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Improved Measurements of Short Term Variations in the Earth's Mass Distribution PETER L. BENDER, JILA, Univ. of Colorado — The first use of high-precision laser interferometry between satellites is planned for the NASA-DLR GRACE Follow-On mission, that is expected to be launched in 2017. The GRACE mission has successfully monitored changes in the Earth's mass distribution since 2002, with very important applications in hydrology and other areas of earth science. It is based on K-band measurements of changes in the separation of two satellites about 200 km apart in the same nearly polar orbit. On GRACE Follow-On a laser interferometry system between the satellites will be added in parallel to the K-band system to improve the relative velocity precision to 50 nm/s. However, studies are still going on to understand better how much of an improvement can be expected in measuring changes in the mass distribution. One particular analysis approach called Ocean Calibration that has been suggested but not yet tested will be described briefly. The problem is that it takes 10 to 15 days for the satellite ground-tracks to cover the globe with close enough spacing to match the desired spatial resolution, but the mass distribution changes more rapidly. This can be corrected for to some extent using partial information from other sources on the mass distribution changes. However, it remains the main limitation on the accuracy of the final results.

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