Near-surface temperature gradients detected by microbuoys in the Arctic Ocean

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Microbuoys

(1) Autonomous observations of small-scale processes

(2) Robustness through numbers
ADMB deployment

- UAS deployment system
- Drift with surface currents
- Radio data upload
Deployment

July-August 2013
Temperature gradients

Gradients by region and day

04 AUG

05 AUG

06 AUG

07 AUG

08 AUG

-1 -0.5 0 0.5 1 1.5 2

Gradient [° C m⁻¹]

ADMB

3cm

1m

negative gradient

positive gradient

Temperature
Temperature gradients

Gradients by region and day

Southern Set:
- >2 weeks since ice
- positive gradients

Temperature

Gradie

Depth

Temperature
Temperature gradients

Gradients by region and day

Northern Set:
- Remnants of ice cover
- Negative gradients

ATOM image of ice floe edge
Vertical scales in sensing

PMW  ITP  CTD  μB

mm  cm  m  10 m  100 m  1000 m

Light  NPP
Ongoing development

- Adjustable sensing programs
- Pushbutton operation
- Easy deployment
- 30+ day battery life
- ~500 mL volume
- 1-5 m cable
- Iridium data retrieval
- Suspended sensing package
Future development

Adjustable sensing programs

Iridium data retrieval

~500 mL volume

1-5 m cable

Suspended sensing package

Potential sensors:
• Temperature
• Conductivity
• Pressure
• Acoustics
• Light
• …
Microbuoys in Arctic Observations

Collaborative deployments

- Spatial variability around larger observing systems
- Local ocean conditions
- Informing ice forecasting
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