Spaceborne Interferometry: 15-16 April 1993, Orlando, Florida

Agropedology 2015, 25 (02), 202-212

Assessment of C-band SAR Interferometric Products for Land Cover Classification

Shelton Padua[1*], Vinay Kumar Sehgal[2] and Kishan Singh Rawat[2]

[1]ICAR – National Bureau of Soil Survey and Land Use Planning, Regional Centre, Jorhat-785004, India
[2]Division of Agricultural Physics, Indian Agricultural Research Institute, New Delhi – 110012, India

Abstract: Up to date information regarding the land cover types are required for environmental monitoring and remote sensing offers the best option for land cover mapping. of late, microwave remote sensing is increasingly utilized for land cover discrimination due to its all time, all weather capability. Synthetic Aperture Radar (SAR) Interferometry has significantly increased the potential of microwave remote sensing for land cover mapping. A study was conducted to assess the potential of SAR Interferometry for land cover discrimination using C-band ERS-1/2 SAR data in the Sind river basin, Madhya Pradesh. Use of SAR Interferometric products namely coherence and intensity for land cover classification in the study area gave an overall accuracy of 75%. The coherence alone could discriminate between vegetated and non-vegetated land covers. The vegetation types were found to be negatively affecting the coherence of the area, but, there was no direct negative relationship between coherence and Normalized Difference Vegetation Index (NDVI).

Key words: *Synthetic Aperture Radar, Interferometry, Intensity, Coherence, Land cover classification*

Introduction

Accurate mapping of land cover type is essential in a number of scientific disciplines and more particularly in environmental monitoring. Conventional ground based surveys of land cover mapping are prohibitively expensive due to involvement of large areas. Production of land cover maps from remotely sensed images has always been perceived as one of the greatest contribution of earth observation by satellites (Mumford *et al.* 1996; Barnsley *et al.* 1995; Higgins 1995). Optical satellite remote sensing methods are more appropriate, but require cloud free conditions for the data to be useful (Srivastava *et al.* 2006; Loveland *et al.* 1991). In tropical areas, cloud free acquisitions are rare, thereby reducing the optical sensors applicability in such areas. Radar, operating in the microwave window of the electromagnetic spectrum offers a solution to the cloud cover problem in that radar data acquisition is independent of cloud cover (Srivastava *et al.* 2006; Raucules *et al.* 2003; Bush *et al.* 1978). Moreover, radar is an active system making the data acquisition possible at any time. Coherence is an estimate of phase stability of the imaged targets in the time between two SAR data acquisitions. The normalized coherence is given by the complex correlation between two co-registered complex SAR images of backscatter intensities I_1 and I_2, according to the equation (Weydahl 2001):

$$\gamma = \frac{\langle I_1 I_2^* \rangle}{\sqrt{\langle I_1 I_1^* \rangle \times \langle I_2 I_2^* \rangle}} \quad (1)$$

The brackets ‹› indicate the estimated ensemble average and * denotes the complex conjugate.

Measurement of interferometric coherence and the backscatter intensity can significantly improve the potential of SAR data for land cover classification (Xiaobing *et al.* 2009). Satellite repeat-pass of a few days should be used when carrying out land cover discrimination using Interferometric SAR (InSAR). If the ground surface is undergoing changes caused by glacier motion, thawing conditions, moisture changes, field operations, or building constructions will cause the coherence to decrease (Weydahl 2001). Coherence can also decrease if the signal has a significant volumetric component, as is often the case for

*Corresponding Author Email:shelton_padua@yahoo.com

Spaceborne Interferometry: April , Orlando, Florida by Robert D. Reasenberg (): Robert D. Reasenberg: Books - loveinamasonjar.comSpaceborne Interferometry: April , Orlando, Florida (Proceedings / Spie--the International Society for Optical Engineering, V.) book download.Spaceborne Interferometry: April , Orlando, Florida. (Proceedings / Spie--the International Society For Optical. Engineering, V.) By Robert D.Spaceborne Interferometry: April , Orlando,. Florida (Proceedings / Spie--the International Society. For Optical Engineering, V.) By Robert D.Download pdf book by Robert D. Reasenberg - Free eBooks.We answer within 24 hours! Format: Paperback. of pages: Subject: Science & Math / Astronomy & Space Science / Astronomy. Publish date Publisher.Spaceborne interferometry: 15 - 16 April , Orlando, Florida. Society of Photo -Optical Instrumentation Engineers TIBKAT Ground sensing: 14 April , Orlando, Florida / Hatem N. Nasr, Spaceborne interferometry: April , Orlando, Florida / Robert .If you are searched for the book Spaceborne Interferometry: April , Orlando, Florida (Proceedings /. Spie--the International Society for Optical.Applied laser radar technology: April , Orlando, Florida / Gary W. Kamerman, William E. Keicher, chairs/editors ; sponsored and published .Download Spaceborne Interferometry: April , Orlando, Florida (Proceedings / Spie--the International Society for Optical Engineering, V.) book.Spaceborne Interferometry: April , Orlando, Florida (Proceedings / Spie--The International Society for Optical Engineering, V.).Spaceborne Interferometry: April , Orlando, Florida (Proceedings / Spie--The International Society for Optical Engineering, V.). 15 Jun Spaceborne interferometry: April , Orlando, Florida / Robert D. Reasenberg, chairs/editors [sic] ; sponsored and published by.