rather than on reducing long-lived carbon dioxide emission to zero without delay. This article is relevant in the background of the recent UNEP report which mentions that by 2100, all greenhouse gases must fall to zero, or the world will face what IPCC scientists have described as 'severe, widespread and irreversible' effects of climate change. But the emphasis, according to the author, should be on carbon dioxide and not on short-lived pollutants. Two articles in this volume throw light on new methods and understanding in energy research. The role of organic sulphur compounds in the formation and thermal degradation of sedimentary organic matter is known. The recent advances in sulphur isotope analytical methods have now enhanced our understanding of this process. Armani reviews the recent developments in sulphur isotope analyses, which revealed natural isotopic structures reflecting microbial and thermal sulphur–carbon reactions affecting oil sources and reservoirs. Betrand and Horsfield review the thermal maturation shale-gas systems. Being different from traditional petroleum reservoirs, characteristics of these shale-gas systems are complex because of their depositional and diagenetic nature. Understanding of thermal and geochemical histories of these reservoirs has improved, as revealed in the mineral and organic properties at the sub-micrometre scale. But key questions remain regarding the fundamental physics governing transport and retrieval mechanisms. Most importantly, mitigation of the environmental hazard of oil and gas production from shale still remains elusive. Readers may check out the news feature in *Nature* dated 14 December that advocates a reality check on the actual potential of shale gas production. It cautions that much of the energy industry may be vastly overestimating how much natural gas can actually be produced in the coming decades.

All in all, the articles in this volume make a representative cross-section of current research advances in Earth as well as planetary research. The bulky volume contains articles widely ranging from exoplanets to paleobiology, and the editors may do well to pool up these varied titles subject-wise, and categorize the articles under various individual sections at least in future issues so that it helps the readers to target their attention according to their specific interests without being overwhelmed by the diversity of topics and sheer fecundity exhibited in the pages.

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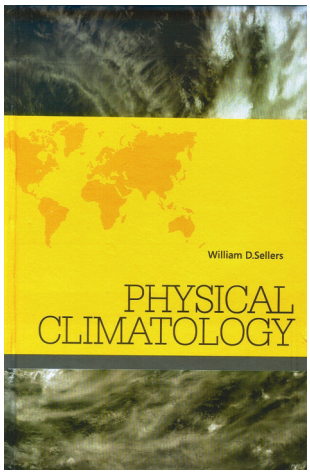

Physical Climatology. William D. Sellers. New India Publishing Agency, 101, Vikas Surya Plaza, C.V. Block, LSC Market, Pitam Pura, New Delhi 110 034. 2015. viii + 272 pp. Price: Rs 1550.

The first version of this book[1], which originated from a course of lectures taught at the university level, is among the most valuable textbooks available on this topic and has been widely used for nearly five decades. This book was designed to provide the basics of physical processes relevant to climate system. It has a concise collection of topics sequentially organized in 13 chapters suitable for both graduate and postgraduate level curriculum. It provides theoretical basis for radiation, water and energy balance, turbulence, surface energy transfer, and the hydrological cycle enroute to basis for the theories of climate change. Although other textbooks have emerged on the same topic, it should be mentioned that the presentation style of this book, which is more descriptive and less mathematical, still caters to a heterogeneous readership and its information cannot be simply ruled out as rudimentary.

The first six chapters of this book deal with radiation and transport processes from hemispheric viewpoint and atmospheric radiative balance perspective. Further chapters exclusively address the physical processes relevant to water balance, turbulence transfer and surface energy exchanges and introduce a pathway to paleo-climatology. There is also discussion on bottlenecks in the synthesis of climate change. The discussion on water balance and evaporation is presented at length compared to contemporary textbooks. Although the discussions on current debate relating to climate change and climate sensitivity synthesis cannot be seen much in this book, it should be mentioned that it was published in an era when numerical weather prediction was given more prominence, with less attention to climate model development and synthesis.

All in all, this book is well-written, well-illustrated, and is a good contribution to those interested in understanding and pursuing research on physical climatology. We recommend this book, both as an introductory text and a comprehensive review of the physical climatological processes. This is one of the well laid out books and is extremely readable, except for the use of obsolete units.

1. Sellers, W. D., *Physical Climatology*, The University of Chicago Press, 1965, p. 272.

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