

## 2D Seismic analysis of Chalk play potential in the upper D, E and F-quadrants

Dick Stegers, Msc

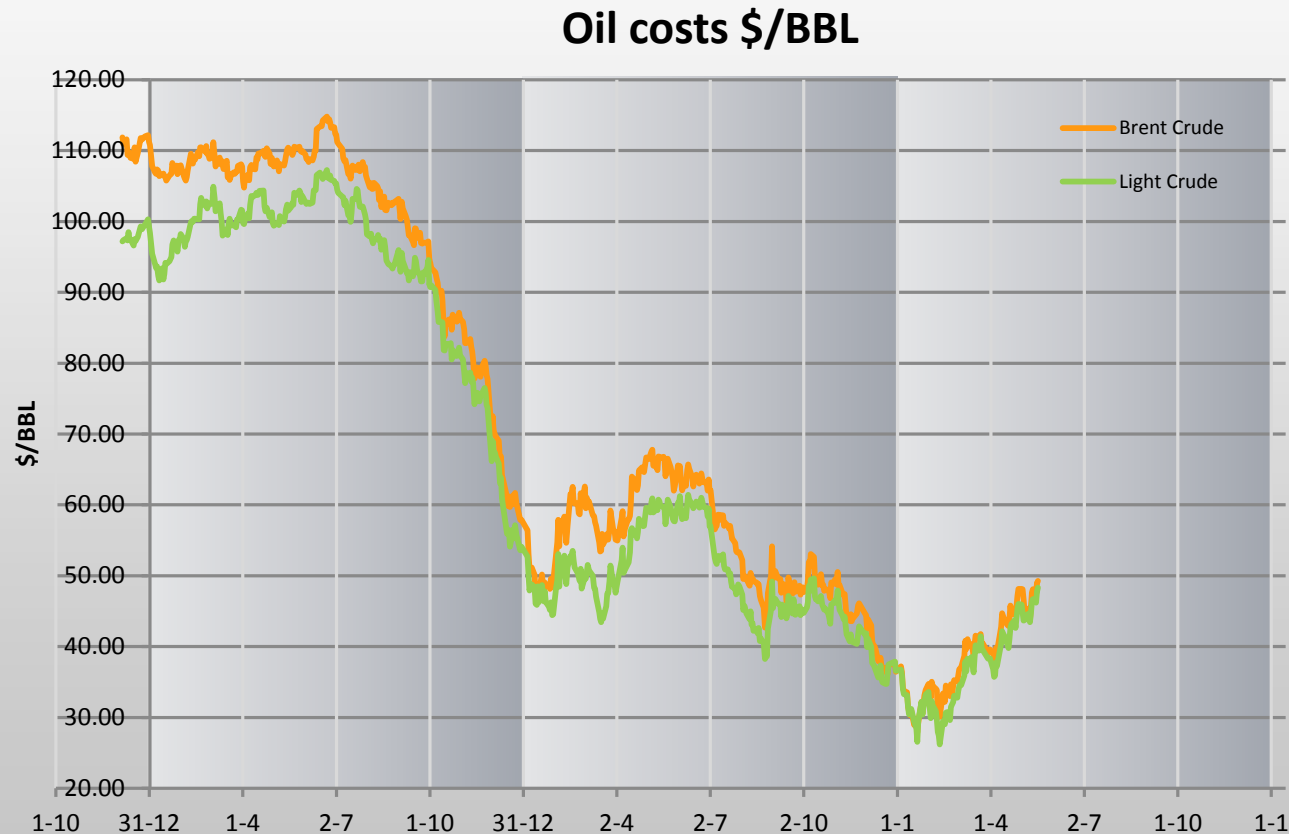
23-05-2016

EBN: Dutch Exploration Day



# Economics

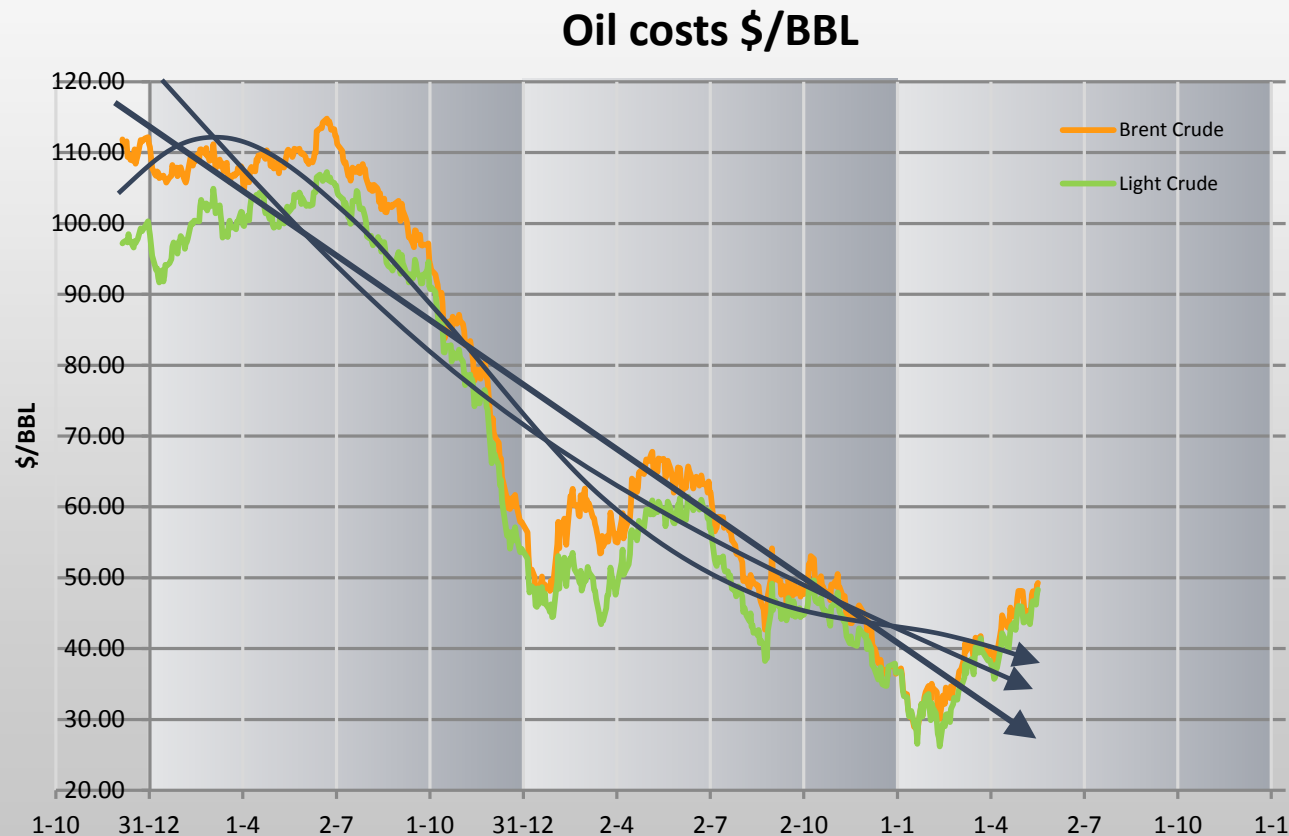
- Exploration, like any other business, has one major goal: making profit





# Economics

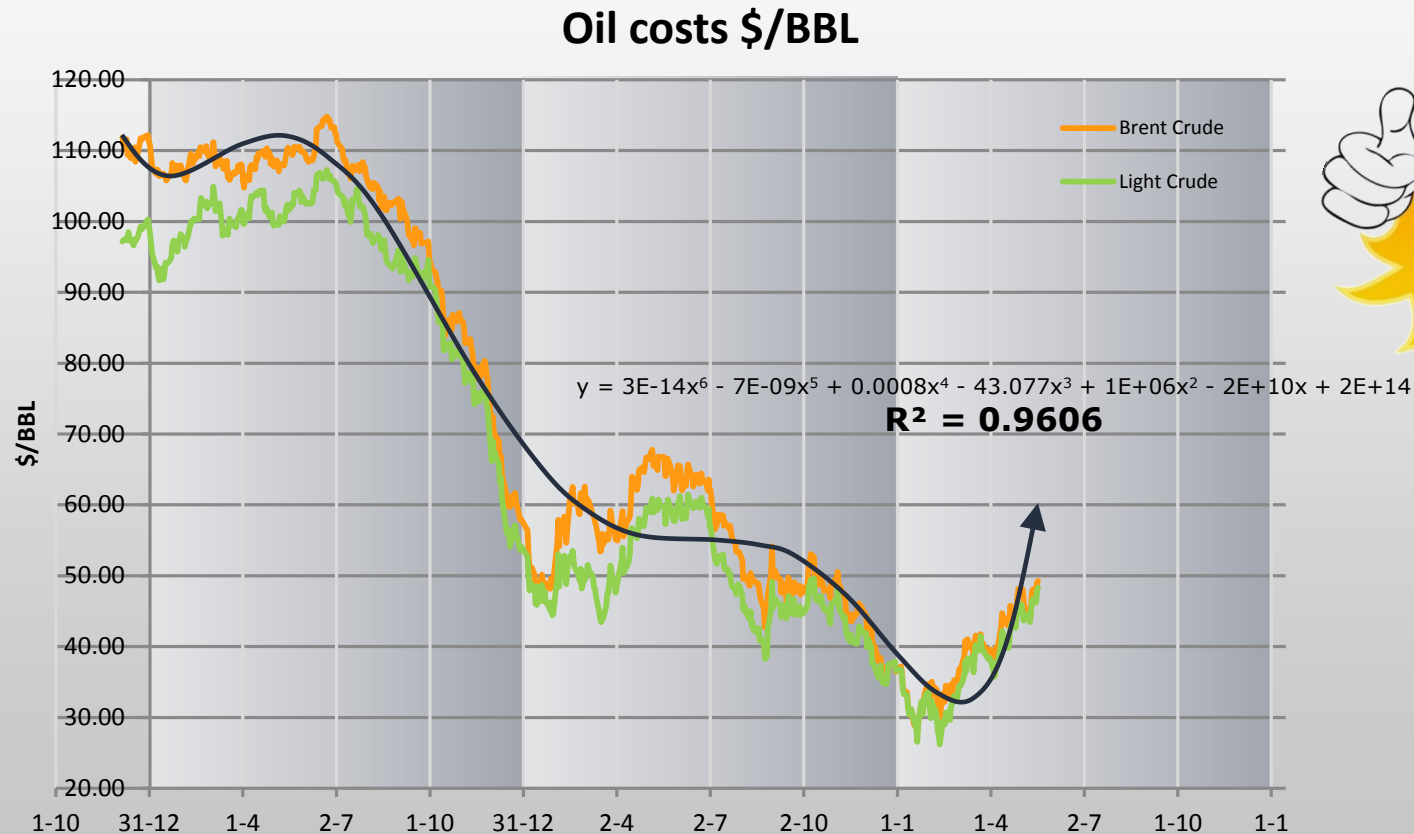
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# Economics

- Exploration, like any other business, has one major goal: making profit





# Background

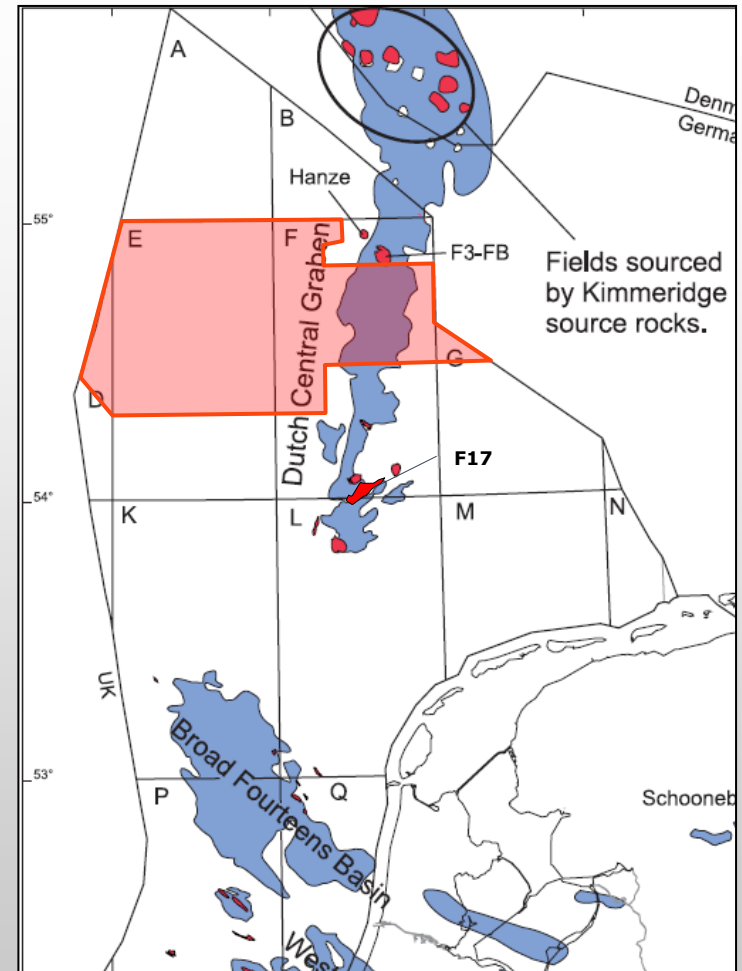
## Discovery F17-NE



4-12-'12: Wintershall announces an **oil discovery** in exploration licence **F17a** in the Dutch North Sea. Exploration well F17-10 found a Late Cretaceous **Chalk** reservoir of good quality containing crude oil. Preliminary resource estimates indicate a potential of at least 30 million barrels recoverable oil with a more than significant upside.

## EBN study 2013:

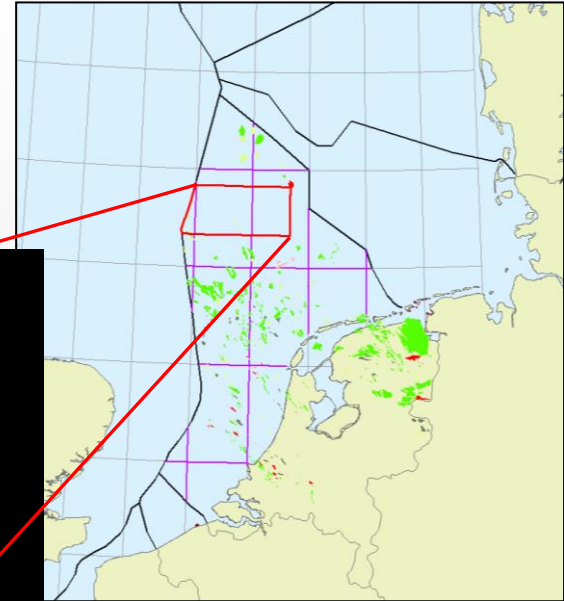
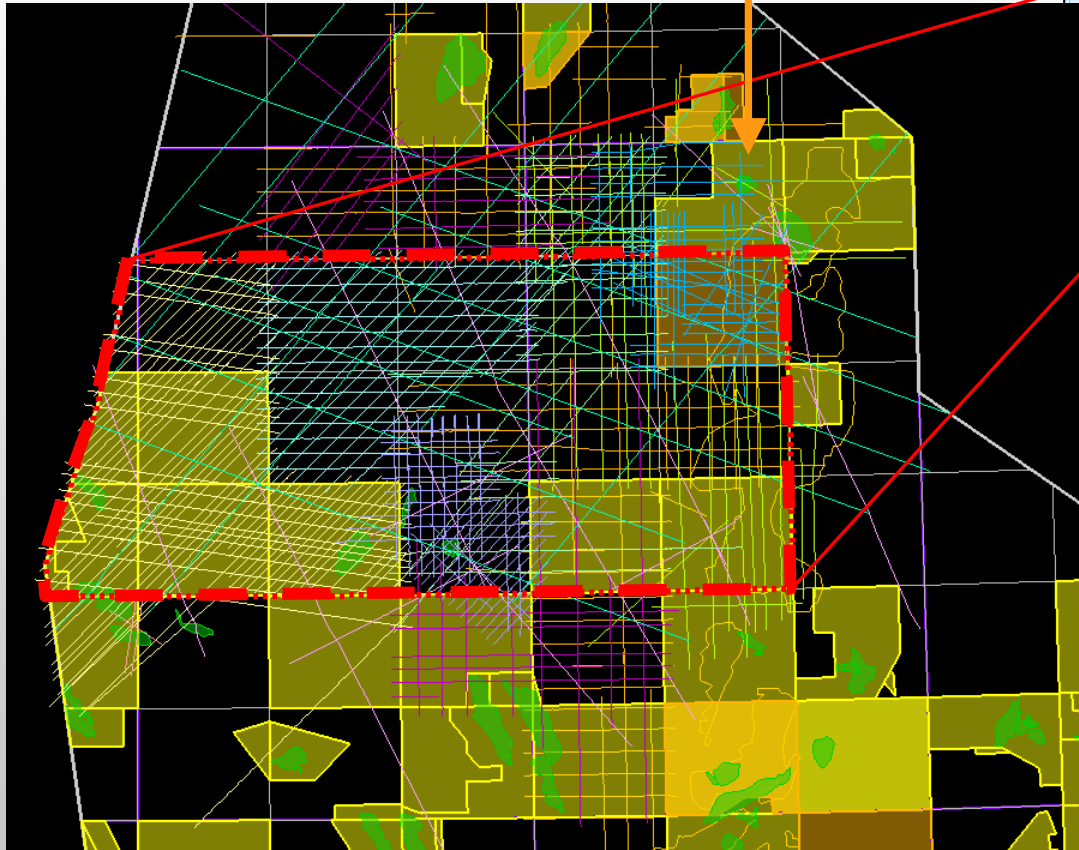
- 'Chalk in the northern Dutch offshore is underexplored'
- Non-exclusive 3D-seismic in DEF-quadrants shot in 2011/2012 with Fugro





# Study Area

F02 Hanze



- Focus on open acreage
- Regional 2D dataset
- Eleven different surveys
  - 80's, 90's, 00's
  - ~350 lines
- Area of ~6.500 km<sup>2</sup>



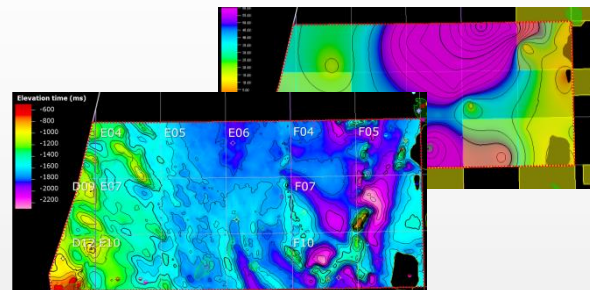
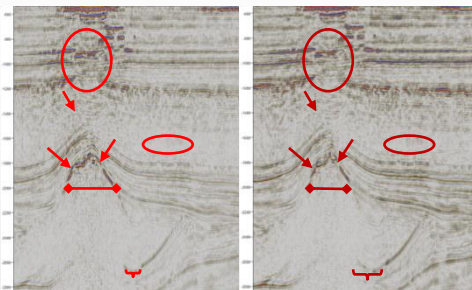
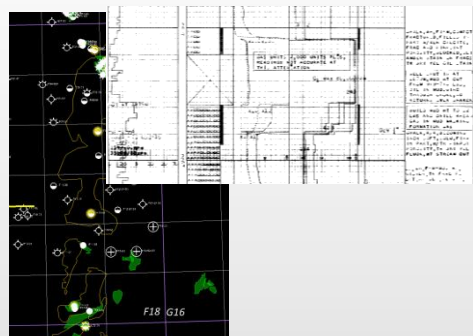


# Chalk study

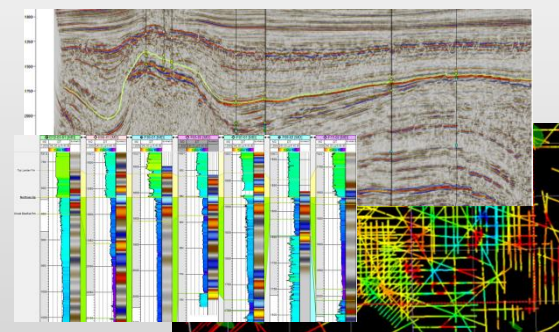
Reprocessing seismic data

Grids & thickness maps

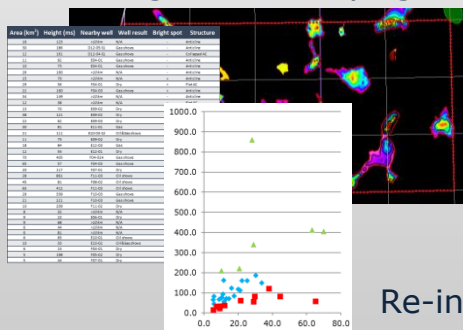
HC analysis well documents



Interpreting seismic data



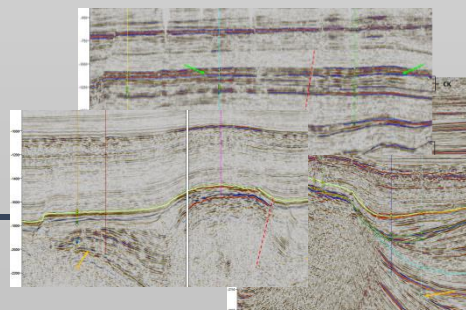
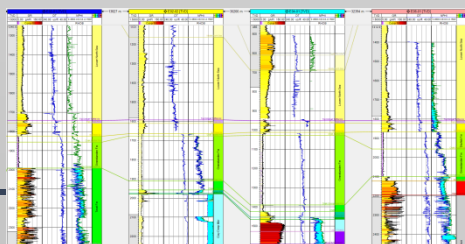
Defining and classifying leads



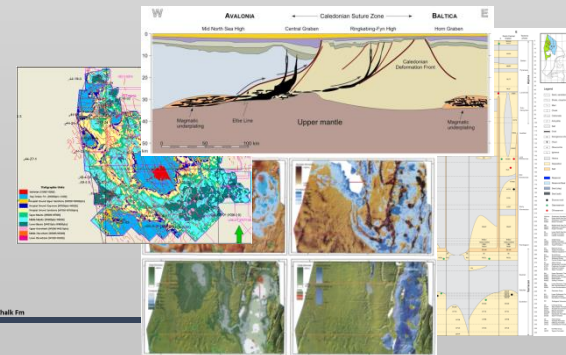
## Chalk study

Re-interpretation Welltops

Analysis analogues



Geological study



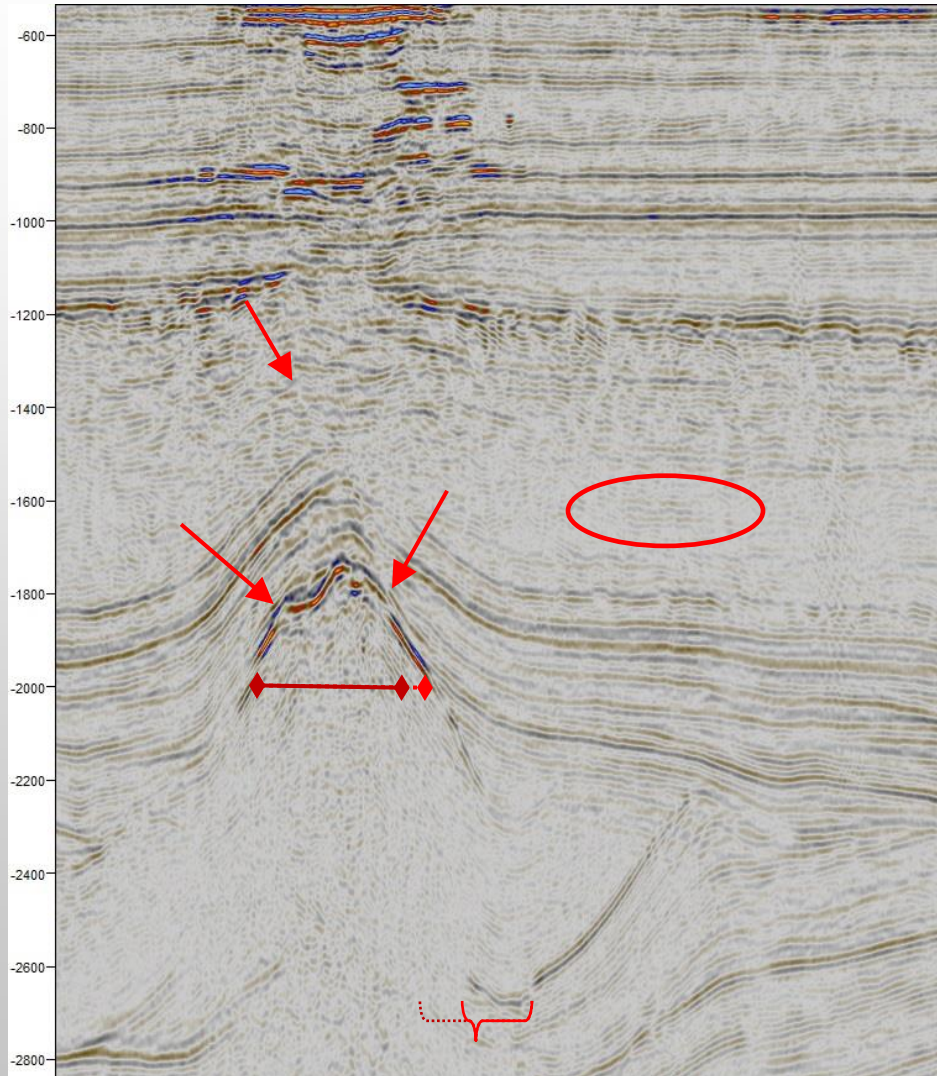
Chalk



# Seismic reprocessing: Vintage

W

E



Reprocessed seismic data

- Improved signal-to-noise ratio
- Improved fault recognition
- Narrowed steep features
- Widened rimsynclines
- Improved reflection continuation

*Chalk*

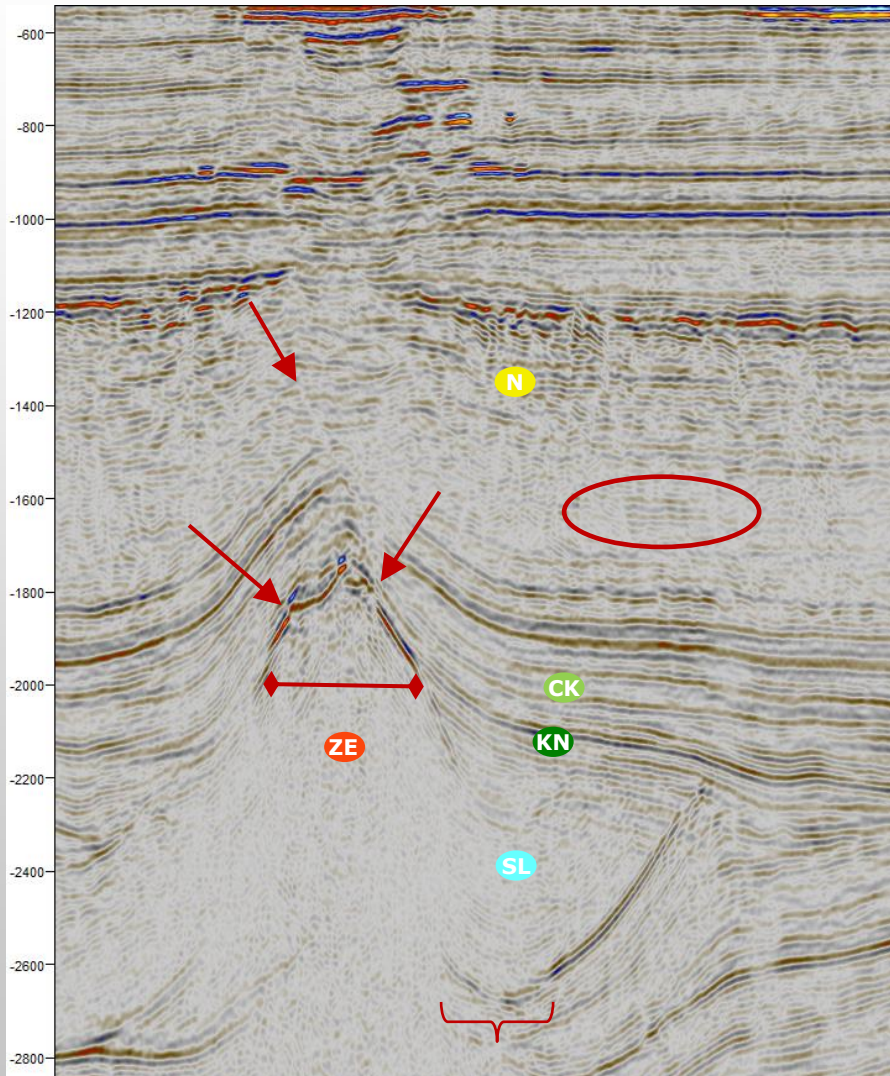




# Seismic reprocessing: Reprocessed

W

E



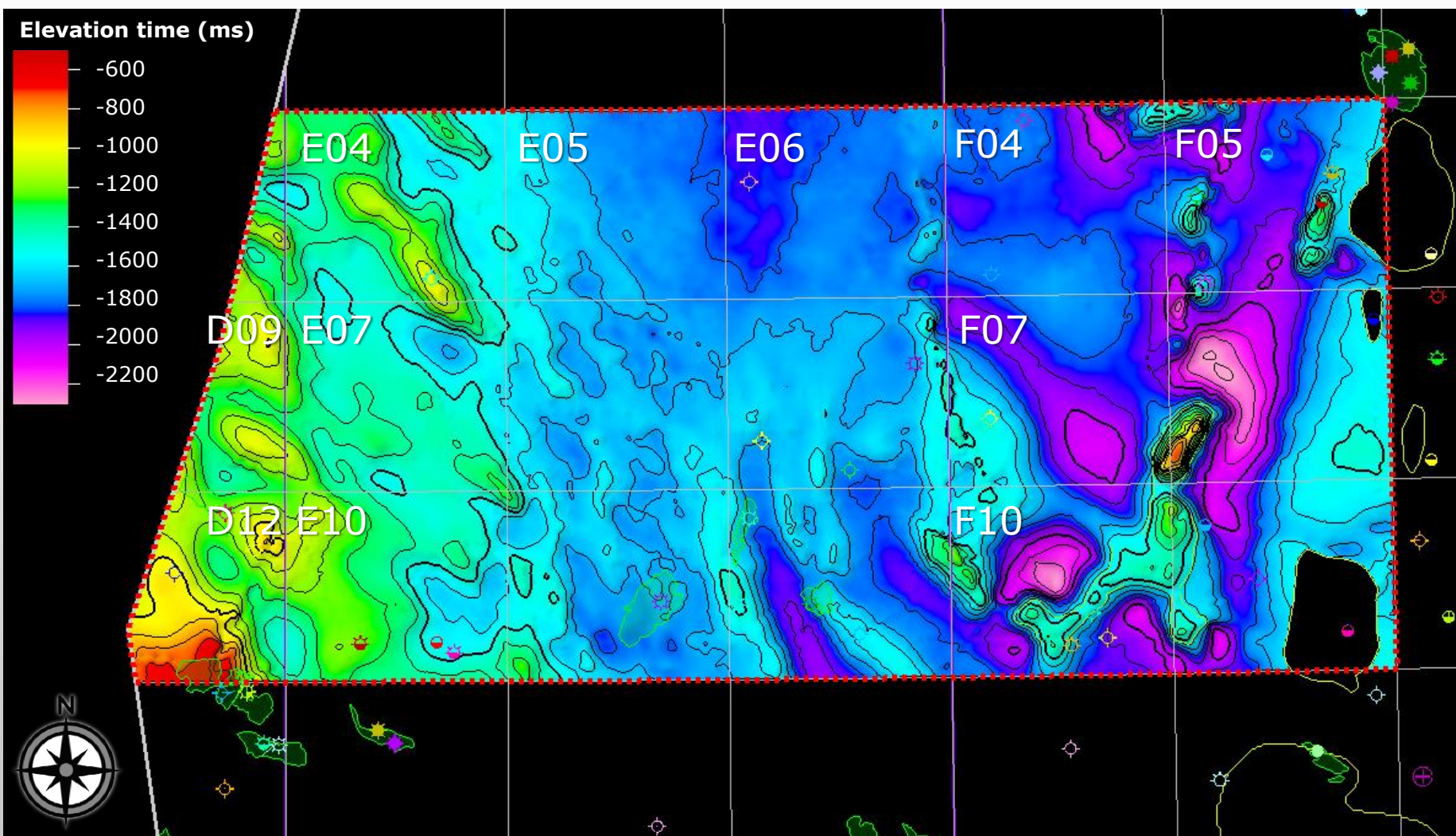
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# Map Top Chalk



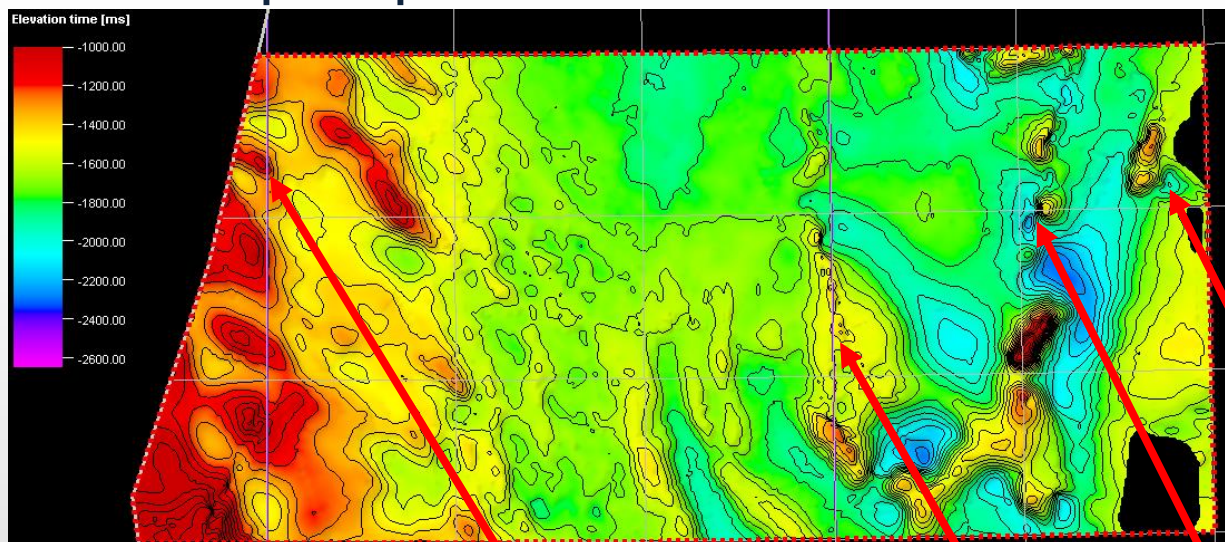
*Chalk*



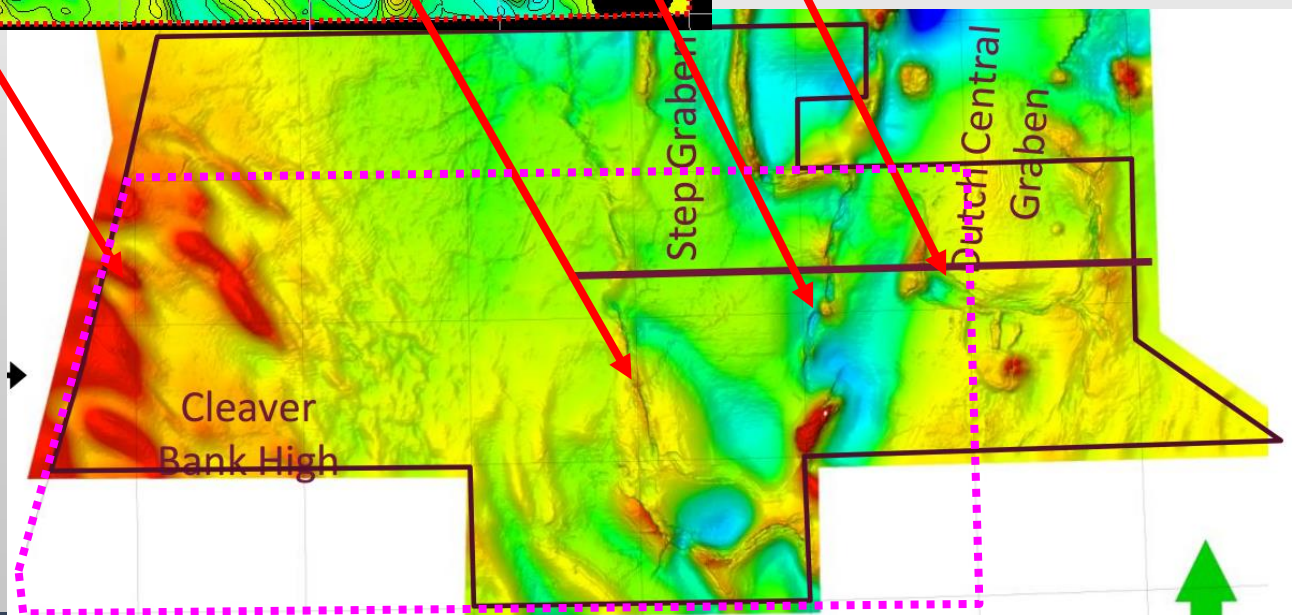


# Map Top Chalk

AmsterdamPG 2D



EBN 3D

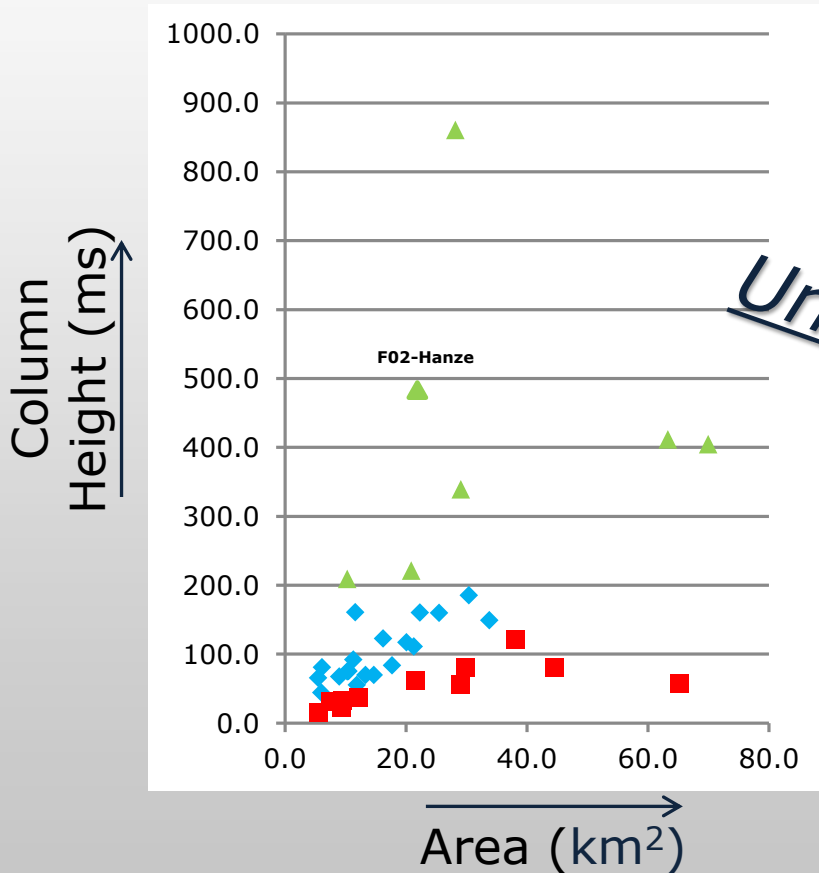


Chalk



# Leads

- Polygons of leads based on closing contours
- 28 structures  $>10 \text{ km}^2$  ; 9 structures  $5\text{-}10\text{km}^2$



Area ( $\text{km}^2$ )	Height (ms)	Nearby well	Well result	Bright spot	Structure
16	123	>10 km	N/A	-	Anticline
30	186	D12-05-S1	Gas shows	-	Anticline
12	161	D12-04-S1	Gas shows	-	Collapsed AC
11	92	E04-01	Gas shows	-	Anticline
10	75	E04-01	Gas shows	-	Anticline
26	160	>10 km	N/A	-	Anticline
15	70	>10 km	N/A	+	Anticline
29	56	F04-01	Dry	+	Flat AC
22	160	F04-03	Gas shows	+	Anticline
34	149	>10 km	N/A	-	Anticline
12	38	>10 km	N/A	-	Flat AC
13	70	E09-02	Dry	+	Anticline
38	121	E09-02	Dry	-	Flat AC
22	62	E09-03	Dry	-	Flat AC
30	81	E11-01	Gas	-	Flat AC
21	111	E10-03-S2	Oil&Gas shows	-	Anticline
11	75	E09-02	Dry	+	Anticline
18	84	E12-03	Gas	+	Anticline
12	55	E12-01	Dry	+	Anticline
70	405	F04-02A	Gas shows	+	Steep collapsed AC
65	57	F04-03	Gas shows	+	Flat AC
20	117	F07-01	Dry	++	Collapsed AC
28	861	F11-03	Oil shows	++	Steep AC
45	81	F08-02	Oil shows	+	Flat AC
63	412	F11-03	Oil shows	++	Steep AC
29	339	F10-03	Gas shows	+	Steep AC
21	221	F10-03	Gas shows	+	Steep AC
10	209	F11-02	Dry	+	Steep AC
8	32	>10 km	N/A	-	Flat AC
9	23	E06-01	Dry	-	Flat AC
9	68	>10 km	N/A	-	Anticline
6	44	>10 km	N/A	-	Anticline
6	81	>10 km	N/A	-	Anticline
6	65	E10-01	Oil shows	-	Anticline
10	33	E10-02	Oil&Gas shows	-	Flat AC
6	15	F04-01	Dry	+	Flat AC
5	198	F05-02	Dry	+	Steep AC
5	44	F07-01	Dry	+	Collapsed AC

Chalk





# Conclusions

- Still high untapped potential in northern Dutch offshore
- Reprocessed 2D-seismic data significantly improves quality
- Regional analysis with 2D seismic gives an excellent indication of HC-potential different structures
- Deliverables project:

Geological report, 2D-seismic dataset and Petrel-project:

- Interpreted re-processed seismic dataset
- All wells incl. LAS-files and TD-tables
- Well top re-interpretation
- Well log analysis
- Polygon set of leads
- Maps of reservoir & seal
- Regional maps by TNO



D.P.M. Stegers  
[d.stegers@amsterdampg.com](mailto:d.stegers@amsterdampg.com)

[www.amsterdampg.com](http://www.amsterdampg.com)

Thank you  
for your attention!

# Down to earth

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