AMSR-E snow depth on sea ice: Processing update[1] & overview of the validation campaign in March 2006[2]

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[1] with D.J. Cavalieri and A. Ivanoff (NASA/GSFC)

[2] with D.J. Cavalieri (GSFC), A. Gasiewski (CU), S.P. Gogineni (KU), J. Heinrichs (Fort Hays), W. Krabill (NASA/WFF), P. Kanatagtram (KU), M. Klein (CU), C. Leuschen (JHU now KU), J. Maslanik (CU), J. Sonntag (NASA/WFF), J. Stroeve (NSIDC), M. Sturm (CRREL)`

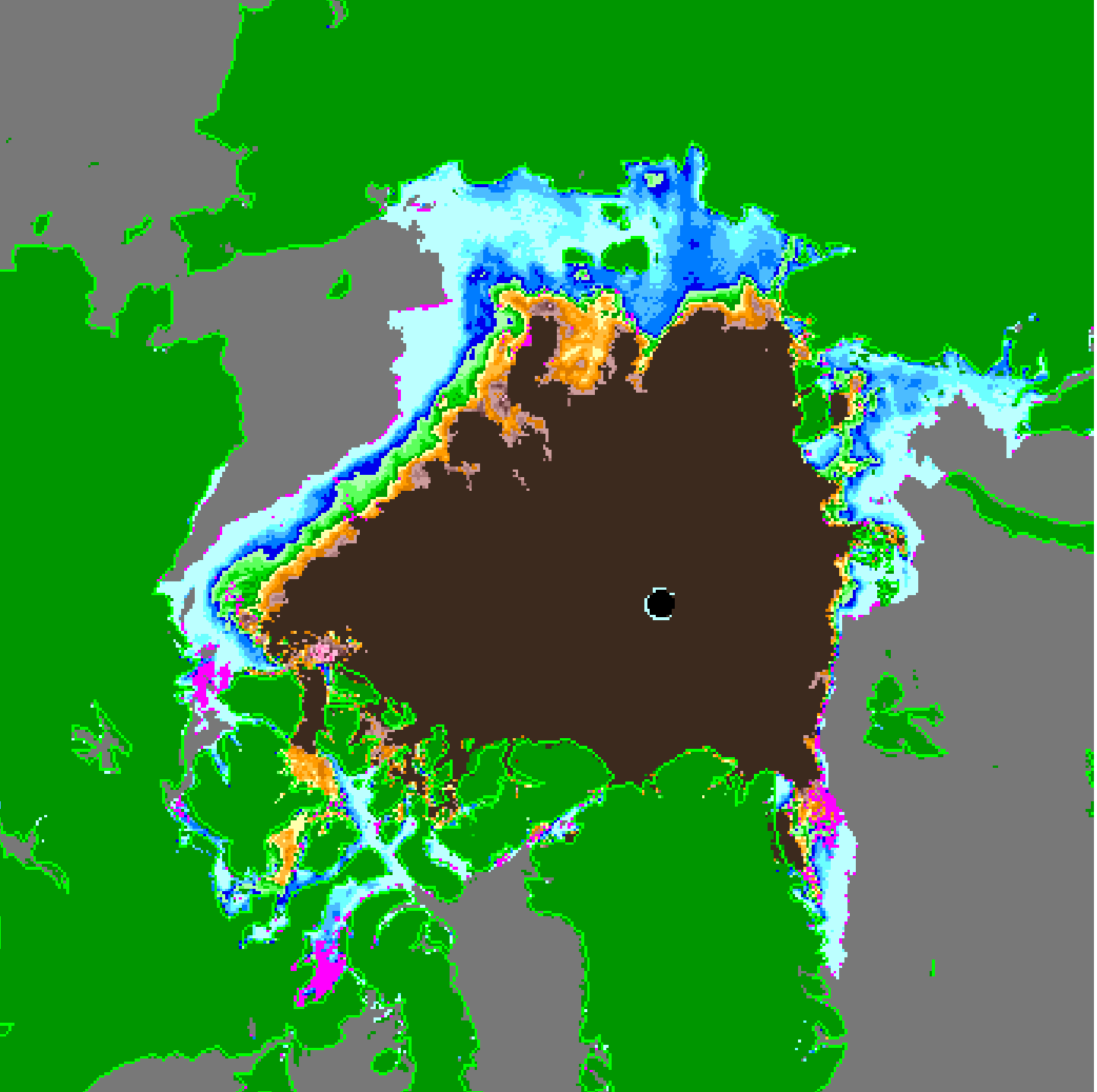
Modifications/improvements for the latest version:

Incorporation of temporal information to

- Flag for intermittent melt/freeze events and weather effects

- Flag for summer melt

- Improved Arctic multiyear sea ice mask (the previous one was too restrictive)



Snow depth product
10/2004 - 9/2005

Land

Open ocean

Multiyear ice

Melt/freeze, Wx

Summer melt

0 10 20 30 40 50

Snow depth [cm]

Arctic aircraft AMSR-E validation campaign in March 2006

Strategy: 2-tier upscaling process to validate AMSR-E snow depths

Tier 1: Validation of aircraft measurements with in-situ measurements (In-situ measurement led by M. Sturm (CRREL) and J. Maslanik (U. Colorado))

Tier 2: Validation of AMSR-E snow depth retrievals by flying patterns that cover approximately 4 x 8 AMSR-E pixels

Also: One flight was coordinated with ICESat orbit

Arctic aircraft AMSR-E validation campaign in March 2006

P-3 aircraft primary instrumentation:

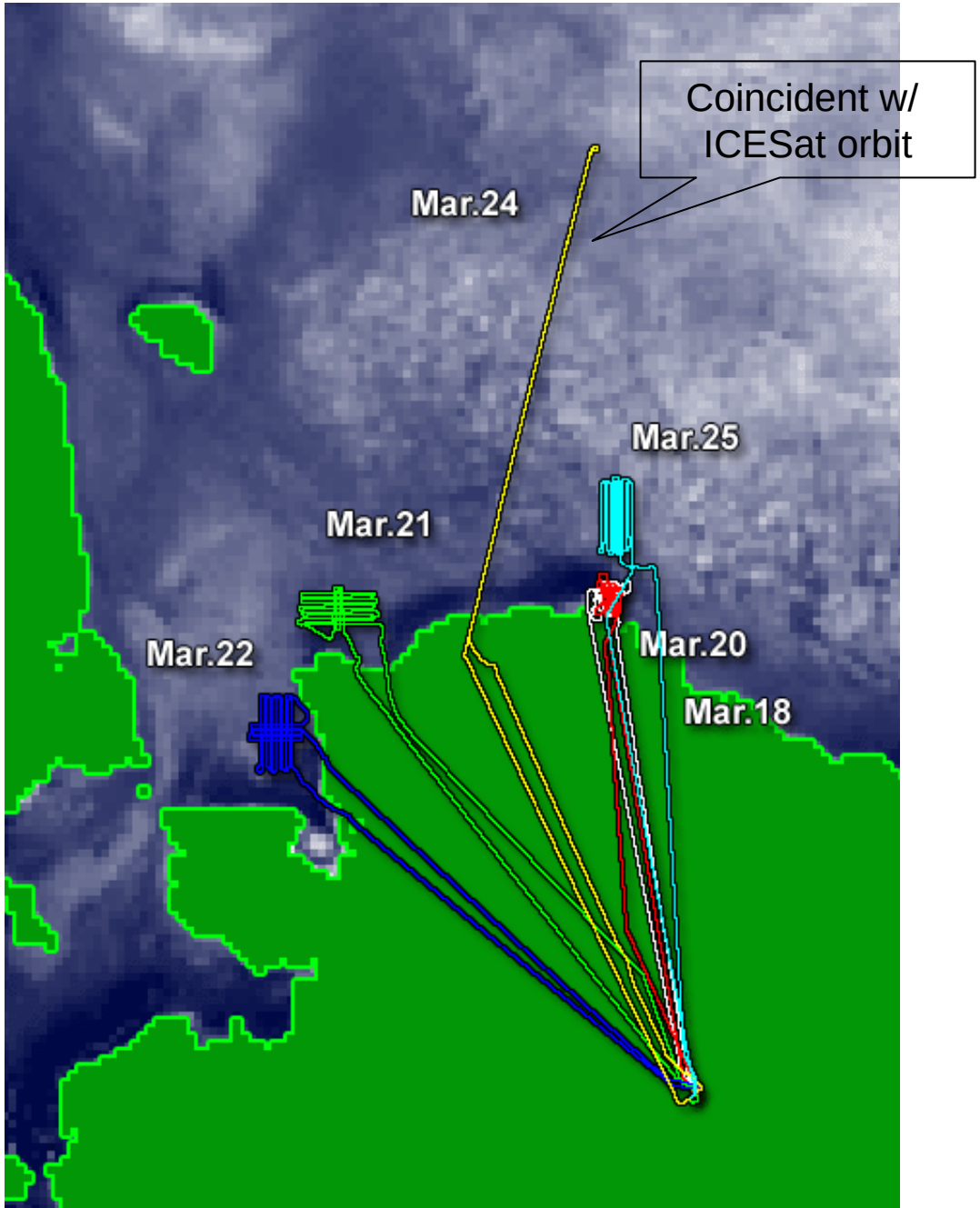
- Polarimetric Scanning Radiometer (Instr.-PI: A. Gasiewski, CU): Microwave radiometer with similar frequencies as AMSR-E.

- Snow radar (Instr.-PI: S.P. ,Gogineni, KU): New radar that can directly measure snow depth on sea ice.

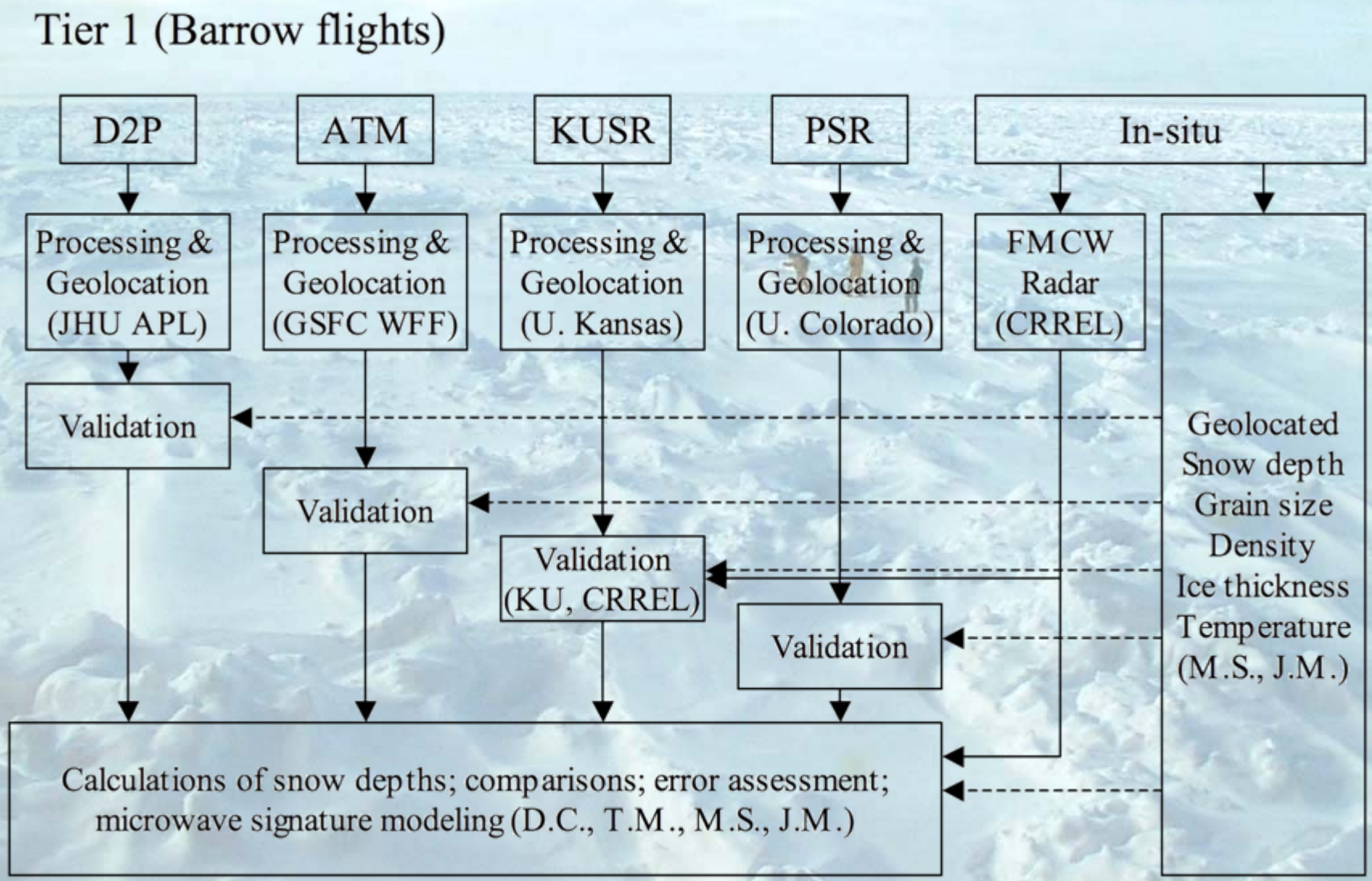
- ATM (Instr.-PI: W. Krabill, GSFC): Laser altimeter, which measures height of the snow.

- D2P (Instr.-PI: Carl Leuschen, JHU APL): Radar altimeter, which measures height of sea ice

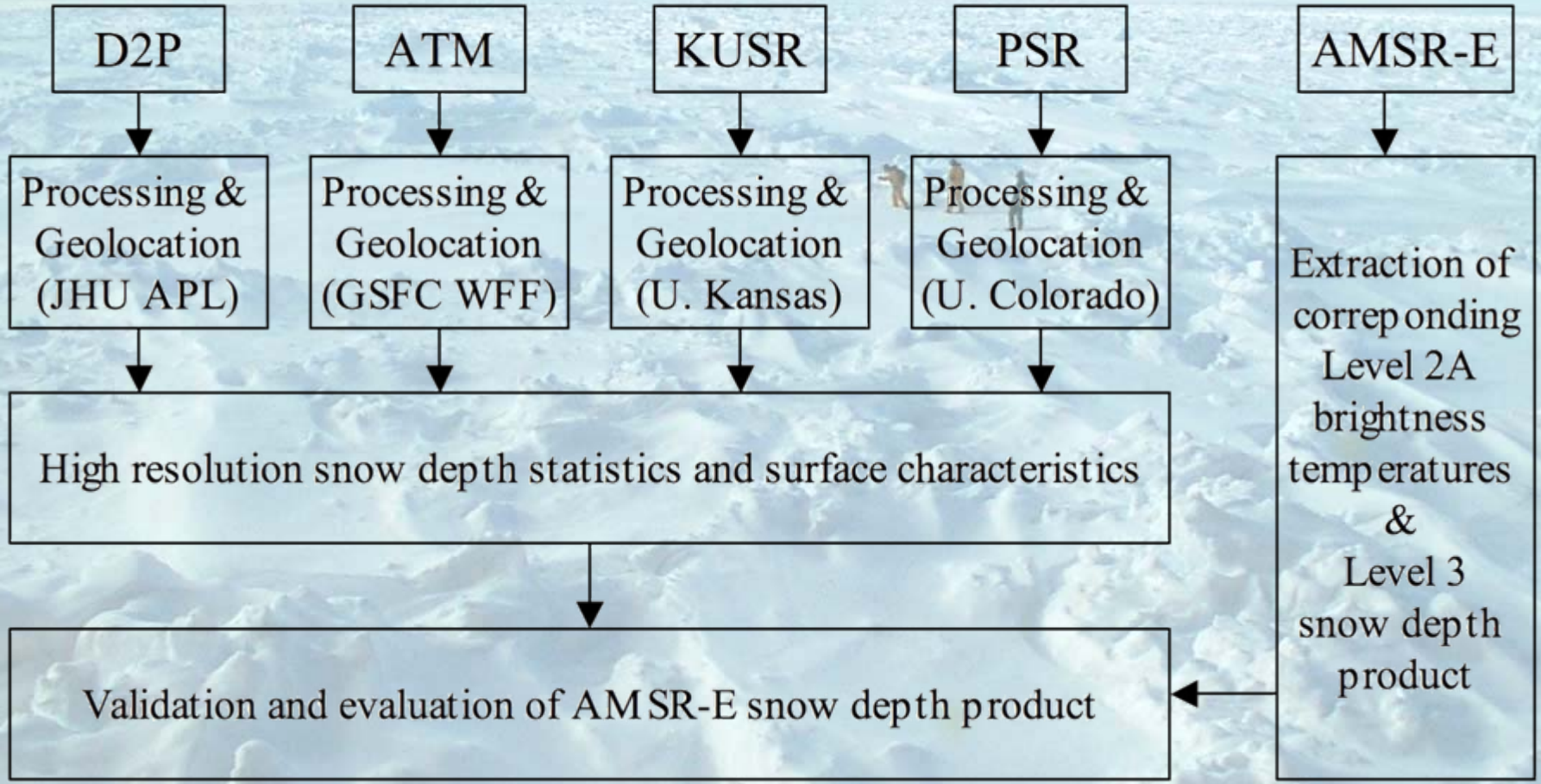
Arctic 2006 AMSR-E validation campaign



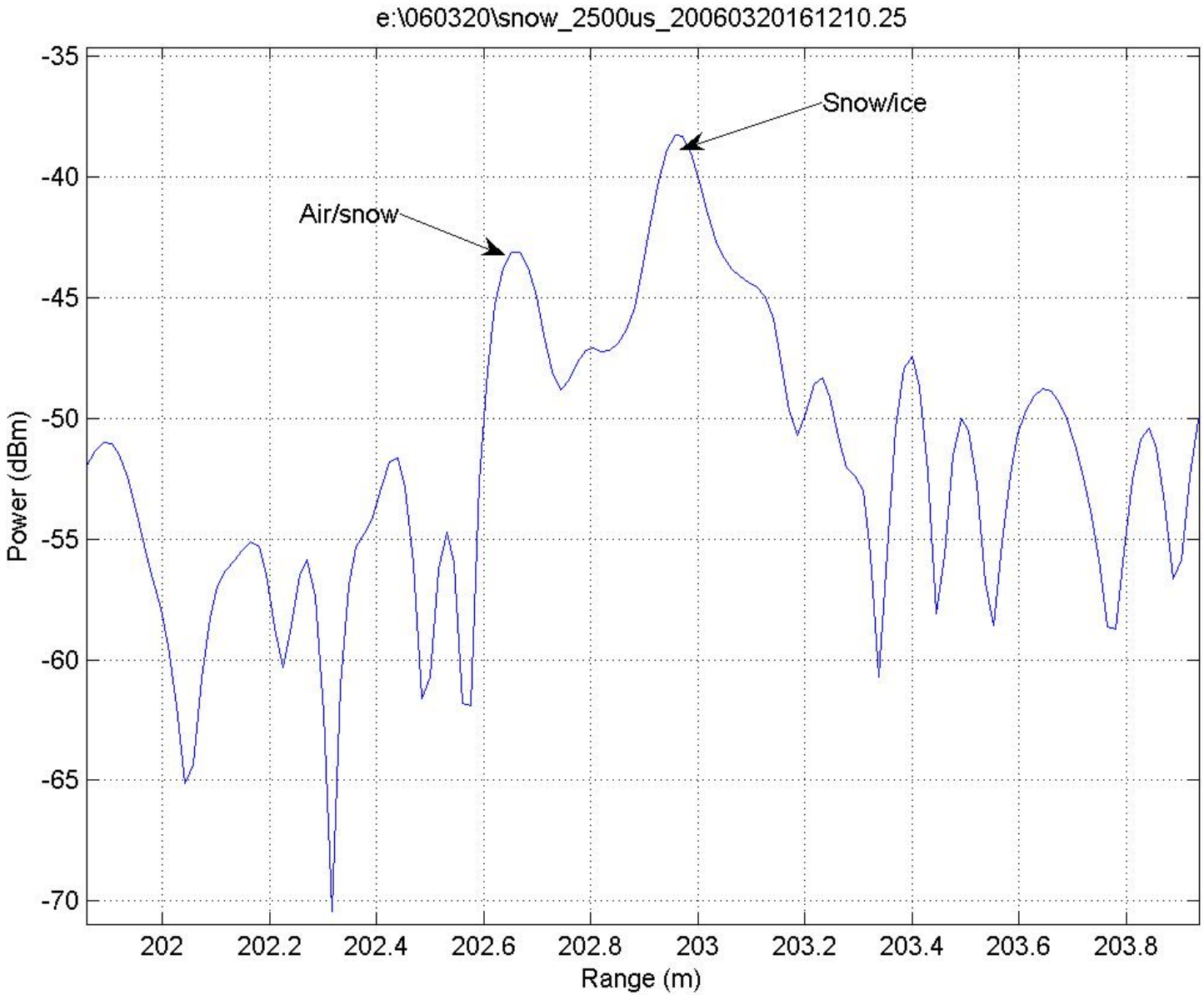
Next steps:

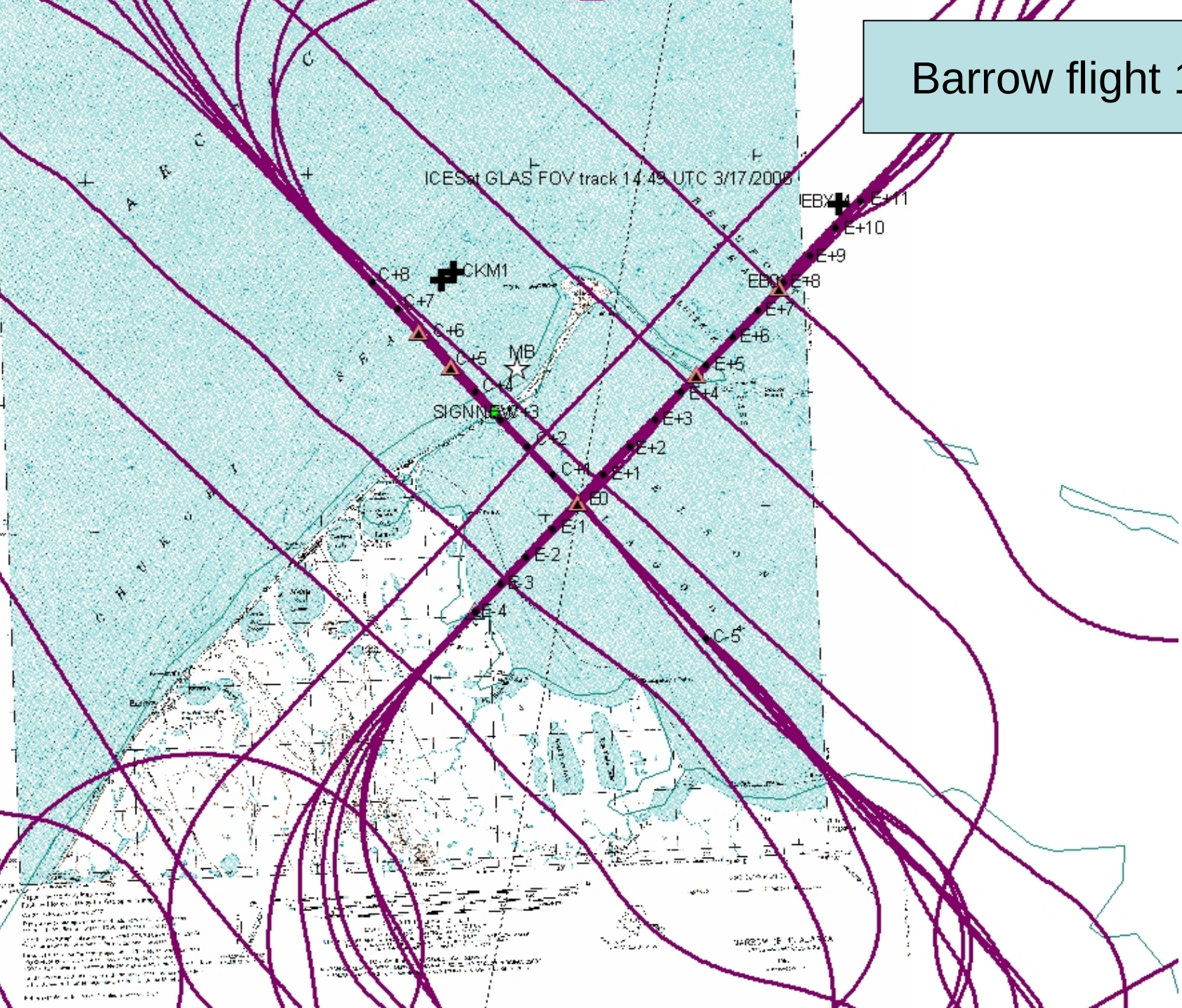

Tier 1 (Barrow flights)
D2P
ATM
KUSR
PSR
In-situ
Processing & Geolocation (JHU APL)
Processing & Geolocation (GSFC WFF)
Processing & Geolocation (U. Kansas)
Processing & Geolocation (U. Colorado)
FMCW Radar (CRREL)
Validation
Validation
Validation (KU, CRREL)
Validation
Geolocated
Snow depth
Grain size
Density
Ice thickness
Temperature
(M.S., J.M.)
Calculations of snow depths; comparisons; error assessment;
microwave signature modeling (D.C., T.M., M.S., J.M.)

Tier 2 (Chukchi/Beaufort Seas flights)



Snow radar: First results




Barrow flight 1
ICESat GLAS FOV track 14:49 UTC 3/17/2008
CKM1
MB
SIGNNEW
C+8
C+7
C+6
C+5
C+4
C+3
C+2
C+1
C0
C-1
C-2
C-3
C-4
C-5
E+1
E+2
E+3
E+4
E+5
E+6
E+7
E+8
E+9
E+10
E+11