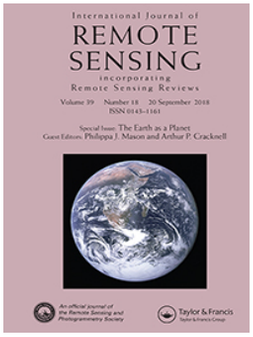

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SAR analysis of the Larsen-C A-68 iceberg displacements

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ABSTRACT

The fracture of the Larsen C ice shelf, which has been continuously monitored since the final months of 2016, started to grow rapidly in 2017 and, in February 2017, only a 20 km ice strip kept a huge section of the shelf attached to the Antarctic Peninsula. The final collapse, expected in 2017, occurred indeed between July 10 and July 12, with a loss of an area of some 6,000 km^2, corresponding to about 9–12% of the entire shelf. Following US National Ice Center (NIC) criteria, the calved iceberg was named 'A-68'. Responding to the ASI 'COSMO-SkyMed Open Call for Science Initiative', this paper presents a study of the initial phase of iceberg A-68 melting process and drifting trajectory. The analysis covers a period of six months and makes use of a set of COSMO-SkyMed ScanSAR Huge images.

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1. Introduction

The fracture of the Larsen C Ice Shelf (LCIS) has been continuously monitored since 2016, sometime giving rise to alarming news (Nasa 2017; Phys. Org. 2017; Kulessa et al. 2014). Following a previous study (Moctezuma-Flores and Parmiggiani 2016) and thanks to the ASI 'COSMO-SkyMed Open Call for Science Initiative', we decided to monitor the development of the LCIS fracture with COSMO-SkyMed (CSK) SAR images. The CSK image acquisitions over the area of interest started in January 2017 but were temporarily interrupted at the end of March in order to wait the development of the fracture in the next melting season. After the LCIS calving event of July, it was immediately decided to follow the evolution of the new giant A-68 tabular iceberg. In Figure 1 is the georeferenced CSK images of LCIS area before and after the iceberg detachment.

SAR instruments provide useful images for monitoring polar regions. As the microwave radiation of an active SAR instrument can penetrate through the clouds, SAR images are unaffected by cloud cover and are much better than the passive sensing of optical captors. The aim of this paper is the detection and tracking of iceberg A-68. To pursue this task, we decided to use brightness and topological parameters of SAR HH polarized images to define a set of linear functions for iceberg recognition (Mazur, Wahlin, and Krezel 2017). Using TerraSAR-X images, a recent study (Frost, Ressel, and Lehner 2016) presented an algorithm for constant false alarm rate (CFAR) detection in

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