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Low Degree Harmonics of the Earth's Gravity Field from GPS and LEO and SLR Observations

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In the integrated approach the low degree harmonics of the Earth's gravity field and the GPS and Low Earth Orbiter (LEO) orbits and clocks are solved for simultaneously by adjusting ground-based GPS and SLR observations as well as LEO GPS and other mission data. Thus the low degree harmonics, e.g. dynamic geocenter and Earth orientation estimates, become more accurate and can be recovered down to daily resolution. Seasonal signals are found in a 1-year CHAMP analysis. The influence of background models, e.g. the ocean tide model or the short wavelength gravity field model, is investigated and discussed. The results are compared to GRACE, LAGEOS and combined GRACE-LAGEOS monthly solutions.