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The empirical accelerations that are estimated to obtain the precise orbits used in the Geophysical Data Records often show systematic signatures that indicate errors in the prelaunch satellite model, represented as a set of plates of known surface, orientation, optical and infrared properties. Although the impact of such errors on the final solution is relatively small, orbits that are dynamically constrained can benefit from the adoption of empirical models that include these systematic features. Also, such models could eventually help in stabilizing the time series of DORIS station coordinates used for the realization of the terrestrial reference frame. We propose an empirical modeling approach in which the acceleration is expressed in a reference frame aligned with the sun direction. In such a frame, the radiation pressure accelerations are very stable, with small periodic variations whose amplitudes depend on the beta angle. This facilitates the overall observability of the model parameters to be identified. We tested this method using the GPS measurements available for the Jason satellites; we present the results, and discuss the prospects for the implementation in the precise orbit solutions of all the DORIS-based altimeter missions.
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