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HlSST and SLR - bridging the gap between GRACE and GRACE Follow-on

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GRACE is undoubtedly one of the most important sources to observe mass transport on global scales. Numerous applications have shown the validity and impact of using its data. Within the EGSIEM project GRACE gravity field solutions from various processing centers are processed and combined to further increase the spatial and temporal resolution. However, it is expected that GRACE will not continue to observe mass variations from space till its successor GRACE Follow-on will be operational. Thus there is a need for an intermediate technique that will bridge the gap between the two missions and will allow 1) for a continued and uninterrupted time series of mass observations and 2) to compare, crossvalidate and link the two time series. Here we will focus on the combination of high-low satellite-to-satellite tracking (hlSST) of low-Earth orbiting satellites by GNSS in combination with SLR. SLR is known to provide highest quality time-variable gravity for the very low degrees (2-5). HlSST provides a higher spatial resolution but at a lower precision in the very low degrees. Thus it seems natural to combine these two techniques and their benefit has already been demonstrated in the past. Here we make use of the lessons learned within the EGSIEM project and focus on various aspects of combination such as the optimal strategy and relative weighting schemes. We discuss also the achievable spatial and temporal resolutions of different satellite scenarios, such as e.g. using Swarm satellites in combination with Sentinel and/or single GRACE satellites, and present the potential and limitations for geophysical applications.