

# **Institute Ice Stream: An analog to the Ross Embayment ice streams in the Ronne drainage**

*Ted Scambos*

*NSIDC, University of Colorado*

Landsat image pairs and regional ice morphological mapping show a host of characteristics of the Institute Ice Stream (IIS) that are reminiscent of the Ross Embayment ice streams on the opposite side of the WAIS. Surface features in enhanced-resolution images suggest that the Institute has an extensive ice plain on its northeastern side, and an intensely-shearing ice-on-ice margin along the eastern boundary of the stream. Elevation mapping from an image-enhanced portion of the RAMP DEM and velocity mapping from Landsat image pairs provide information on flow speed, strain, and driving stress. These data indicate that the Institute trunk has extremely low average slope (0.0008; lower than several major ice streams) and low driving stress. Maximum flow speed in the lower trunk is just under 400 m a<sup>-1</sup>, and observations spanning 11 years show no significant change in flow speed. As of 1997, the mass flux of IIS was 22.7 +/- 2 Gt a<sup>-1</sup>, while input from accumulation is estimated at 25.1 +/- 2 Gt a<sup>-1</sup>. Changes in slope and flow speed in the upper trunk define a very clear transition, or 'onset' to streaming ice flow, suggesting a significant change in basal properties there.

In the Ronne Shelf area downstream of IIS, a set of streaklines curves sharply near the Korff Ice Rise, implying a significant change in ice flow direction in the recent past. Between the Korff and Henry ice rises lie the Doake Ice Rumples, lightly-grounded regions that partly obstruct outflow from IIS. It is hypothesized that changes in thickness (or basal melt rates) on the Ronne would significantly affect the proportion of IIS ice that flows over the Doake Ice Rumples. Such a change in thickness may explain the curved streaklines. Further evidence of flow changes in the western Ronne Ice Shelf may be preserved in flow-stripes downstream of the Doake rumples.