

Review on:

Thomas Warner's book **Numerical Weather and Climate Prediction**

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Numerical Weather and Climate Prediction is an excellent general introduction to atmospheric modelling. Atmospheric modelling students, model users as well as aspiring model developers will find this book useful. The book is based on course material presented over 30 years by the author at two universities in the USA, and from his vast numerical modelling experience. The book is therefore highly recommended for all atmospheric modelling scientists. However, the book does not specialise in particular aspects of atmospheric modelling. For instance, although there is a considerable part of the book devoted to numerical methods, the book rather focusses on the strengths and weaknesses of atmospheric models and their application in general. In fact, a wide range of subjects associated with the modelling process, both in research and in operations, are effectively described and explained. The contents of the book include the governing equations, numerical methods, parameterisation, surface processes, initialization, ensemble methods, predictability, verification, experimental design, model output analysis, operational forecasting, statistical post-processing, applications models, computational fluid-dynamics models, climate modelling and downscaling. The illustrations are clear and educative and at the end of each chapter a list of suggested references for further reading is supplied followed by a number of problems and exercises.

Atmospheric models to produce operational forecasts across a range of time scales, for the production of climate change projects, regional downscaling to ever-higher resolution, a variety of empirical downscaling or recalibration methods, the running of applications models, etc. have all been used in South Africa extensively for quite a few years now. Notwithstanding, many, if not most students and modelling practitioners have become model users as opposed to model developers (although there has been a considerable effort to develop forecast or projection "systems" but these for the most part make use of existing numerical models, both regional and global). Only a few of us actually peer into model codes and even fewer can state that they completely and truly understand the entire model and the various parts being used, most of the time developed by independent modelling groups. All levels of model users and to some extent model developers in South Africa can benefit from reading Warners' book since this book helps the reader to better understand and appreciate atmospheric models.

The book is available from a number of sources, for example Cambridge Books Online and Kalahari.net, but I purchased mine on Amazon. It is available as hardcopy, eBook and as a Kindle version. I have all three versions, installed on my smartphone, tablet and Kindle Fire. Get your own copy of the book too. It should be in your library.