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01/30/02 S. W. BOUGHER

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"PROBLEMS AND ISSUES IN SOLAR SYSTEM AERONOMIC MODELING"
S. W. BOUGHER and I. C. F. Mueller-Wodarg

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Curves as follows: (long dash) total solar heating,
(solid) molecular conduction, (short dash) adiabatic cooling,
(dot-dash-dot) hydrodynamic advection (horizontal plus vertical),
and (dot-dot-dot-dash) CO₂ cooling. Separate rates for

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REFERENCES

Bouger, S. W., S. Engel, R. G. Roble, and B. Foster,
Comparative Terrestrial Planet Thermospheres : 2. Solar Cycle Variation of Global Structure and Winds at Equinox,
J. Geophys. Res., 104, 16591-16611, 1999.

Bouger, S. W., S. Engel, R. G. Roble, and B. Foster,
Comparative Terrestrial Planet Thermospheres : 3. Solar Cycle Variation of Global Structure and Winds at Solstices,
J. Geophys. Res., 105, 17669-17689, 2000.

Bouger, S. W., E. Chassefiere, J.-J. Berthelier, and P. Touboul,
THERMOPAC/ADIP : A Generic Package for Long-Term Monitoring of the Martian Thermosphere, *Adv. in Space Research*, 27}, 2001a.

Bouger, S. W., J. H. Waite, T. Majeed, G. R. Gladstone, and D. Grodent,
Jupiter Thermospheric General Circulation Model (JTGCm) : Formulation and Case Studies Incorporating Ion Drag and Joule Heating,
Jupiter Planet, Satellites, and Magnetosphere, Boulder, CO. June, 2001b.

Bouger, S. W., R. G. Roble, and T. J. Fuller-Rowell,
Simulations of the Upper Atmospheres of the Terrestrial Planets,
AGU Monograph, "Comparative Aeronomy in the Solar System",
 Editors : M Mendillo, A. Nagy, and H. Waite, AGU, 2002.

Fox, J. L., and S. W. Bouger,
Structure, Luminosity, and Dynamics of the Venus Thermosphere,
Space Science Rev., 55, 357-489, 1991.

Mengel, J. G., H. G. Mayr, I. Harris, and D. R. Stevens-Rayburn,
Non-Linear Three-Dimensional Spectral Model of the Venusian Thermosphere with Superrotation : III. Temperature, Composition, and Winds,
Planetary Space Sci., 37, 707, 1989.

Mueller-Wodarg, I. C. F.,
The Application of General Circulation Models of the Atmospheres of the Terrestrial-Type Moons of the Giant Planets,
AGU Monograph, "Comparative Aeronomy in the Solar System",
 Editors : M Mendillo, A. Nagy, and H. Waite, AGU, 2002.

Roble, R. G.,
EOS, American Geophysical Union, 62, #3, 1981.

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Roble, R. G.,
Chemistry in the Thermosphere and Ionosphere,
Chemical and Engineering News, 64, #24, 23-38, 1986.

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