

Polar Gridding Issues

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MODIS Science Team Meeting

Outline

- * Polar Grids for Snow and Ice Products
- * Recommendations from the MODIS Snow and Ice Workshop and NSIDC PoDAG meeting
- * Simulating a MODIS image of Arctic sea ice with Landsat TM data
- * Comparison of two methods of gridding the sea ice image to a polar grid
- * Future plans

SSMI Brightness Temperatures for 7 February 1988 (19H Channel)



EASE Grid; ascending and descending data averaged together.



SSMI Polar Stereographic Grid.

EASE-Grid Attributes

- **Azimuthal Equal-Area Map**
 - grid cell aspect ratio varies from 1:1 at the pole to 2:1 at the equator
 - nested grids are easily defined and are also equal-area
 - same goes for coarser resolution grids
- **Rectangular grid coordinates**
 - relationship between the positions of grid cells is implicit, i.e. cell $(x,y+1)$ is adjacent to cell (x,y)
 - easily stored in computer program arrays
- **Separate grids for northern and southern hemispheres**

Recent Recommendations:

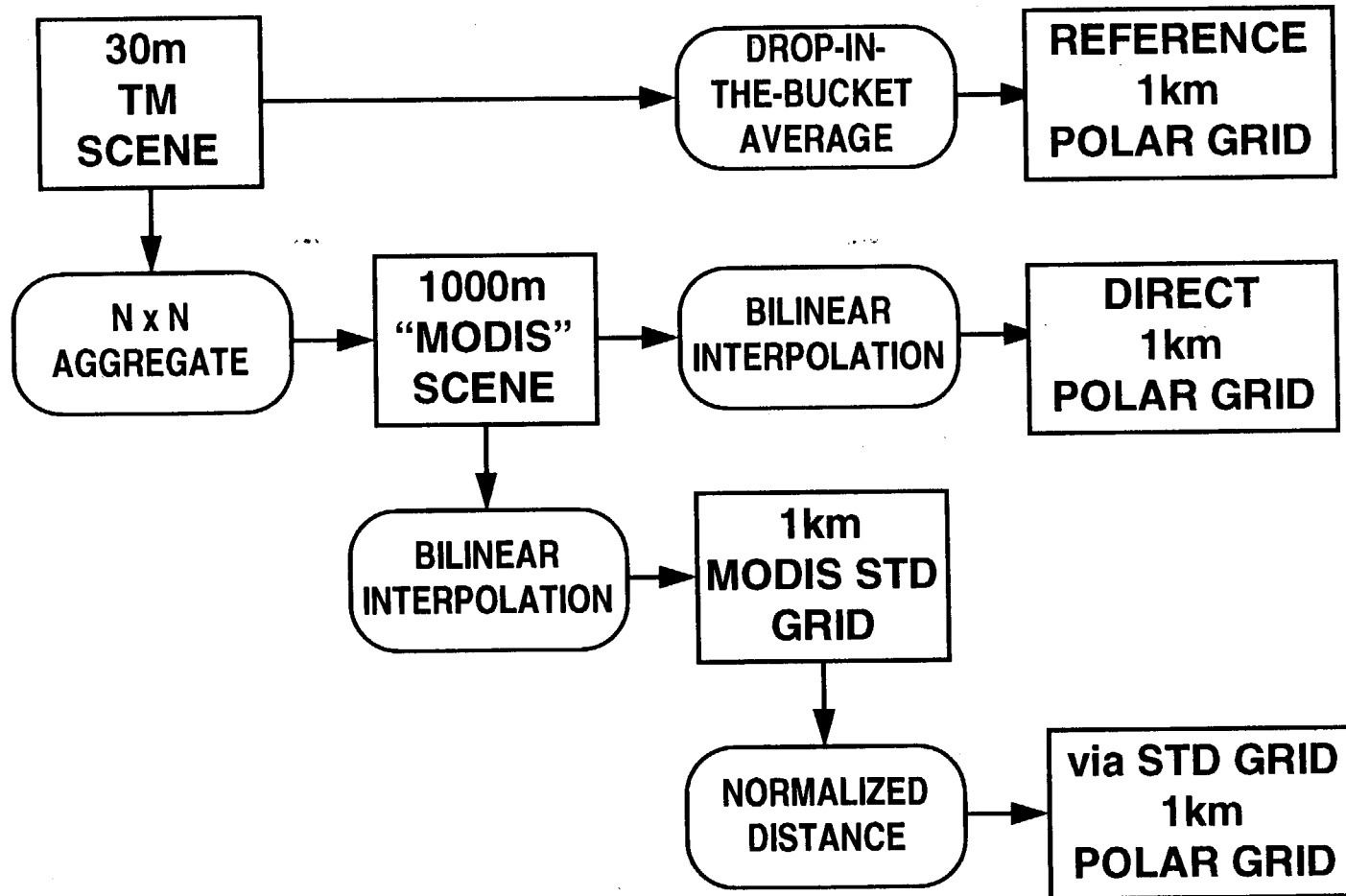
* MODIS Snow and Ice Workshop (Sept 95):

"The planned ISCCP-derived grid for EOS Level 3 products may not be suitable for polar applications of the MODIS Snow and Ice products. More information is needed to determine the best approach (that is efficient while preserving scientific integrity) to routinely produce these data for the polar community"

* NSIDC Polar DAAC Advisory Group (PoDAG) (Oct 95):

"PoDAG is concerned that the proposed ISCCP-derived grid for MODIS level 3 EOS products may not be suitable for polar applications. NSIDC will review possible approaches for producing level 3 data in a polar projection. A letter will be formulated and send to R. Wolfe, A. Strahler and B. Evans stating PoDAGs concern."

Data Flow





REFERENCE



DIRECT to
POLAR GRID



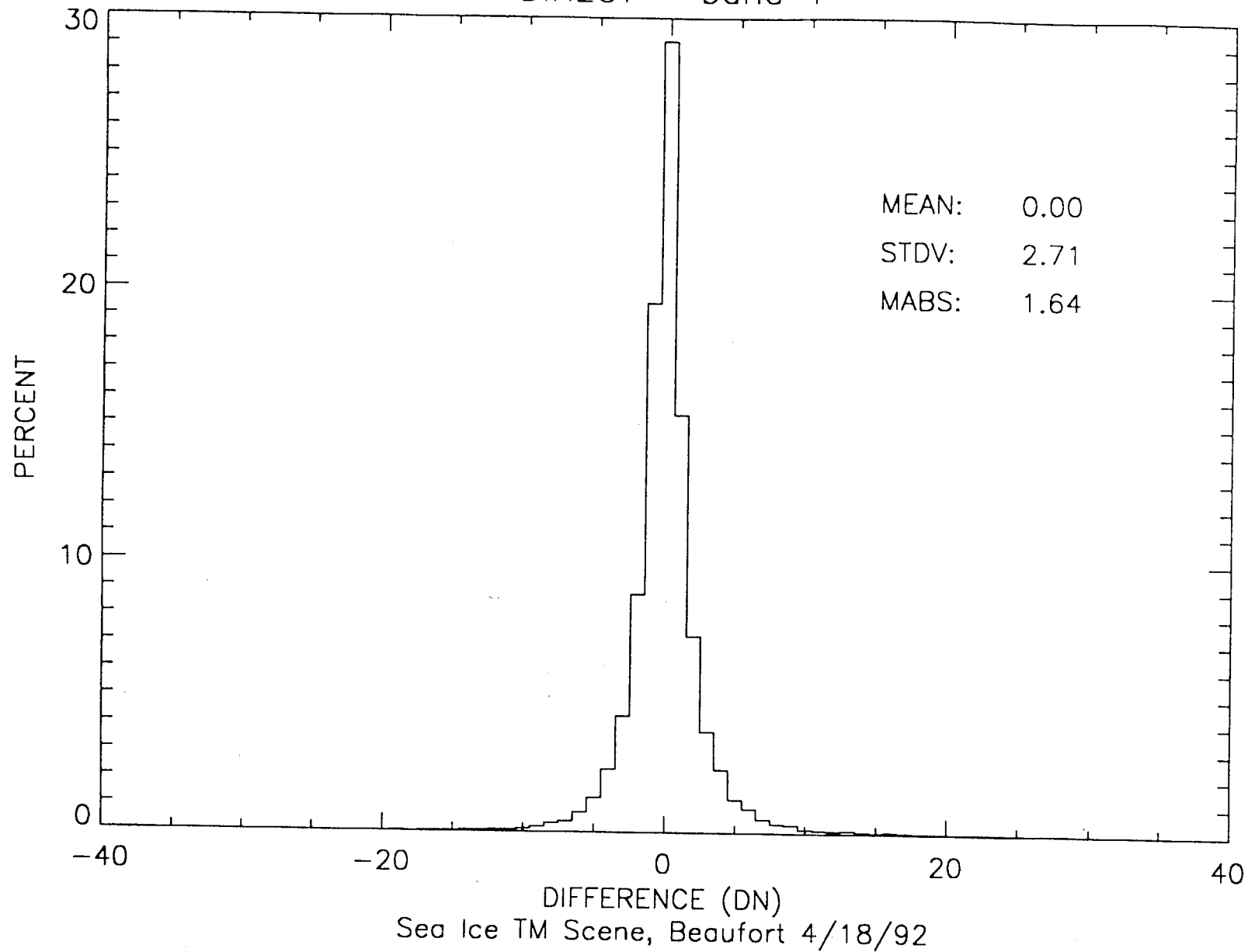
via MODIS
STD GRID

Sea Ice Example - Beaufort 4/7/92

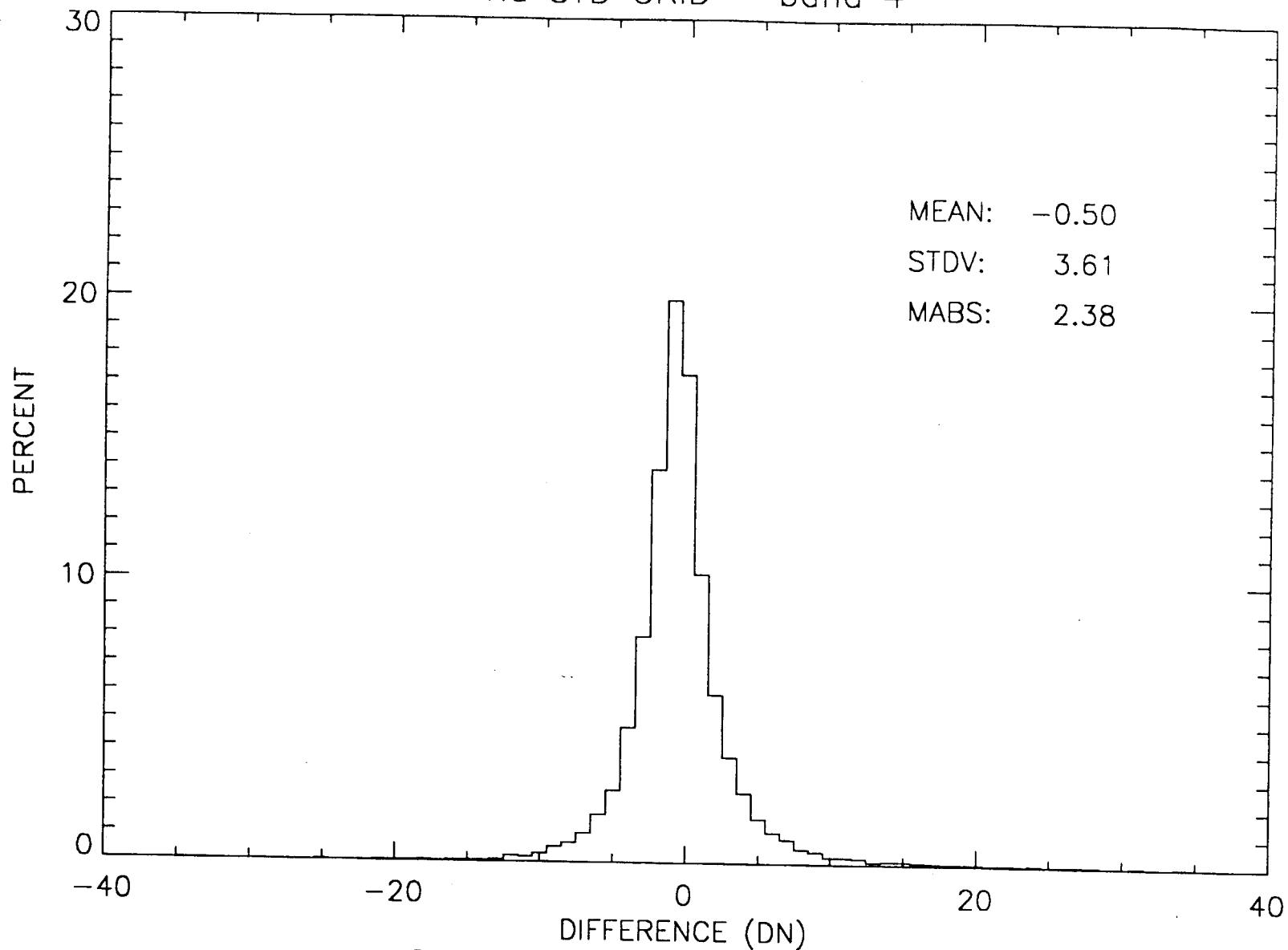
MODIS Polar Gridding Schemes

MEAN ERROR	band 2	band 4	band 5	band 6
Vatnajokull 10/19/92 via STD GRID	-0.26	-0.28	-0.37	-0.47
Vatnajokull 10/19/92 DIRECT	0.10	0.09	0.01	-0.08
Beaufort Sea 4/7/92 via STD GRID	-0.44	-0.45	-0.46	-0.33
Beaufort Sea 4/7/92 DIRECT	-0.01	0.00	0.00	0.00
Beaufort Sea 4/16/92 via STD GRID	-0.46	-0.46	-0.42	-0.22
Beaufort Sea 4/16/92 DIRECT	0.00	0.00	0.00	0.00
Beaufort Sea 4/18/92 via STD GRID	-0.50	-0.50	-0.50	-0.41
Beaufort Sea 4/18/92 DIRECT	0.00	0.00	0.00	0.00
STANDARD DEVIATION	band 2	band 4	band 5	band 6
Vatnajokull 10/19/92 via STD GRID	2.11	2.53	1.92	1.13
Vatnajokull 10/19/92 DIRECT	1.87	2.25	1.74	1.02
Beaufort Sea 4/7/92 via STD GRID	3.06	3.44	1.24	0.97
Beaufort Sea 4/7/92 DIRECT	2.26	2.48	0.93	0.70
Beaufort Sea 4/16/92 via STD GRID	1.83	2.06	0.74	0.56
Beaufort Sea 4/16/92 DIRECT	1.50	1.72	0.62	0.41
Beaufort Sea 4/18/92 via STD GRID	3.14	3.61	1.74	0.71
Beaufort Sea 4/18/92 DIRECT	2.35	2.71	1.21	0.55
MEAN ABSOLUTE ERROR	band 2	band 4	band 5	band 6
Vatnajokull 10/19/92 via STD GRID	1.01	1.28	1.05	0.72
Vatnajokull 10/19/92 DIRECT	0.83	1.08	0.87	0.51
Beaufort Sea 4/7/92 via STD GRID	1.61	1.82	0.86	0.54
Beaufort Sea 4/7/92 DIRECT	0.99	1.14	0.50	0.32
Beaufort Sea 4/16/92 via STD GRID	1.10	1.20	0.55	0.27
Beaufort Sea 4/16/92 DIRECT	0.70	0.78	0.30	0.14
Beaufort Sea 4/18/92 via STD GRID	2.05	2.38	1.13	0.52
Beaufort Sea 4/18/92 DIRECT	1.39	1.64	0.72	0.26

DIRECT - band 4



via STD GRID - band 4



Future Plans:

- * Incorporate MODIS snow and ice algorithms.
- * Reproduce data at regional to hemispheric scales.
- * Repeat tests with MAS data.
- * Compare alternative interpolation techniques.