A new empirical thermospheric density model JB2006 using new solar indices

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Abstract: A new empirical atmospheric density model is developed using the CIRA72 (Jacchia 71) model as the basis for the diffusion equations. New solar indices based on orbit based sensor data are used for the solar irradiances in the extreme and far ultraviolet wavelengths. New exospheric temperature and semiannual density equations are employed to represent the major thermospheric density variations. Temperature correction equations are also developed for diurnal and latitudinal effects, and finally density correction factors are used for model corrections required at high altitude (1500-4000 km). The new model, Jacchia-Bowman 2006, is validated through comparisons of accurate daily density drag data previously computed for numerous satellites. For 400 km altitude the standard deviation of 16% for the standard Jacchia model is reduced to 10% for the new JB2006 model for periods of low geomagnetic storm activity.

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