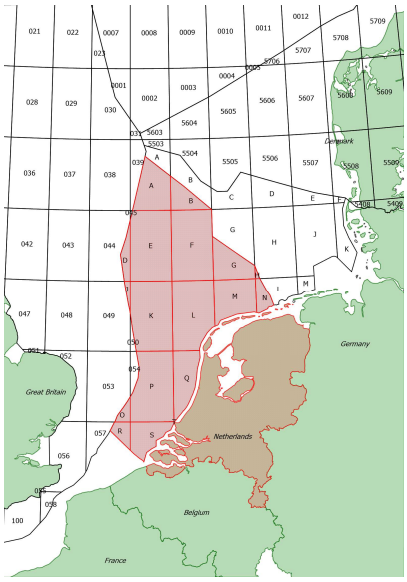
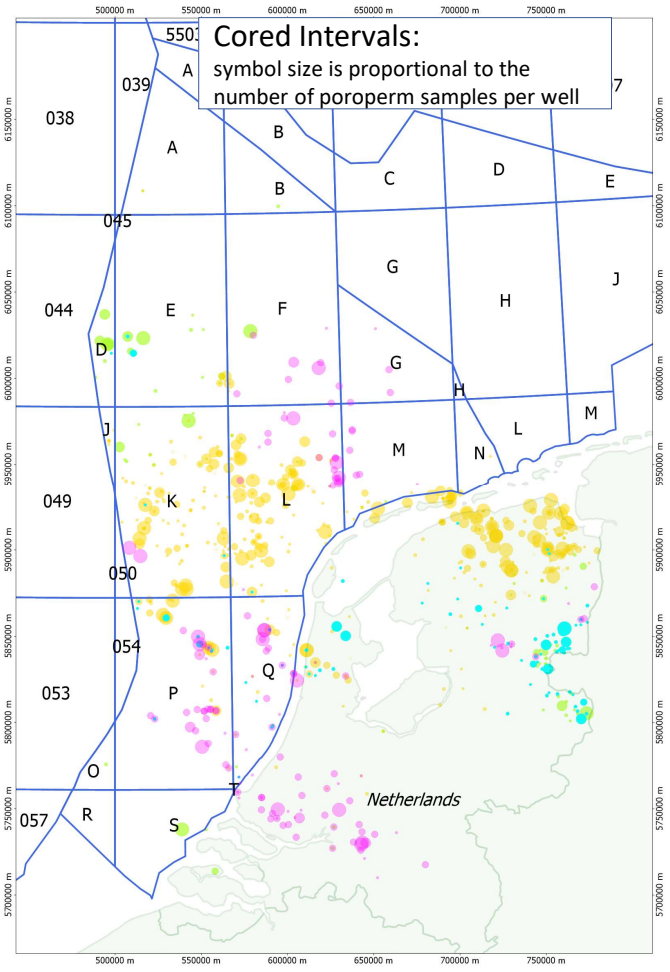
Southern North Sea, Dutch Sector, Digital Core Log Database



Calderdale Geoscience (CGL), an independent geoscience consultancy established in 2004, has produced a suite of mapping and database products focussed on the Southern North Sea (SNS).

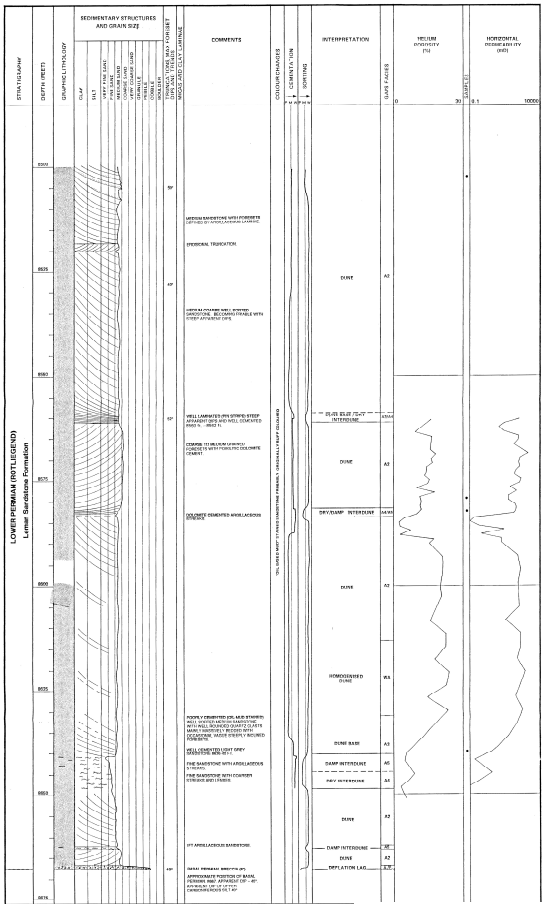
CGL now offers digital core logs from the SNS Dutch Sector. This product facilitates the mapping and modelling of reservoir properties both onshore and offshore Netherlands.



SNS Cored Intervals:

CGL can offer digital products for the wells indicated (left). **CGL** has evaluated the cored intervals across all stratigraphic intervals, including:

- Carboniferous (230 wells)
- Rotliegend (540 wells)
- Zechstein (220 wells)
- Triassic (240 wells)



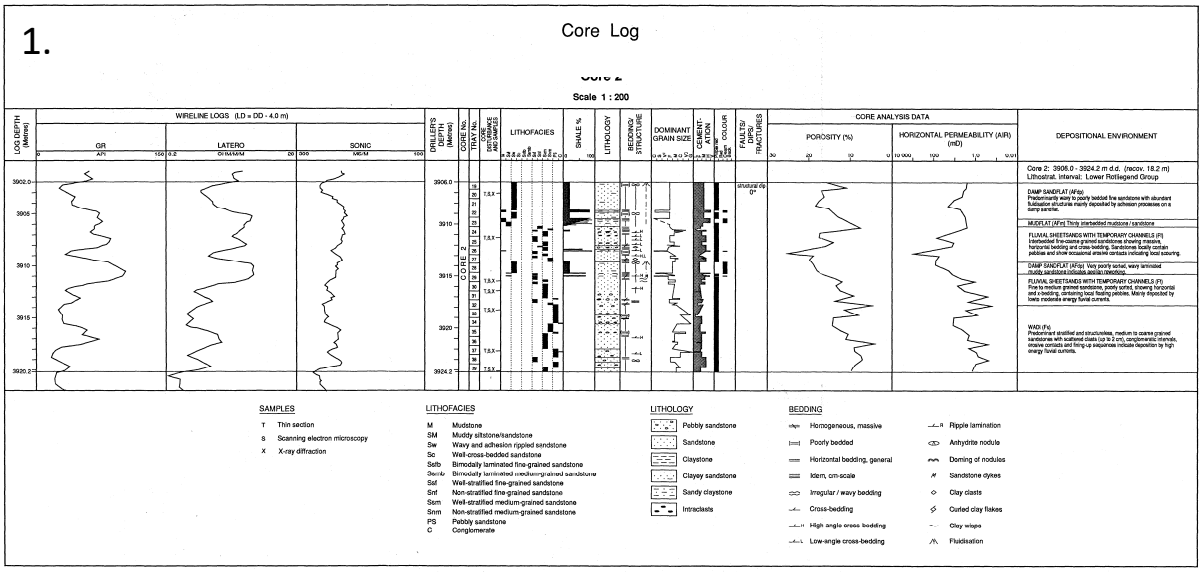
Available Products:

CGL core logs can be purchased singly or as groups of wells in the following formats:

- Bespoke drafted images, with wireline, porosity/permeability and petrography data added; with hyperlinked high quality core photographs
- Data-tables of core attributes, both descriptive and interpretative-based, presented as workstation-ready LAS curves and/or spreadsheet interval tables.

For more information, please contact Paul Emerson; paule@calderdalegeoscience.co.uk
Visit www.calderdalegeoscience.co.uk

1.



Important rock-property data often remains undiscovered and under-utilised in legacy core logs, core reports and well reports (1). **CGL** offers the digital capture of these core attribute data to clients as a bureau service.

The captured digital data can be output as spreadsheets (2) and/or LAS curves (3). These can be imported into workstations for reservoir property analysis and geophysical model calibration. In this example, the original images (1) have been vectorised into descriptive and interpretative curves (2 and 3) as follows:

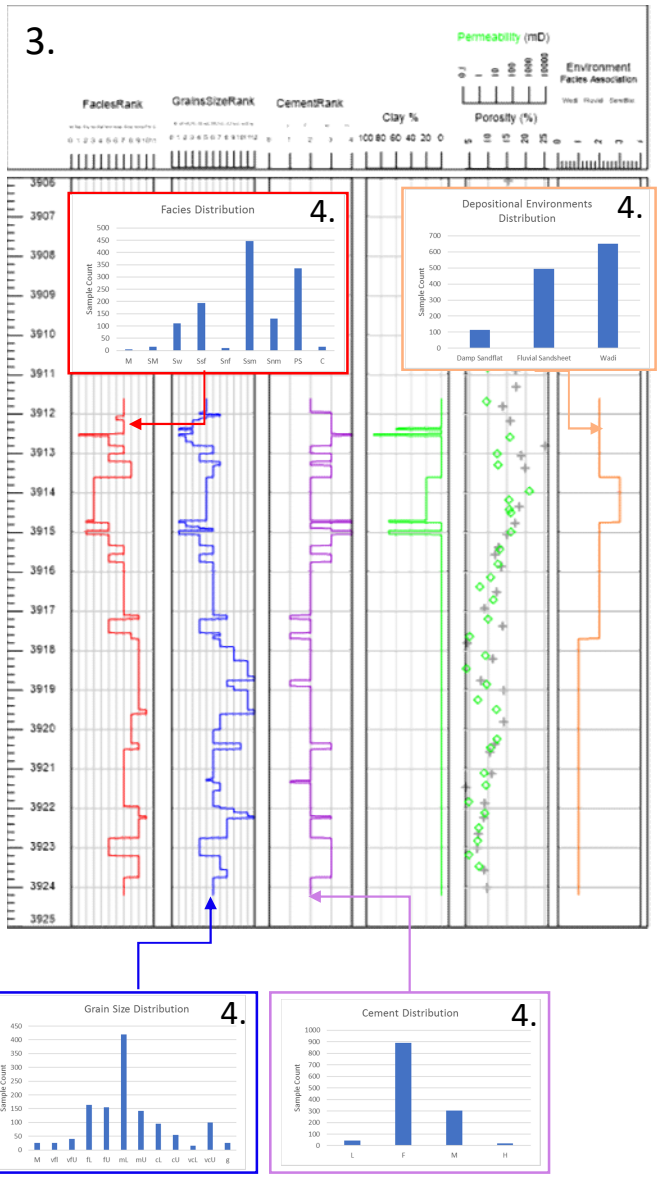
- Lithofacies code curve with an ordinal scale
- Grain size curve with a Wentworth scale
- Cementation index with an ordinal scale
- Shale (%) curve
- Porosity/permeability point data
- Interpreted facies associations with an ordinal scale

This regularly sampled data can readily be analysed and plotted as distributions (4).

2.

			LITHOFACIES	LITHOLOGY		STRUCTURE		MEDIAN	CLAY		
TOP		BOTTOM	CODE	PROCESS	DOM	SUB	DOM	SUB	GRAIN SIZE	CONTENT	CEMENT	COLOUR
3911.60	-	3911.80	Ssm	Ff	Ss		b		fU	0	F	LtRd
3911.80	-	3911.90	Ssm	Ff	Ss		b	xl	fU	0	F	LtRd
3911.90	-	3911.95	Ssm	Ff	Ss	C	b	xl	fU	0	F	LtRd
3911.95	-	3912.00	Ssm	Ff	Ss		b	xl	fL	0	M	LtRd
3912.00	-	3912.05	Ssm	Ff	Ss		b	xl	mU	0	M	LtRd
3912.05	-	3912.10	Snf	Ff	Ss	C	pl	ic	fU	0	M	LtRd
3912.10	-	3912.15	Snf	Ff	Ss	C	pl	ic	fL	0	M	LtRd
3912.15	-	3912.25	Ssm	Ff	Ss		l	ic	vfU	0	M	LtRd
3912.25	-	3912.35	Ssm	Ff	Ss		l	xl	vfU	0	M	LtRd
3912.35	-	3912.40	Ssm	Ff	M	Ss	l		M	60	M	LtRd
3912.40	-	3912.50	Ssm	Ff	Ss		l		vfU	0	M	LtRd
3912.50	-	3912.55	M	Ff	M		l		M	90	H	DkRd
3912.55	-	3912.70	Ssf	Ff	Ss		pl		vfL	0	M	LtRd
3912.70	-	3912.80	Ssf	Ff	Ss		b		vfU	0	M	LtRd
3912.80	-	3913.00	Ssm	Ff	Ss		b	xh	mL	0	F	LtRd
3913.00	-	3913.05	Ssf	Ff	Ss		b	xl	fL	0	M	LtRd
3913.05	-	3913.20	Ssf	Ff	Ss		b		fL	0	M	LtRd
3913.20	-	3913.30	Snm	Ff	Ss		h	ic	mU	0	F	LtRd
3913.30	-	3913.60	Snm	Ff	Ss		h		mL	0	M	LtRd
3913.60	-	3914.70	Sw	Aldp	Ss	M	b	w f	fU	20	F	DkRd
3914.70	-	3914.75	SM	Aldp	M	Ss	l		M	70	H	DkRd
3914.75	-	3914.85	Ssf	Ff	Ss		l		vfL	0	F	LtRd
3914.85	-	3914.90	Ssf	Ff	Ss		l	xh	fL	0	F	LtRd
3914.90	-	3914.95	Ssf	Ff	Ss		l		mL	0	M	LtRd
3914.95	-	3915.05	SM	Ff	M	Ss	h	sd	M	70	H	DkRd
3915.05	-	3915.33	Ssf	Ff	Ss		b	xh	fL	0	M	LtRd
3915.33	-	3915.55	Ssm	Ff	Ss		b	xh	mL	0	F	LtRd
3915.55	-	3915.75	Ssf	Ff	Ss		b		fL	0	M	LtRd

3.



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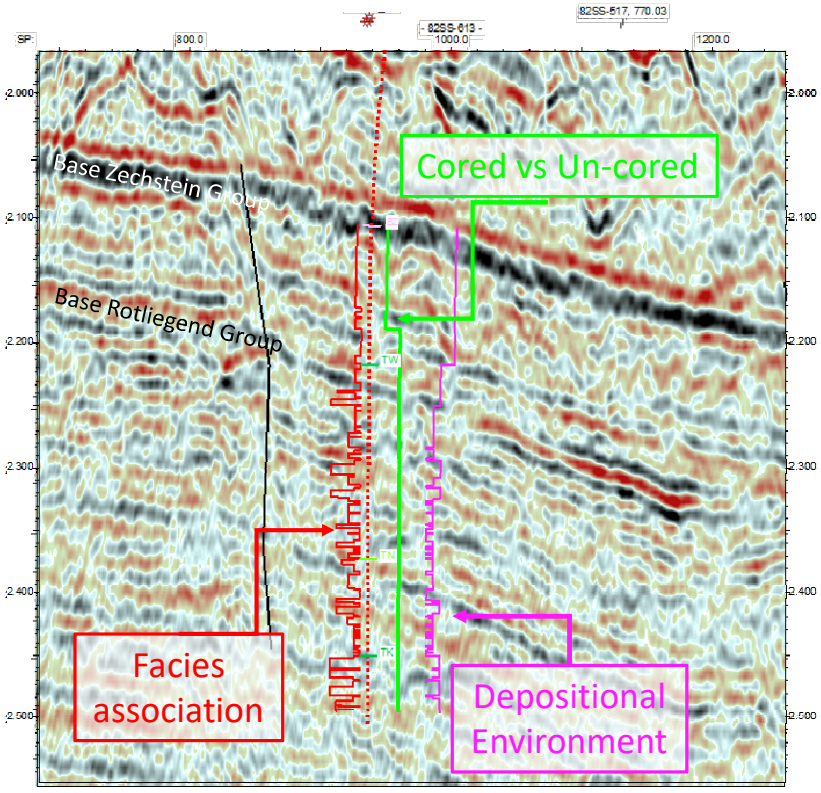
In the case of substantial cored intervals, facies associations can be displayed at seismic scale. Here, an interpreted facies association curve, captured from a thick cored section through Rotliegend and Upper Carboniferous strata, has been scaled to emphasise energy of deposition and potential reservoir quality (see below). Excursions of the curve to the left reflect higher energy and better reservoir quality (*e.g.* channel and mouthbar associations). In addition, curves have been constructed to illustrate the cored versus un-cored interval (with a binary 0 (uncored) to 1 (cored) scale) and depositional environment (scaled to emphasise more marine environments with excursions to the left). Facies association interpretation can be extrapolated to non cored intervals using wireline data and can also be provided by **CGL**.



In the Rotliegend (BZ), displaying facies associations at seismic scale, facilitates seismic interpretation:

- Seismically -transparent desert lake/marginal sabkha facies of the Silverpit Clay interval form part of the regional sealing unit.

The Upper Carboniferous (Namurian (TN) and Westphalian (TW)) section shows a direct and clear relationship between facies, depositional setting, stratigraphy and seismic response:

- Bright reflectors indicating delta top coals and fluvial channel development in upper part of Westphalian unit .
- Development of thick Kinderscoutian ((TK) Namurian) deltaic channel sands near base of cored section.
- Gas is encountered in the channelised intervals sourced from adjacent coal-prone delta top.

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