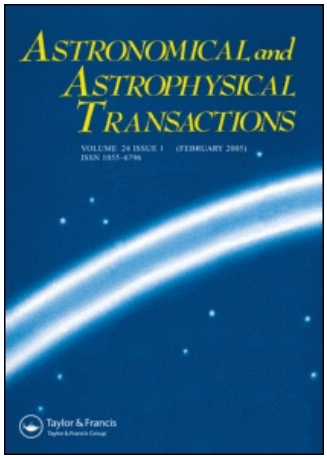

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Asteroids III: A review

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Asteroids III: A review

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The University of Arizona Press, in collaboration with the Lunar and Planetary Institute (USA), has published *Asteroids III* (edited by W. F. Bottke Jr. *et al.*), the most recent book in the popular series initiated by Tom Gehrels.

This third book has fewer pages but is nearly twice as large in size as *Asteroids II*. The chapters in *Asteroids III* have similar titles to those of previous editions. Some chapters are more detailed (for example, 'Evolutionary processes', 'History and interrelations with other solar system bodies'), but all are packed with new and valuable content. Unfortunately, compared with previous issues, *Asteroids III* does not contain the useful section, 'Tabulation', which has probably been excluded for the purpose of space-saving. The availability of tables was particularly handy for the reader in considering celestial bodies.

Without going into detail of specific papers, it should be noted that some results are especially new and challenging. These include chapters written by A. Milani *et al*. (*Asteroid close approaches*), R. Jedike *et al*. (*Observational selection effects in asteroid surveys*), B. A. Ivanov *et al*. (*The comparison of size-frequency distributions of impact craters and asteroids*), J. L. Hilton (*Asteroid masses and densities*), S. J. Ostro *et al*. (*Asteroid radar astronomy*), S. J. Bus *et al*. (*Visible-wavelength spectroscopy of asteroids*), M. J. Gaffey *et al*. (*Mineralogy of asteroids*), A. W. Harris and J. S. V. Laggeros (*Asteroids in the thermal infrared*), E. Dotto *et al*. (*Observations from orbiting platforms*), A. S. Rivkin *et al*. (*Hydrated minerals on asteroids*), R. P. Binzel *et al*. (*Physical properties of near-Earth objects*), M. A. Barucci *et al*. (*Physical properties of Trojan and Centaur asteroids*), W. J. Merline *et al*. (*Asteroids do have satellites*), R. J. Sullivan *et al*. (*Asteroid geology from Galileo and NEAR data*), A. F. Cheng (*NEAR: mission summary*), D. Nesvorny *et al*. (*Regular and chaotic dynamics of the asteroid belt*), W. F. Bottke Jr. *et al*. (*The effect of Yarkovsky on the dynamical evolution of asteroids*), A. Morbidelli *et al*. (*Origin and evolution of near-Earth objects*), K. Holsapple *et al*. (*Asteroid impacts: laboratory experiments and scaling laws*), E. Asphaug *et al*. (*Asteroid interiors*), D. T. Britt *et al*. (*Asteroid density, porosity and structure*), D. C. Richardson *et al*. (*Gravitational aggregates*), P. Paolicchi *et al*. (*Side effects of collisions*), D. J. Scheeres *et al*. (*The fate of*

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asteroid ejecta), H. Y. McSween Jr. *et al*. (*Thermal evolution models of asteroids*), K. Keil (*Geological history of asteroid 4 Vesta*), B. E. Clark *et al*. (*Asteroid space weathering and regolith evolution*), V. Zappala *et al*. (*Physical and dynamical properties of asteroid families*), A. Cellino *et al*. (*Spectroscopic properties of asteroid families*), T. H. Burbine *et al*. (*Meteoritic parent bodies*), P. R. Weissman *et al*. (*Evolution of comets into asteroids*), A. Shukolyukov and G. W. Laugmair (*Chronology of asteroid accretion and differentiation*), J.-M. Petit *et al*. (*Primordial excitation and depletion of the main asteroid belt*), F. Marzari *et al*. (*Trojan asteroids*).

The chapters concerning the inter-relationships between different classes of bodies, *e.g. Asteroids and comets* (P. R. Weissman *et al*.), *Asteroids of the main belt and near-Earth objects* (A. Morbidelli *et al*.), *Trojan and Centaur asteroids* (M. A. Barucci *et al*. and F. Marzari *et al*.) and *Linking meteorites and near-Earth objects to their parent bodies* (T. H. Burbine *et al*.), seem to be the most promising in terms of a better understanding of the history and evolution of asteroids and the solar system. Many key problems may be solved through *in situ* asteroid investigations, such as those discussed by Sullivan *et al*. and Cheng, among others.

In the chapter by D. Morrison *et al*., the important issue of asteroid–comet impact hazard is discussed for the first time. They highlight the current probability estimate of a global ecological catastrophe due to impact at approximately twice per one million years. Owing to the efforts of scientists over the last decade, public and, indeed, governments' understanding of the threat to life on Earth from the sky is growing. However, it is still unclear how a potential threat could be resolved practically on a global scale. Morrison *et al*. conclude that probably the best way to deal with it is through international cooperation.

The main value of *Asteroids III*, as well as the previous books in the series, is that it focuses on the most significant results and issues concerning investigations of asteroids and other solid bodies of the solar system over the last decade.