Preface to the Fourth Edition

In preparing this fourth edition of *Statistical Methods in the Atmospheric* Sciences I have again tried to serve the needs both of instructors and students for a textbook, while also supporting researchers and operational practitioners needing a reasonably comprehensive but readable and not-too-cumbersome reference. The primary student audience will likely be upper-division undergraduates and beginning graduate students. These readers may wish to ignore the many literature references except in cases where additional information may be desired as a result of the material having been presented too briefly or otherwise inadequately. Researchers and other practitioners may see little use for the exercises at the ends of the chapters, but will find useful entry points into the broader literature in the references, which are more concentrated in the more research-oriented sections.

The most prominent change from the third edition is inclusion of a separate chapter on the burgeoning area of ensemble forecasting, including statistical (MOS) postprocessing of ensemble forecasts. However, all of the chapters have been updated, including but not limited to new and expanded treatments of extreme-value statistics; ANOVA, experimental design and comparisons among multiple means; regularization/shrinkage methods in regression and other techniques; nonparametric and "machine learning" regression methods; verification for probability density forecasts, ensemble forecasts, spatial structure field forecasts, and sampling and inference for verification statistics; regularization and missing data issues in PCA; expanded treatment of CCA and allied methods; and "machine learning" methods in discrimination, classification, and clustering.

The extensive reference list in this new edition includes more than 400 entries that were not listed in the previous edition. Of these, half are dated 2011 and later, having appeared since publication of the third edition. Also included in this edition are new examples and exercises, and a new appendix listing symbols and acronyms.

Of course it is unrealistic to expect that a work of this length could be produced without errors, and there are undoubtedly many in this book. Please take a moment to let me know about any of these that you might find, by contacting me at dsw5@cornell.edu. A list of errata for this and previous editions will be collected and maintained at https://tinyurl.com/WilksBookErrata, and at https://bit.ly/2DPeyPc.