Geophysical Research Abstracts, Vol. 7, 09156, 2005 SRef-ID: 1607-7962/gra/EGU05-A-09156 © European Geosciences Union 2005



Monitoring the changing ice climate in the Arctic ocean using ocean waves as a tool

P. Wadhams

Dept of Applied Mathematics and Theoretical Physics, University of Cambridge, UK [Current address: Laboratoire d'Oceanographie de Villefranche, Villefranche-sur-Mer, 06230, France] (p.wadhams@damtp.cam.ac.uk)

When ocean waves penetrate for great distances through a sea ice cover, they propagate as flexural-gravity waves with very small amplitudes and with an altered dispersion relation. It has been shown that at a critical wave period (typically some 30 s for thick ice) a resonance occurs whereby the energy spectrum shows a distinct peak which is a function of the modal thickness of undeformed ice averaged over a line from the ice edge to the measuring site. Using this effect it is possible to monitor the mean ice thickness over the whole Arctic for long periods by a suitable network of satellite-tracked buoys which measure the flexural-gravity wave spectrum using tiltmeters. Since 2003 the author and colleagues have been developing and validating this technique as a component of two EU projects (GreenICE and SITHOS). Work in 2003 was done from an ice camp in the Beaufort Sea and from FS "Polarstern". In May 2004 an ice camp was established north of Ellesmere Island from which 4 buoy arrays were deployed, with a fifth added in August in Fram Strait. The four original buoys are still transmitting. Validation has been by drilling, by helicopter EM transects and by airborne laser profiling.