

Tropospheric and Ionospheric Echo Characteristics and Their Modification in InSAR Deformation Monitoring

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KEY WORDS: Interdisciplinary Approaches for the Design and Analysis of Deformation Measurements

ABSTRACT:

Tropospheric and ionospheric perturbations have become one of the inevitable but intractable problems in InSAR deformation monitoring, which sometimes severely influenced the quality of InSAR deformation products, especially with the occurrence of strong earthquake. Tropospheric and ionospheric effects should be eliminated theoretically, however people always paid their attention to one of the two factors. In this paper the tropospheric and ionospheric effects are considered synthetically in InSAR interferogram generation. We adopted ALOS/PALSAR images covering Wenchuan to detect the surface motion. And meanwhile, GPS data and ECMWF model are used to analyze the atmospheric echo, which will be subtracted from InSAR interferogram. Thus we have got two kinds of coseismic and postseismic deformation products, with and without atmospheric modification. By comparing the two kinds of products, we can draw a conclusion that the atmosphere echo must be removed there where existed obvious tropospheric and ionospheric horizontal gradients during the formation of SAR image pairs.