ANALYSIS METHODS OF ATMOSPHERIC ARTEFACTS IN THE APPLICATION OF SAR

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Certain atmospheric conditions may lead to erroneous propagation which might affect high resolution products like polarimetric SAR (synthetic aperture radar) Data in a serious manner. The reason can be found in the lower atmosphere (troposphere) as well as due to ionospheric driven influences. The main focus in this contribution lies in the troposphere where water vapour or irregularities in the refractive index may influence the propagation of waves.

As frequency becomes higher, attenuation effects may occur that may possibly limit the usefulness of such data. Moreover, phase effects can limit the interpretation of Interferometric SAR products in the way that subsidence of terrain or crustial deformation may be biased by such an atmospheric phase screen. The approach which has been taken in this contribution is of high impact and allows us to focus on atmospheric effects in a promising manner. The data which have been used are provided by E-SAR, the DLR airborne SAR system. Several innovative analysis methods has been devised and applied to a polarimetric L-Band data set. These procedures which can be considered as a major strategy to identify the influence of unwanted signals due to tropospheric effects have been systematically applied. The way in which the data was analysed and modified with the help of so called virtual pattern gives insightful information on the order of magnitude of the influences and represents a systematic approach to tackle the issue of atmospheric artefacts. In addition, suggestion for a second step of this investigation will be shown and further strategies will be anticipated. The investigations to be reported generate optimism about the potential techniques to account for atmospheric effects.