
Preface

It is with great satisfaction and personal delight that I can write the foreword for this book *Fundamentals of Basin and Petroleum Systems Modeling* by Thomas Hantschel and Armin Ingo Kauerauf. It is a privilege for us geoscientists that two outstanding physicists, with scientific backgrounds in numerical methods of continuum-mechanics and in statistical physics respectively could be won to deeply dive into the numerical simulation of complex geoprocesses. The keen interest in the geosciences of Thomas Hantschel and Armin I. Kauerauf and their patience with more descriptive oriented geologists, geochemists, sedimentologists and structural geologists made it possible to write this book, a profound and quantitative treatment of the mathematical and physical aspects of very complex geoprocesses. In addition to their investigative interest during their patient dialogue with afore mentioned geological specialists Thomas Hantschel and Armin I. Kauerauf gained a great wealth of practical experience by cooperating closely with the international upstream petroleum industry during their years with the service company IES, Integrated Exploration Systems. Their book will be a milestone in the advancement of modern geosciences.

The scientific and the practical value of modern geosciences rests to a large degree upon the recognition of the complex interrelationship of individual processes, such as compaction, heat-, fluid- and mass-flow, reaction kinetics etc. and upon the sequential quantification of the entire process chain. The intelligent usage of modern high speed computers made all this possible.

Basin modeling was for many years considered as “a niche discipline”, mainly propagated and used by geochemists. What a fundamental error and misunderstanding! The absolute contrary is the truth. Basin modeling integrates practically all geoscientific disciplines, it allows an unprecedented quantitative understanding of entire process chains and it detects quickly inconsistencies or uncertainties in our knowledge base. In short, the basin modeling-approach is a big step forward in modern geosciences. This book is a challenge for academic teachers in the geosciences and likewise for scientists and engineers in the petroleum and mining industry. The challenge is to

educate much more than in the past the younger ones among us to be able to walk along the borderline between the exact sciences with a physical and mathematical background and the classical geosciences and vice versa.

In 1984 Prof. Bernard Tissot and I wrote in the Preface of the second edition of our book *Petroleum Formation and Occurrence*: “It is evident that computer modeling is here to stay, and may very well revolutionize the field. The computer can be used as an experimental tool to test geological ideas and hypotheses whenever it is possible to provide adequate software for normally very complicated geological processes. The enormous advantages offered by computer simulation of geological processes are that no physical or physico-chemical principles are violated and that for the first time the geological time factor, always measured in millions of years rather than in decades, can be handled with high speed computers with large memories. Thus, the age of true quantification in the geosciences has arrived. We believe that this computer-aided, quantitative approach will have an economic and intellectual impact on the petroleum industry, mainly on exploration.” All this indeed is the case now. And even more so, basin modeling enhances and deepens the intelligent interpretation of geological data acquired by geophysical, geological and geochemical methods and thus converts static information into dynamic process understanding.

I congratulate the two authors for their excellent textbook. I urge the geoscientific community to dig into the wealth of scientific information offered in this book. It will help us to understand and quantify the dynamics occurring in the subsurface.

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