

EARTH OBSERVATION SYMPOSIUM (B1)
Earth Observation Applications and Economic Benefits (5)

Author: Prof. Vern Singhroy
Canada Centre for Remote Sensing, Canada

Dr. Francois Charbonneau
Canada Centre for Remote Sensing, Canada

Dr. Junhua Li
Canada Centre for Remote Sensing, Canada

HIGH RESOLUTION INSAR MONITORING OF HIGH RISK GEOHAZARDS SITES.

Abstract

During the past year there were at least twenty five media reports of landslides and seismic activities some fatal, occurring in various areas in Canada. These high risk geohazards sites requires high resolution monitoring both spatially and temporally for mitigation purposes, since they are near populated areas and energy, transportation and communication corridors. High resolution air photos, lidar and satellite images are quite common in areas where the landslides can be fatal. Recently, radar interferometry (InSAR) techniques using images from several radar satellites are increasingly being used in slope stability assessment. This presentation provides examples of using high-resolution (1-3m) frequent revisits InSAR techniques from RADARSAT 2 to monitor several types of high-risk landslides affecting transportation and energy corridors and populated areas. We have analyses over 200 high resolution InSAR images over a three year period on three geologically different sites. Coastal landslides in Canada represent a specific threat on the coastlines of populated areas in southern British Columbia and the Atlantic provinces because high tsunami potential. Along the Canadian coastline, there are various configurations of topography, geomorphology, and geology conditions, which are conducive to mass failure. In these coastal regions, landslides are triggered by seawater intrusion, coastal scouring, high intensity/frequency rainfall and storm events, land subsidence, human activity and rapid snowmelt, accompanied by favourable geological and geotechnical conditions. They occur without warning and with little time lag between failures and as such high resolution spatial and temporal images are required for monitoring. In Atlantic Canada, Hurricane Irene in August 2011 cost about 130 million dollars in damage and affected more than 250000 people resulting in several coastal landslides. The high resolution InSAR images are effective in characterizing differential motion within these low velocity landslides. These landslides become high risk during the active wet spring periods and RADARSAT InSAR images provided the baseline monitoring over the three year period. Our high resolution InSAR results provide an effective monitoring of high risk landslides that are triggered by seasonal and coastal storm events and will be used to plan acquisition of rapid revisits the RADARSAT Constellation Mission.