



# Snow Radar Tools Applicable for Sea Ice and SUMup Update

Lora Koenig

NASA GSFC

OIB Workshop 1/29/2014



# Land Ice Pick Algorithm

## Land Ice Algorithm Characteristics:

- Surface pick is 4 times air noise ( $> \text{Mean } 1000 \text{ bins} * 4$ )
- Band pass filter is used to determine peaks (5x5 low pass 50x5 high pass)
- $\frac{1}{4}$  of the peak width is used as pick and connected using leading edge
- $\sim 50$  m along track resolution

## Sea Ice Applications:

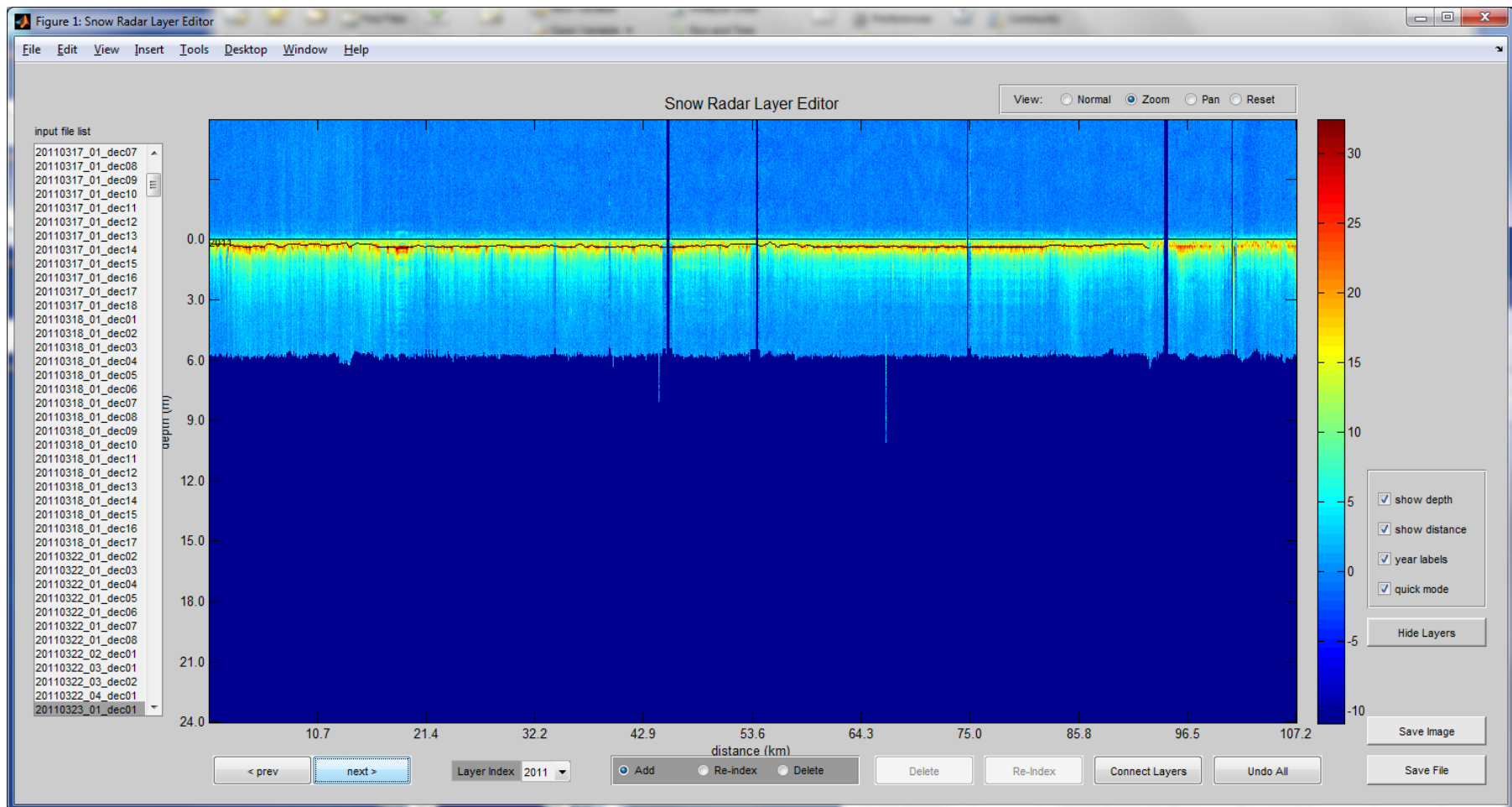
- Matlab GUI interface is a powerful tool for visually/manually adjusting picks
- Preprocessing Code can be adjusted to Nathan's algorithm if GUI interface is useful

Contact Lora Koenig if you are interested in Matlab Code including GUI. It will be posted in final version  $\sim$  June 2014.



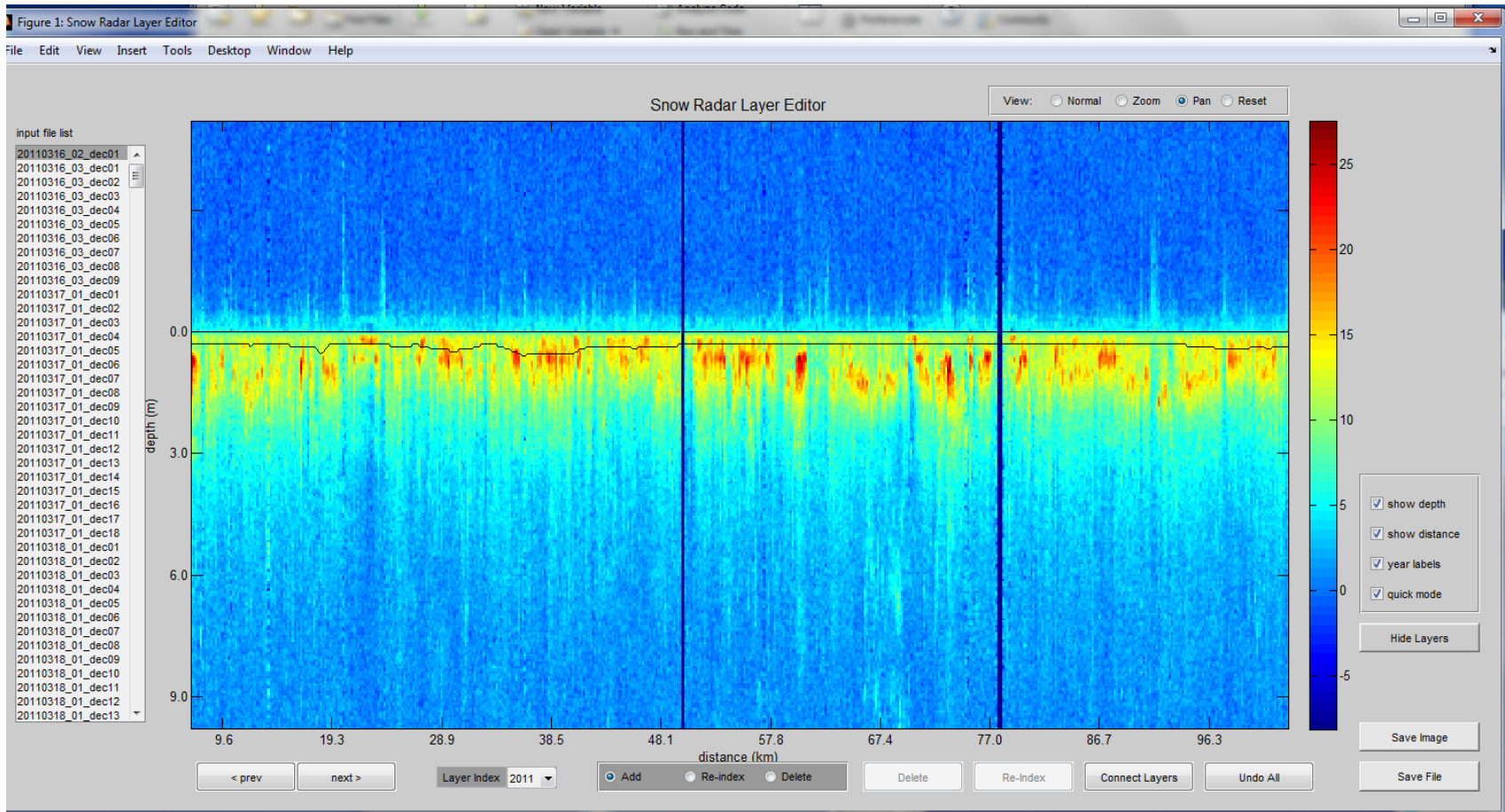
# GUI and Picks over Sea Ice

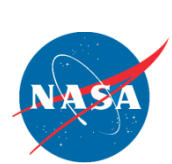
## The Good



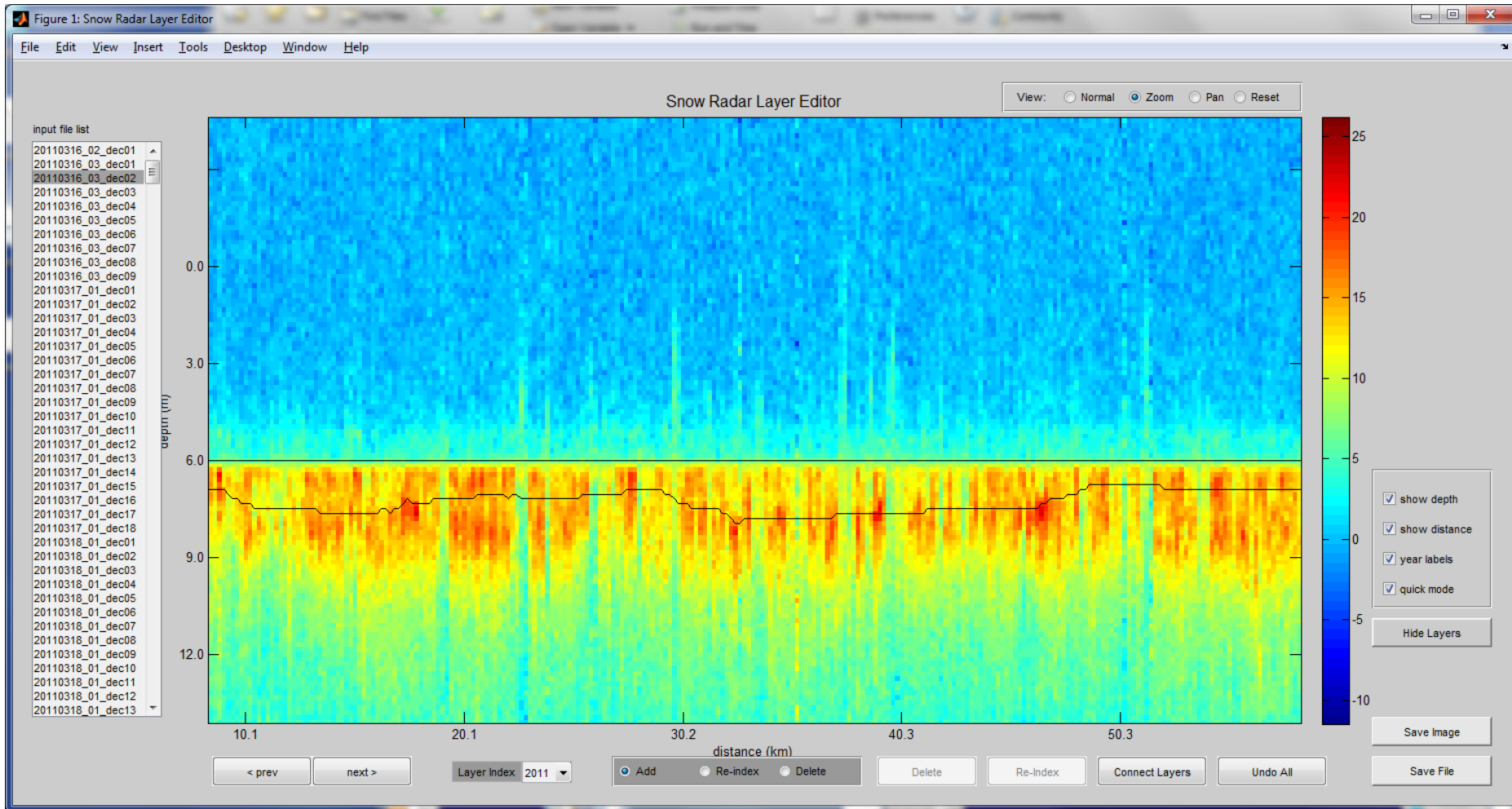


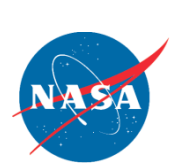
# The Bad



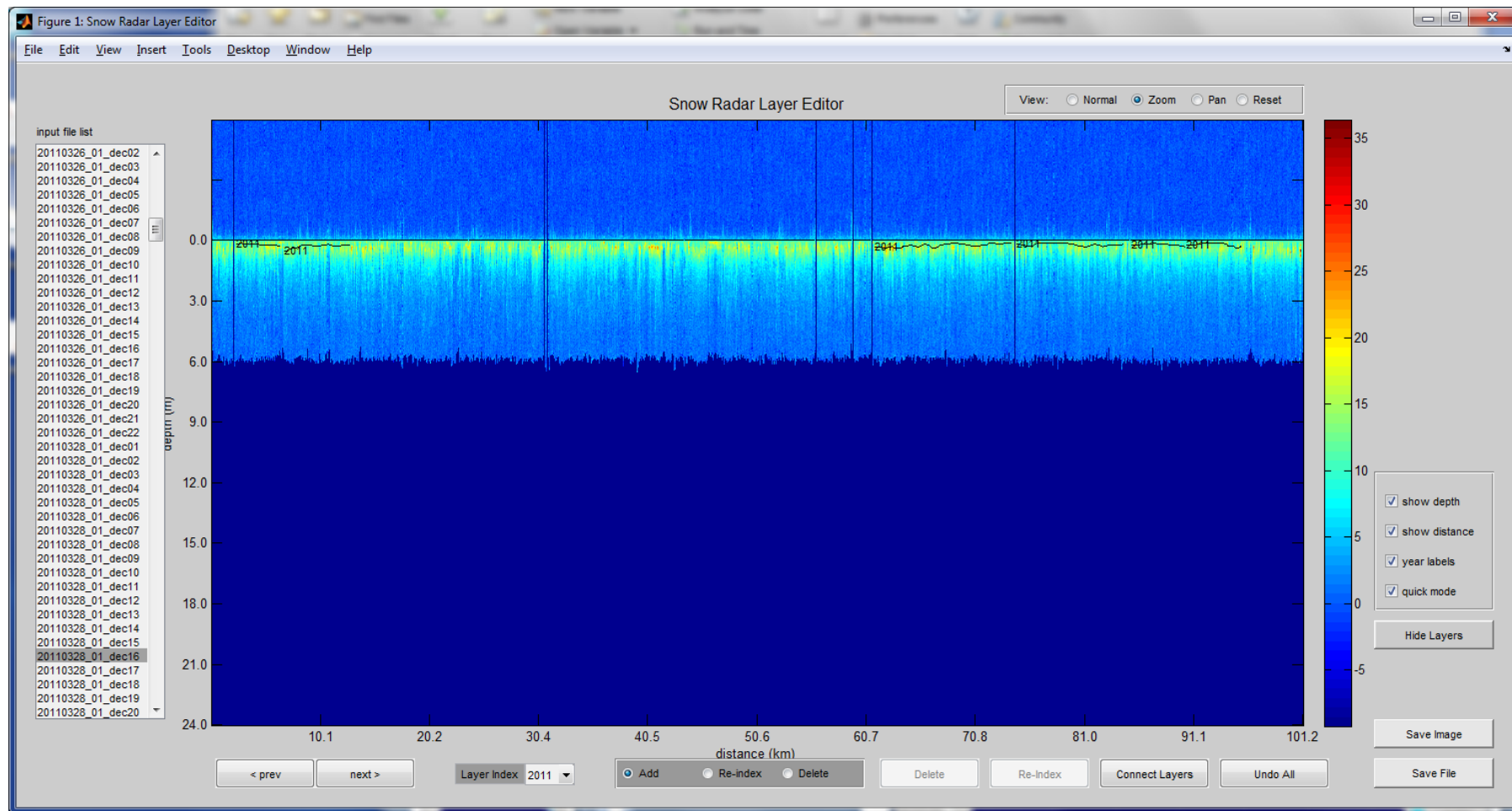


# The Bad, Close up





# The Intermittent







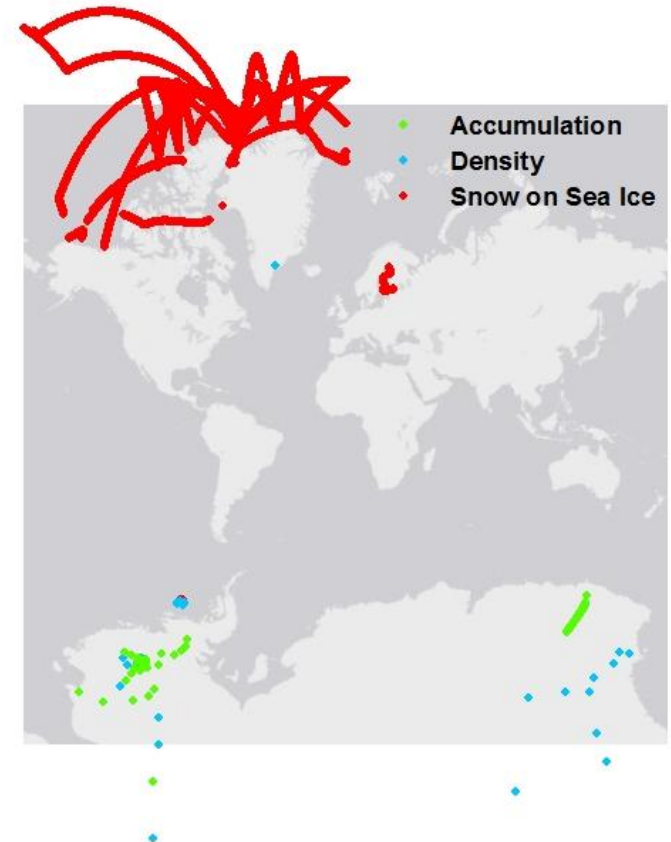
# SUMup Snow on Sea Ice and Density Dataset



Over 0.8M points in SOSI dataset which includes:

- SIMBA 2007 data- Lewis et al. 2011.
- Finnish Meteorological Institute, Sea Ice Observers data 1991-2012, Provided by Eero Rinne
- IceBridge Dataset- Kurtz et al. 2012.
- IceBridge Dataset- Panzer is Coming Soon.

~110 Density measurements over sea ice (SIMBA)



Data Posted at: <http://neptune.gsfc.nasa.gov/csb/index.php?section=267>

Under Events from NASA Cryospheric Science Laboratory Page



# Example of SOSI data

SUMup\_datasets\_v1.xlsx - Microsoft Excel

1	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
	Date taken	Lat	Long	Distance Along Transect	Snow Depth (m)	Error	Density Taken (no-0 yes-1)	Sea Ice Thickness(m)	Error	Sea Ice Type (1st year-1 multi year-2)	Sea Ice Freeboard (m)	Error	Snow Ice Thickness (m)	Error	Radar Horizontal Resolution (m)	Method	Citation
7262	20020219	65.6817	24.5233	-9999	0.150	-9999	0	0.740	-9999	1	-9999	-9999	0.050	-9999	-9999	-9999	1 Finnish
7263	20020219	65.1233	25.2400	-9999	0.200	-9999	0	0.550	-9999	1	-9999	-9999	0.050	-9999	-9999	-9999	1 Finnish
7264	20020219	65.7600	24.1283	-9999	0.290	-9999	0	0.700	-9999	1	-9999	-9999	0.140	-9999	-9999	-9999	1 Finnish
7265	20020226	60.3333	22.0667	-9999	0.000	-9999	0	0.000	-9999	1	-9999	-9999	0.000	-9999	-9999	-9999	1 Finnish
7266	20020226	59.7833	21.3717	-9999	0.000	-9999	0	0.000	-9999	1	-9999	-9999	0.000	-9999	-9999	-9999	1 Finnish
7267	20020226	60.2833	26.4633	-9999	0.000	-9999	0	0.000	-9999	1	-9999	-9999	0.000	-9999	-9999	-9999	1 Finnish
7268	20020226	60.6417	21.2250	-9999	0.000	-9999	0	0.280	-9999	1	-9999	-9999	0.180	-9999	-9999	-9999	1 Finnish
7269	20020226	59.7950	23.3833	-9999	0.050	-9999	0	0.250	-9999	1	-9999	-9999	0.000	-9999	-9999	-9999	1 Finnish
7270	20020226	60.3967	26.2733	-9999	0.050	-9999	0	0.270	-9999	1	-9999	-9999	0.070	-9999	-9999	-9999	1 Finnish
7271	20020226	61.8500	21.4833	-9999	0.050	-9999	0	0.350	-9999	1	-9999	-9999	0.000	-9999	-9999	-9999	1 Finnish
7272	20020226	64.6833	24.4600	-9999	0.050	-9999	0	0.500	-9999	1	-9999	-9999	0.000	-9999	-9999	-9999	1 Finnish
7273	20020226	62.3867	21.2250	-9999	0.070	-9999	0	0.350	-9999	1	-9999	-9999	0.000	-9999	-9999	-9999	1 Finnish
7274	20020226	64.2233	24.7000	-9999	0.100	-9999	0	0.300	-9999	1	-9999	-9999	0.000	-9999	-9999	-9999	1 Finnish
7275	20020226	62.1650	21.1583	-9999	0.100	-9999	0	0.420	-9999	1	-9999	-9999	0.090	-9999	-9999	-9999	1 Finnish
7276	20020226	63.8900	22.9467	-9999	0.120	-9999	0	0.550	-9999	1	-9999	-9999	0.000	-9999	-9999	-9999	1 Finnish
7277	20020226	64.9333	24.6667	-9999	0.170	-9999	0	0.700	-9999	1	-9999	-9999	0.000	-9999	-9999	-9999	1 Finnish
7278	20020226	63.2100	21.1433	-9999	0.200	-9999	0	0.390	-9999	1	-9999	-9999	0.060	-9999	-9999	-9999	1 Finnish
7279	20020226	65.1233	25.2400	-9999	0.200	-9999	0	0.550	-9999	1	-9999	-9999	0.050	-9999	-9999	-9999	1 Finnish
7280	20020226	65.6817	24.5233	-9999	0.200	-9999	0	0.790	-9999	1	-9999	-9999	0.080	-9999	-9999	-9999	1 Finnish
7281	20020226	63.4117	21.1000	-9999	0.250	-9999	0	0.250	-9999	1	-9999	-9999	0.000	-9999	-9999	-9999	1 Finnish
7282	20020226	65.7600	24.1283	-9999	0.300	-9999	0	0.710	-9999	1	-9999	-9999	0.140	-9999	-9999	-9999	1 Finnish
7283	20020305	60.3333	22.0667	-9999	0.000	-9999	0	0.000	-9999	1	-9999	-9999	0.000	-9999	-9999	-9999	1 Finnish
7284	20020305	59.7833	21.3717	-9999	0.000	-9999	0	0.000	-9999	1	-9999	-9999	0.000	-9999	-9999	-9999	1 Finnish
7285	20020305	60.2833	26.4633	-9999	0.000	-9999	0	0.000	-9999	1	-9999	-9999	0.000	-9999	-9999	-9999	1 Finnish
7286	20020305	64.6833	24.4600	-9999	0.050	-9999	0	0.550	-9999	1	-9999	-9999	0.000	-9999	-9999	-9999	1 Finnish
7287	20020305	59.7950	23.3833	-9999	0.070	-9999	0	0.250	-9999	1	-9999	-9999	0.000	-9999	-9999	-9999	1 Finnish

**Please submit any relevant SOSI or Density data you have.**  
**Data templates are on-line.**

<http://neptune.gsfc.nasa.gov/csb/index.php?section=267>

Under Events from NASA Cryospheric Science Laboratory Page