

Interferometric study on sea ice, outlet glacier and ice sheet, Antarctica by ERS-1 SAR

Fumihiko NISHIO	Hokkaido University of Education, 1-15-55, Shiroyama, Kushiro-City, Japan, 085, fnishio@earth.kus.hokkyodai.ac.jp
Hiroshi Kimura	Gifu University, Faculty of Engineering, Gifu-City
Akira Takahashi	Communication Research Laboratory, Tokyo
Okitsugu WATANABE and Teruo Furukawa	National Institute of Polar Research, Tokyo

Abstract

we generated a series of two interferograms of the area in the Kaya Glacier, Lutzow Holm Bay, East Antarctica using data acquired from descending orbits during a 3-day repeat cycle of ERS-1 operations in December, 1991. The color sequence of yellow toward red indicates the direction in which the number of fringes increases. One complete color cycle (e.g. red to red) represents one fringe and a path length difference of wavelength in the round-trip. We discuss some results of interferometry for sea ice and Kaya Glacier movement flowing down from the ice sheet. The interferogram reflects one or more of several components in surface deformation. The example of the Kaya Glacier in December, 1991 displays a dense, colorful fringe patterns indicating vertical movements by tidal action, consistent with tide gauge records at Syowa Station. Another examples of the fast sea ice near Kaya and Shirase Glacier are displayed with fringe patterns indicating deformation of discontinuities in the pattern which are up to tens of kilometers long. These discontinuities in the pattern may reflect cracks that separate the fast sea ice into discrete segments, which were applied by either compression or tilting between two passes. These interferogram for sea ice and glaciers are potentially useful capabilities for many studies in polar regions. Additional work is important to verify the nature of discontinuities and reduce the uncertainties in the interpretation.

Keywords: SAR-interferometry, tidal motion, grounding line, topographic fringe