National Snow and Ice Data Center

Supporting Cryospheric Research Since 1976

AMSR-E Snow Products Validation

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Advanced Microwave Scanning Radiometer for NASA's Earth Observing System
AMSR-E

Outline

Interactions with the AMSR-E Snow Algorithm Team

Tibet case study: improved spatial resolution from AMSR-E

Passive microwave vs. visible snow cover

Blending AMSR-E SWE with MODIS snow cover

T_B time series at Dome C

Interactions with Snow Algorithm Team

We reviewed V001 Snow Products (late Feb 04). Status:

B01: Feb – Apr '04

B02: Jun '02 – Mar '03 & Apr – Jun '04

Issues reported to algorithm team, fixes are planned for a future release:

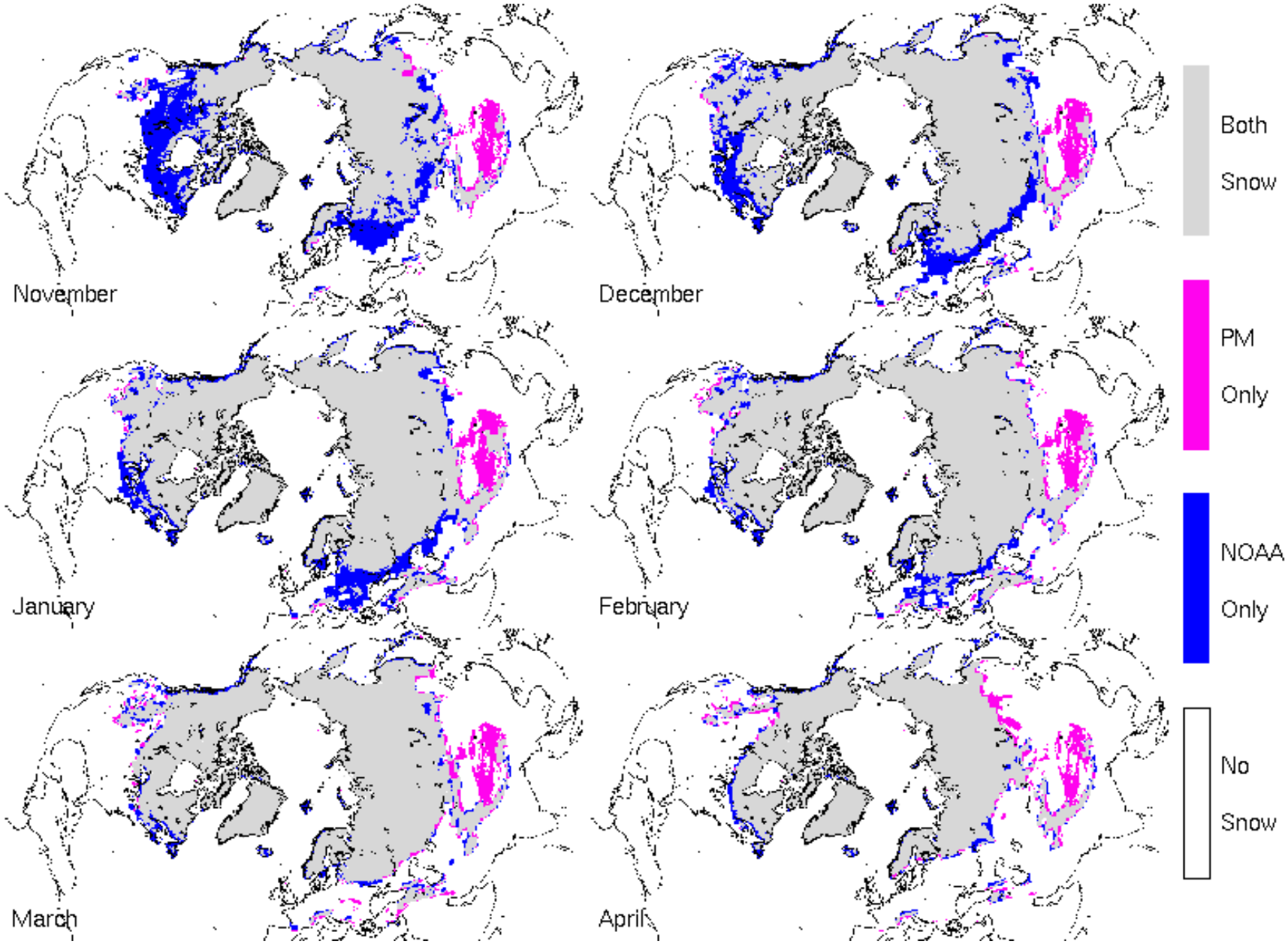
- *SWE range of values too conservative, will be scaled*
- *Offset land/permanent ice masks; we produced and delivered to R. Kelly alternative masks from GLCC and BU-MODIS*
- *Some data was adversely affected by orbital maneuver, a check for this has been added*

We are discussing alternative approaches to the static snow climatology currently being used.

Interactions with Snow Algorithm Team (cont'd)

We provided historical (1987-2003) monthly SSM/I-derived SWE to team for time series analysis.

We are reviewing newly released data, and plan to confirm expected changes as they are incorporated. N.B. Issue of PGE update notes raised by Melinda yesterday is critical to timely, efficient validation of expected changes in a given release.



Monthly snow extent climatology for NOAA and passive microwave data for the period 1978 to 1999 (50% or more of the weeks in the particular month over the total time period classified as snow covered).

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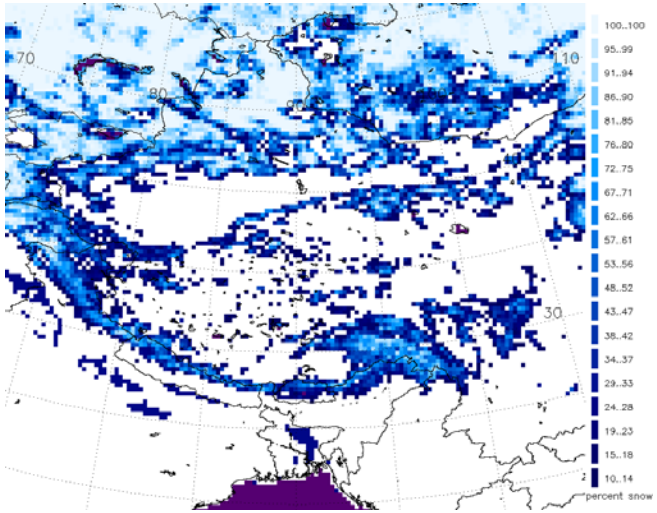
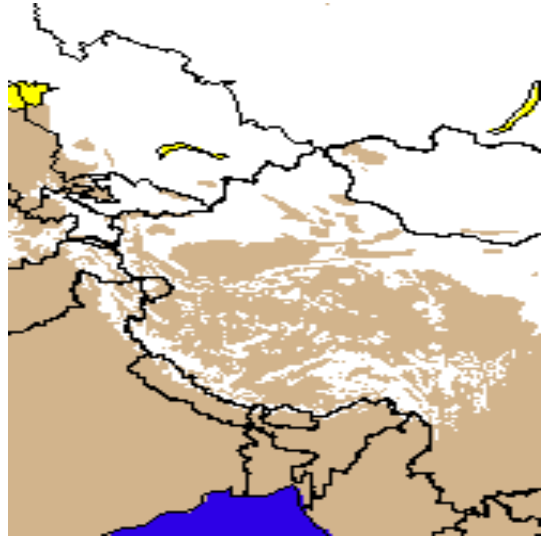
Tibet Plateau Region Snow Cover

Jan 9-16, 2003

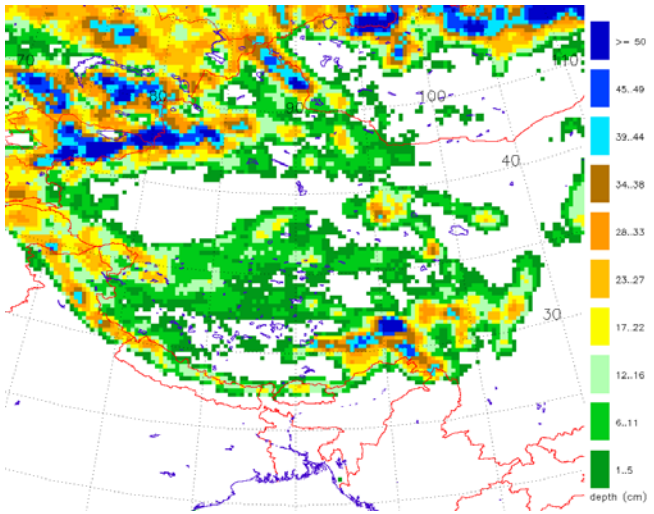
MODIS

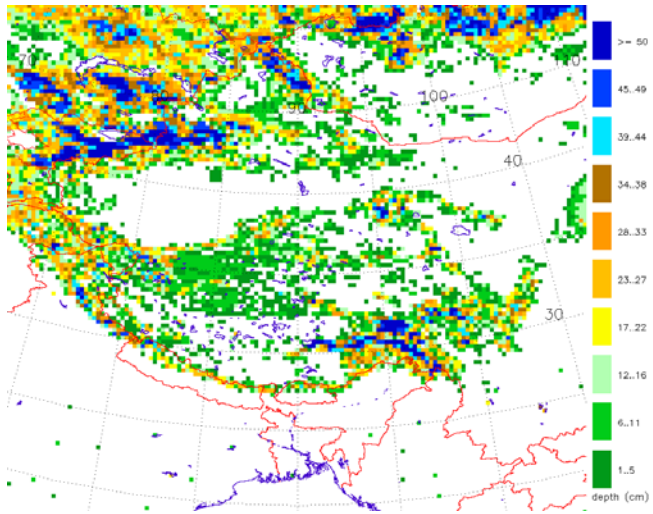




NOAA
IMS

SSM/I





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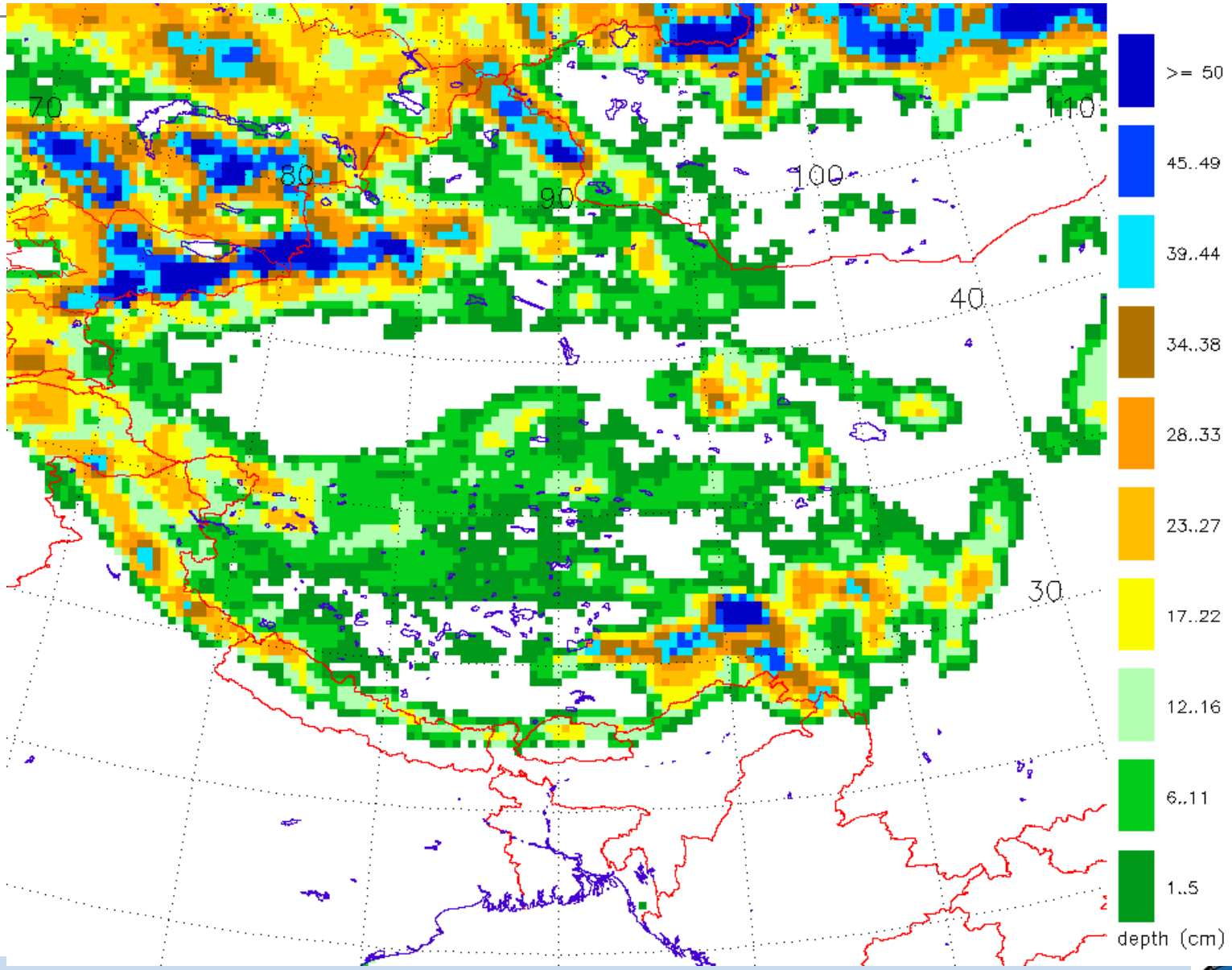
Snow Cover Derived from SSM/I January 9-16 2003



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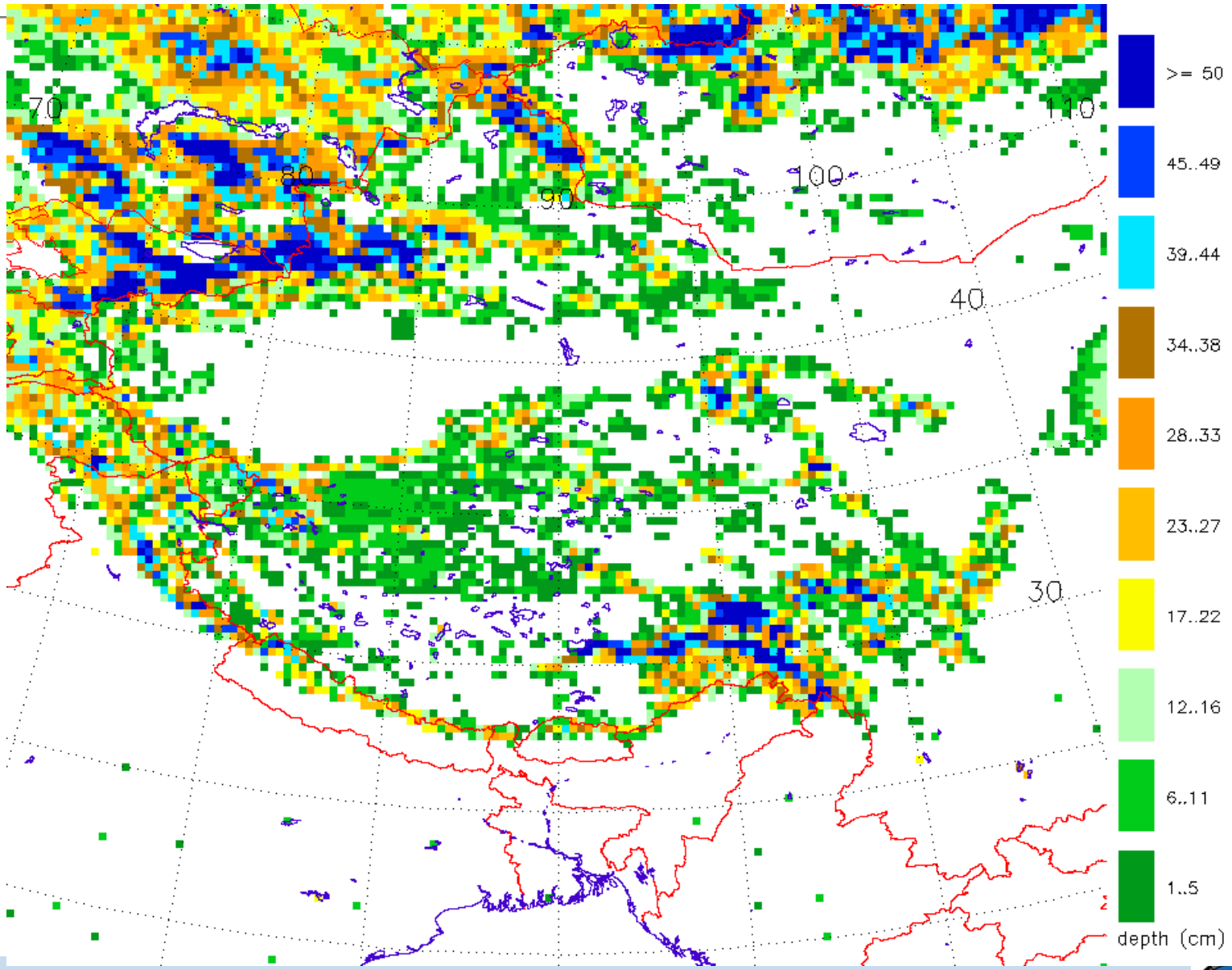
Snow Cover Derived from AMSR-E January 9-16 2003

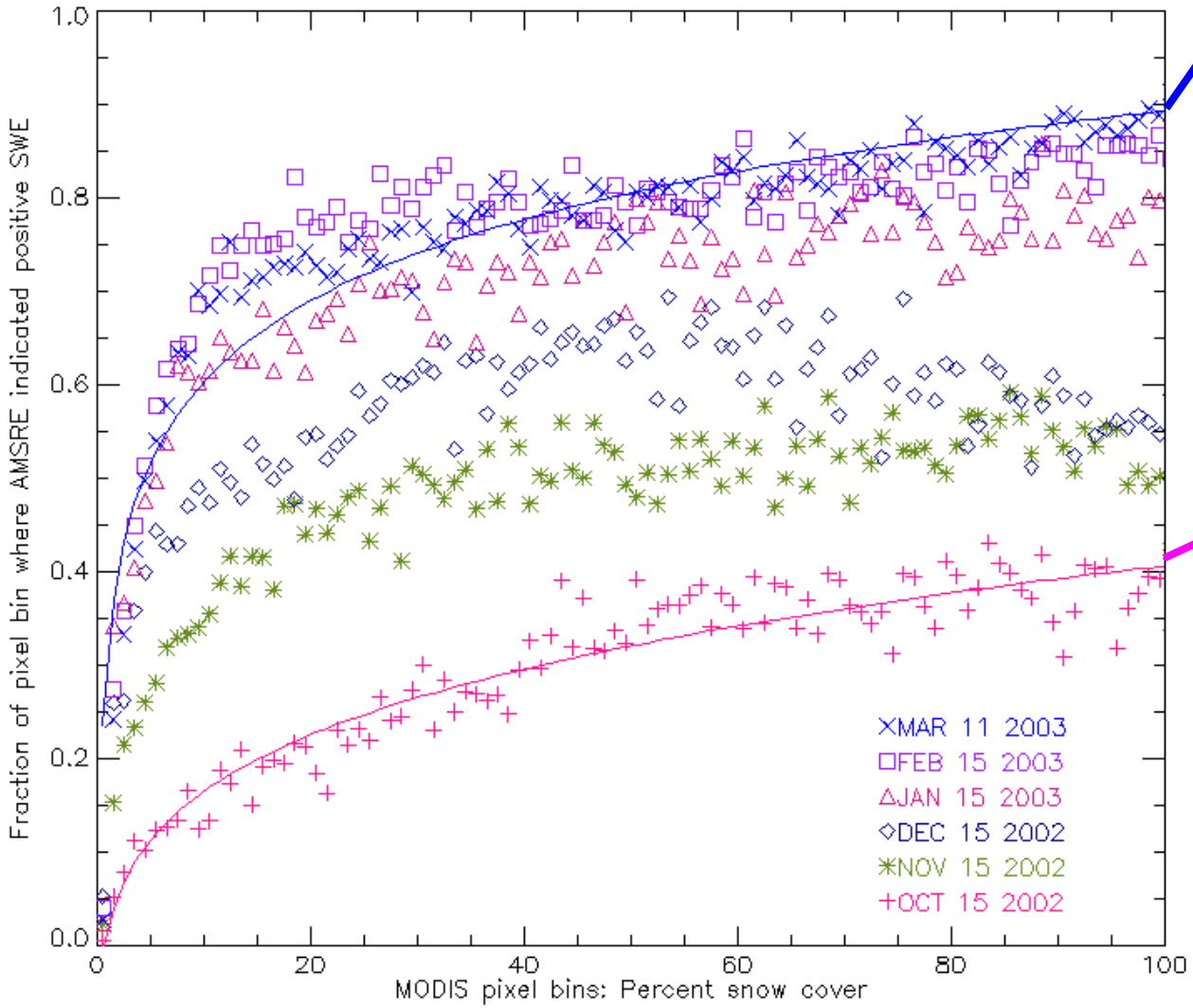


Ongoing Tibetan Plateau questions

How are SWE retrievals influenced by:

- ***Frozen Ground/Soil Type***
- ***Water (solid/liquid) extent within scene***
- ***Influence of reduced atmospheric layer***
- ***Validation using non-representative station data***
- ***Significant general problems of dense vegetation and wet snow conveniently absent on Tibet Plateau***

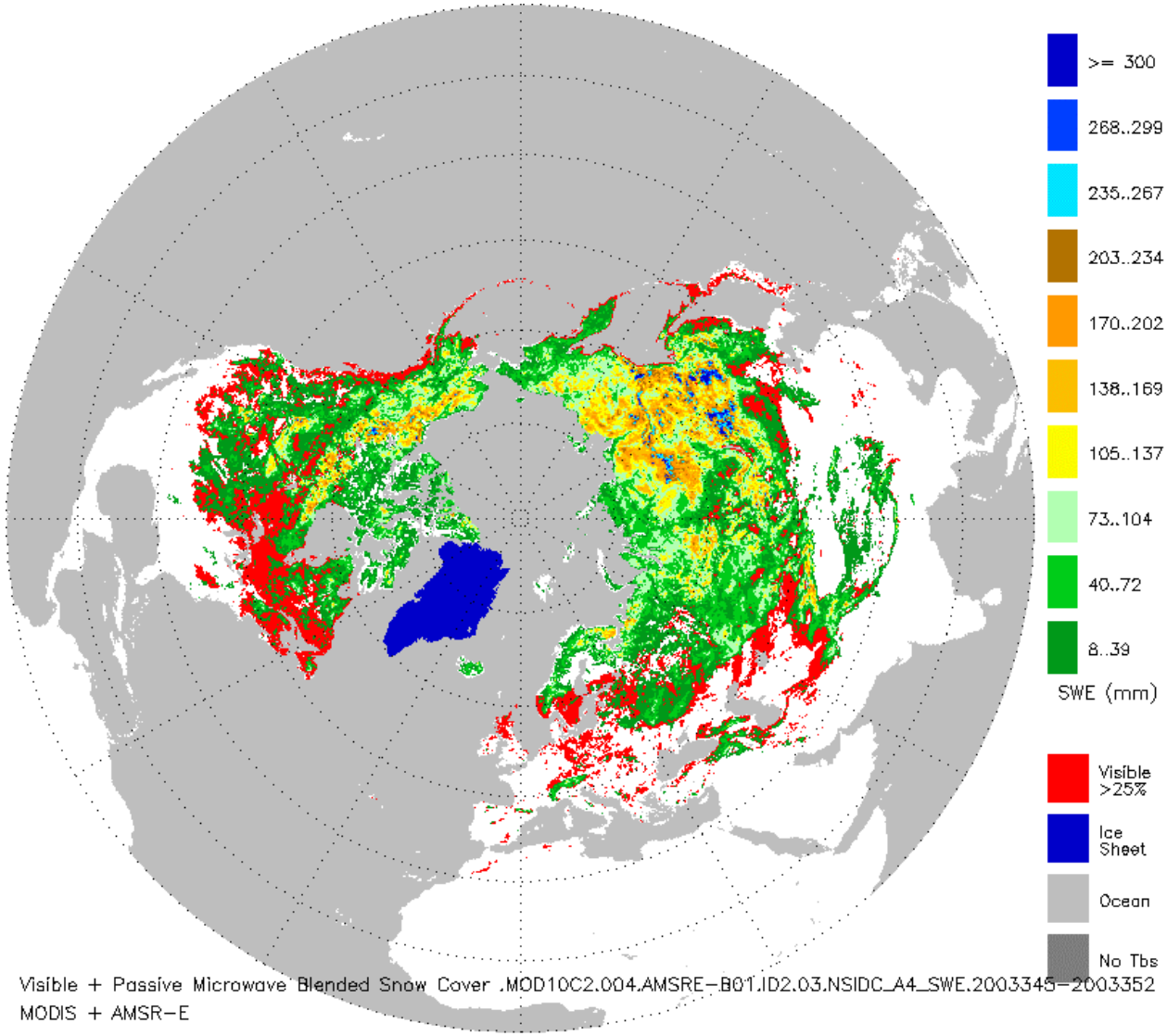
AMSR-E vs. MODIS Snow Cover



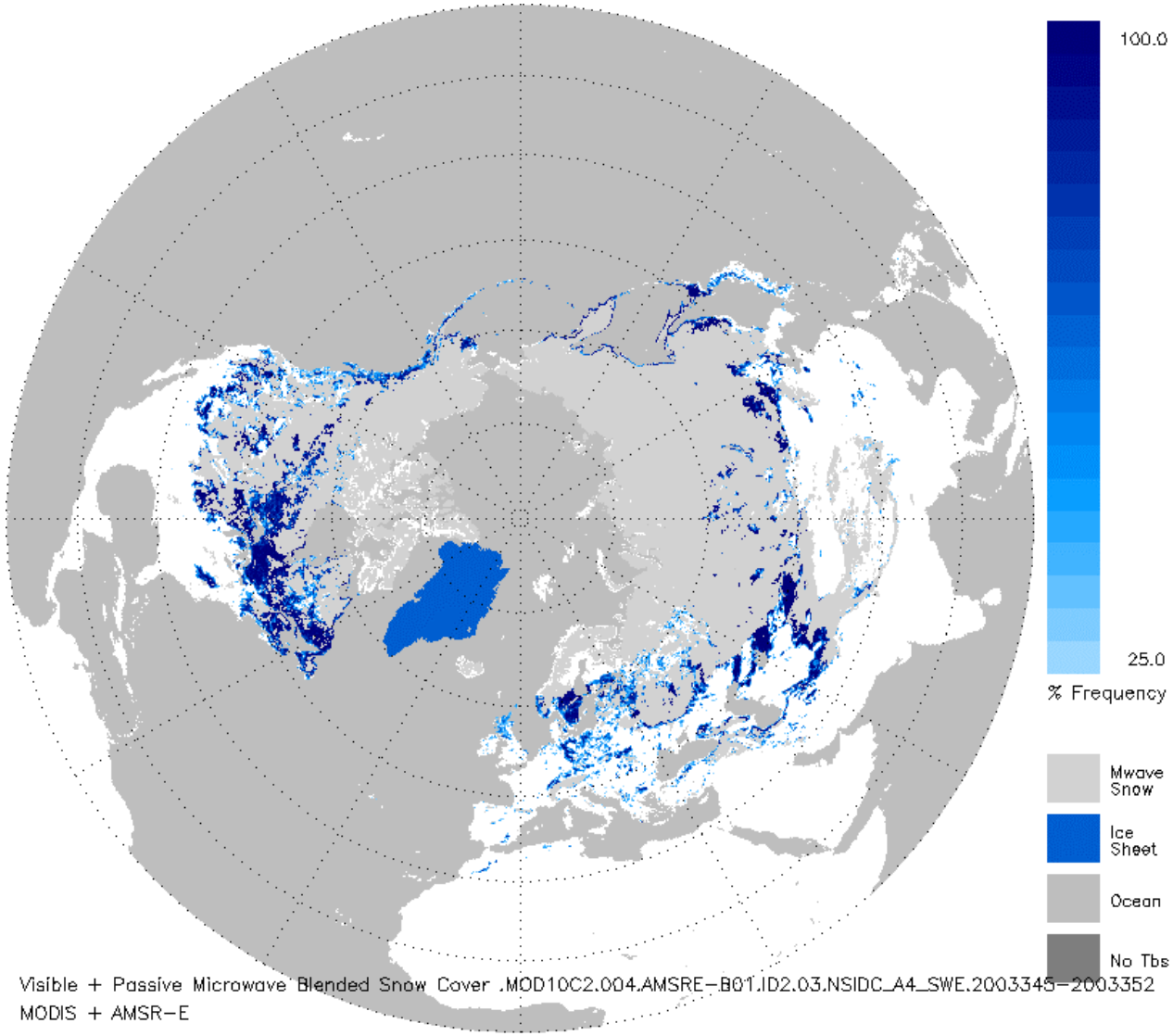
Feb/Mar: snow pack has developed, probability is high for microwave spectral gradient

Early Season: shallow and/or intermittent snow, doesn't trigger microwave spectral gradient

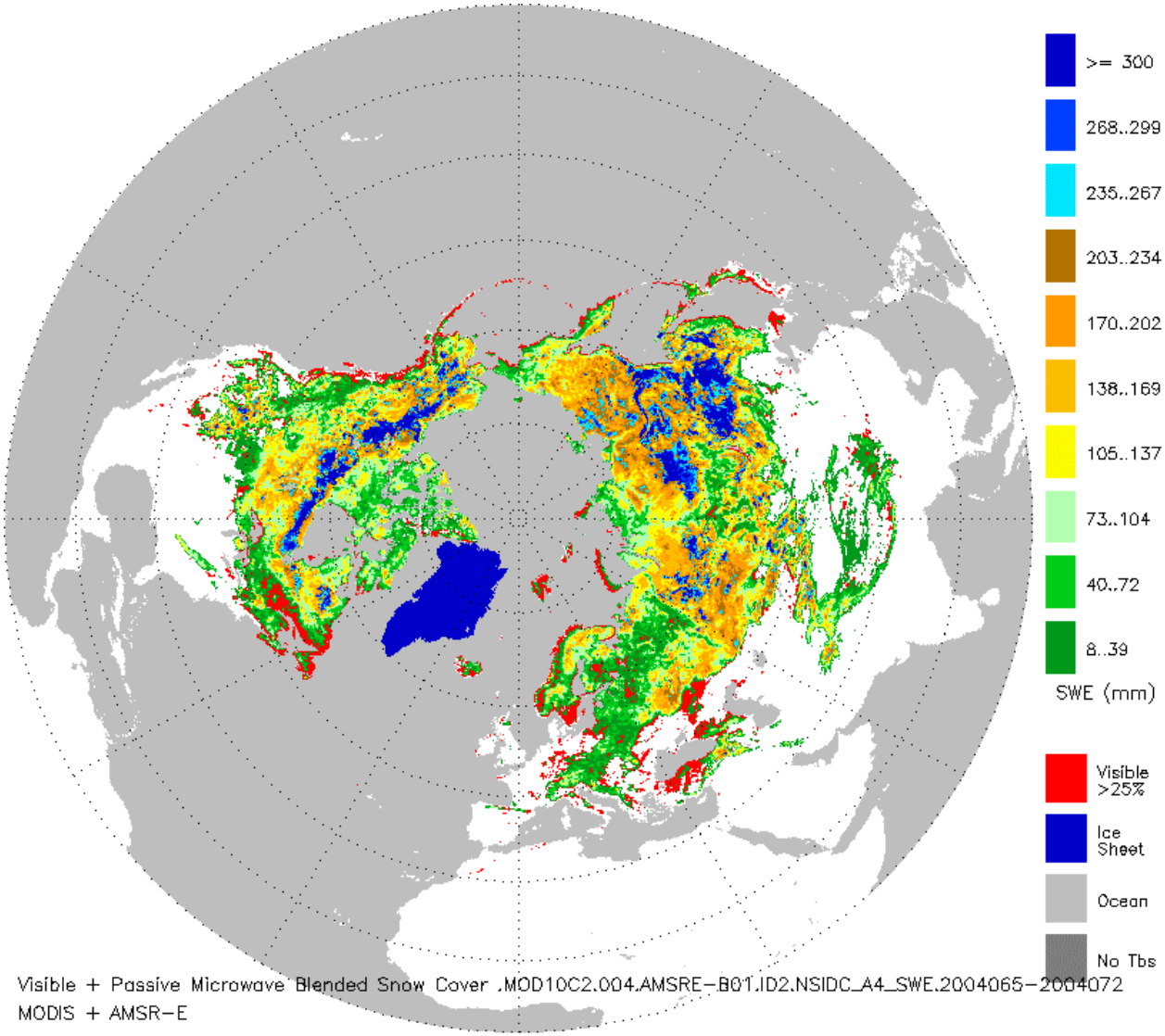
Blended AMSR-E/MODIS Snow Product – 11-18 Dec ‘03



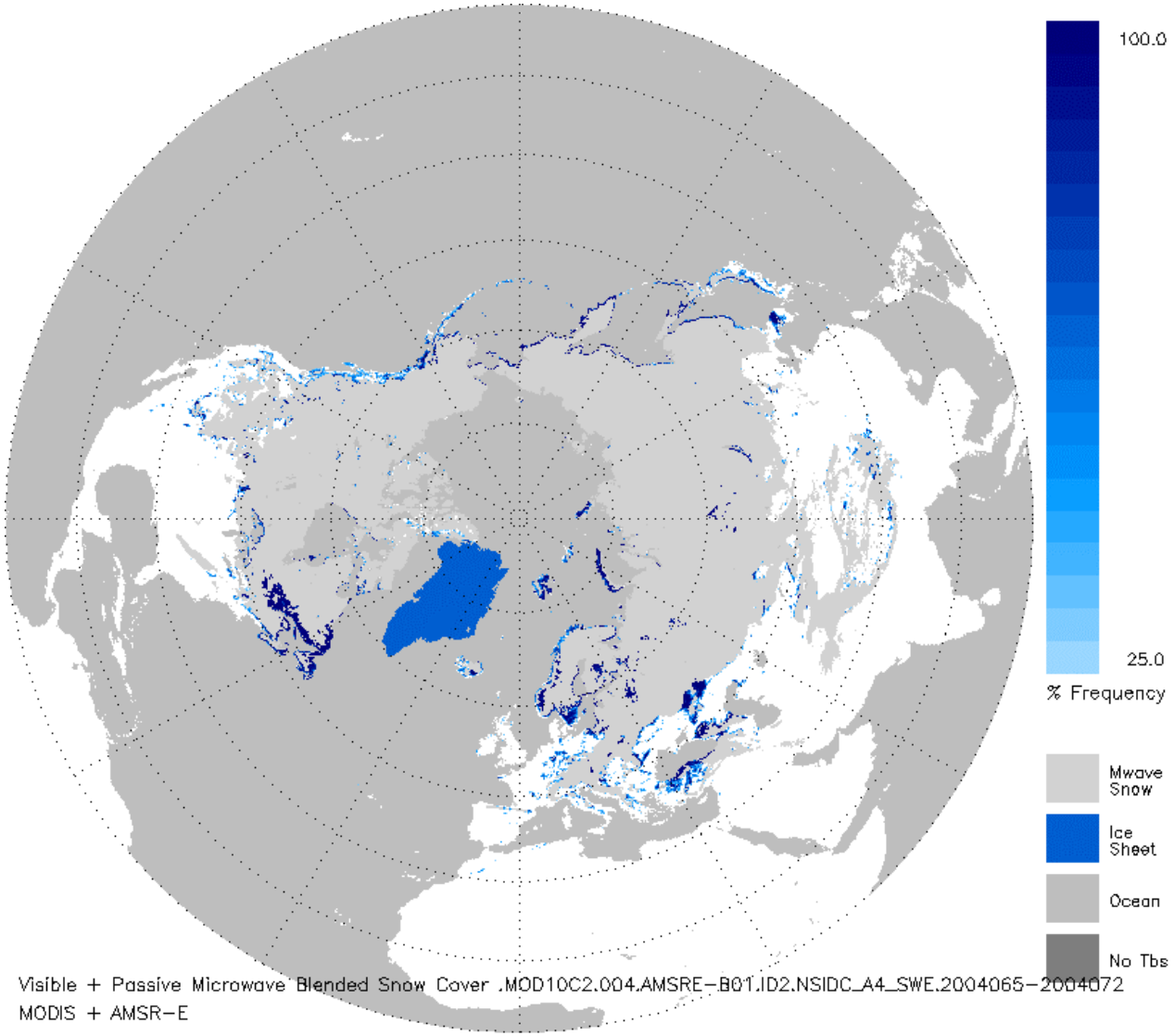
Blended AMSR-E/MODIS Snow Product – 11-18 Dec ‘03



Blended AMSR-E/MODIS Snow Product – 5-12 Mar ‘04

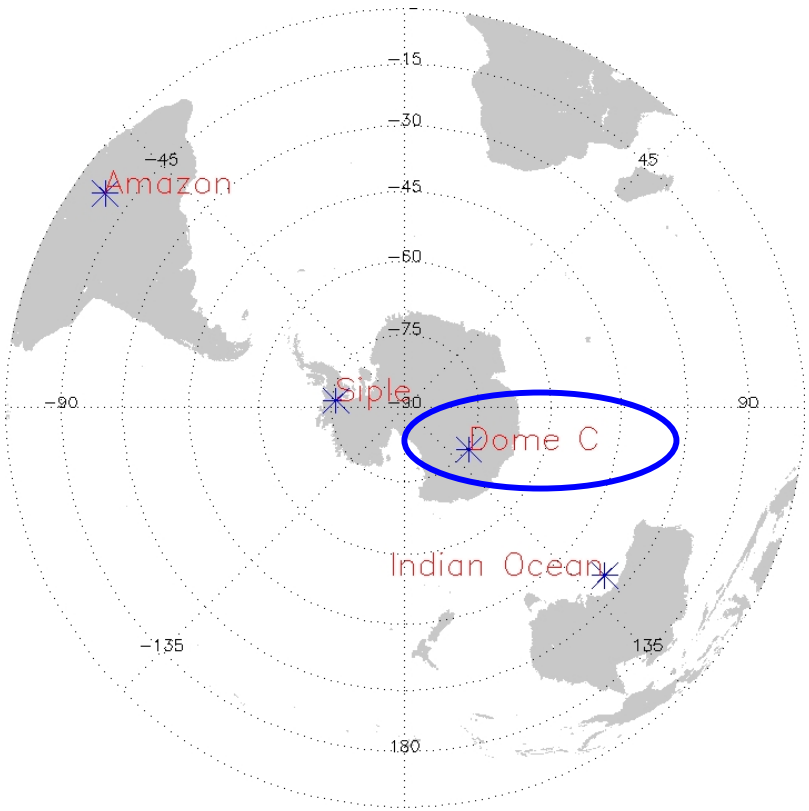


Blended AMSR-E/MODIS Snow Product – 5-12 Mar ‘04

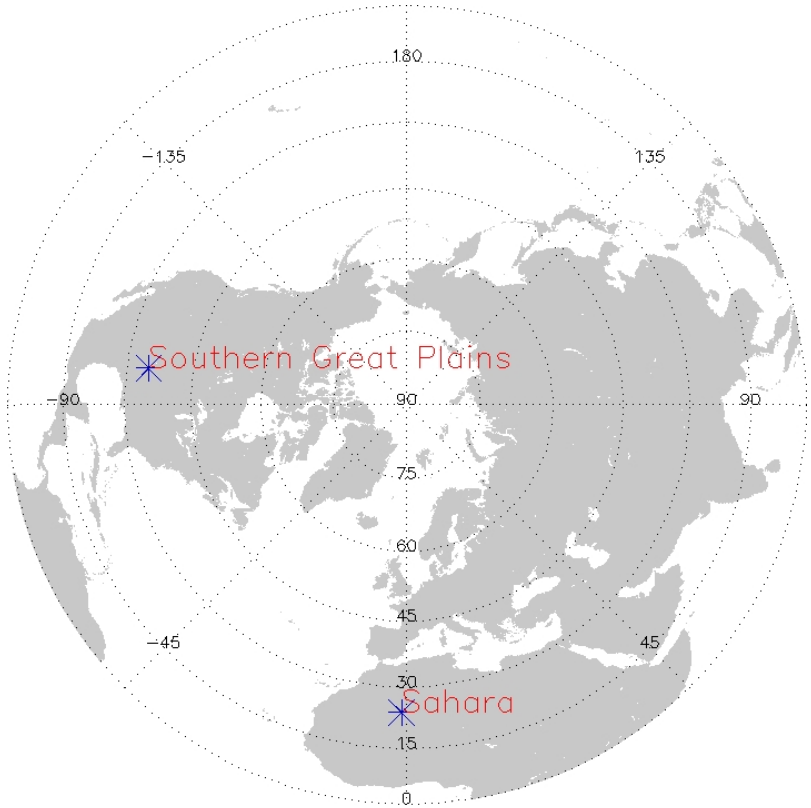


AMSR-E Validation: Location of Sample Targets --

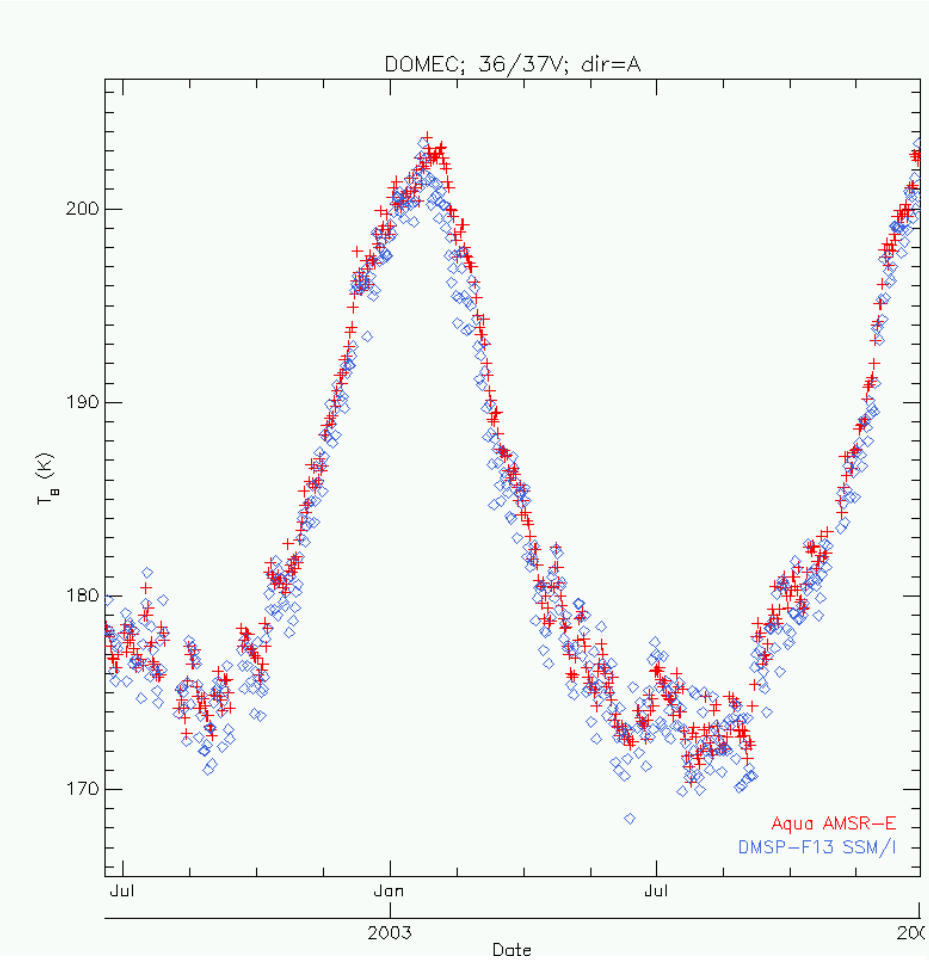
Southern Hemisphere

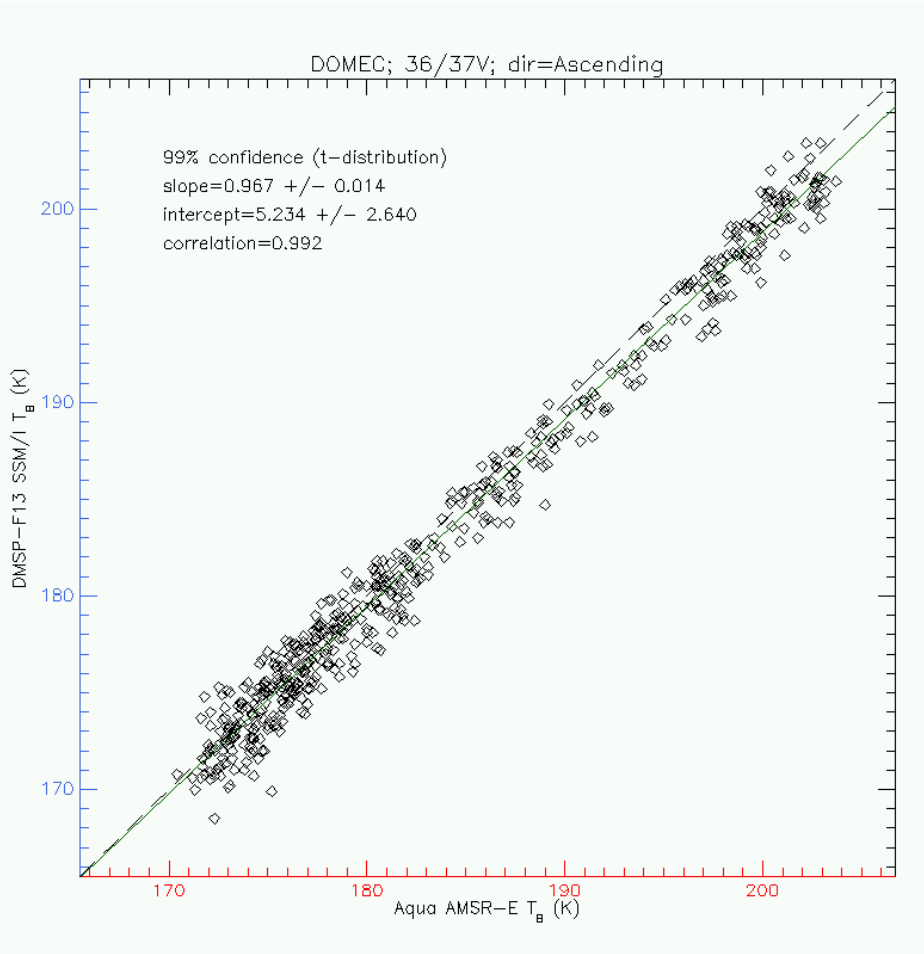


Northern Hemisphere



Comparison of NASA Aqua AMSR-E (36 GHz) and DMSP SSM/I (37 GHz) Dome-C Antarctica, June 2002 to December 2003.





Plans

- *Review of newly processed SWE data*
- *Continuing Tibet investigation*
- *Blended Product development*
- *CLPX: examining algorithm sensitivity to grain size; comparison with ground and airborne data*
- *Collaboration with E. Njoku: using historical passive microwave archive to evaluate homogenous candidate locations for calibration targets*