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Mass redistribution from global GPS inversion for GRACE validation or combination

Monitoring hydrological redistributions through their integrated gravitational effect is the primary aim of the GRACE mission. Yet it has been proposed that at larger scales this may be achieved independently by measuring and inverting the elastic loading associated with redistributing masses, e. g. with the IGS network. This is particularly interesting as long as GRACE monthly gravity solutions not (yet) match the targeted baseline accuracies at the lower degrees. Moreover, GRACE does not determine a degree-1 term. In this contribution (1) we describe a joint inversion technique, (2) we introduce a physically motivated regularization that guarantees stable inversion results if only GPS data is used, (3) we apply this technique to GPS data provided by the IGS service covering recent years, and (4) finally we compute what the relative contribution of GRACE and GPS would be in a joint inversion, that is answering the question: where can GPS validate GRACE? Finally, if GRACE fields become publicly available, we will compare inversion results.