

SCHREIBER B.C., LUGLI S. & BABEL M. (Eds) 2007. *Evaporites Through Space and Time*.

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Evaporites are fascinating deposits not only because of their hydrocarbon potential and usually excellent preservation of depositional structures but also from their important role in the interpretation of basin evolution and palaeogeography. They have an unusual potential to record in detail the final stage of development of many sedimentary basins. For these reasons, there was widespread research on evaporites in the second half of the 20th century, which resulted in several key books and special volumes that outlined the geological conditions and processes controlling the formation of these deposits. It is worth stressing here the outstanding efforts in this field of the first of the co-editors of the volume. It is now clear, for example, that evaporites are unusually differentiated with regard to their lithology, petrography and mineralogy, sedimentology and diagenesis, composition, origin and evolution in space and time. As a result of this expansion in research many fundamental questions relating to the geology of evaporites have been identified. Some of these, however, such as diagenetic conversion, the processes leading finally to the evaporitic rocks and the geochemistry of these rocks, to mention only a few; have received little attention from researchers so far and remain for future investigation. In this context, the origin of evaporites, their sedimentology and diagenesis, and their economic potential are still at the descriptive stage, as exemplified by the book under review.

The volume documents evaporites of different ages and regions around the world, attributed to various models and processes of origin, composition and diagenetic transformations, and occurring essentially in the *ancient record*. There is first a critical overview by the editors of the results of the papers comprising the volume, placing these into the context of the state-of-the-art of current research. The compilation is divided into five parts of unequal length, each comprising from two to six contributions. The first part of the volume is relatively long and deals with *Tectonics, basin evolution and evaporites* (five papers). Then follow two very short parts devoted to *Working depositional models* (two papers) and *Post-depositional evolution of sediments* (two papers). The fourth part is the largest

and deals with *Ancient basins* (seven papers). The book finishes with two examples of *Regional reviews* (two papers). In my view it is the first and fourth parts of the volume that are the most interesting.

The volume covers a great range of evaporite topics. In their selection of papers, the editors have tended to concentrate on those describing gypsum and salt deposits, but there is one paper on clastic deposits predating the Miocene Mediterranean evaporites and two papers on carbonates supposedly associated with the Alpine Triassic and Neoproterozoic evaporites respectively. With regard to evaporite mineralogy, the topics covered range from gypsum, through anhydrite, K-Mg sulphate to halite, potash salts and sylvite. The volume presents evaporites from South Africa, north Africa, through the Mediterranean and east Asia, from the European Alpine systems to South Atlantic salt settings and the Permian Basin of Texas and New Mexico; the evaporites described were deposited in intracratonic, through orogenic, foreland and platform to syn- and post rift evaporitic basins, and range in age from Precambrian to modern saline brines. The methods used by the authors range from classic field and regional investigations, through seismic to geochemical (fluid inclusions and stable isotopes) and even experimental studies. The reader will find in this volume regional syntheses, discussions of local phenomena ("pseudocarniole", sylvite), short and long contributions, standard research papers and overviews, new ideas and repetitions of old hypotheses. Taking into account the great range of geological questions and methods covered, and the different types of paper (both analytic and synthetic) presented, this is a well planned and well organized book with up-to date references, a useful index, and excellent photos and illustrations. The individual papers are written by active researchers who are well recognized in their respective field of research at least at least in their own region. In general, everybody may find something of interest to enhance their knowledge of evaporites. In particular, I would like to draw the reader's attention to how much we can learn from seismic analyses with regard to the geometry of evaporites and basin evolution (papers by KERNER & GAMBÔA and BERTONI & CARTWRIGHT). Similarly,

some new ideas with regard to the Badenian gypsum palaeoenvironments may come from the highly sophisticated depositional models for gypsum suggested by M. BABEL. However, this extensive conceptual modelling does not help to account for the gypsum subfacies present across the whole Carpathian Fore-deep, especially when the interpretations of these facies are often based by that author on very local, essentially carbonate settings, which are non-representative for this regionally large gypsum basin. An unusual assemblage of evaporitic structures, as well as possible, albeit unproven, examples of true calcite replacement after selenites are found in Neoproterozoic carbonates of South Africa (GANDIN & WRIGHT). Certainly worth reading is the use of the array of evaporite sedimentary fabrics in the interpretation of the palaeowater depth of the Permian Basin of Texas and New Mexico (HOVORKA & *al.*), which may prove helpful in palaeoenvironmental reconstructions of other evaporite basins.

Finally, to what extent does the book achieve its aim? As may be inferred from this extremely short review of the contents it would be difficult to find a sophisticated common theme or idea linking this collection of papers. This is understandable in that the editors were limited in their choice of papers by the presentations at the International Geological Union conference in Florence in 2004. Possibly for the same reason, the papers included in the volume are uneven in length,

content and quality. Although the editors have assembled the papers on a wide range of topics in a satisfactory manner, the contents and presentation of the volume are not well balanced. Nevertheless, the volume may help to complete or refresh our knowledge of "Evaporites Through Space and Time". Although the editors at the end of their overview aim to "... the future Martian evaporites", it is clear from the volume under review that there is still a lot of work to be done on the evaporites of our own planet. In my opinion, a striking example of this is a common lack of consideration of carbonates in a wider palaeogeographic context and their relationship to evaporites (e.g. papers by BABEL, BABEL & BOGUCKIJ and BUKOWSKI & *al.*). Because of this, the palaeoenvironmental reconstructions are often hindered by the lack of relevant information. Perhaps it is a personal view, but some of the papers are overloaded with glossaries of concepts and definitions which make the texts too long and very heavy to read (e.g. BABEL). It is also usual for authors of scientific investigations to provide evidence in support of their interpretations and not merely state their own beliefs (e.g. HRYNIV & *al.*, p. 320).

In spite of these faults, I sincerely hope that the book will be appreciated by students, researchers and professionals alike who wish to further their knowledge of evaporites. It will certainly be a welcome addition to the libraries of both research and academic institutes and therefore can be recommended.