PolInSAR Complex Coherence Estimation Based on Covariance Matrix Similarity Test

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Polarimetric SAR interferometry (PolInSAR) is a combination of both Polarimetric SAR and interferometric SAR. PolInSAR can obtain both full polarimetric information and interferogram at same time. Most PolInSAR data processing and applications are based on the polarimetric complex coherence descriptor which contains the full interferometric and polarimetric information. The reliable estimation of complex coherence is crucial for the accuracy of these processing and applications. Here a new estimation method is proposed based on a similarity test of the Complex Wishart distributed PolInSAR covariance matrix. The advantage of this method is that it takes both polarimetric and interferometric information into the estimation procedure to select the most similar candidate pixels for sample average and thereby produces more accurate and reliable estimation. The derived similarity test indicator shows great sensitivity to both the polarimetric and interferometric property. The efficiency of the proposed estimation scheme is demonstrated real PolInSAR data (See Fig. 1.).

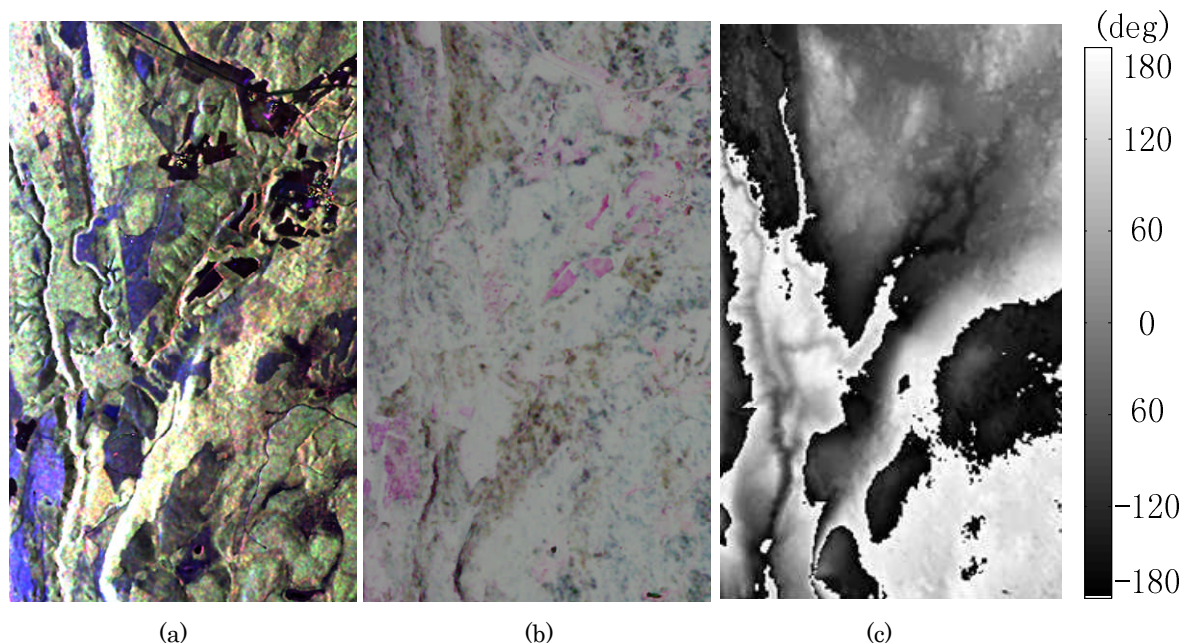(a)　　　　　　　　　　　(b)　　　　　　　　　　　(c)

Fig. 1.　Processed L band E-SAR PolInSAR images of the Krycklan test site (2486×1495 pixels). (a) Filtered master track RGB composite image with Pauli scattering components (HH-VV, HV and HH+VV). (b) Estimated polarimetric coherence magnitude. The polarimetric coherence RGB images are formed by linear basis coherence magnitude (HH, HV and VV). (c) Estimated HH polarization interferogram(in deg).