Using quasi-observation approach to estimate regional deformation field

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Abstract. ~uasi-observation approach is rigorous, efficient and flexible for combining different types of geodetic data to estimate time-dependent motions of stations in a region of active deformation. The primary observations are analyzed separately to produce loosely constrained estimates of station positions and coordinate system parameters which are then combined with appropriate constraints to estimate velocities, co-seismic and post-seismic displacements. We define a fractional degrees of freedom to handle the case of finite constraints and stochastic perturbation of parameters and develop statistical tests for determining compatibility between different data sets. With these developments, we show an example of combining space and terrestrial geodetic data to obtain the deformation field in southern California.

Keywords: Deformation analysis, Estimation, Space geodesy

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