# High Resolution Two Dimensional TEC Imaging by an Improvement of Multiple-Aperture InSAR 

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In traditional InSAR especially the L-band InSAR study, ionosphere effect has always been regarded as noise or error source to be removed. The emergence of multiple-aperture InSAR (MAI) made it possible to extract ionosphere signal from InSAR technology. The principle of MAI is to split the SAR spectrum along azimuth direction into forward- and backward-looking images and then form two different-looking interferograms. The differential of the two interferograms is the multiple-aperture interferogram. Due to the linear relation between MAI phase and the derivative of ionospheric along the azimuth direction, we can obtain the TEC(Total Electron Content) variation by integrating the MAI phase. During the integration we found that the estimation of integration constant is very important, which determined the extent of consistency of the derived TEC distribution. We proposed an filtering algorithm to make the integration constant more reasonable so as to improve the accuracy of TEC distribution. Furthermore to validate the effect of this improved algorithm we compared it with the unimproved one , and then CODE ionospheric VTEC data is interpolated to evaluate the ionospheric accuracy of the new method. The result showed the two-dimensional TEC using MAI possessed the advantage of very high spatial resolution and high accuracy, which not only can be used for InSAR ionospheric correction, but also for the space detection of ionosphere, whose spatial resolution is higher than any other space technology, such as radiosonde, GPS and GPS occultation etc.

