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Colin P. North and Kitty L. Milliken, Editors
A.J. (Tom) van Loon, Associate Editor for Book Reviews
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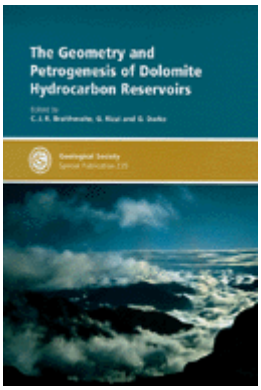
The Geometry and Petrogenesis of Dolomite Hydrocarbon Reservoirs, edited by C.J.R. Braithwaite, G. Rizzi, and G. Darke, 2005. GSL Special Publications 235. The Geological Society Publishing House, Unit 7, Brassmill Enterprise Centre, Brassmill Lane, Bath (Summerset), England BA1 3JN. Hardback, 413 pages. Price GBP 95.00. ISBN 186239-166-1.



About 60% of the identified global hydrocarbon reserves occur in carbonate reservoirs. Of all hydrocarbon-bearing carbonate reservoirs, some 45% are dolomitic in nature. No wonder that information that contributes to a better understanding of these enigmatic reservoir rocks is welcomed by the petroleum geological community with great enthusiasm.

The present volume represents a selection of papers arising from a conference on the subject held at the Geological Society of London in December 2002. The meeting, attended by some 70 scientists, was the largest of its kind since the 1991 bicentennial conference in Ortisei (Italy), honoring the first description of the mineral by the French count Déodat de Dolomieu two centuries earlier. The study of the mineral dolomite and of dolomitic sedimentary rocks (dolostones) have attracted the attention of a wide array of investigators throughout the centuries, not only because of its mysterious origin and occurrence, but especially because dolomitic rocks can develop into prolific hydrocarbon-bearing or even base-metal reservoirs. From a highly specialized conference attended by a select group of researchers, amongst whom several of the usual suspects, one cannot expect the outcome to provide the final answer or definite conclusion on the dolomite question. The result of such meetings should rather be regarded as a progress report by a fair representation of the scientific community.

Following an introduction by the editors, the book consists of a mixed bag of 16 papers, mostly by authors from academia and research institutes. Only few petroleum-industry contributions have been included. Consequently, the title of the book is somewhat misleading. Apart from obligatory general references and remarks like "may be applied to petroleum exploration in similar settings", the subject ‘hydrocarbon reservoir’ is treated specifically in two papers only, though even those are somewhat cursory case histories.

Broadly speaking, the papers can be subdivided into two categories. The first deals with the general analysis of particular questions relating to dolomite genesis, including reviews and theoretical modeling of specific issues. The second provides examples of outcrops that possibly could serve as hydrocarbon-reservoir analogues and of just a few subsurface cases.

In a critical re-appraisal, Machel reviews the development of ideas on the concepts and models of dolomitization, setting the scene and painting an adequate state-of-the art picture of the current dolomite research. The biogenic origin of sedimentary dolomite is described by Wright & Wacey, including a presentation of experimental results. Wright et al. have applied isotopic modeling to the Waulsortian limestones of Ireland. They conclude that the results of their research can be used to any dolomite reservoir, but unfortunately fail to illustrate this statement with a subsurface

example. A theoretical review, using the ever popular numerical-modeling approach, is presented by Whitaker et al. Veteran carbonate geologist Lucia argues that much of the porosity in dolomitic rocks is not derived from the process of dolomitization, but that it is inherited from precursor limestones. Gregg describes issues of base-metal mineralization of dolomitic rocks, but the implication for petroleum reservoirs unfortunately appears only in the title of his paper. The presentation by Gale et al. on fracture prediction, although interesting, is not really particular to dolomitic reservoirs, but also valid for other rock types. Clark et al. present one of the rare case histories of the book in a rather descriptive paper on the Late Jurassic Arab carbonates of the Al Rayyan Field, offshore Qatar. Ehrenberg presents the results of his study of Miocene carbonates, cored by ODP Leg 194 off the Great Barrier Reef, NW Australia. Carnell & Wilson give an overview of the distribution of various dolomitic rocks in SE Asia, which is interesting but does not give much new insight. Some general observations on the Late Jurassic Arab Formation, one of the most prolific oil reservoirs in the Middle East, is given by Kirkham, though this is no case history in the strict sense. Saller provides an overview of Paleozoic dolomitic reservoirs in the Permian Basin of New Mexico and Texas. Bouch et al. present an outcrop analogue example from the Carboniferous in the Lake District (England), though the analogy with the subsurface remains hypothetical. The paper by Hopkins deals with the Early Carboniferous Pekisko Formation of Western Canada, illustrating the importance of dolomitic mudstones as potential hydrocarbon reservoirs. Finally, Nagy et al. and Mulhall & Sevastopulo present outcrop analogue examples from the Irish Carboniferous, without really showing the relation with subsurface dolomitic reservoirs.

As usual for publications by the Geological Society, the book is well edited and richly illustrated. Some figures are in color, but this seems to be a random choice. The contents cover the subject of sedimentary dolomitic rocks adequately in a general sense and give a good overview of the various issues. The connection with hydrocarbon reservoirs appears to be somewhat far-fetched. Apart from a few North American examples and one from the Middle East, the reader will look in vain for the remainder of the globally prolific dolomitic hydrocarbon reservoirs. Nevertheless, the book is a welcome addition for sedimentary carbonate sedimentologists from both academia and professional institutions. On the other hand, industry reservoir geologists and petroleum engineers will find only limited information that will be of direct relevance to their daily work.

Jan de Coo
Petroleum Geology Consultant
The Hague, The Netherlands
e-mail: jandecoo@planet.nl

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