



PGK

Petroleum Geologische Kring

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Venue:	PGK's monthly meetings are held at the KIVI building, Prinsessegracht 23, Den Haag. Drinks are served from 17:00 hrs; the lecture starts at 18:00hrs.		www.pgknet.nl
Membership:	Apply for membership through the PGK website. The annual fee is €15.-		
Accounts:	ABN/AMRO Bank: 88.65.82.733 (PGK, Den Haag)		

FEBRUARY 2012 NEWSLETTER

SLOCHTEREN MINI-CONFERENCE, 15TH OF FEBRUARY

BOOK PRESENTATION IN COOPERATION WITH THE SEPM

registration will be required before February 8th.

The next PGK meeting will be on **Wednesday, February 15th, 2012** at the KIVI building, Prinsessegracht 23, Den Haag.

This is an extended meeting with 5 talks to introduce the new book: "The Permian Rotliegend of the Netherlands" SEPM SP98. This will be followed by the **Annual General Meeting**.

Because we need to know how much food to order, **registration will be required** by either sending an email to vice-chairman@pgknet.nl or through the website <http://www.pgknet.nl/>

The book will be available at discounted price for those members who attend.

Program:

- 16:00-16.25 hrs: Jürgen Grötsch: **The Groningen Gas Field and the Rotliegend of the Netherlands**
- 16:25-16:50 hrs: Rick Donselaar: **Thin-bedded fluvial sheet sandstone as secondary reservoir target: Ten Boer Member, Southern Permian Basin**
- 16:50-17:20 hrs: **Break and drinks**
- 17:20-17:55 hrs: Jos Okkerman: **Tight Gas reservoirs in the Rotliegend**
- 17:55-18:20 hrs: Reinhard Gaupp: **Diagenesis in Rotliegend sandstones**
- 18:20-18:30 hrs: Chris Schaafsma and Fokko van Hulten: **Close-out**
Abstracts on separate page
- 18:30-19:30 hrs: **Buffet dinner** (sponsored by NAM)
- 19:30-20:00 hrs: **Annual General Meeting PGK**

MARCH PGK MEETING:

The March meeting takes place on **Wednesday, 21st of March 2012**. Lecture by Dirk Nieuwland, on "Fault seal prediction in sandstone reservoirs: a proven geomechanical method".



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UPCOMING EVENT:

Also in **March** you are invited to attend a **special lecture on shale gas** by AAPG distinguished lecturer Quinn R. Passey (Exxon Mobil). This event will take place on March 29th at the Shell office in The Hague. Details will follow in the next newsletter and will appear on the website when available.

EXCURSION PROGRAM

The first excursion this year will be a one-day trip. The theme will be:

Geothermal Energy in the Netherlands: a day trip to three "hot" sites.

Date: March 9th

Cost: €30,-

For details and registration please visit the website: <http://www.pgknet.nl/>

We are also planning another geo-gastronomic fieldtrip, with the emphasis on good geology combined with good food and easy access to outcrops. This excursion will be to Sicily, from May 16–19 (Ascension day is 17/5). Details will follow, keep an eye on the website.

Finally we are planning the autumn excursion to the Pyrenees (Trempe).

NEW MEMBERS

Application for membership has been received from Aafke Bouma (Shell), Mark Foster (Dutch Geoconsultancy), Frederic von Guillome (Wintershall), Klaas Hofstede (Dutch Geoconsultancy), John Keating (Shell), Aigerim Shamil (Shell). If no objections are received prior to or during the next meeting, they will be admitted as members of our society.

MEMBERSHIP FEE

The membership fee for 2012 is still €15. Please renew your membership by transferring € 15 to the following bank account: 88.65.82.733, PGK, Den Haag

Please make sure to mention your "name" and "PGK fee 2012" in the subject line.

Thanks to our sponsors:

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TNO-Geological Survey of the Netherlands	Total E&P Nederland	Wintershall Noordzee	*		

**Program PGK Meeting Wednesday February 15th, 2012****Address: KIVI Building, Prinsessegracht 23, Den Haag**

The scientific part will be chaired by Rien Herber

16:00-16.25 hrs: Jürgen Grötsch: The Groningen Gas Field and the Rotliegend of the Netherlands**Abstract:**

More than 50 years ago, the discovery of the giant Groningen Gas Field in the subsurface of the Netherlands by NAM B.V. marked a turning point in the Dutch and European energy market initiating the replacement of coal by gas. Despite the fact that the Rotliegend dryland deposits in the Southern Permian Basin are one of Europe's most important georesource, no sedimentological overview is available to date for the subsurface of the Netherlands. The SEPM Special Publication 98 presents for the first time such a summary of the current knowledge together with a comprehensive core atlas from on- and offshore wells, essentially providing a reference handbook for "The Permian Rotliegend of the Netherlands" for geoscientists and petroleum engineers in industry and academia. The talk will introduce the new book, together with the geology of the Groningen Field as the main driver behind gas development in Central Europe.

16:25-16:50 hrs: Rick Donselaar: Thin-bedded fluvial sheet sandstone as secondary reservoir target: Ten Boer Member, Southern Permian Basin**Abstract**

The Ten Boer Member (ROCLT; Upper Rotliegend, Southern Permian Basin) is a claystone-dominated succession with thin sandstone beds, deposited on the margin of a large saline lake. The sandstone beds were deposited by fluvial channels and associated unconfined sheet floods in the distal part of a fluvial system. A recent re-perforation test in a depleted Rotliegend well successfully produced 30 Mm³ gas from a thin ROCLT sandstone bed at only 50K Euro re-perforation costs. This success triggered a detailed study to map the fluvial fairways and assess the lithofacies associations of the ROCLT. Based on log and core analysis the ROCLT succession is subdivided into five cycles, each characterised by a high-to-low-to-high gamma-ray succession and an associated mudstone-sandstone-mudstone sediment sequence. The cyclic succession is interpreted as a wet-dry-wet climatic change. Log correlation panels and gamma-ray-log-derived net sand maps show that the sandstone deposits are concentrated in SSW-NNE-oriented belts 15-30 km wide. The belts are fairways for fluvial transport from the Variscan Mountain Range in the south to the basin centre in the north. The shape of the fluvial fairways changes from elongate belts to lobe shapes across a narrow east-west-oriented transition zone. Net-to-gross drops drastically north of the transition, and the sandy lithofacies changes accordingly from stacked sandstone in the elongate belts to thin sheet sandstone embedded in claystone in the lobe-shaped part. Over time the fluvial fairways show a lateral shift, and the entire fluvial system gradually progrades northward.

The net sand maps assist to further constrain the locus of isolated sheet sandstone reservoir units, and thus aid in future reservoir architecture modeling.

16:50-17:20 hrs: drinks**17:20-17:55 hrs: Jos Okkerman: Tight Gas reservoirs in the Rotliegend****Abstract**

After more than 50 years of gas production from the Rotliegend the tight gas reservoirs in these Permian age redbed deposits remain a relatively underdeveloped part of the play. An in-place volume exceeding



100 Bcm is estimated to be present in the Dutch onshore and offshore areas. Attempts to develop these TG reservoirs started in the late 1960's but met with mixed results. In the last decade improved drilling and stimulation techniques, in combination with sustained efforts on cost reduction and aided by more favorable gas prices, enabled operators to unlock the gas volumes in several tight gas fields.

Rotliegend deposits are often heterogeneous, with large lateral and vertical variations in lithology, texture and sedimentary structure. Pronounced bedding, layering and lamination is common. The complex structural evolution of the South Permian Basin area since the Permian caused large areal variations in burial history and fluid flow through the Rotliegend deposits and in combination with textural and mineralogical differences resulted in a wide range of reservoir properties. A wide range of 'tight' reservoir properties may be encountered, depending on the combination of factors that influence reservoir properties and deterioration of these properties. Factors contributing to tightness in the Rotliegend include fine grain size, mechanical compaction, grain coating metal oxides and clays, clay mineral authigenesis (notably illite) and the formation of pore-filling and pore-blocking carbonate, sulphate and quartz cements. The pore systems in tight Rotliegend reservoir rock are commonly complex, containing both primary and secondary porosity with pore and pore throat sizes ranging from nm to mm. The pores may be connected or isolated and pore throats shapes and sizes and cement fill may vary widely even at porescale.

The spatial distribution of all these influences and resulting reservoir properties remains difficult to predict. Clay minerals are a key control on permeability and formed throughout the burial history, starting with deposition. The key permeability impairing events that impacted on Rotliegend reservoirs that are tight at the present are interpreted to have occurred rapidly during early burial and during uplift phases and progressed slowly due to burial and mechanical compaction.

Typical is that the tight Rotliegend reservoirs contain elements with better permeability (better quality streaks and fractures). The presence and distribution of these more permeable features are an important control on the lateral and vertical connectivity and productivity in the tight reservoirs, and feature prominently in the selection of the optimal development methods.

17:55-18:20 hrs: Reinhard Gaupp: Diagenesis in Rotliegend sandstones

Abstract:

The Rotliegend red bed sandstones are the most important gas reservoirs in Western Europe. For more than 40 years diagenesis studies were performed in the Rotliegend with the aim to support reservoir quality assessment in E&P. Fundamental progress has been achieved in the understanding of diagenetic histories and their impacts on reservoir quality. The diagenetic processes and products in Permian Rotliegend sandstone reservoirs are basically comparable in the entire Southern Permian Basin (from UK offshore, the Netherlands offshore and onshore sectors, the North German Basin, the Polish Basin) but vary with the local and regional trends in, e.g., stratigraphic–structural setting, burial-thermal evolution, and charge histories. The impairment of porosity by advanced mechanical compaction, pore-filling blocky cements, and the impairment of permeability by clay minerals are major risks with regard to reservoir quality.

18:20-18:30 hrs: Chris Schaafsma and Fokko van Hulten: Close-out

18:30–19:30 hrs: Buffet dinner (sponsored by NAM)

19:30-20:00 hrs: Annual General Meeting PGK

The current board will continue as is, because most members have served for less than one term due to interim appointments.