lems. I met quite a few of them in my own brushes with paleoclimatology. My admiration of them was renewed and amplified as I read.

Perhaps I am an old curmudgeon, but I think there are many problems that are yet to be solved in the give-and-take between climate theory (including climate models) and the record. I am not sure we can yet explain how an ice sheet gets started after being nudged by the orbital element shifts. The astronomical theory provides a pacemaker for the ice ages, but some parts of the mechanism are still missing. Even if we allow the greenhouse gases to enhance the response, it does not seem to be enough. I am also not so sure of the Sun's changes in brightness as an explanation for the Medieval Warm Period or the so-called Little Ice Age.

Reading this great history reminds me of the explosive changes during the last century in physics, chemistry, mathematics, and biology, to name just a few. Reading and contemplating history provides us with context within which we live and work. This book helps.

—GERALD R. NORTH

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PYTHON PROGRAMMING AND VISUALIZATION FOR SCIENTISTS
Alex DeCaria, 2016, 270 pp., $24.00, softbound, Sungod Publishing, ISBN 978-0-9729033-7-0

Python is becoming a popular choice among scientists to analyze their data due to the language's flexibility, ease of use, and the large amount of freely available libraries. Learning Python can seem overwhelming at first, but Alex DeCaria’s book, Python Programming and Visualization for Scientists, looks to simplify the learning process by only explaining the basics needed for scientists to be productive. While this book expects that you have experience with programming, it does not require any Python experience.

The book is divided into three sections: “Python Basics,” “Plotting and Visualization,” and “Advanced Topics.” The “Python Basics” section explains basic syntax, simple I/O, functions, and classes. Those with Python experience can easily skip this section, which comprises almost half the book. However, if your Python experience was gained through online searches, you may want to consider reviewing this section, as it provides a great review of the basic language. This section also provides

NEW PUBLICATIONS

FLOOD FORECASTING: A GLOBAL PERSPECTIVE

This book describes flood forecast systems and operations as they currently exist at national and regional centers around the globe, with a focus on the technical aspects of these systems. It includes details of data flow, what data are used, quality control, hydrologic and hydraulic models used, and unique problems faced by each system. Each chapter describes the system and details its strengths and weaknesses. The text provides historical coverage to help readers understand why forecast systems have developed as they are and to see how specific systems deal with common forecasting problems.

AN INTRODUCTION TO CLOUDS FROM MICROSCALE TO CLIMATE

This book provides a fundamental understanding of clouds, ranging from cloud microphysics to large-scale impacts of clouds on climate. On the microscale, phase changes and ice nucleation are covered, including aerosol particles and the thermodynamics relevant for cloud formation and precipitation. At larger scales, cloud dynamics, mid-latitude storms, and tropical cyclones are discussed, leading to clouds' role in the hydrological cycle and their effect on climate. Each chapter ends with problem sets and multiple-choice questions that can be completed online.

WEATHER ANALYSIS AND FORECASTING: APPLYING SATELLITE WATER VAPOR IMAGERY AND POTENTIAL VORTICITY ANALYSIS (SECOND EDITION)

This book explains how to interpret water vapor patterns in terms of dynamical processes in the atmosphere and their relation to diagnostics available from numerical weather prediction models. The main focus is on the close relationship between satellite imagery and the potential vorticity fields in the upper troposphere and lower stratosphere that provides a set of operational forecasting methods.
several “gotcha” warnings that are helpful to new Python users.

The second section, “Plotting and Visualization,” walks the reader first through the process of creating simple plots and then toward more complex plots by using matplotlib and basemap. The book gives many great examples that are geared toward the weather and climate communities, ranging from basic x,y plots, to polar plots, to contour plots with wind barbs or streamlines, to 3D plots. Basemap is also discussed for users who require a plot with a map underlay. Some of the code examples in this section build off of previous examples, so new Python programmers should use caution if they skip around from examples because key concepts are added throughout this section.

The “Plotting and Visualization” section also discusses how to read in NetCDF and HDF5 data. Only the basic concepts of reading in NetCDF and HDF5 datasets are covered; writing files in these formats is not covered. Because working with datasets is such an important part of a scientist’s workflow, this topic might have benefited more if it was placed in the “Advanced Topics” section, where it could have been discussed in more detail without seeming out of place.

The final section, “Advanced Topics,” discusses in great detail the topics of regular expressions and Fourier analysis. Both of these topics are thoroughly discussed in a straightforward manner. Time and dates are also discussed in great detail, but it would have been helpful to discuss handling non-Julian calendars, which can be tricky to first-time users. This section also briefly mentions simple statistics, handling of matrices, and code performance.

This book should not be used as a complete reference for Python. It was written to give beginners a productive start in learning the language. Where the book is not complete, the author lists suggestions on where to go for more information on the topic, which is helpful.

This book would be very useful for an introductory scientific programming class. I would also recommend it for scientists who would like to learn the basics of Python and who would like to start programming within a couple of days. While I would not generally recommend this book for experienced Python programmers, it does discuss useful topics in the last section that experienced programmers might find helpful. The book is generally well organized into clear sections, which would allow experienced Python programmers to skip around to different sections to find relevant information quickly.

—Sheri Mickelson.

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