Preface

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AAPG Studies in Geology 56, Atlas of Deep-water Outcrops, is a much-needed volume that provides a compendium of many of the world’s best outcrops of deep-water, clastic depositional systems.

Outcrops have long been the "tool of the trade" for geologists trying to better understand the architecture, facies, and evolution of deep-water depositional systems. Most importantly, outcrops serve as accessible examples of deep-water systems that can be studied at a range of scales as analogs for the buried but economically important deep-water systems that are the targets of modern hydrocarbon exploration.

Today, seismic studies of the sea floor and underlying sediments along modern deep-water continental margins in the Gulf of Mexico, Brazil, the North Sea, West Africa, Indonesia, and other key areas paint rather detailed pictures of basin-to-reservoir-scale architecture of deep-water systems.

Although one-dimensional cores and logs from these areas provide limited views of features at a fine scale, there remains a resolution gap that complicates predictions of deep-water lithofacies and heterogeneity at intrafield scales. General recognition of this gap, emphasized as early as the mid 1980s in the COMFAN (Committee on Fans) meeting volume (Normark et al., 1983–1984; Bouma et al., 1985) and coupled with the increased needs of the petroleum industry, catalyzed a flurry of academic and industry studies of deep-water outcrops that might provide appropriately scaled analogs for subsurface deep-water reservoir systems.

These outcrop studies, conducted around the world, greatly enhance our understanding of deep-water processes and the reservoir-scale architecture of deep-water deposits. However, selecting and applying the appropriate analog is still a critical issue in deep-water settings (Mutti et al., 2003). Given that many deep-water outcrop analogs are derived from foreland basins and other active margin settings, it is frequently questioned whether these outcrop analogs can be used in passive-margin subsurface reservoir systems.

The Atlas incorporates the descriptions of the outcrop geometries as well as the statistical data obtained from the detailed studies of more than 100 deep-water outcrops from around the world. The format of this volume is designed to standardize the presentation of visual as well as the statistical data for a better understanding of the depositional models, processes, and architectural/reservoir modeling of this very important depositional setting.

The volume includes examples ranging from Precambrian to Cenozoic age, collected from seven continents and various islands. Some are classic locales such as southern France, Ireland, South Africa, Spain, west Texas, and southern California, whereas others are from new or remote places few readers have likely visited (e.g., Borneo, Patagonia, Tibetan Plateau, and Canadian Rockies). Many of the former are well studied and the associated volume contributions provide detailed outcrop information. Many of the latter can be viewed as previews of the classic deep-water outcrops of the future. Volume contributors include an international array of scientists from academia, industry, and government agencies, offering a wide range of perspectives on deep-water systems.

The end result is a single-volume summary of the current knowledge of most of the major outcropping deep-water rock sequences that serve as today’s models and analogs for the subsurface targets of petroleum exploration around the world.

References

