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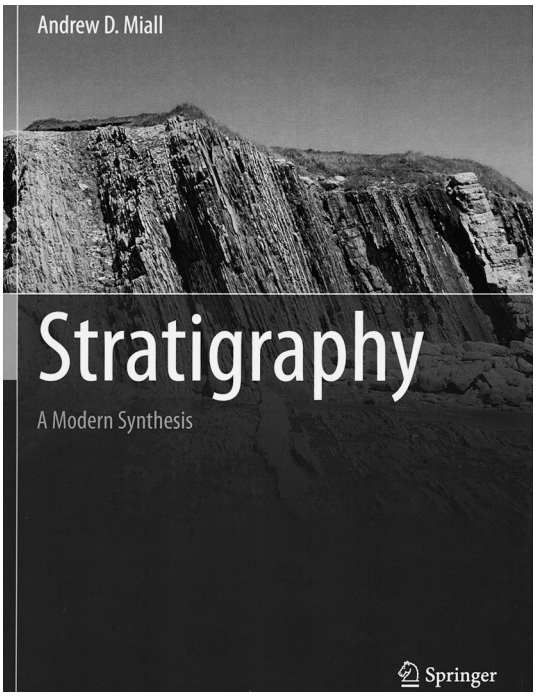
Book reviews

Stratigraphy: A Modern Synthesis, by Andrew D. Miall, 2016. Springer Verlag, Berlin/Heidelberg. 454 pages. Hardcover; price USD 99.00. ISBN 978-3-319-24302-3.



Andrew D. Miall, professor of geology at the Department of Earth Sciences, University of Toronto, has a particular interest in sequence stratigraphy and sedimentology of non-marine sandstones.

The present book broadly describes the most recent stratigraphical methods, integrates the field of stratigraphy with sedimentology and comprises eight chapters: 1 – The Scope of Modern Stratigraphy; 2 – The Stratigraphic-Sedimentologic Data Base; 3 – Facies Analysis; 4 – Facies Models; 5 – Sequence Stratigraphy; 6 – Basin Mapping Methods; 7 – Stratigraphy: The Modern Synthesis; 8 – The Future of Time. In the introduction, the history of stratigraphy is discussed; a smooth transition brings us to techniques employed in current stratigraphical studies and the author describes these methods in great detail, showing us how they have changed during the last 200 years, leading to contemporary stratigraphy.

Chapters 2–5 equip the reader with the necessary background of sedimentological processes and their relationship with the stratigraphical framework. Clastic and chemical sediments are discussed in detail, together with techniques used to study and describe them. The sedimentological background serves to introduce the basic principles of facies analysis, sequence stratigraphy and basin analysis. The author discusses classic examples of methods and data and illustrates the most important exceptions and complex issues related to data interpretation. Analytical and laboratory methods are also discussed, together with fieldwork-related issues which are important for identification of depositional processes and sedimentary environments. This shows us how crucial these steps are in stratigraphical work.

Chapter 6 focuses on mapping method, that can be used to extrapolate the data obtained during fieldwork and in the laboratory, thus enhancing the interpretation potential. The next chapter is devoted to basic elements of chronostratigraphy and stratigraphical correlation. The examples discussed here employ sequence-stratigraphical methods, magnetostratigraphy, cyclostratigraphy and/or astrochronology, and are concentrated on local and regional facies analysis. Methods that can be used to determine the geological age are also introduced, illustrating how the stratigraphical table was constructed and how local and regional correlations can be completed and refined.

Chapter 8 summarises the current state of knowledge related to geological time and discusses not only the stratigraphical potential of sedimentary rocks, but also the most notable pitfalls encountered by a scientist who tries to interpret the geological age of a studied section. Sedimentological data, stratigraphical correlation, cyclical sedimentary processes, Walther's Law, facies models and sequence stratigraphy all imply continuity of the sedimentary record. However, the author shows that such assumptions can easily lead to misinterpretation of geological data, and a more complex analy-

sis of such data, employing more variables, usually is required. Keeping these restrictions in mind, the author offers us more advanced stratigraphical knowledge and demonstrates potential applications. This explains why stratigraphical studies can no longer be perceived as a separate branch of geological studies, but instead become an interdisciplinary bridge between sedimentology, basin analysis, geochemistry and geophysics. New definitions and methods are more useful for the interpretation of geological processes, giving us access to the sedimentary record with a better understanding of 'hidden' depositional processes, with unprecedented resolution and the possibility of putting it in a global tectonic and climatic context. Recent data related to those issues, as well as introduction of current methods of sequence stratigraphy, seismic stratigraphy, chronostratigraphy and cyclostratigraphy are the main potential of this tome.

The book has been edited perfectly, is well structured and up-to-date and contains a vast amount of data related to the most important topics of modern stratigraphy. Numerous references allow the reader to study stratigraphical methods further. All chapters are voluminous and well prepared, and accompanied by many photographs and figures. The book can also be used as a glossary of stratigraphical methods, and thus is recommended not only to experienced scientists, but also to readers embarking on their first journey into modern stratigraphy.

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