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# UKCS Frontier Basins and Licensing

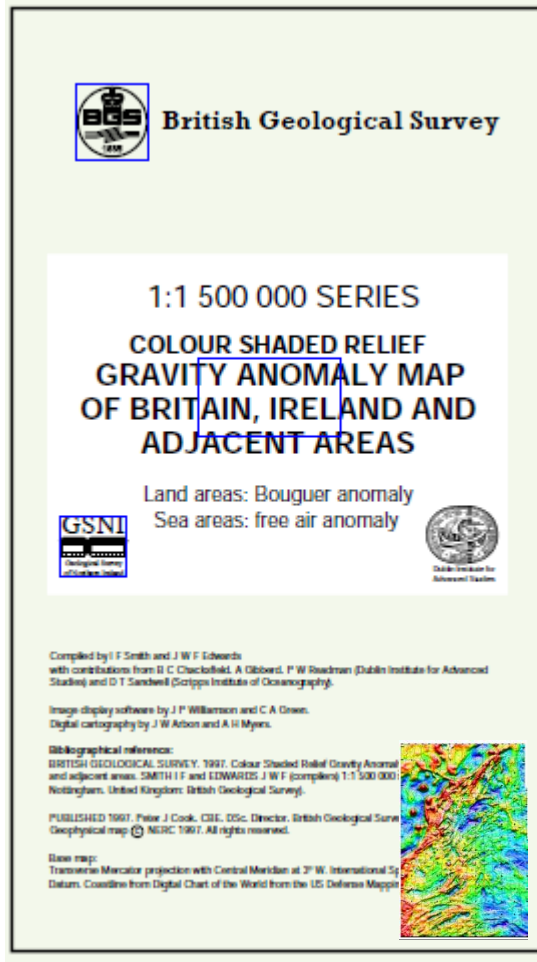
## APPEX Conference 2016

2<sup>nd</sup> March 2016

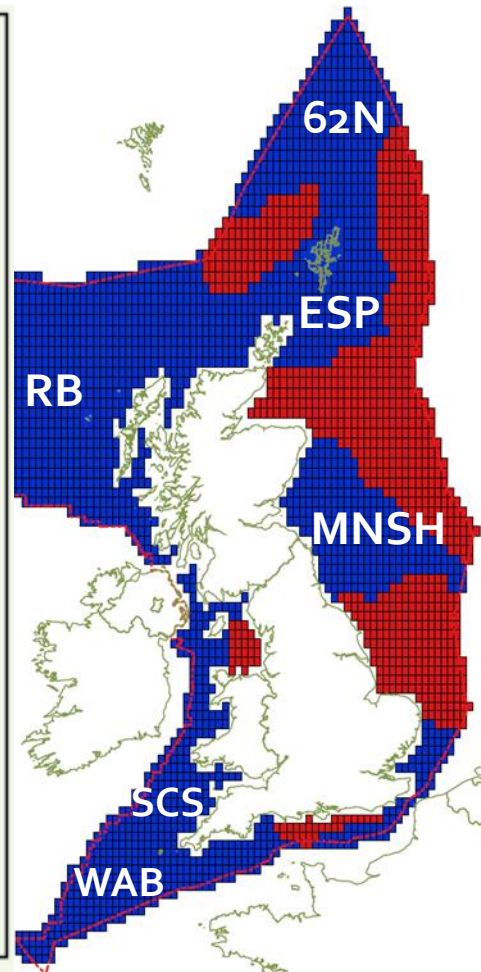


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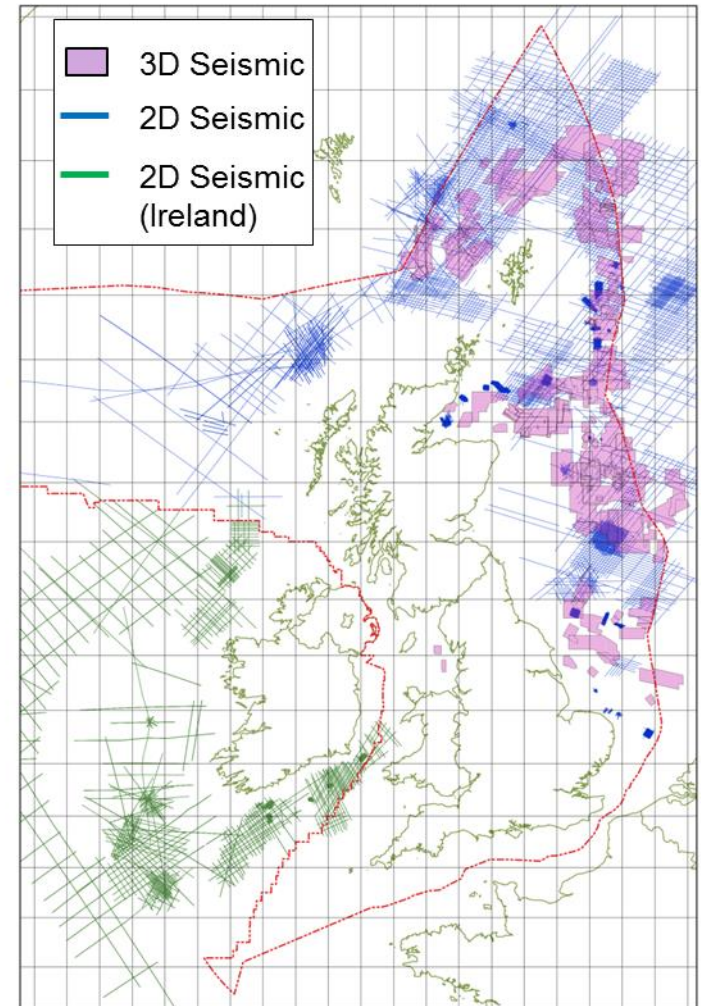
# UKCS Frontier Basins & Plays



BGS Gravity Map



Low vs High Well Density



Seismic Acquired 2005-2015

**Frontiers should also be defined in Three Dimensions**

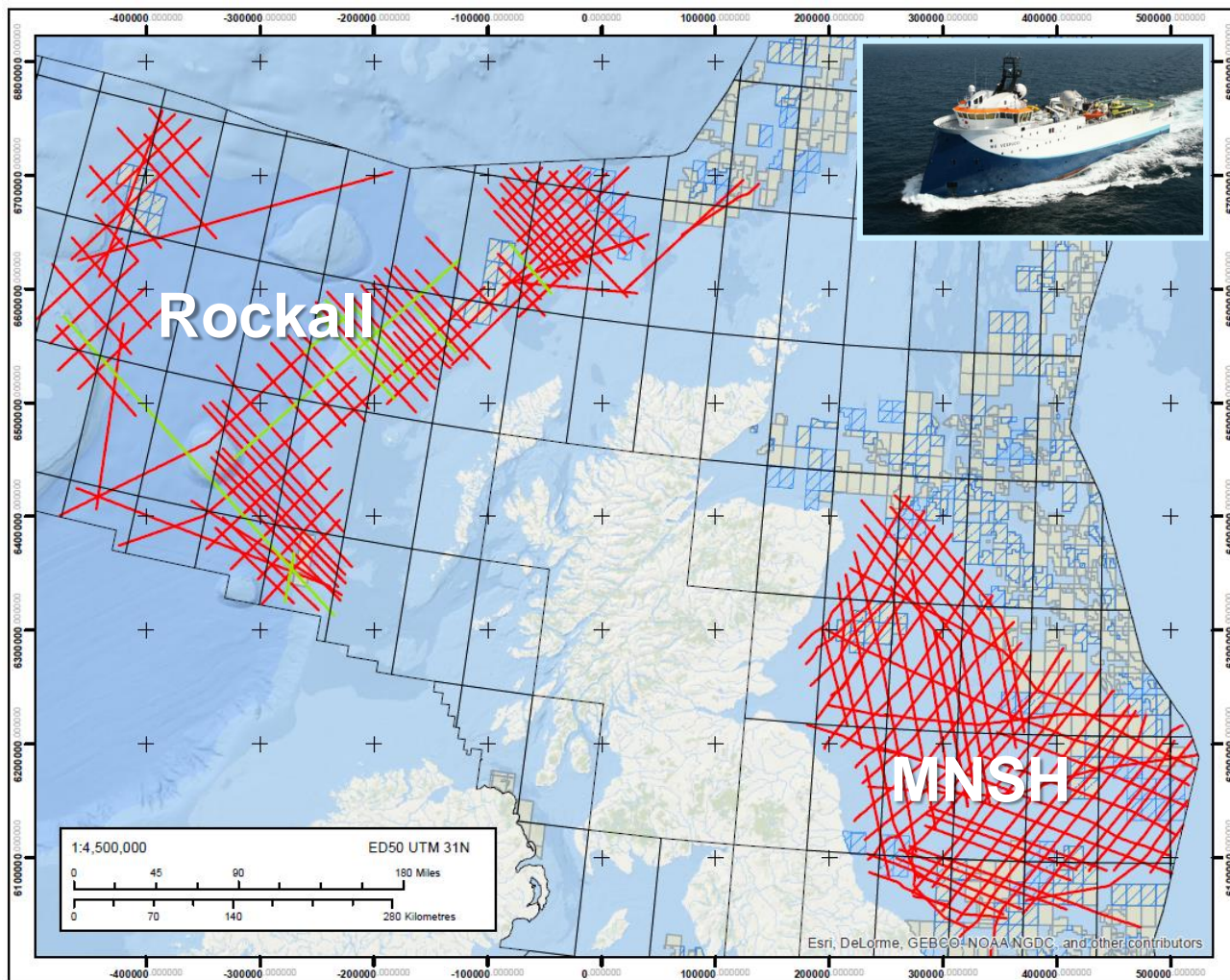




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# Government-Funded Seismic Programme 2015

**Free Subsurface Data Packages available end March 2016**



## Rockall Basin

- 8896 km 2015 Broadband PSTM
- 1117 km 2014 Broadband PSTM
- Approx. 5000 km Legacy Data, some reprocessed

## Mid-North Sea High

- 10849 km 2015 Broadband PSTM
- Approx. 10000 km Legacy Data, some reprocessed

**Almost 40,000  
km total  
seismic data  
package**

**12 months from Funding to Data Delivery**



The subsurface data will be made freely available to support evaluation of frontier or underexplored areas which will be offered in the upcoming (2016) 29th Offshore Licensing Round. The two regions included in these data packages are the basins around the North Rockall Basin and the Mid North Sea High and Forth Approaches areas.

Data packages will be available as a Workstation-Ready Product, as well as in software independent formats. Data available will include:

- Processed seismic data - pre-stack time migrated (full offset stack and angle stacks) for newly acquired regional 2D surveys, legacy 2D lines supplied by Western Geco, some of which will be reprocessed before release.
- Digital data from released hydrocarbon exploration wells including spliced digital well logs, selected well reports and well header information.
- Gravity and magnetic data plus interpreted maps and gridded surfaces.
- Raw seismic data will also be available by request - a media and handling charge will apply.

**Data Delivery Survey on OGA Website.**

## **Government Funded Seismic Programme**

**29th Frontier Round Data Packages Available for download end Q1 2016 via [www.ukoilandgasdata.com](http://www.ukoilandgasdata.com)**

The latest shapefiles of the survey locations are available from the OGA website, where updates on the 29th Round will also be made available in due course.

**[www.gov.uk/oga](http://www.gov.uk/oga)**





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# Data Analysis Competition

**Aim:** Stimulate small business and academic start-up activity in UKCS

## Phase 1 (March to April)

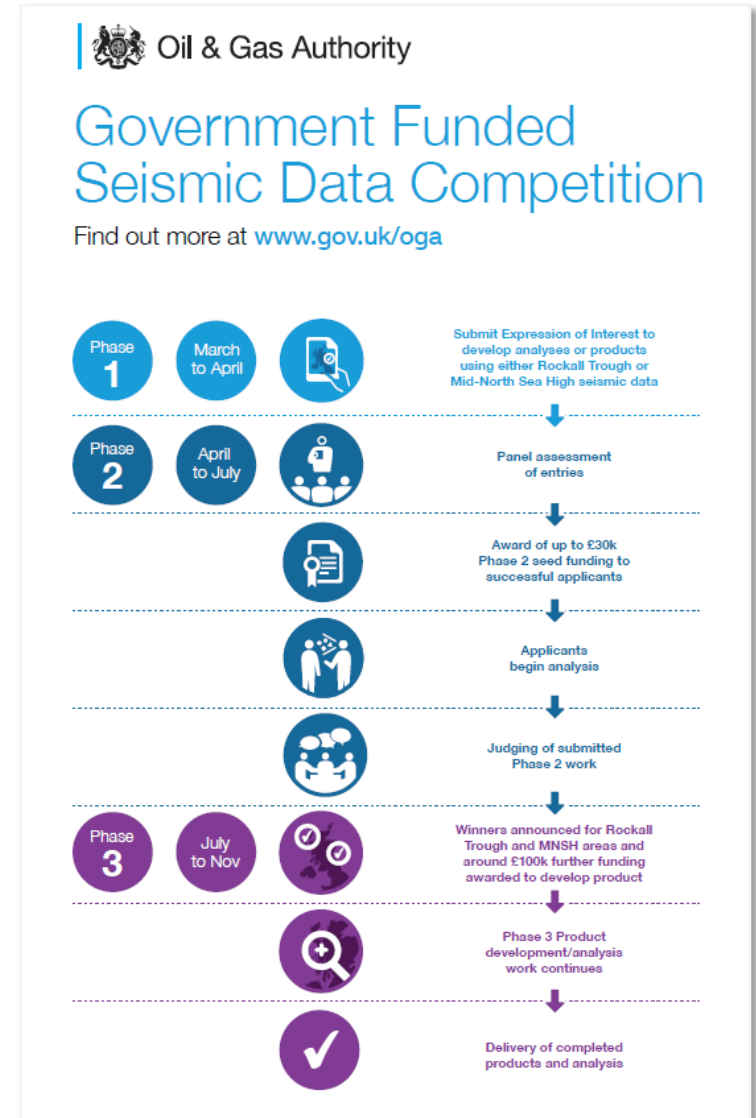
- Submit expression of interest and project plan
- Best proposals will be awarded up to £30,000 seed money

## Phase 2 (April to July)

- Successful applicants develop initial analyses or products

## Phase 3 (July to November)

- Two winners will be awarded up to £100,000 each to fully develop or extend analyses or products (one award for each area)

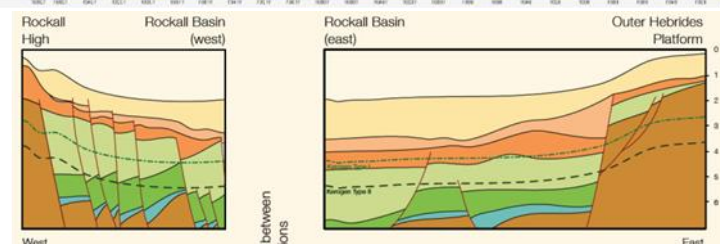
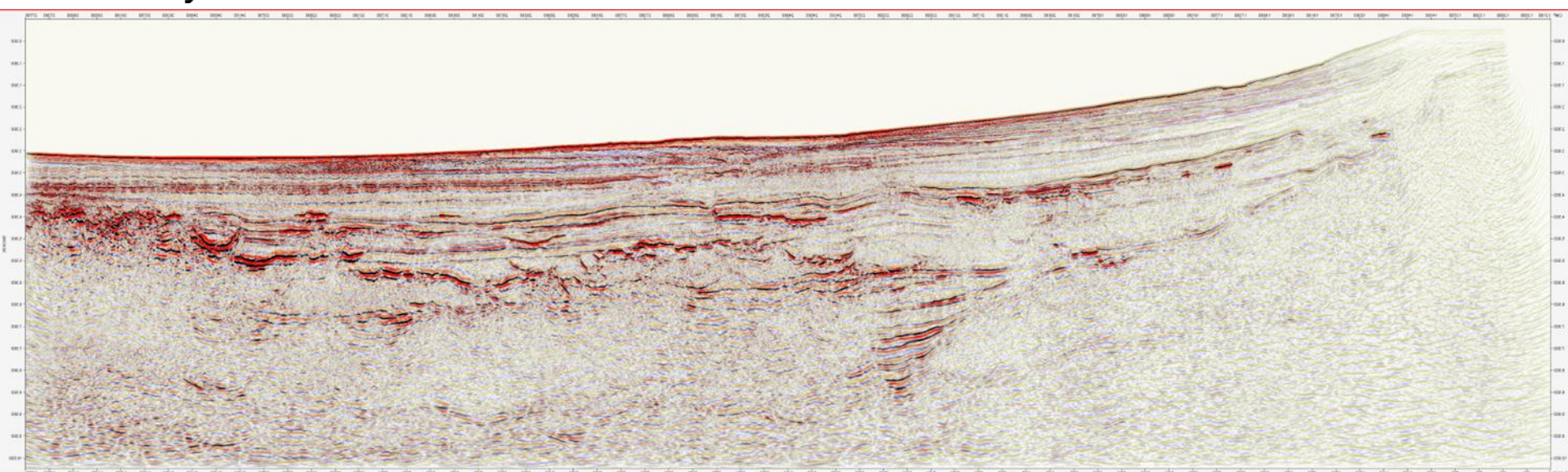


More Information on [www.gov.uk/oga](http://www.gov.uk/oga) on 7th March 2016

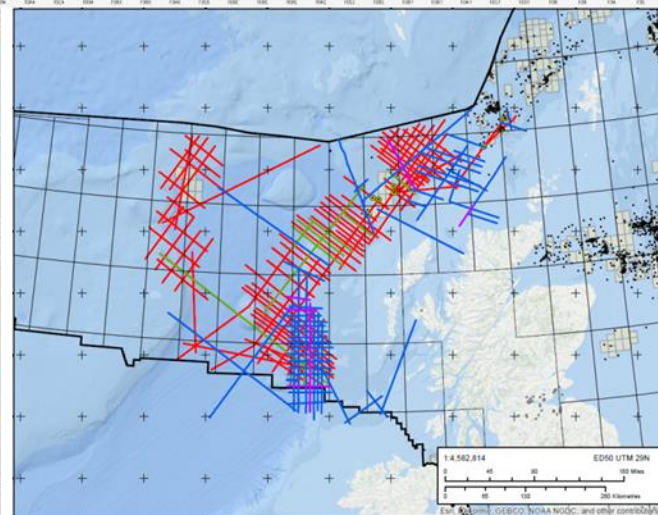
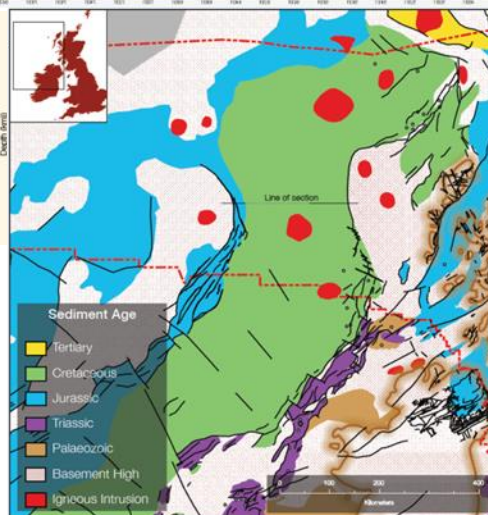




# Rockall Basin



- Under-Explored Area with just 12 Exploration Wells drilled since 1980.
- Proven Working Petroleum System with Benbecula Discovery in 2000
- Most Legacy Seismic Data Acquired pre-1998



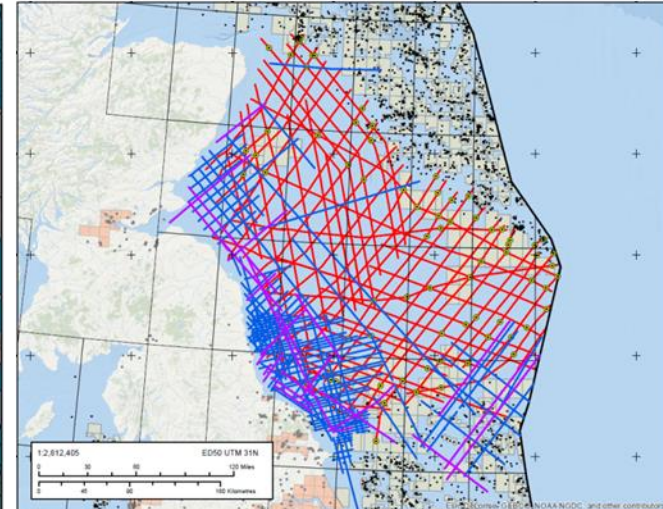
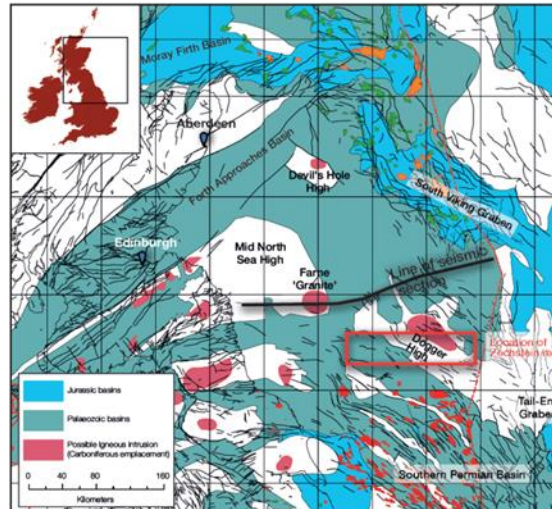
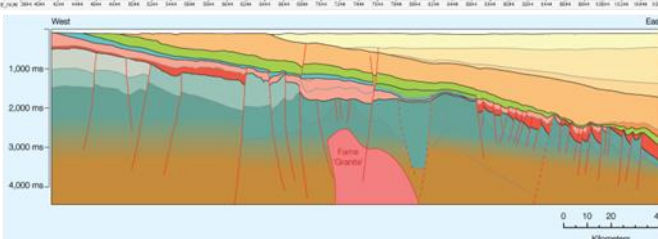
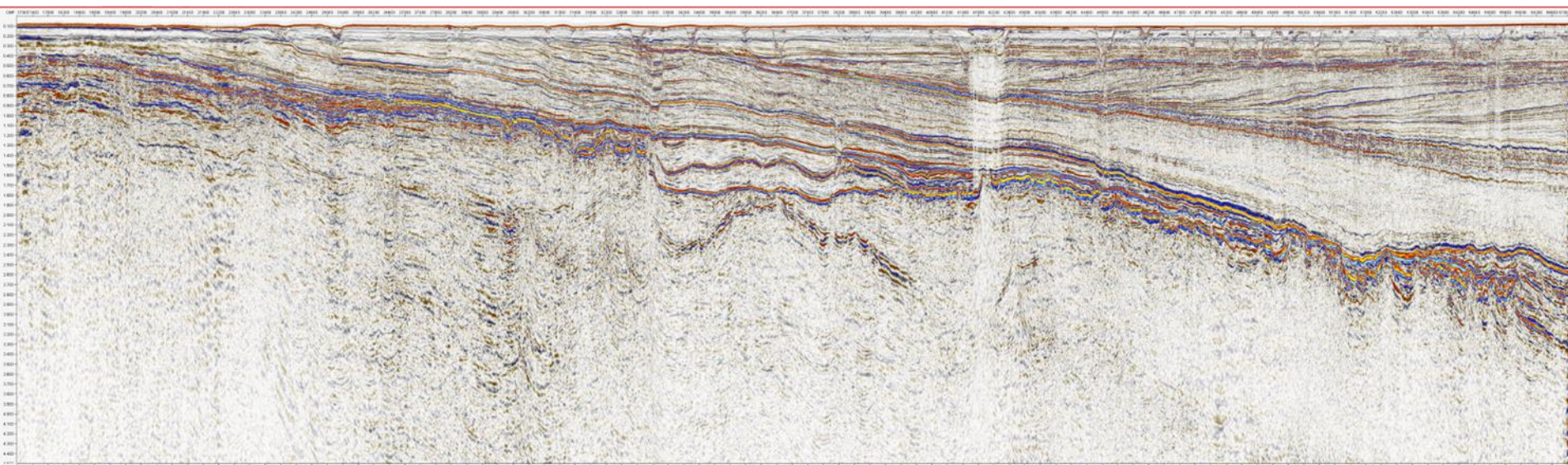
Line 78 PSTM Preliminary Line





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# Mid North Sea High



- Broadband Technology Applied to Improve Imaging
- Acquired and Reprocessed Data Close to Shore to Transfer Critical Onshore Knowledge
- Breagh & Pegasus Discoveries. Extending the Carboniferous Play to the North
- Link with BGS-managed 21<sup>st</sup> Century Roadmap Project on Palaeozoic Prospectivity

Line 58 PSTM Preliminary Line

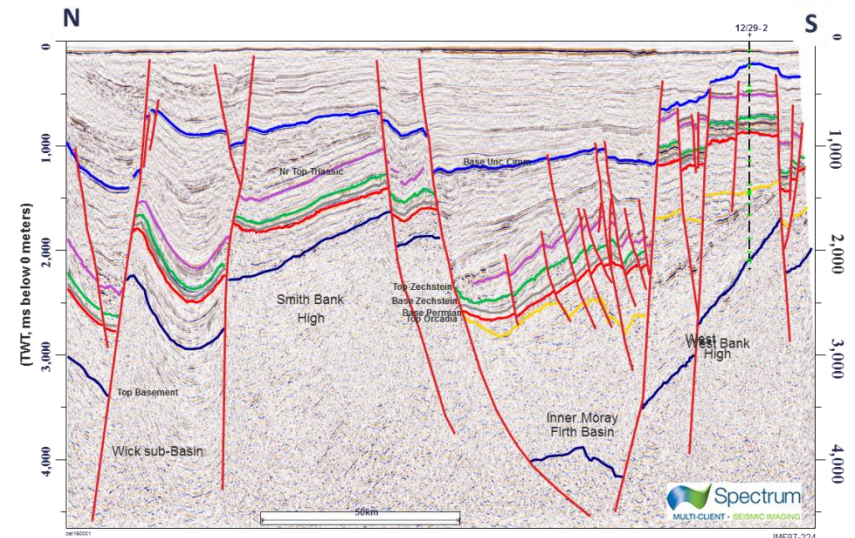
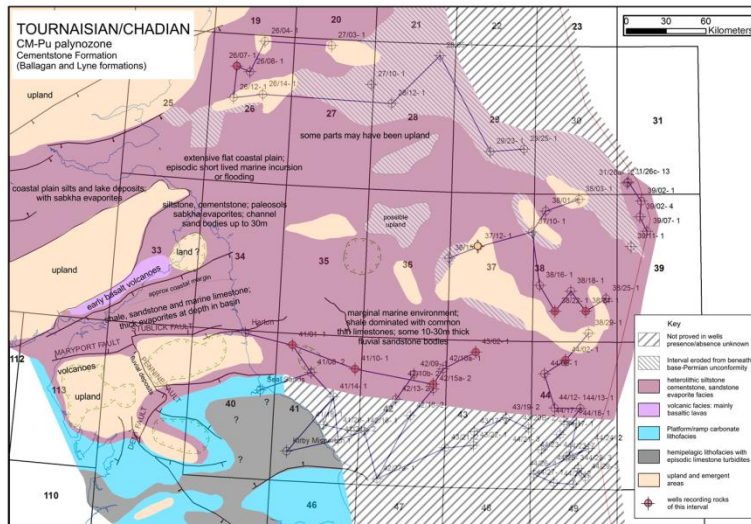
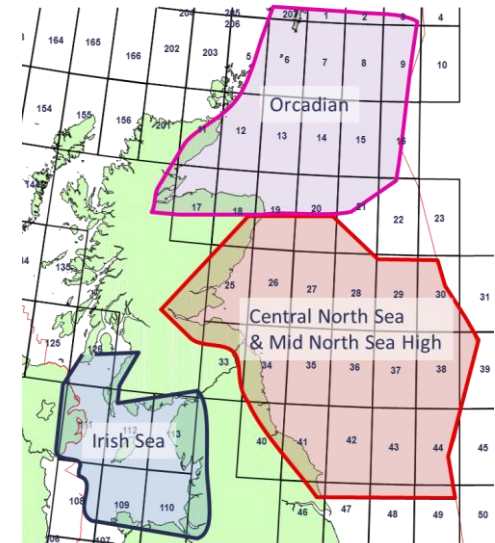
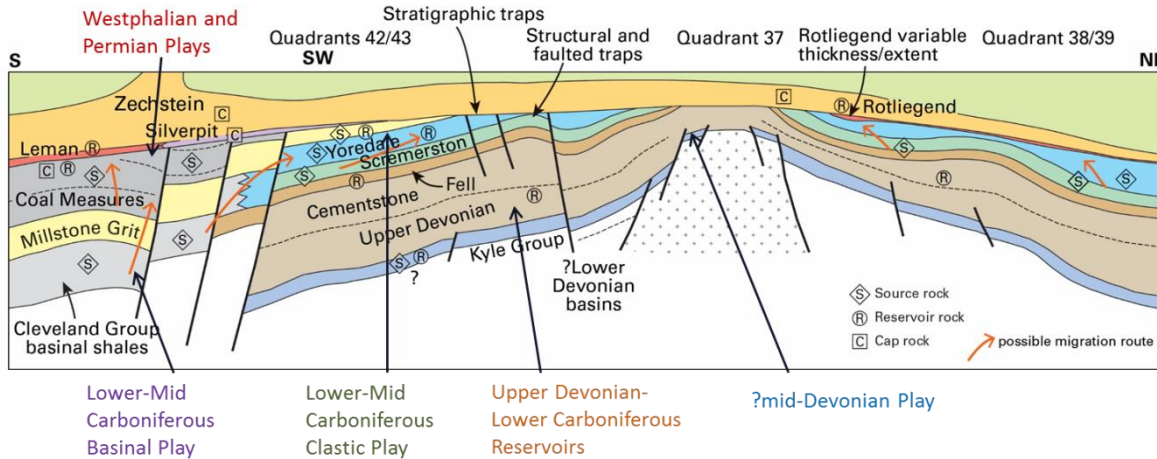


## 21 CXRM Palaeozoic Project



**British  
Geological Survey**

NATURAL ENVIRONMENT RESEARCH COUNCIL



## Next Technical Meeting: Thursday 17<sup>th</sup> March 2016

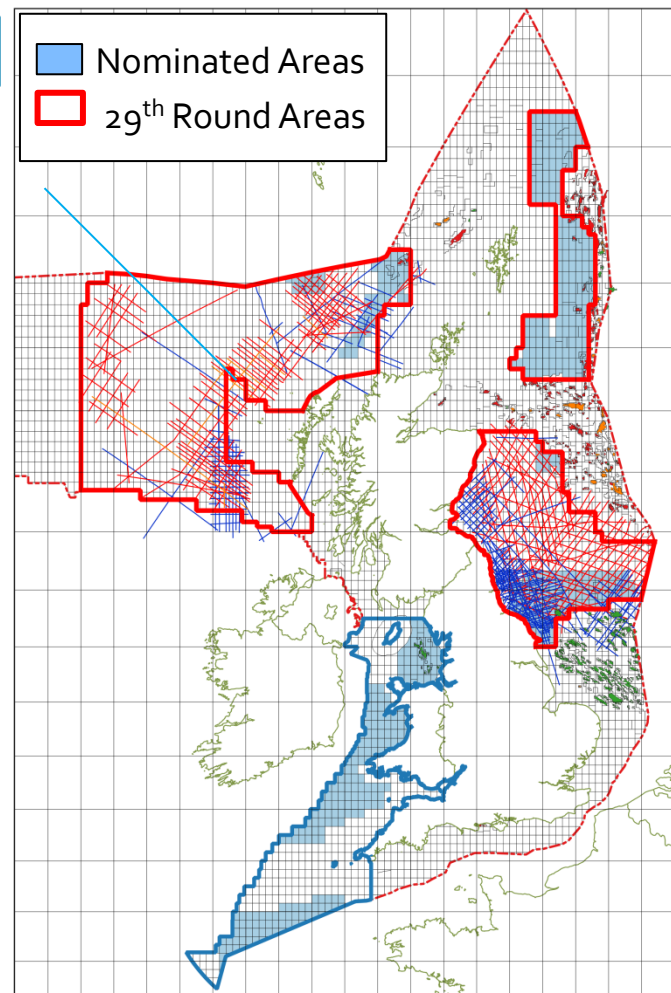
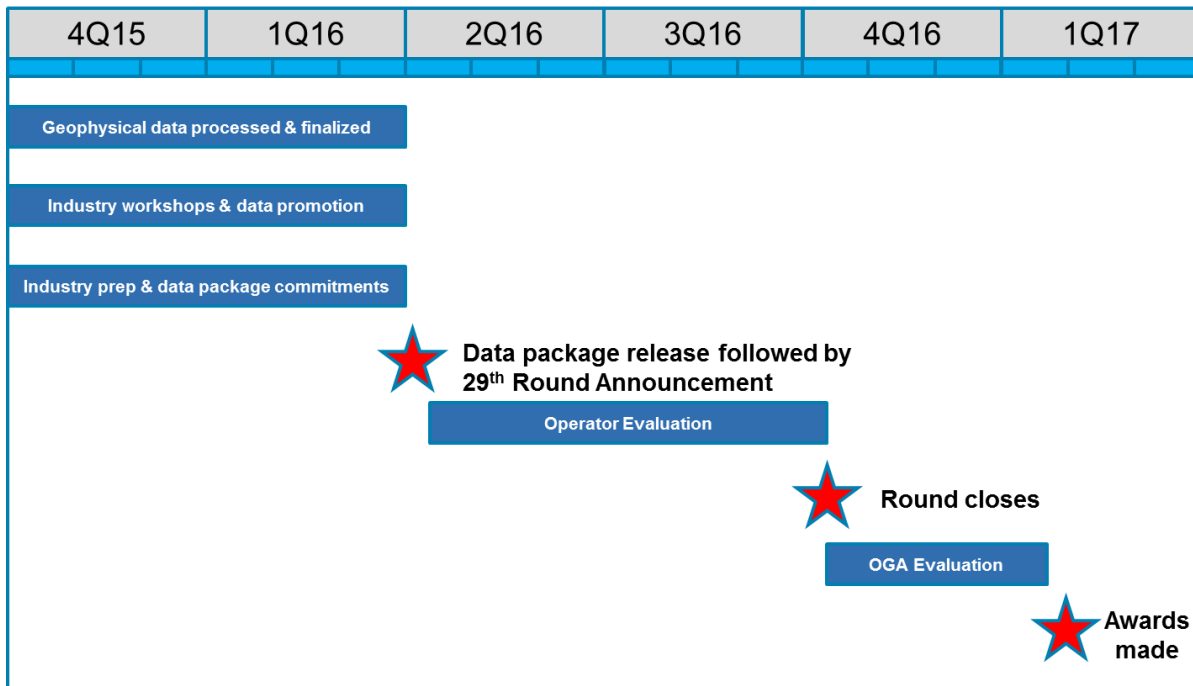




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# 29<sup>th</sup> Frontier Round

N.B. Timing subject to completion of Strategic Environmental Assessment



## Areas to be included in 29<sup>th</sup> Licensing Round:

- Rockall Basin
- Mid North Sea High Basin
- East Shetland Platform (part)

**Improved, Flexible Licenses to be made available.**

**29<sup>th</sup> Round will focus on Under-Explored Frontier Areas**





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# Innovate License

INITIAL TERM: Period up to a maximum of 9 years

## Phase A

Studies & Reprocessing

Financial Viability

SEA\*

No compulsory relinquishment

## Phase B

Seismic Programme

Financial Viability

SEA\*

Up to 75% negotiable

## Phase C

Drill E&A Wells

Financial Capacity, plus Technical,  
Environmental and Safety Competence

SEA & AA

Relinquish to prospective field area

*\* AA in some areas*

## Innovate Licence Advantages

- **Lowers Entry Hurdles:** Reduced Access Costs, Deferred Capacity/Competence Tests
- **Flexibility:** Design Licence around the Work Programme (no shoehorning).
- **Broader Areas:** Available everywhere on UKCS, Larger Tranches on Offer
- **Faster Awards:** OGA and OGED expediting AA Process

Ongoing initiatives to improve access to data and studies

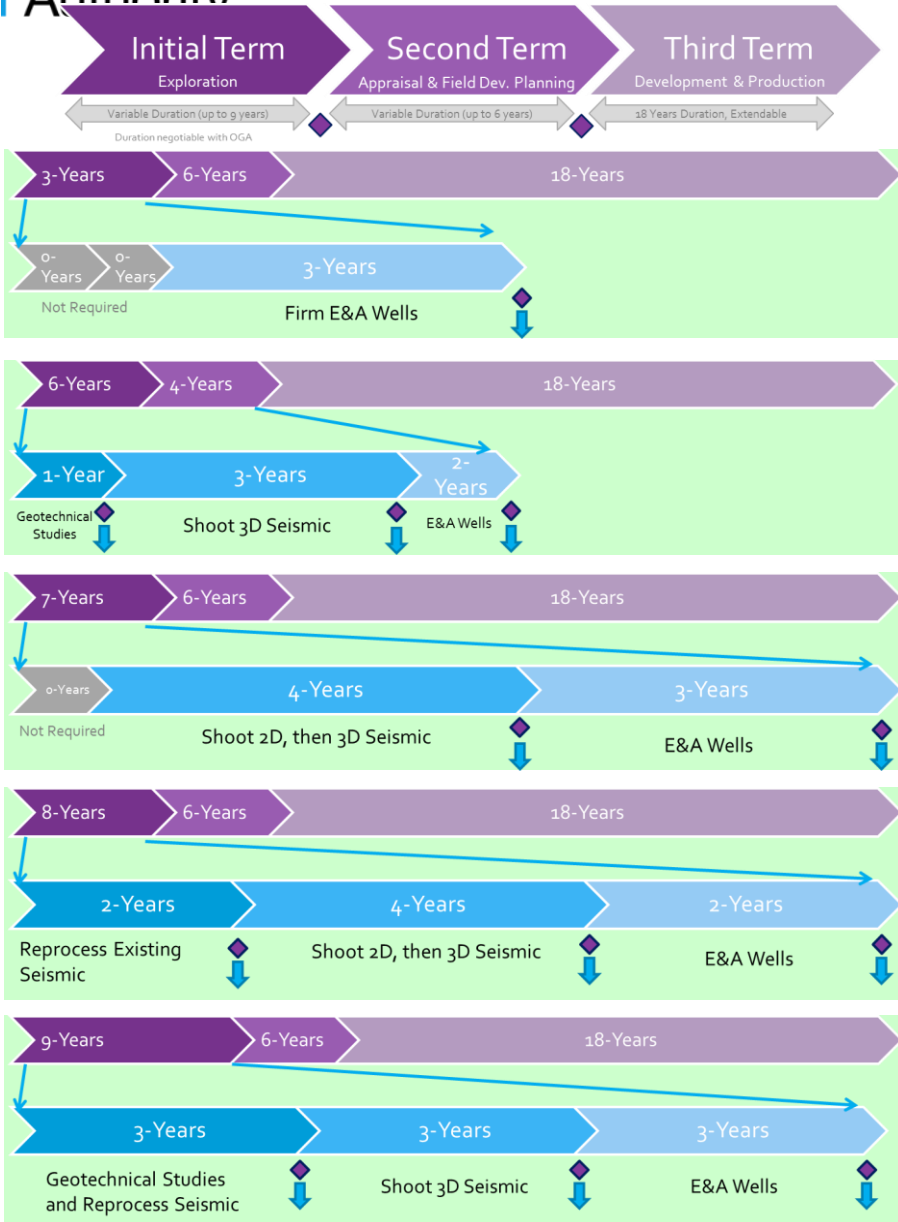
**Innovate exploration license offers a flexible & pragmatic approach**

Will largely be implemented for 29<sup>th</sup> Round, full implementation for 30<sup>th</sup> Round





# Example Innovate Licences



## Flexible Durations:

- Initial Term (up to 9 Years)
- Second Term (4 to 6 Years)

## Three-Phase Initial Term:

- Phase A – for studies and reprocessing
- Phase B – for shooting new seismic
- Phase C – for drilling wells

## Decision Gate at end of each Phase:

- Proceed or Drop

If Phases A or B not required, can enter straight into Phase C





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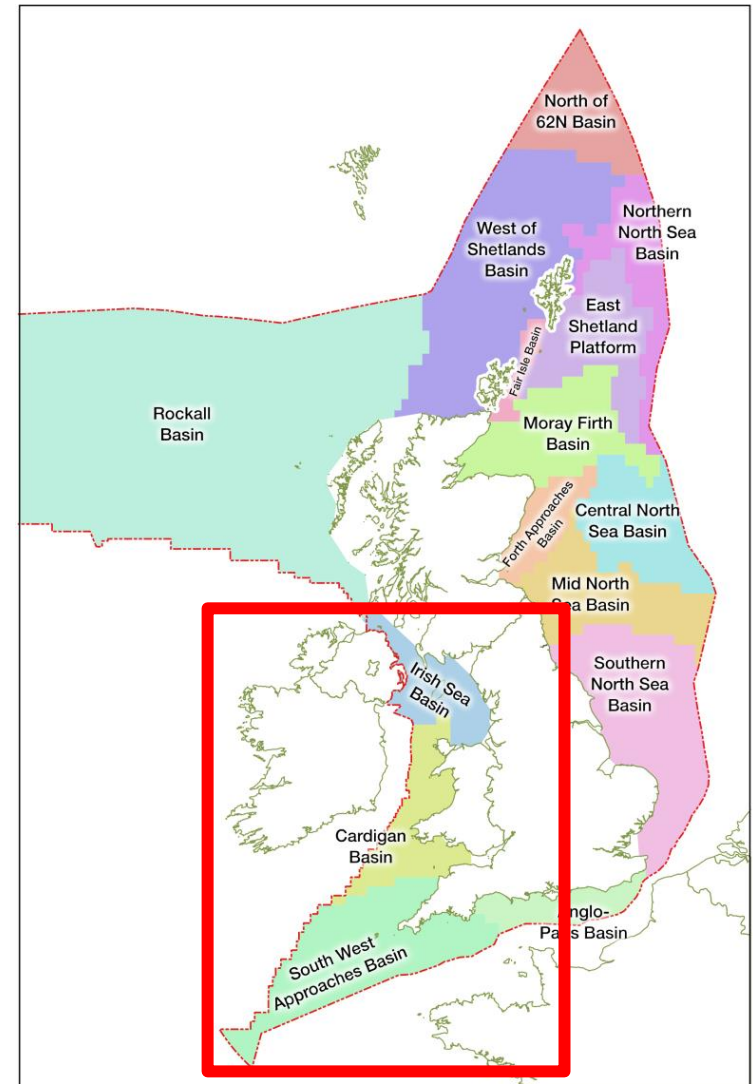
# Government-Funded Seismic Programme 2016

**£20m of new funding for a second round of new seismic surveys to unlock new exploration activity on the UK Continental Shelf**

**Acquisition, Processing and Reprocessing must be completed by end March 2017.**

**Interest Shown by Industry in:**

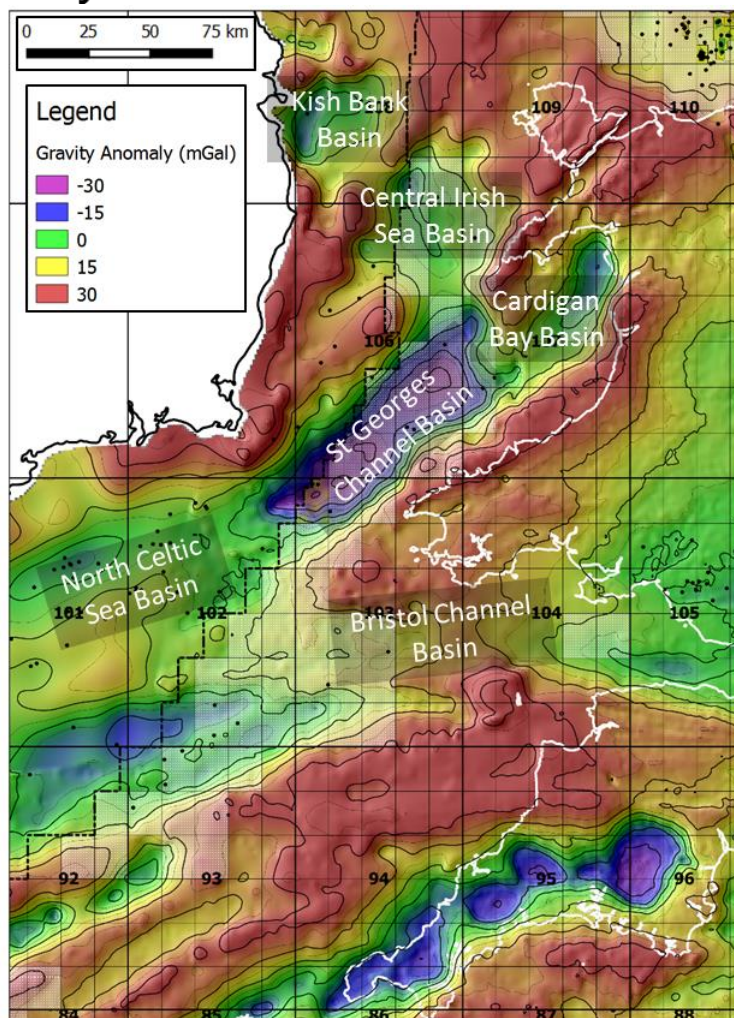
- East Irish Sea Basin
- Cardigan Basin, incl. South Celtic Sea
- SW Approaches Basin



**Focus on Frontier Basins & Plays**

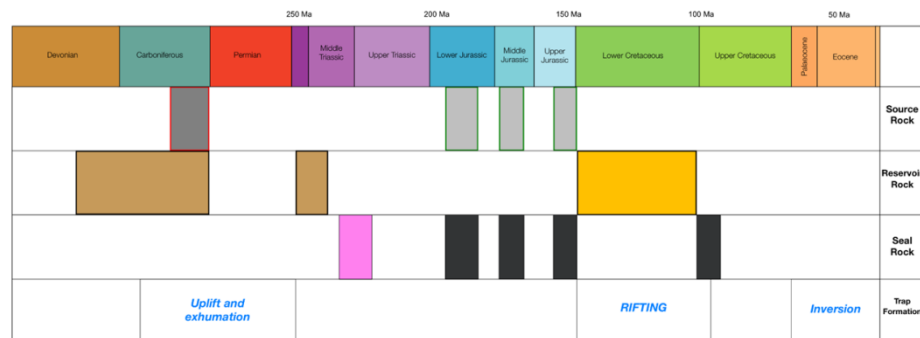


# South Celtic Sea Basin/Cardigan Basin



BGS gravity anomaly data - Offshore: Free-Air Anomaly.  
Onshore: Bouguer Anomaly

- *Principal Reservoir:* Lower Triassic Sherwood Sandstone
- *Top Seal:* Triassic Mercia Mudstone Group (incl. evaporites)
- *Main Source Rock:* Lias Group Mudstones



## Source Rocks

- Type I - oil prone
- Type II - oil prone
- Type III - gas prone

## Reservoir Rocks

- Shallow Marine
- Fluvial
- Continental

## Seal Rocks

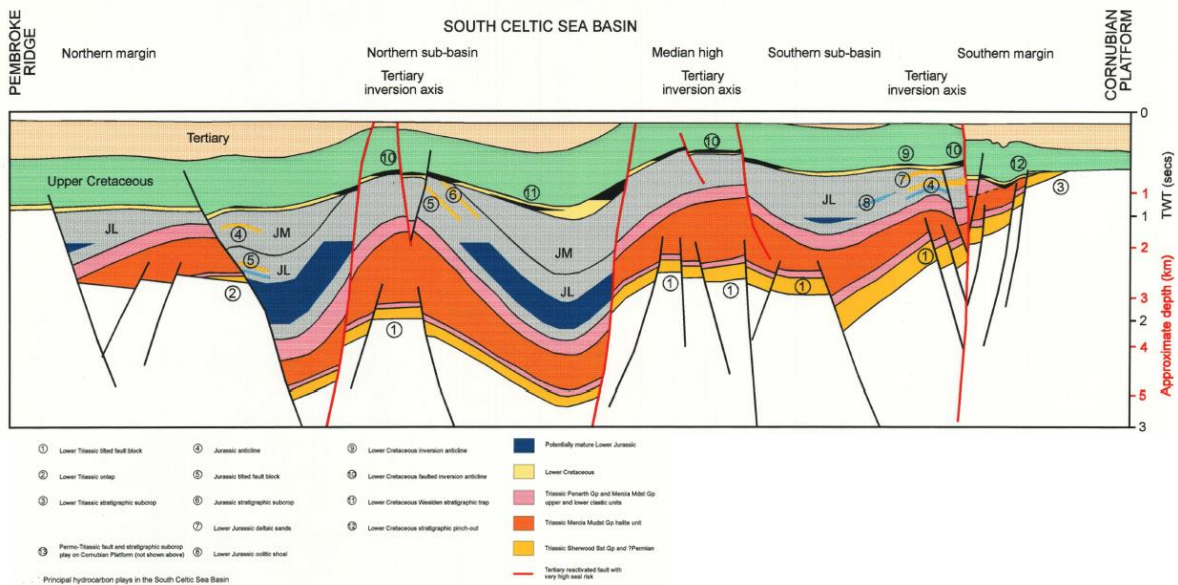
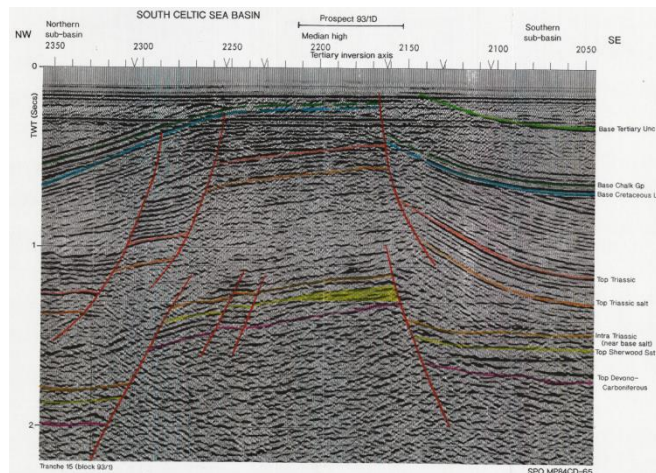
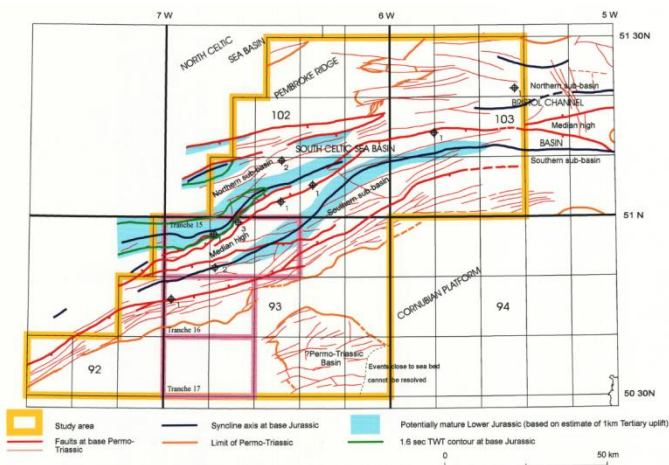
- Shale / mudstone
- Evaporites





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# South Celtic Sea Basin



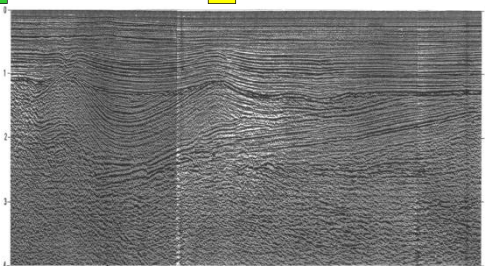
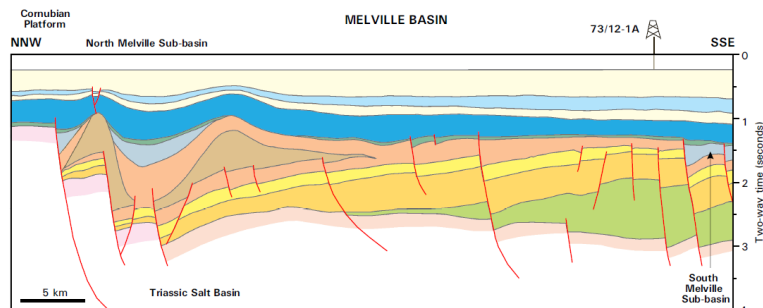
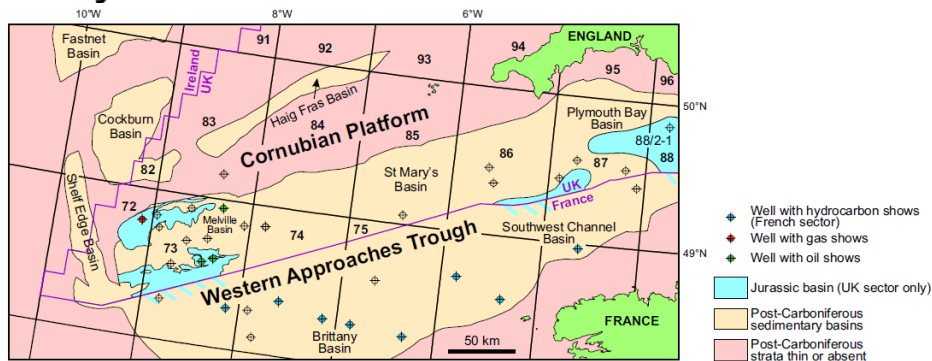
- Working Hydrocarbon System in Ireland
- Dragon Gas Discovery in UK
- Most UK wells drilled along main Inversion Axis

Focus on under-explored frontier areas

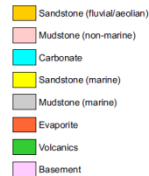
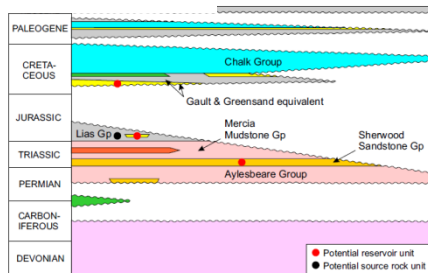


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# SW Approaches Basin



Chapman (1989)



- No Seismic acquired in last two decades
- No Wells since 1980s
- 3 wells with oil shows and 1 with gas shows in UK waters
- 8 wells with oil/gas shows in French waters

- *Principal Reservoir:* Lower Triassic Sherwood Sandstone
- *Top Seal:* Triassic Mercia Mudstone Group (incl. evaporites)
- *Source Rock:* Lias Group Mudstones

- *Tilted Fault Blocks, Four-Ways and Stratigraphic Traps*
- *Complex Structural History*



Focus on under-explored frontier areas





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# East Orkney & East Shetland



- *Principal Reservoir:* Devonian Fluvial Sandstone
- *Top Seal:* Intra-Devonian Shales
- *Source Rock:* Primarily Devonian Shales, Local Presence of mature Upper Jurassic Source?
  - *Sparse Seismic Data*
  - *Gravity Maps suggest deep basins*
  - *Abundant oil seeps in some areas*

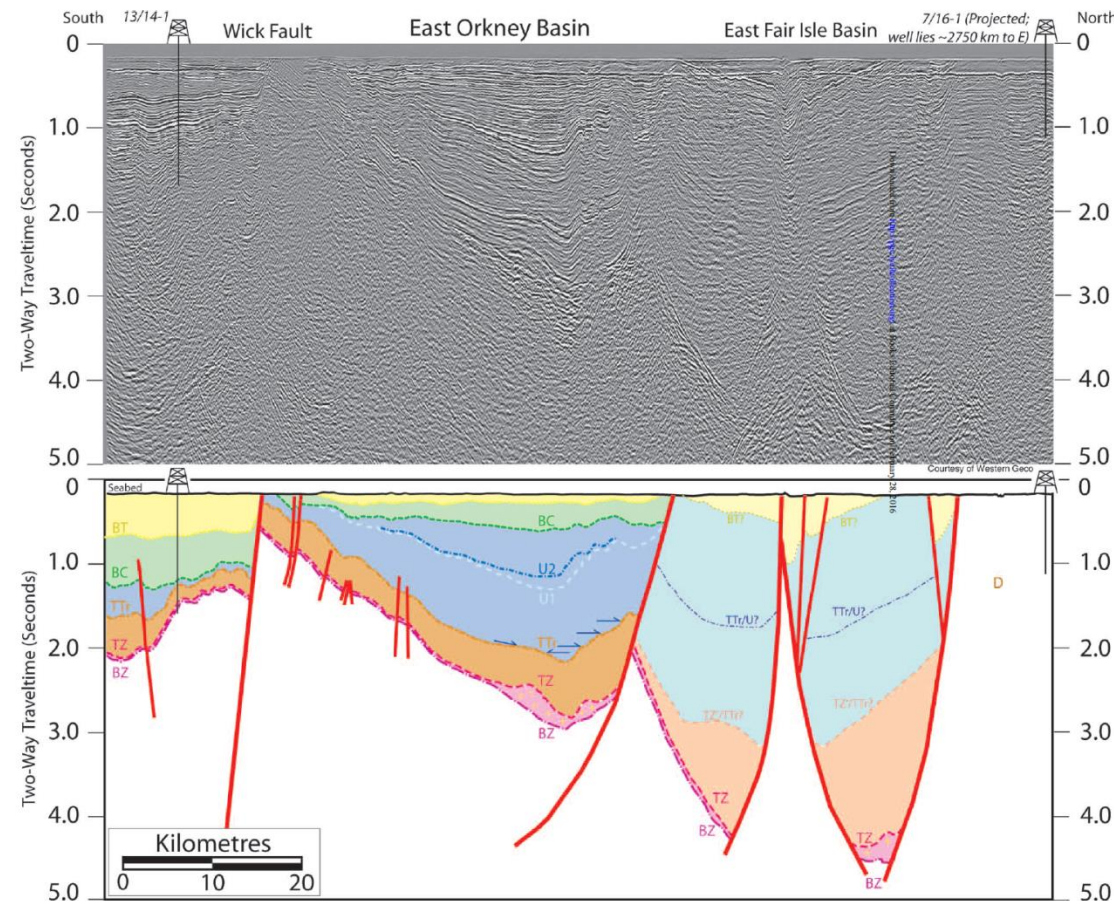
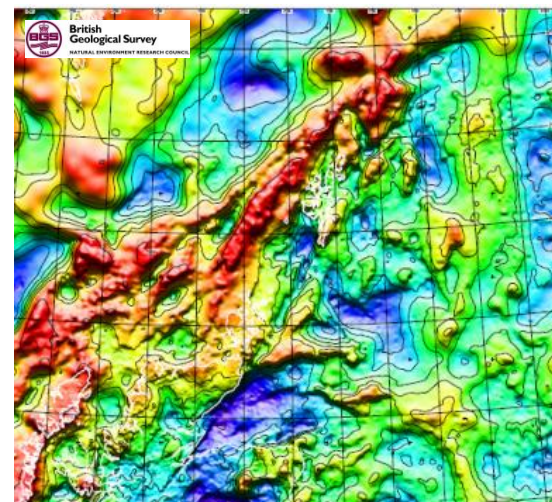


Fig. 7. Uninterpreted and interpreted seismic line GNSR92-204a showing south-north section through the northern Inner Moray Firth, Wick Fault and Cairness Ridge, East Orkney Basin, and deeper sub-basins of the East Fair Isle Basin to the north. The projected location of well 7/16-1 is shown at the northern end of the section, located on a structural high. Location shown in Figure 1. Key to abbreviations in Table 1. D, Devonian.

Richardson, Allen & Underhill, 2002



**Focus on under-explored frontier areas**

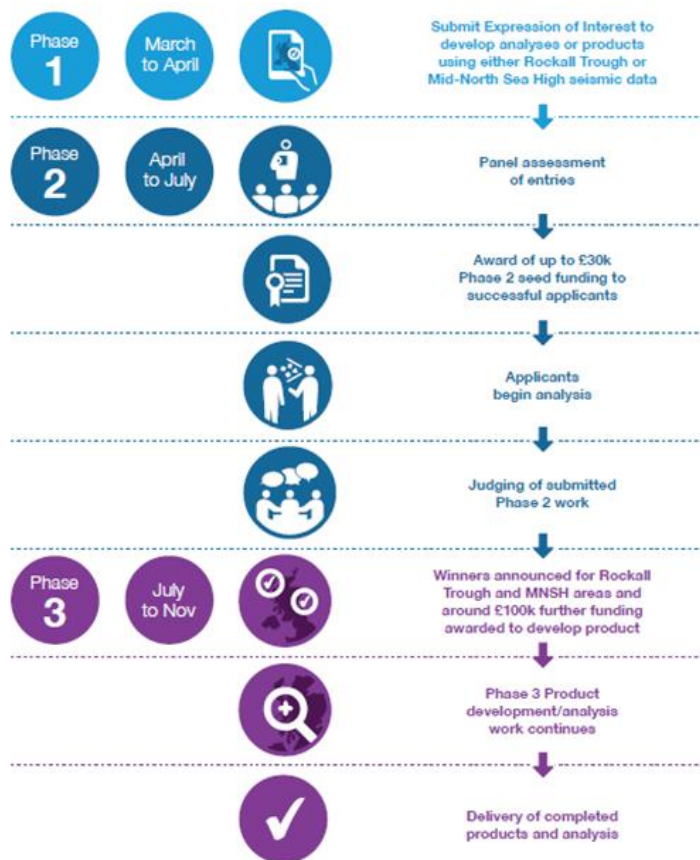




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## Government Funded Seismic Data Competition

Find out more at [www.gov.uk/oga](http://www.gov.uk/oga)



## Government Funded Seismic Programme

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