Ocean properties beneath Pine Island Glacier revealed by Autosub3 and implications for circulation and melting

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Toward PIG, Temperature

Toward PIG, Dissolved Oxygen

Outer shelf

PIG

British Antarctic Survey
NATURAL ENVIRONMENT RESEARCH
Temperature beneath the floating ice
Meltwater fraction
Light attenuation
Implications:

Ice cavity topography:
- numerous 50-200+m deep / large crevasses, especially close to the grounding line;
- and dent-like features with sharp 20m drops;

Ocean:
- the ridge has a profound impact on circulation and melting, as warm water must pass over it;
- meltwater is associated with relatively turbid water, suggesting a sediment source from the grounding line;
- the ridge also represents a source for tidal flow and local mixing enhancement;
- positive feedback as thinning ice gives warm water access to greater ice surface and increase the melting potential.
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