

# Transition Flow of Ice Surrounding Subglacial Lake Vostok

*Weili Wang<sup>1</sup>, Jay Zwally<sup>2</sup> and Matthew Beckley<sup>1</sup>*

*1. SGT, NASA/GSFC, Code 614.1, Greenbelt, MD 20771, USA.*

*2. Cryospheric Sciences Branch, NASA/GSFC, Code 614.1, Greenbelt, MD 20771, USA.*

The Ice, Cloud, and land Elevation Satellite (ICESat) provides precise, high-resolution surface elevation data that is improving glaciological studies in many aspects. One example, the research presented here, is the study of ice flow over subglacial Lake Vostok in East Antarctica. Lake Vostok, about 240 km long and 50 km wide, is the largest subglacial lake in the Antarctic ice sheet. Using ICESat-derived surface elevation data we mapped the surface topography over the subglacial Lake Vostok region, and identified the transition zones between the lake and the surrounding ice sheet. The transition zones are characterized by a trough in the western shoreline and a ridge in the eastern shoreline of the lake. We measured the transition zone along the ~180 km long western shoreline to be 15-25 km wide and 4-20 m deep, while the transition zone along the ~180 km long eastern shoreline is approximately 15 km wide and 4-12 m deep. Numerical analysis of the ice flow status within the transition zone suggests that the trough is formed due to the dynamic change in the flow of ice which deforms from vertical compression to vertical extension. The ice flow from the upstream (ice-sheet interior) side is dominated by vertical shearing, while downstream of the lake's grounding line the flow is dominated by basal sliding into the lake.