10 Billion.
- Reconsideration of engineering concepts to reduce cost.
- Move to tie backs.
- Has historical design been conservative?



Upstream Activities - Development

Construction
Transportation
Installation



Upstream Activities - Production

Routine production operations / Asset Management

- Supplies of people/materials to assets is critical
- Ability to offload product is critical
- Significant interest in reducing inspection costs for asset management



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Upstream Activities - Production

Decommissioning

- Decommissioning is expected to represent a multi-billion market.
- Metocean challenges to operations
- Biogeochemistry aspects with respect to removal of structures, disturbance of cuttings, etc.

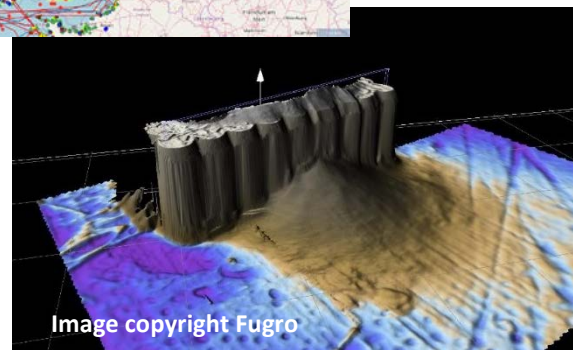


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Geographical Information Needs

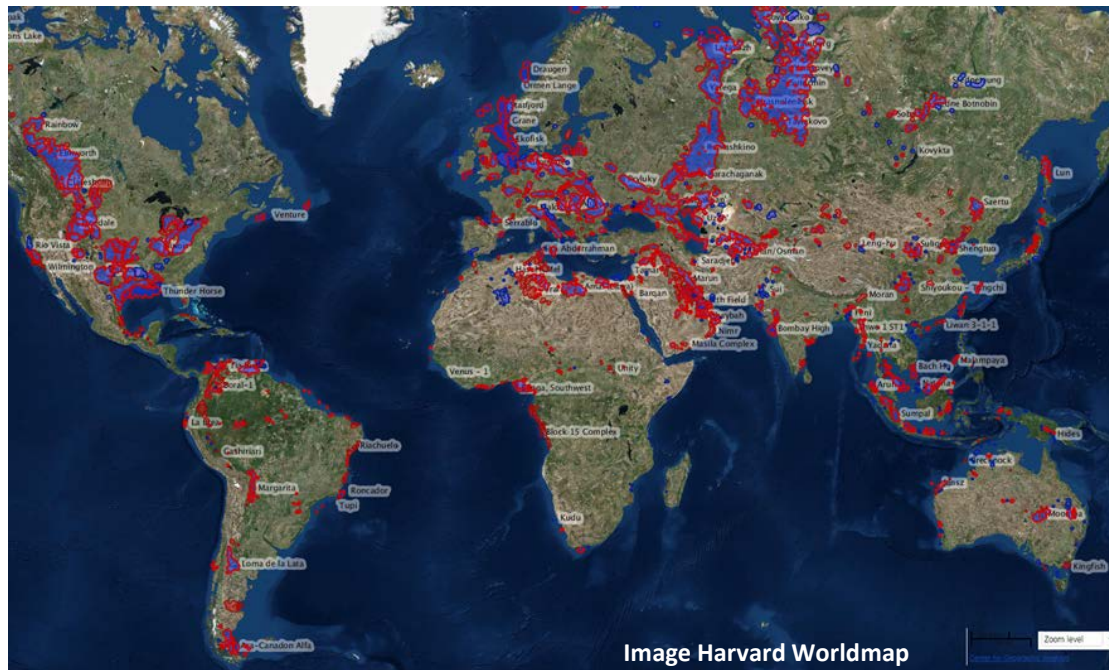
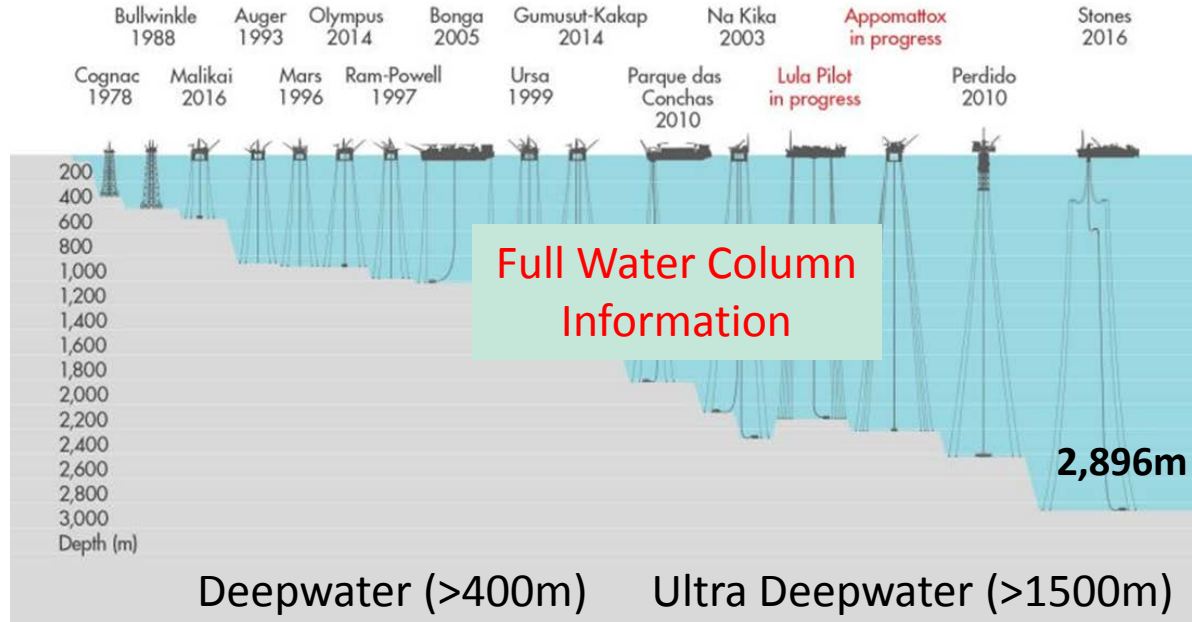


Image Harvard Worldmap

Water Depth Information Needs

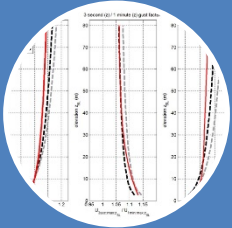


Information Needs

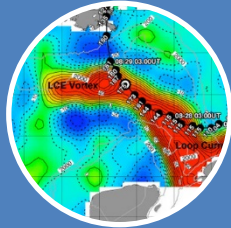
Starting point.....

- Understanding of regional Metocean processes
- Data to inform basic seasonal characteristics of environmental forces for operational considerations
- Data to inform likely extreme events that will drive limit state design.

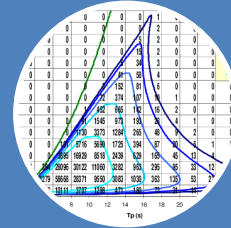
Information needs across the oil and gas life cycle



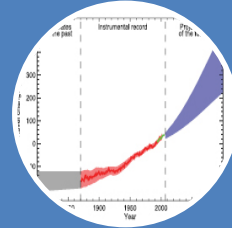
Wind and Meteorological information



Current Information



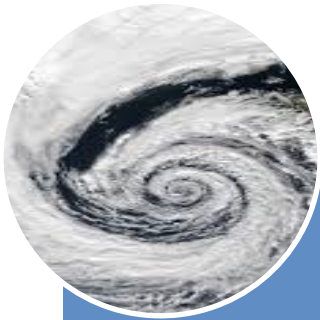
Wave information



Water levels

All phases of the oil and gas life cycle

Wind and meteorological information



Extreme wind loading for station keeping, structural design

Ambient wind loading for fatigue design

Wind loading needs to address coherence of winds

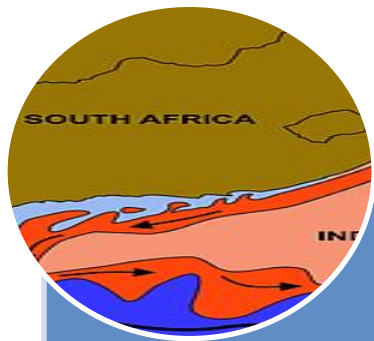
Ambient and extreme pressure, relative humidity, etc. for process engineering design

Meteorological process characterisation, e.g. squalls

Seasonal variability of wind speed and directionality for operational planning

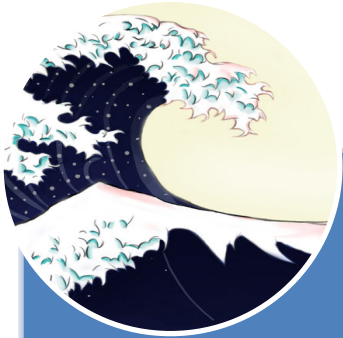
Route forecasts, site forecasts, etc. (probabilistic, deterministic)

Current information



- Extreme current loading for station keeping, structural design
- Ambient current loading for fatigue design
- Current loading needs to address vertical coherence of currents
- Current process characterisation, e.g. solitons, Loop Current Eddies, etc.
- Seasonal variability of current speed and directionality for operational planning
- Route forecasts, site forecasts, etc. (probabilistic, deterministic)

Wave information



Extreme wave loading for station keeping, structural design

Ambient wave loading for fatigue design

Wave process characterisation, e.g. maximum wave height, wave-current interaction

Seasonal variability of current speed and directionality for operational planning

Route forecasts, site forecasts, etc. (probabilistic, deterministic)

Summary

- Metocean is critical to Offshore oil and gas.
- Site specific data generally contracted by operators.
- Sharing of data is dependent on operator's perspective, room for improvement.
- Cost reduction drive gives an opportunity to the ocean information suppliers, but market access is challenging.

The Institute of Marine Engineering, Science and Technology

Thank you to IMarEST
for supporting my attendance.

The IMarEST Operational Oceanography Special Interest Group

- Promotes engagement between users and suppliers of operational oceanographic products and services;
- Seeks to raise the profile and understanding of the concept of operational oceanography
- Provides representation of industry needs at scientific meetings
- Organises the biennial Oceans of Knowledge Conference (next conference November 2019)

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Thank you for your attention.