

# **Integrating satellite observations with modeling: basal shear stress of the Filchner-Ronne Ice Streams, Antarctica**

*Ian Joughin*

*Jonathan Bamber*

*Doug MacAyeal*

*Ted Scambos*

*Mark Fahnestock*

We used control-methods inversions to determine the basal shear stress beneath the Filchner-Ronne Ice Streams where new high-resolution velocity data sets have recently become available. We used an existing inversion algorithm that has been applied successfully to the Ross Ice Streams. The data reveal areas of low basal shear stress that suggest the presence of weak dilatant till beneath the eight Filchner-Ronne Ice Streams we examined. The distribution of this till is patchier than that beneath the Ross Ice Streams, with several “sticky spots” supporting much of the driving stress. This is consistent with earlier studies that indicated a high degree of variation in till porosity beneath Rutford Ice Stream from seismic data. The higher mean basal shear stresses imply significantly higher basal shear heating, which may explain the more steady flow relative to the Ross Ice Streams.