

Ice flow property derived from ICESat surface topography in West Antarctica

Jun Li¹ and H. Jay Zwally²

¹ Raytheon ITSS, Code 971, NASA Goddard Space Flight Center, Greenbelt, MD 20771

² Ocean and Ice Branch, NASA Goddard Space Flight Center, Greenbelt, MD 20771

The major difficulty in calculating ice sheet mass balance is a lack of sufficiently precise information on the flow properties. Analysis of the detailed variations in the ice sheet elevation profile against bedrock reliefs provides valuable means of determining ice flow properties. In this study, the power spectral analysis of the detailed ICESat surface undulation data against available bedrock profiles was performed along selected sections near West Antarctic flow-lines. Results show that the spectra of the surface undulations are characterized by a minimum damping indicated by a peak value of the power with wave-length of several km, while the magnitude of the spectra power for the bedrock intending increase with the wave-length. By using balance velocity and mean damping factor with wave-length 20-40 km the mean ice viscosities were estimated with magnitude of 10^{16} - 10^{18} P, varying clearly along with the temperature changes.