Study of Environmental Arctic Change
Open Science Meeting

Pan-Arctic Observations of Interannual Snowmelt Change and Application to Flood Forecast

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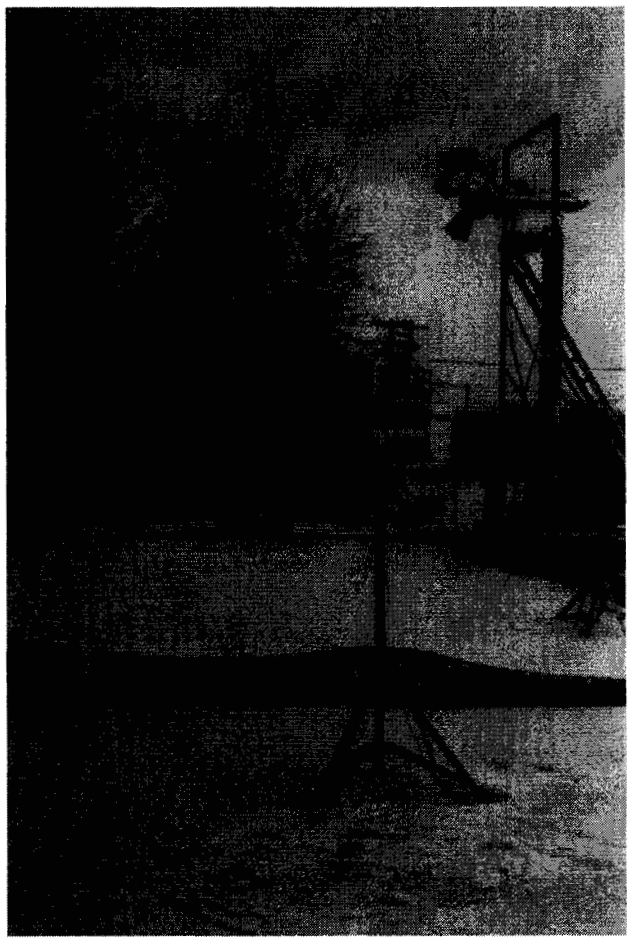
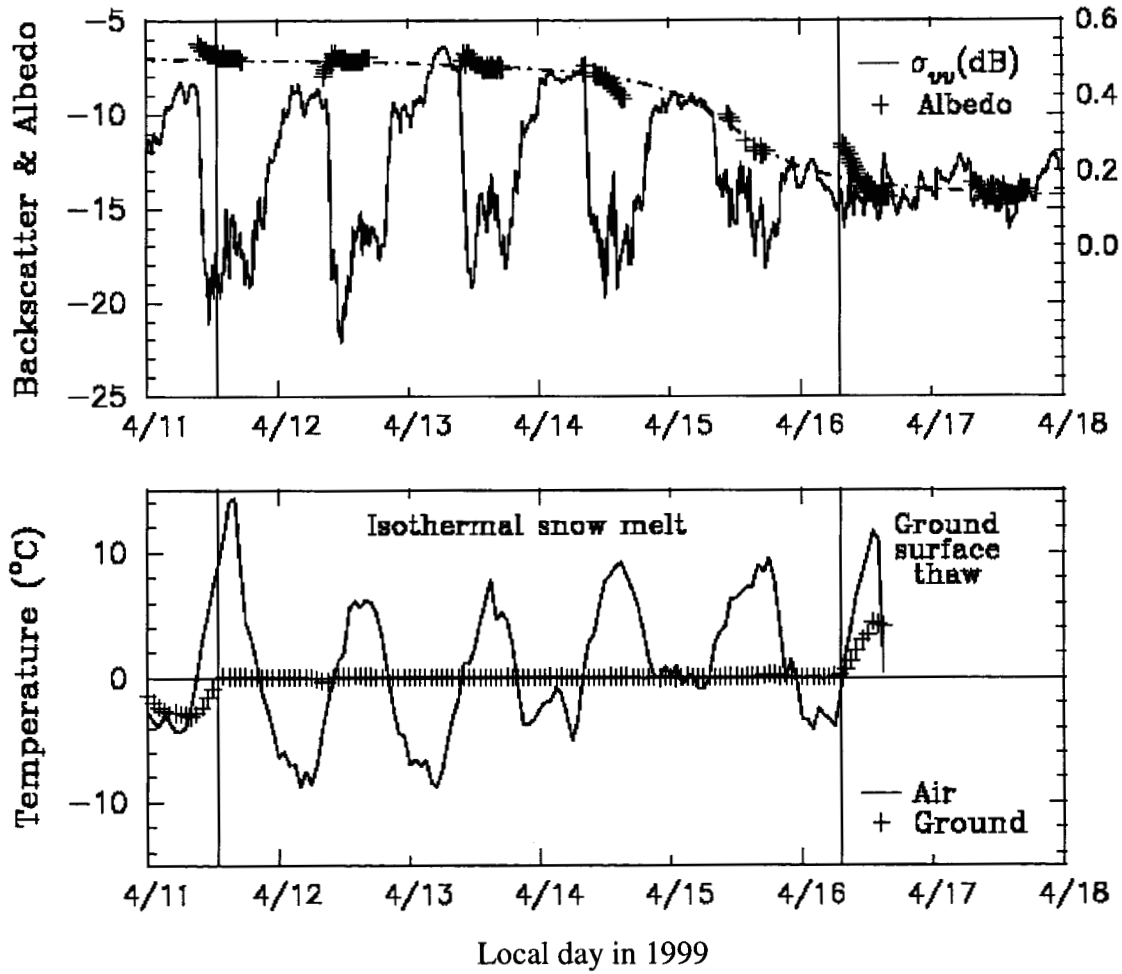
Ku-Band Radar Signature: Snowmelt Process

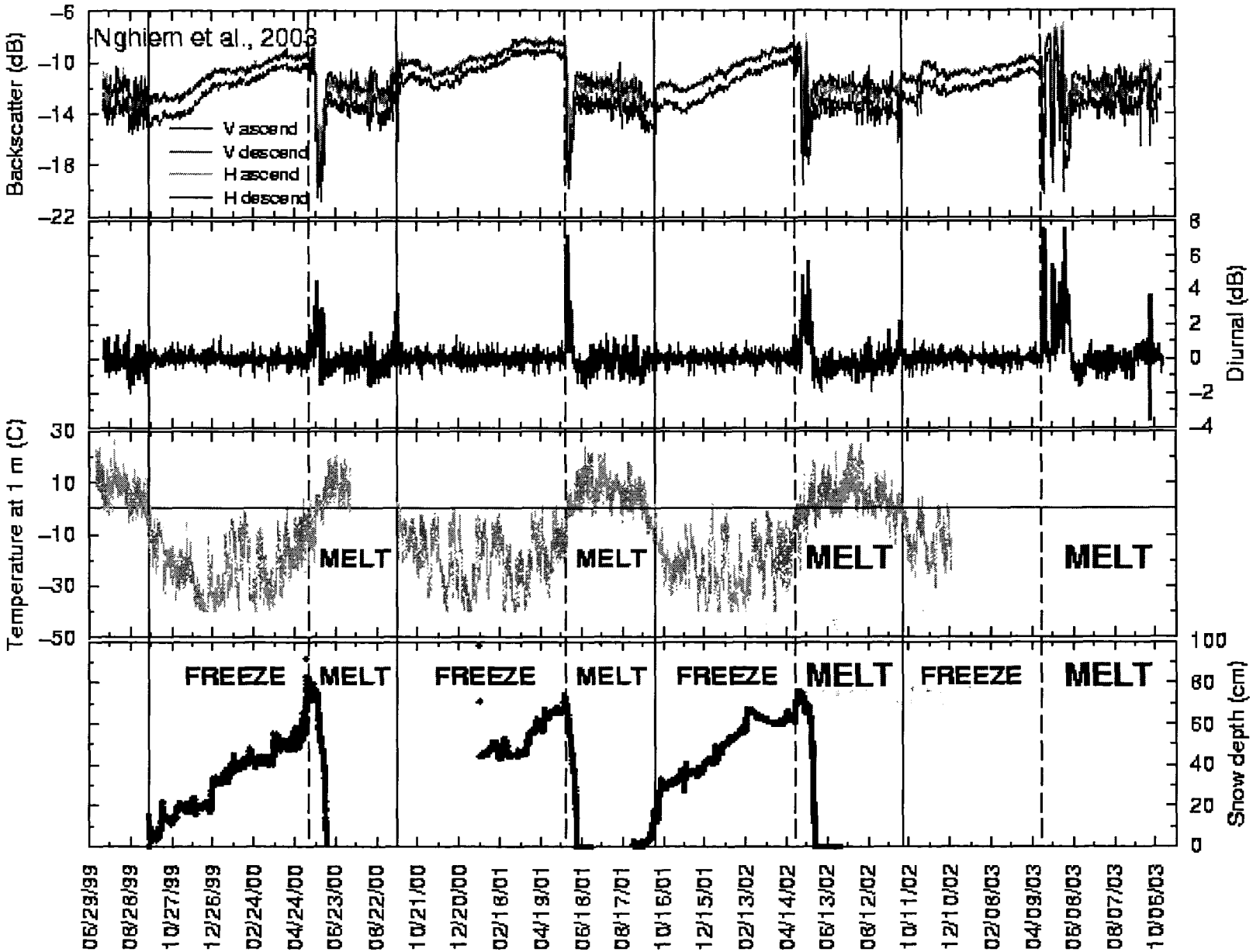
1999 Alaska Experiment (Nghiem, Sturm, Perovich et al.)





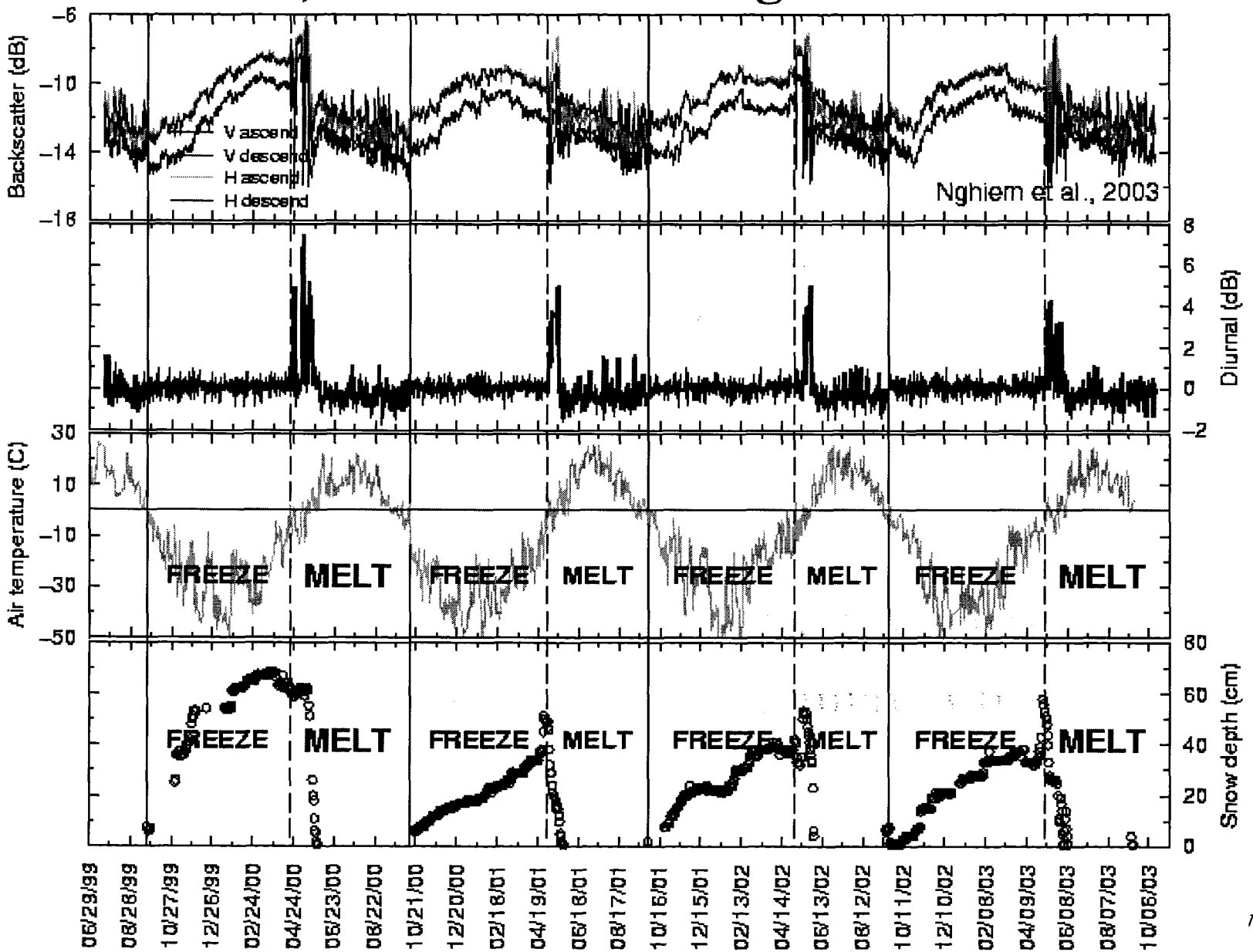
Time-Series Record for ATLAS Stations

Ivotuk, Alaska : 2002 & 2003 long melt/summer



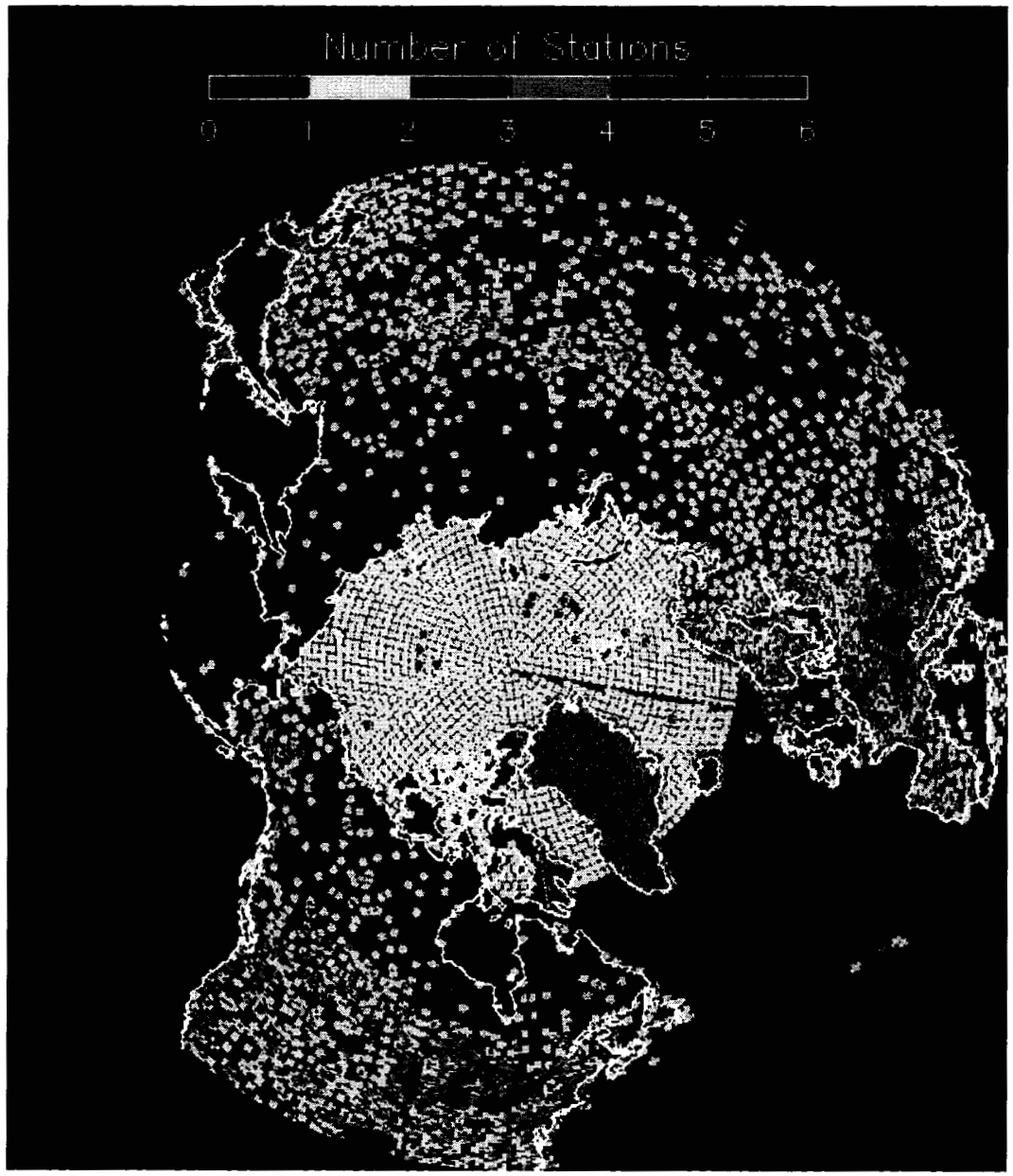
Time-Series Record for NCDC Stations

Olenek, Siberia : 2003 long melt/summer

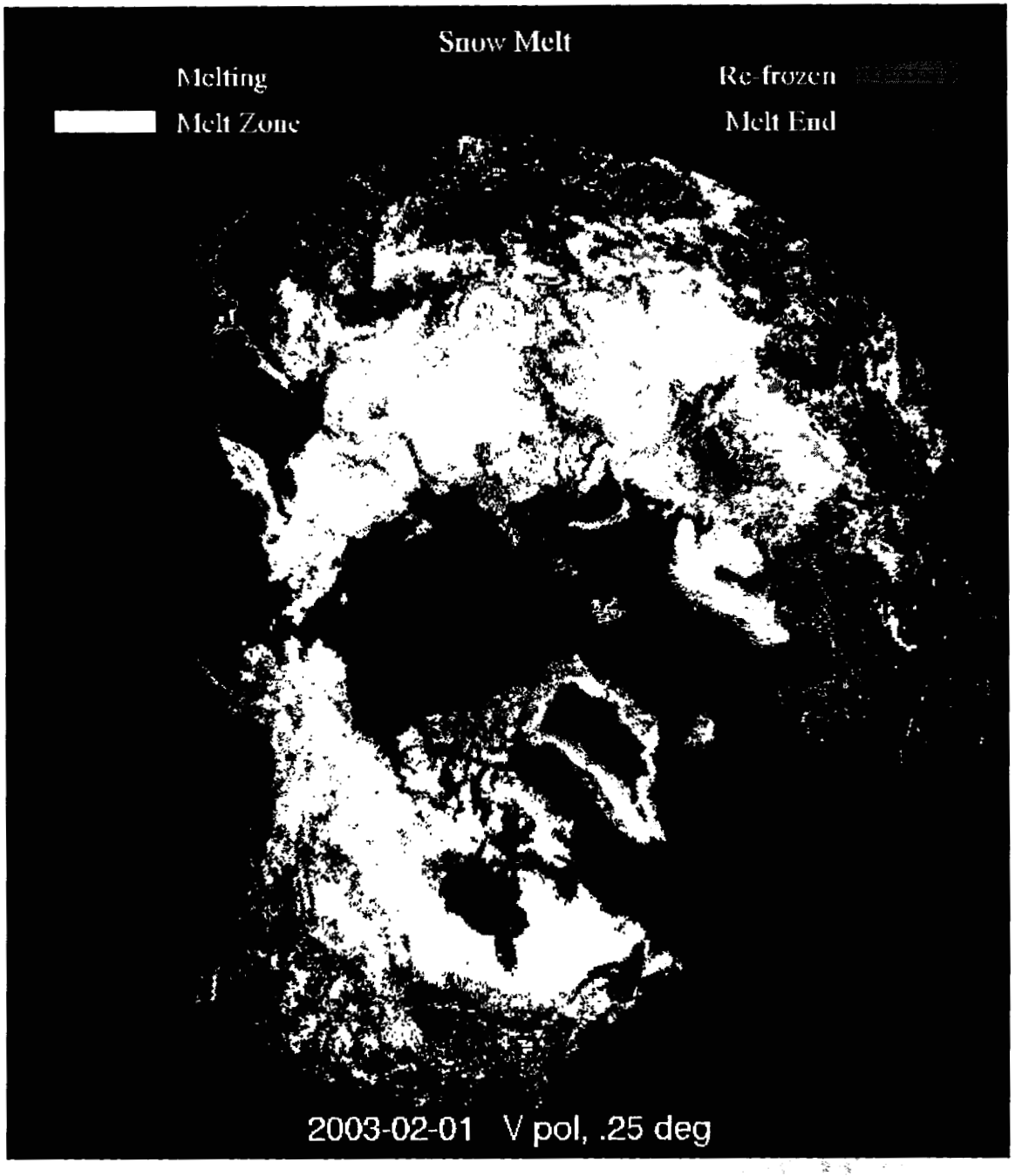


Satellite Stations for Cold Regions (SSCR)

Each station contains multi-year time-series

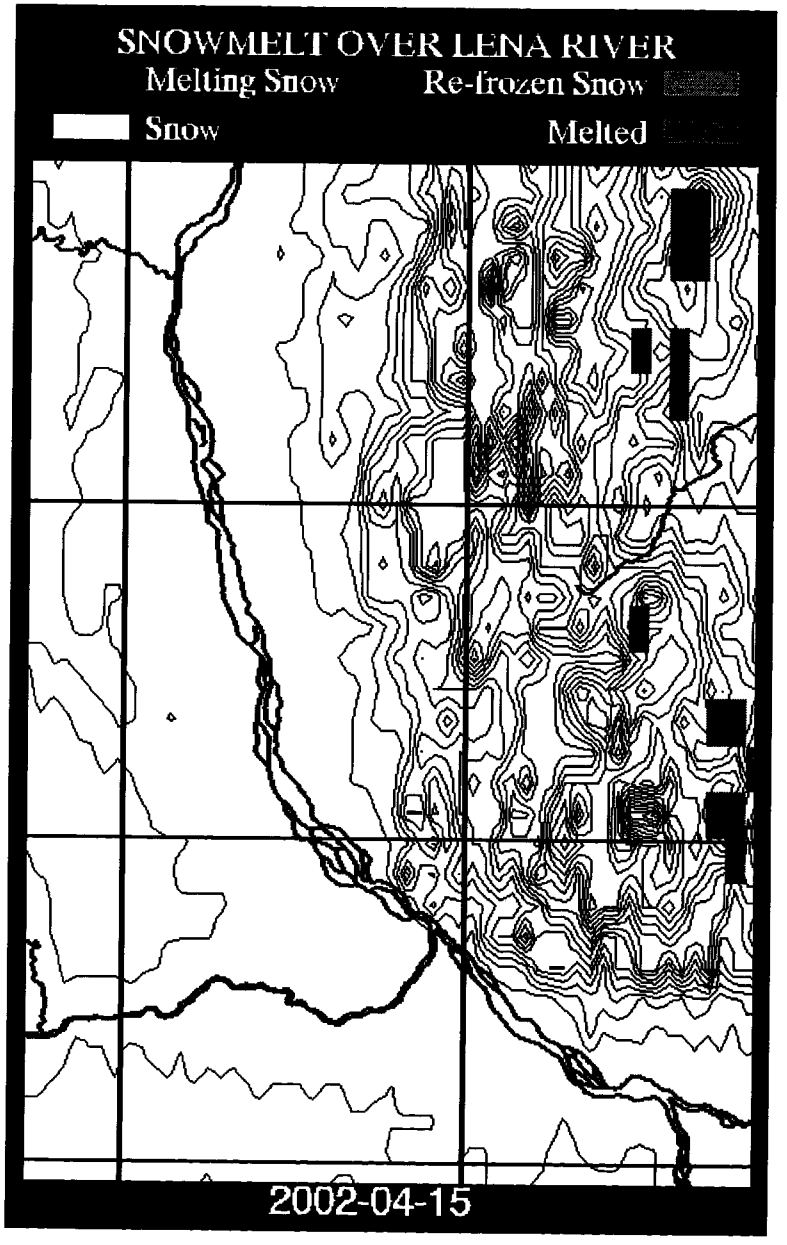


Hemispheric Snowmelt Monitoring



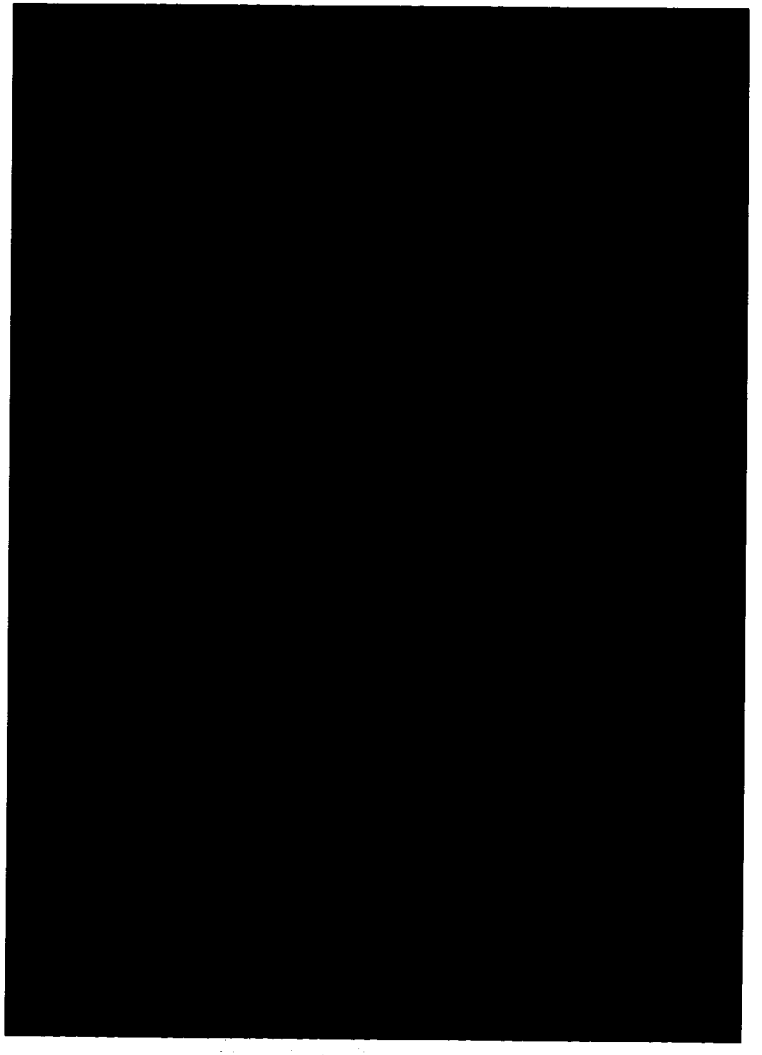
Snowmelt and Lena River Floods

Early Flood Detection (Nghiem and Brakenridge)



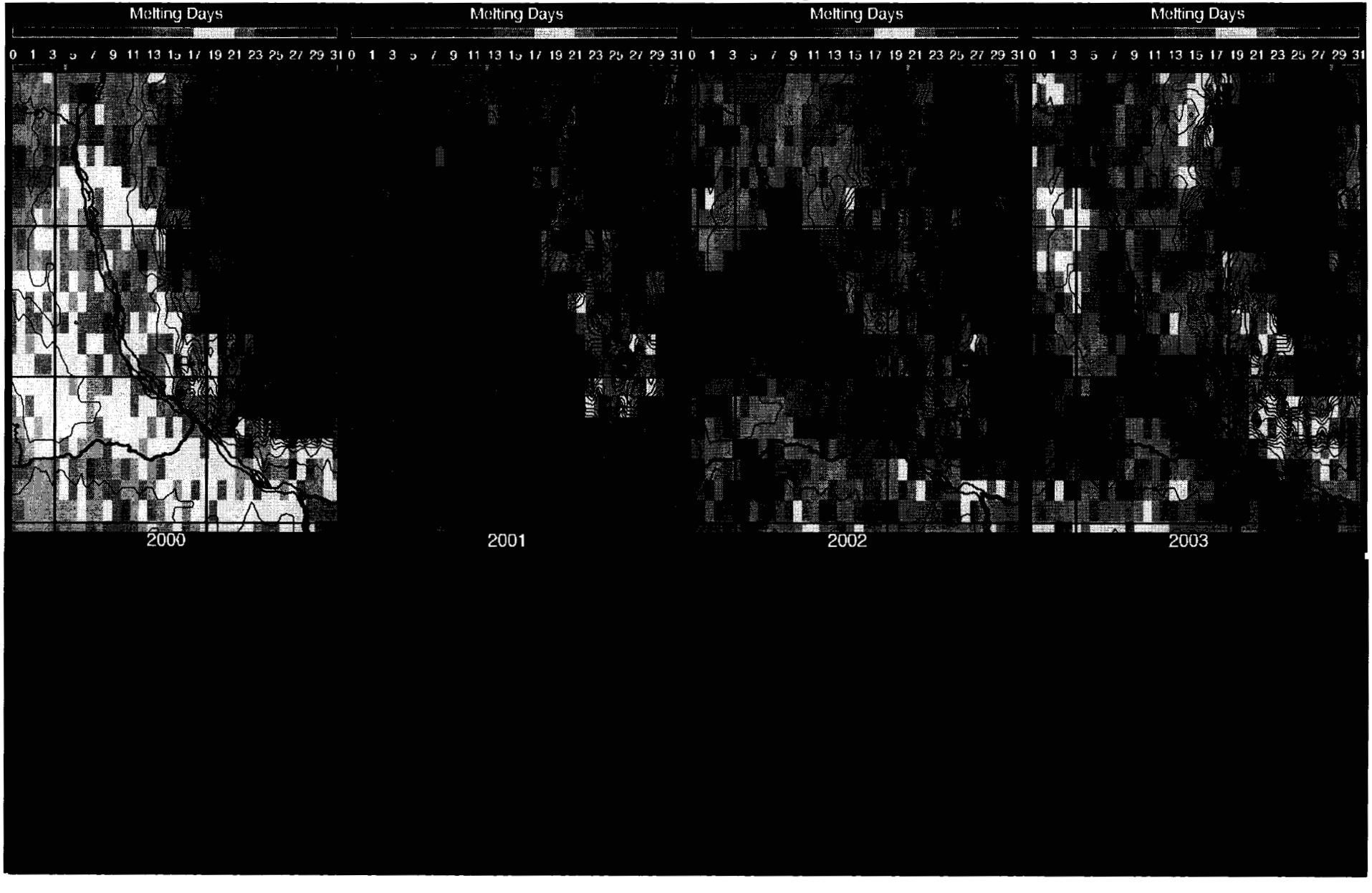
Lena River Floods

6/1/2002 vs 6/8/2002



Snowmelt Days and Flood Severity

$$S_f = 0.01 \cdot \ln(D) \cdot S_c \cdot A^{1/2}$$



Conclusions for SEARCH

Pan-Arctic observations of snow accumulation and melt

- Hemispheric scale and frequent coverage (2 times/day)
- Multi-satellite sensors: QuikSCAT/MODIS/AMSR
- Snow parameters: snow extent, albedo, SWE, melt

Pan-Arctic station networks/systems are necessary

- Network/systems: NCDC ATLAS ArcticNet E-RIMS …
- Understand snow processes: devel./validate algo./models

Regional to pan-Arctic modeling

- Land/snow data assimilation with hydrological model
- Forecast: flood and hydrologic response and change