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Jupiter

The Planet, Satellites and Magnetosphere

This comprehensive volume authoritatively describes current understanding of the complex and fascinating jovian system. Written by a team of world experts, it brings together every aspect of the giant planetary system, from the deep interior of Jupiter to the distant tiny satellites and swarms of escaping gas and dust. Chapters present a synthesis of experimental data from the *Voyager*, *Galileo*, and *Cassini* missions, from telescopes on the ground and in space, and from theoretical models on the different components that make up the Jupiter system. This book is a valuable introduction for graduate students and an indispensable resource for all researchers in planetary science.

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JUPITER

The Planet, Satellites and Magnetosphere

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CONTENTS

<i>Preface</i>	<i>page xi</i>
1 Introduction	1
F. BAGENAL, T. E. DOWLING, W. B. MCKINNON	
2 The Origin of Jupiter	19
J. I. LUNINE, A. CORADINI, D. GAUTIER, T. C. OWEN, G. WUCHTERL	
3 The Interior of Jupiter	35
T. GUILLOT, D. J. STEVENSON, W. B. HUBBARD, D. SAUMON	
4 The Composition of the Atmosphere of Jupiter	59
F. W. TAYLOR, S. K. ATREYA, TH. ENCRENAZ, D. M. HUNTEN, P. G. J. IRWIN, T. C. OWEN	
5 Jovian Clouds and Haze	79
R. A. WEST, K. H. BAINES, A. J. FRIEDSON, D. BANFIELD, B. RAGENT, F. W. TAYLOR	
6 Dynamics of Jupiter's Atmosphere	105
A. P. INGERSOLL, T. E. DOWLING, P. J. GIERASCH, G. S. ORTON, P. L. READ, A. SÁNCHEZ-LAVEGA, A. P. SHOWMAN, A. A. SIMON-MILLER, A. R. VASAVADA	
7 The Stratosphere of Jupiter	129
J. I. MOSES, T. FOUCHET, R. V. YELLE, A. J. FRIEDSON, G. S. ORTON, B. BÉZARD, P. DROSSART, G. R. GLADSTONE, T. KOSTIUK, T. A. LIVENGOOD	
8 Lessons from Shoemaker–Levy 9 about Jupiter and Planetary Impacts	159
J. HARRINGTON, I. DE PATER, S. H. BRECHT, D. DEMING, V. MEADOWS, K. ZAHNLE, P. D. NICHOLSON	
9 Jupiter's Thermosphere and Ionosphere	185
R. V. YELLE, S. MILLER	
10 Jovian Dust: Streams, Clouds and Rings	219
H. KRÜGER, M. HORÁNYI, A. V. KRIVOV, A. L. GRAPS	
11 Jupiter's Ring-Moon System	241
J. A. BURNS, D. P. SIMONELLI, M. R. SHOWALTER, D. P. HAMILTON, C. C. PORCO, H. THROOP, L. W. ESPOSITO	

viii *Contents*

12	Jupiter's Outer Satellites and Trojans	263
	D. C. JEWITT, S. SHEPPARD, C. PORCO	
13	Interior Composition, Structure and Dynamics of the Galilean Satellites	281
	G. SCHUBERT, J. D. ANDERSON, T. SPOHN, W. B. MCKINNON	
14	The Lithosphere and Surface of Io	307
	A. S. MCEWEN, L. P. KESZTHELYI, R. LOPES, P. M. SCHENK, J. R. SPENCER	
15	Geology of Europa	329
	R. GREELEY, C. F. CHYBA, J. W. HEAD III, T. B. MCCORD, W. B. MCKINNON, R. T. PAPPALARDO, P. FIGUEREDO	
16	Geology of Ganymede	363
	R. T. PAPPALARDO, G. C. COLLINS, J. W. HEAD III, P. HELFENSTEIN, T. B. MCCORD, J. M. MOORE, L. M. PROCKTER, P. M. SCHENK, J. R. SPENCER	
17	Callisto	397
	J. M. MOORE, C. R. CHAPMAN, E. B. BIERHAUS, R. GREELEY, F. C. CHUANG, J. KLEMASZEWSKI, R. N. CLARK, J. B. DALTON, C. A. HIBBITTS, P. M. SCHENK, J. R. SPENCER, R. WAGNER	
18	Ages and Interiors: the Cratering Record of the Galilean Satellites	427
	P. M. SCHENK, C. R. CHAPMAN, K. ZAHNLE, J. M. MOORE	
19	Satellite Atmospheres	457
	M. A. McGRATH, E. LELLOUCH, D. F. STROBEL, P. D. FELDMAN, R. E. JOHNSON	
20	Radiation Effects on the Surfaces of the Galilean Satellites	485
	R. E. JOHNSON, R. W. CARLSON, J. F. COOPER, C. PARANICAS, M. H. MOORE, M. C. WONG	
21	Magnetospheric Interactions with Satellites	513
	M. G. KIVELSON, F. BAGENAL, W. S. KURTH, F. M. NEUBAUER, C. PARANICAS, J. SAUR	
22	Plasma Interaction of Io with its Plasma Torus	537
	J. SAUR, F. M. NEUBAUER, J. E. P. CONNERNEY, P. ZARKA, M. G. KIVELSON	
23	The Io Neutral Clouds and Plasma Torus	561
	N. THOMAS, F. BAGENAL, T. W. HILL, J. K. WILSON	
24	The Configuration of Jupiter's Magnetosphere	593
	K. K. KHURANA, M. G. KIVELSON, V. M. VASYLIUNAS, N. KRUPP, J. WOCH, A. LAGG, B. H. MAUK, W. S. KURTH	

25 Dynamics of the Jovian Magnetosphere	617
N. KRUPP, V. M. VASYLIŪNAS, J. WOCH, A. LAGG, K. K. KHURANA, M. G. KIVELSON, B. H. MAUK, E. C. ROELOF, D. J. WILLIAMS, S. M. KRIMIGIS, W. S. KURTH, L. A. FRANK, W. R. PATERSON	
26 Jupiter's Aurora	639
J. T. CLARKE, D. GRODENT, S. W. H. COWLEY, E. J. BUNCE, P. ZARKA, J. E. P. CONNERNEY, T. SATOH	
27 Jupiter's Inner Radiation Belts	671
S. J. BOLTON, R. M. THORNE, S. BOURDARIE, I. DePATER, B. MAUK	
APPENDIX 1 Maps and Spectra of Jupiter and the Galilean Satellites	689
J. R. SPENCER, R. W. CARLSON, T. L. BECKER, J. S. BLUE	
APPENDIX 2 Planetary Parameters	699
J. W. WEISS	
<i>Index</i>	707

The plates are situated between pages 4 and 5.

PREFACE

The time is early 2001. The *Galileo* mission is drawing to a close, *Voyager* is in the history books, and *Cassini* has left Jupiter behind on its way to Saturn. The first *Jupiter* book (Gehrels 1976) was written before *Voyager* encountered Jupiter. The time is ripe for an evaluation of what we have learned about the Jupiter system from this major epoch of exploration. And, what questions remain. So, we organized a conference (~250 attendees came to *Jupiter: Planet, Satellites and Magnetosphere* in Boulder, Colorado, in June 2001) and planned a book . . .

From the outset, we knew the Jupiter system was big. But we did not realize just how enormous the task would be to squeeze the giant planet and its entourage into a single publishable unit. Two years later, it has taken the work of 128 individual authors, many contributing to more than one chapter, to document our scientific understanding of the planet, satellites and magnetosphere.

For historical comparison, Gehrels' (1976) *Jupiter* has 44 chapters written by 80 authors, often as single authors. Each chapter of this book (dubbed—of course—*Jupiter II*) was written by a team, often a large team. A total of 168 contributors involved in 27 chapters plus 2 appendices adds up to an average of 5.8 authors per chapter, and considerable coordination. The editors worked hard with the authors and reviewers to resolve inconsistencies and smooth the style (at least within a chapter). In an ideal world, we would have expended another three months of editorial work. But practical expedience of getting the book out while the data are still fresh (not to mention sheer exhaustion) means there are inevitably imperfections, for which we sincerely apologize.

Each chapter was reviewed by at least two (in some cases up to six) reviewers. The editors thank the following people for reviewing chapters, a huge task that helped improve each chapter immensely: Phil Armitage, Kevin Baines, Amy Barr, Bruno Bézard, Peter Bodenheimer, Mark Boslough, Mike Brown, Wendy Calvin, Robin Canup, Nancy Chanover, Frank Crary, Dale Cruikshank, Brad Dalton, Ashley Davies, Peter Delamere, Andrew Dombard, Michele Dougherty, George Dulk, Larry Esposito, Arkee Eviatar, Paul Feldman, Walker Fillius, Michael Flasar, Daniel Gautier, Paul Geissler, Randy Gladstone, Jay Goguen, Tamas Gombosi, Tristan Guillot, Doug Hamilton, Floyd Herbert, Mihaly Horányi, Robert Howell, Boris Ivanov, Emmanuel Lellouch, Conway Leovy, Alan Lester, Xinlin Li, Jon Linker, Baerbel Lucchitta, Mark Marley, Barry Mauk, Jack McConnell, Tom McCord, Steve Miller, Neil Murphy, Phil Nicholson, Francis Nimmo, Thom Orlando, Chris Paranicas, Bill Paterson, Gerald Patterson, Morris Podolak, Duane Pontius, Kathy Rages, David Rothery, Gerald Schubert, Nick Schneider, Adam Showman, Bruno Sicardy, Damon Simonelli, Bill Smyth, Larry Sromovsky, Glen Stewart, Darrell Strobel, Robert Strom, Mike Summers, Elizabeth Turtle, Vytenis Vasyliūnas, Dimitri Veras, Hunter Waite, John Weiss, Lionel Wilson, Leslie Young, Richard Young and Yuk Yung. Particularly special thanks are due to Tom Hill and David Stevenson for their extensive and thorough reviewing.

The CD that accompanies this book contains many additional illustrations and color versions of graphics that could only be printed in black and white in the book. A Jupiter book website (<http://dosxx.colorado.edu/JUPITER>) will be maintained with this material, updates, corrections and links to other related sites. The website also contains a searchable database of the bibliography.

The book contains ~100 pages of bibliographic references to over 4000 research papers and books. While databases such as the NASA Astrophysical Data System (ADS) have greatly simplified the process of accessing research material, there are still many problems. Most of the references were generated using Bibtex output from ADS. Unfortunately, there are many inaccuracies and inconsistencies in these references. The authors and editors have expended considerable effort in correcting these for the book, but we apologize for any errors that may remain. The editors thank Joe Harrington for his assistance with the bibliography database and formatting.

The book was typeset using Latex. Since only half of the authors were willing to touch Latex, the editors came to appreciate and strongly recommend the translation application Word2tex made in the Ukraine by Kirill and Anna Chikrii (<http://www.word2tex.com/>).

Many of the authors' researches were supported by NASA research grants (and acknowledgements are given at the end of each chapter). We are also grateful for financial assistance from NASA's Solar System Exploration division for partial support of staff at the Boulder editorial office.

Bill McKinnon thanks his brother John for his hospitality during the Jupiter conference, even though his nephew Jared decided to be born during the night before his morning talk. Deep appreciation is also expressed to visionaries Arthur C. Clarke and the late Stanley Kubrick for their earlier voyage of discovery to the Jupiter system.

Tim Dowling thanks his wife Beth and daughters Nicole (5) and Rebecca (2) for their patience. At the start of the project Nicole (then 2) thought that Daddy went to Jupiter to work on the book and had a standing policy against such trips; today she thinks Jupiter is an okay planet—she even helped make the index—but when queried she admits to a preference for Saturn. Rebecca made some contributions to the book as soon as she could reach the keyboard, but they were deemed too cryptic for the final cut.

Fran Bagenal would like to thank the Laboratory for Atmospheric and Space Physics at the University of Colorado, Boulder, for enormous support throughout the production of the book. Just about everyone in LASP/Duane has helped in some way. In particular, my research group of Peter Delamere, David Brain and Andrew Steffl assisted with a myriad of technical and/or tedious tasks. For production work, special thanks are due to Dede Gleason and Rose Hoag. The person who deserves the greatest thanks is Stephen Crusher Bartlett. Not only did he roll up his sleeves to copyedit turgid prose and fix messy graphics but he had to wake up, eat and go to sleep with Jupiter for nearly three years. Fran Bagenal is deeply grateful to her husband/co-worker for his support.

Gehrels' preface to *Jupiter* begins, "We may never do a better book." These editors prefer to say, "We had better never do another book." For a while, at least. We heartily thank all who helped with *Jupiter II*—and send our very best wishes to those who eventually embark on *Jupiter III*.