It is a scientific and argumentative subject that how to adjust the optimal weighting between GPS and InSAR data when jointly inverting for coseismic slip distribution of the 2008 Wenchuan earthquake (Shen et al., 2009; Feng et al., 2010; Tong et al., 2010; Wang et al., 2010). Both Shen et al. (2009) and Feng et al. (2010) applied a positive weighting scheme to GPS data based on either distances of GPS sites from the surface rupture, or the amplitudes of GPS vectors. In the former scheme, the far-field observations contribute to the slip model slightly less than the near-field data, permitting a more abrupt variation in the derived slip model. In the latter consideration, to the contrary, the near-field data have less weight than the far-field data, resulting in a more smoothed spatial variation in the fault slip (Tong et al., 2010; Wang et al., 2010).

In this paper, we weight the GPS data and InSAR data based on Helmert Variance-covariance Component Estimation method (HVCE method) (Grafarend, 2006; Xu et al., 2009). The 485 GPS displacement data are categorized into three sub-datasets (near-field, mid-field and far-field), and they are combined with InSAR data (LOS displacements) to invert for coseismic slip distribution of the 2008 Wenchuan earthquake, while simultaneously determining the relative weight ratio among the four different sub-datasets using the HVCE method. Comparison with previous schemes, our result showed some modification to the solution, especially for a better fit to surface rupture from geological survey after the earthquake (Xu et al., 2009). Finally, Optimal weighting between GPS and InSAR data for joint inversion is discussed.