

PETROLEUM GEOLOGISCHE KRING

KONINKLIJK NEDERLANDS GEOLOGISCH MINBOUWKUNDIG GENOOTSCHAP



PGK

Secretary: Alessandra Giacometti Panterra Geoconsultants BV Veerpolder 5, 2361KX Warmond Phone / Fax: 071-3019307 071-3010802 E-mail: secretary@pgknet.nl	Treasurer: Marco van der Meulen Stadhoudersplantsoen 2 2517 JL Den Haag Phone: 070-3424613 E-mail: Marco.van-der-Meulen@wintershall.com
Venue: PGK's monthly lectures are held at the KIVI building, Prinsessegracht 23, Den Haag. Drinks are served from 5 PM; the lecture starts at 6 PM.	www.pgknet.nl
Membership:	Apply for membership by contacting the secretariat. Euro 15,-
Accounts:	Fortis Bank: 88 65 82 733 (PGK, Den Haag) Postbank: 4074482 (PGK, Den Haag)

MARCH NEWSLETTER

19 MARCH: MONTHLY MEETING

The next PGK meeting will be on Wednesday 19th March. As usual, social hour (free drinks) will be between 17:00 and 18:00 hrs. The lecture will be given by **Jim Jennings**, Visiting Professor at Shell SIEP, with the title:

"3D Modeling of Stratigraphically Controlled Porosity and Permeability Heterogeneity for Improved Fluid-Flow Simulation "

Please see other side of this newsletter for the lecture abstract.

OTHER PGK ACTIVITIES

NB. The date of the April PGK meeting has been changed! The meeting will be on **Wednesday the 23rd of April**. Prof. H. Doust (VU Amsterdam) will give a presentation, the title and abstract of which will appear in the next newsletter.

NEW MEMBERS

Applications for membership have been received from Florian Maurer, Bart Heesbeen (VU), Roland Spuy (Shell). If no objections are received prior or during the next meeting, they are automatically admitted as members of our society.

Monthly meeting: Wednesday 19 March 2003
Address: KIVI building, Prinsessegracht 23, Den Haag
Social hour: (free drinks) between 17:00 and 18:00 hrs
Lecture: at 18:00hrs

3D Modeling of Stratigraphically Controlled Porosity and Permeability Heterogeneity for Improved Fluid-Flow Simulation

James W. Jennings, Jr.

Visiting Professor, Shell International E&P, Rijswijk, The Netherlands

F. Jerry Lucia and Stephen C. Ruppel

Bureau of Economic Geology, The University of Texas at Austin

The porosity and permeability of many subsurface hydrocarbon reservoirs exhibit a high degree of spatial variability over a wide range of scales. This heterogeneity arises from the interaction of many depositional and diagenetic processes in very reservoir-specific ways. Nevertheless, for modeling purposes it is often useful to categorize the variability into “small” or “large” scale heterogeneities occurring within or between geological objects respectively. These two different scales of heterogeneity frequently exhibit very different patterns of spatial variability, have different effects on fluid flow behavior, and require different methods for data analysis and modeling.

In this presentation we will illustrate the analysis and modeling issues by focusing upon Permian dolomitized shallow-water platform carbonate reservoirs of West Texas and New Mexico. In these reservoirs the small-scale heterogeneities occur within rock-fabric flow units as much as 20 ft thick, which in turn compose the laterally continuous high-frequency cycles of a sequence-stratigraphic framework. Most of the porosity and permeability variance occurs at these small scales within the flow units and exhibits weak spatial correlations. The magnitude of this small-scale variability has important effects on reservoir injection and production rates. The larger scale heterogeneities are spatially controlled by the stratigraphy. These heterogeneities have a smaller variance and are easily obscured by the small-scale variability in data analysis; nevertheless, they exert a dominant control on large-scale waterflood sweep patterns.

We will present a new approach for the construction of 3D reservoir flow simulation models with a superior representation of stratigraphically controlled variability. Using the South Wasson Clear Fork reservoir in West Texas as an example, and well logs as a primary source of subsurface data, we will illustrate a method of model construction that links high-resolution sequence-stratigraphic frameworks, porosity-permeability relationships from core data, outcrop-derived models of small-scale spatial statistics, and a practical approach to porosity-permeability scaleup. The resulting model exhibits stratification and stacking patterns typical of shallow-water platform carbonates in the Permian Basin and elsewhere, and it has a reduced requirement for arbitrary kv/kh modifications to inhibit cross-flow in waterflood simulations. We expect that the insights and modeling methods will be useful in other settings in which a significant component of the porosity and permeability heterogeneity is stratigraphically controlled.

Please post this page on the board of your office building. New members and guests welcome!

Thanks to our sponsors:

Argo Geological Consultants - BP Nederland Energie - DSM Energie - Energie Beheer Nederland - ENRES International - Fugro Inpark - Fugro Robertson - Hogeschool Rotterdam, sectie aardrijkskunde - Nederlandse Aardolie Maatschappij - Oranje Nassau Energie - PanTerra Geoconsultants - Petro-Canada Netherlands - Schlumberger - Shell Nederland - Terra Incognita Geoconsultancy and Geobooks - TNO-NITG - TotalFinaElf E & P Nederland - Unocal Netherlands - Wintershall Noordzee

Distribution of this Newsletter was sponsored by: Hays Informatiebeheer