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Determination of Saturn's Gravity Field from four Cassini Dedicated Flybys in the Prime and Equinox Missions

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We present our current best results for Saturn's gravity field obtained by analyzing Cassini's data acquired during four flybys carried out between September 2006 and January 2010. More flybys are under consideration for the End of Life mission when the pericenter of the spacecraft's orbit will be lowered to an altitude of about 4000 km above Saturn's atmosphere.
Although affected from the unknown mass of the B-ring, the coefficients J2, J4 and J6 were already determined with good accuracy from X- and Ka-band Doppler data from the first three flybys.
The use of advanced media calibration (AMC) systems, available at two out of three Deep Space Network complexes for calibration of Earth troposphere, has reduced the noise in the Doppler observables in some of the tracking passes. Saturn's J3 zonal harmonic coefficient was poorly determined from the first three flybys, but we expect its formal accuracy to be consolidated adding the fourth flyby data set. We show here the four independent solutions for Saturn's gravity field obtained from each flyby and the combined, multiarc solution.