

Basal Melt Beneath the Filchner-Ronne Ice Shelf

Ian R. Joughin
Jet Propulsion Lab
M/S 300-235
4800 Oak Grove Drive
Pasadena, CA 91109, United States
818-354-1587 (voice)
818-393-3077 (fax)
ian@radar-sci.jpl.nasa.gov

Laurence Padman
Earth & Space Research
3350 SW Cascade Ave
Corvallis, OR 97333-1536
541-753-6695 (voice)
541-753-1999 (fax)
padman@esr.org:

Basal melt beneath ice shelves is factor in the overall mass balance and stability of ice shelves. The resulting ice shelf water also contributes to the formation of Antarctic bottom water. For these reasons, basal melt beneath the Filchner-Ronne has been studied by both the glaciological and oceanographic communities. These studies have lead to a wide range of estimated values for the basal melt.

We have derived an estimate of ice flow velocity for nearly [✓]entire the Filchner-Ronne Ice Shelf and and nearly all the major ice streams feeding it. In conjunction with ice thickness data, we have derived basal melt/freeze rates for most of the ice shelf. The patterns of freeze/melt agree well estimates from oceanographic models. From the basal freezing rates, we are able to derive the distribution of marine ice thickness beneath the shelf , which appears to be in good agreement with the observed marine ice distribution. We have also determined total basal melt beneath the ice shelf by comparing the difference in the inputs (flux across grounding line, accumulation) with the outputs (flux at the front of the shelf).