



National Snow and Ice Data Center
Supporting Cryospheric Research Since 1976

Snow: updates & metric

*Leo vanKampenhout, Jan Lanaerts, Bill Sacks
Andrew Slater, Dave Lawrence, Charlie K*



Additions to the Snow Scheme

- 12 Snow Layers (from 5)
- New SWE cap 50m (from 1m)

- Wind Affected Fresh Snow Density
- Wind Compaction (post-Precip.)



Leo

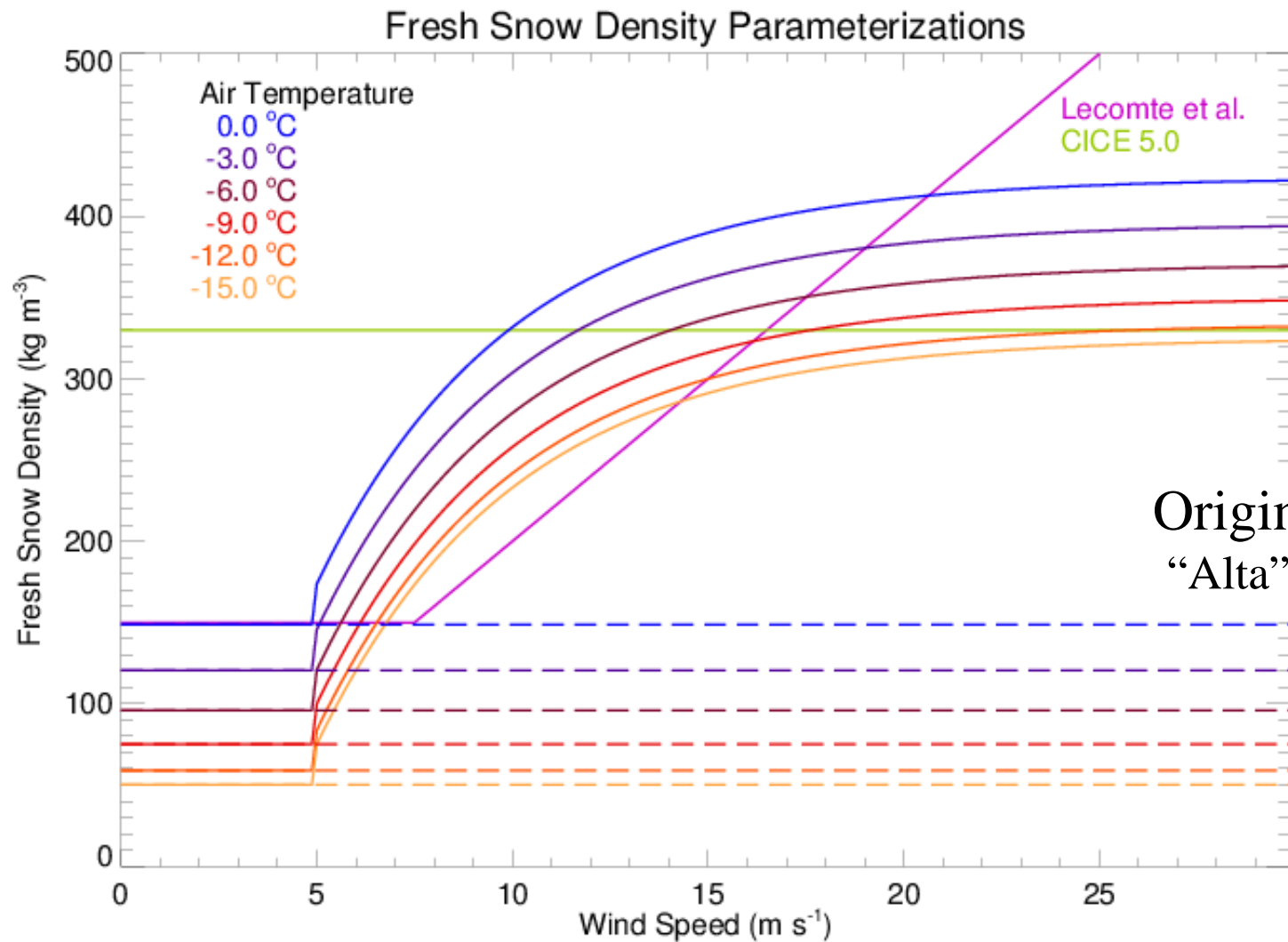


Jan

Ice Sheets (vs. Seasonal Snow)



Fresh Snow Density (i.e. during precip event)



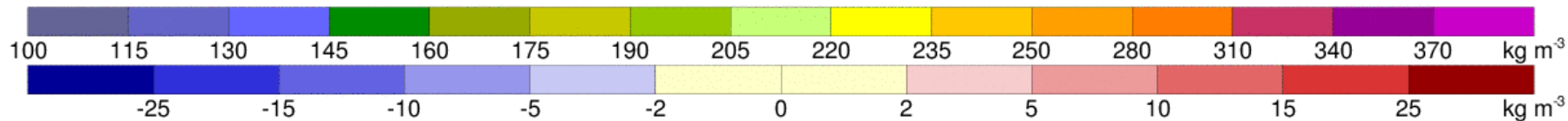
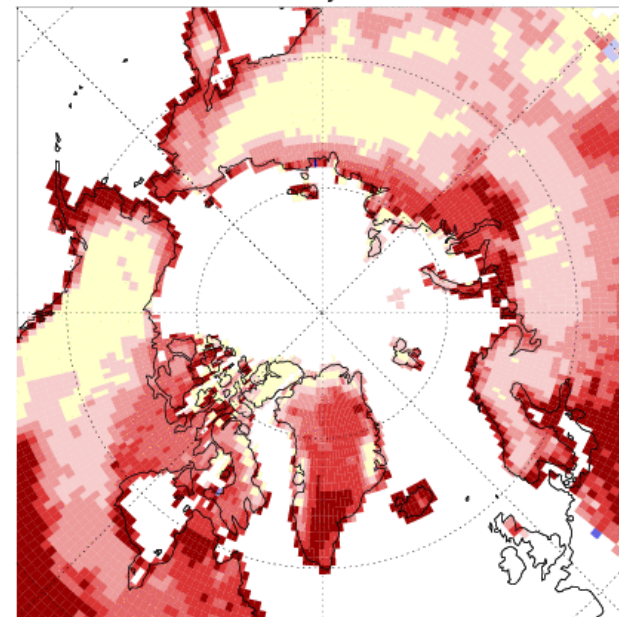
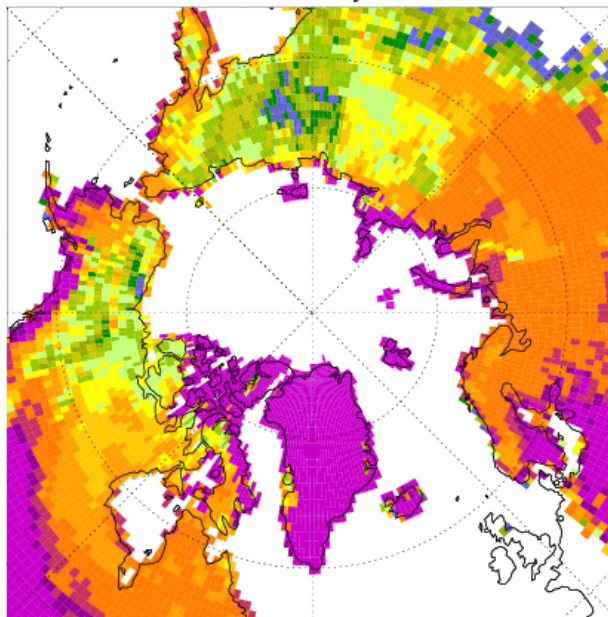
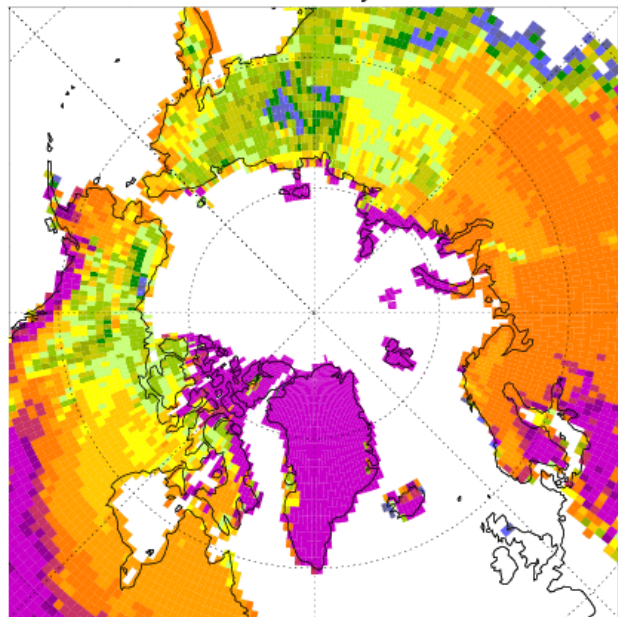
Snow Density

March Density: Old

March Density: New

Diff: New - Old

March Density: Difference



ERA-Interim, 0.5x0.5, 1980-2014

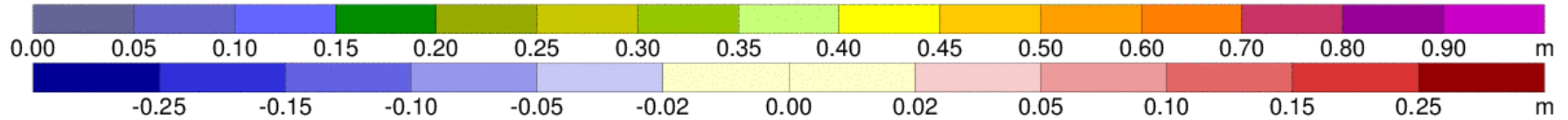
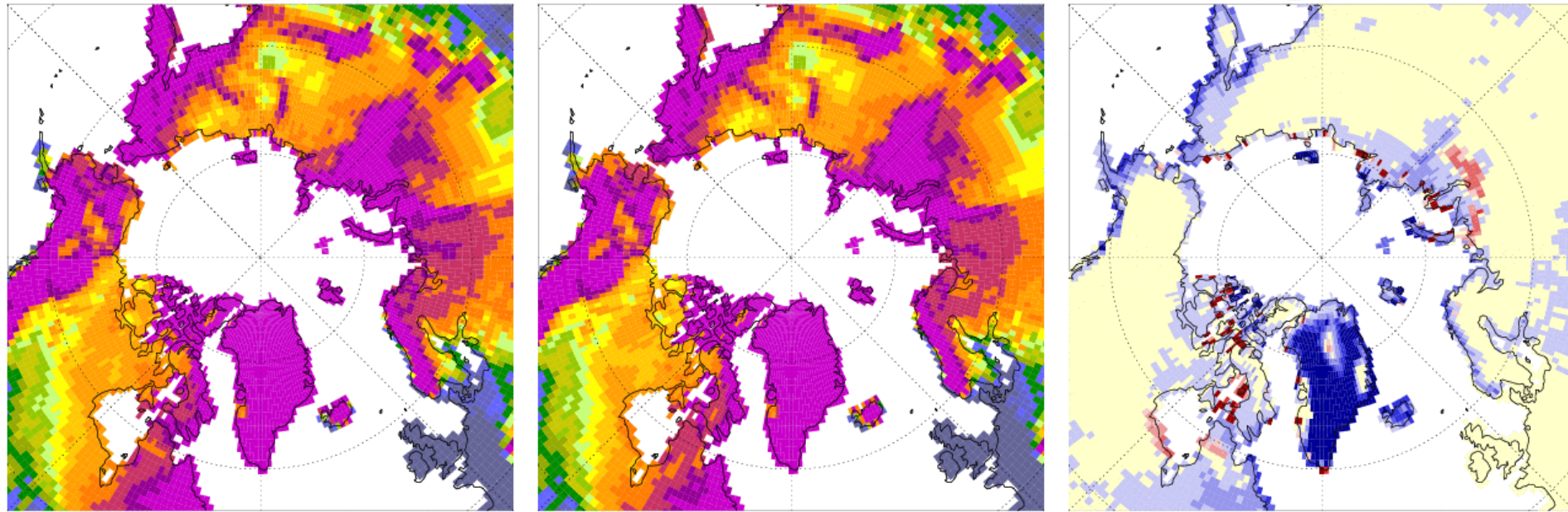
Snow_Depth

Diff: New - Old

March SNOW_DEPTH: Old

March SNOW_DEPTH: New

March SNOW_DEPTH: Difference



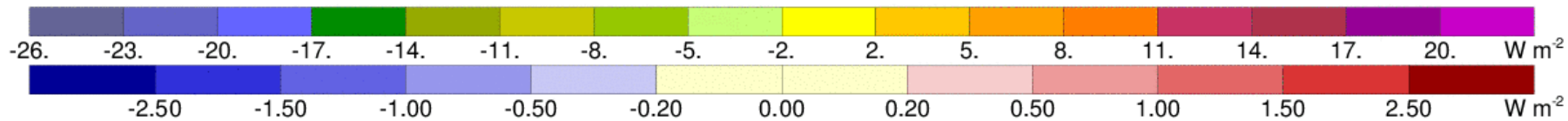
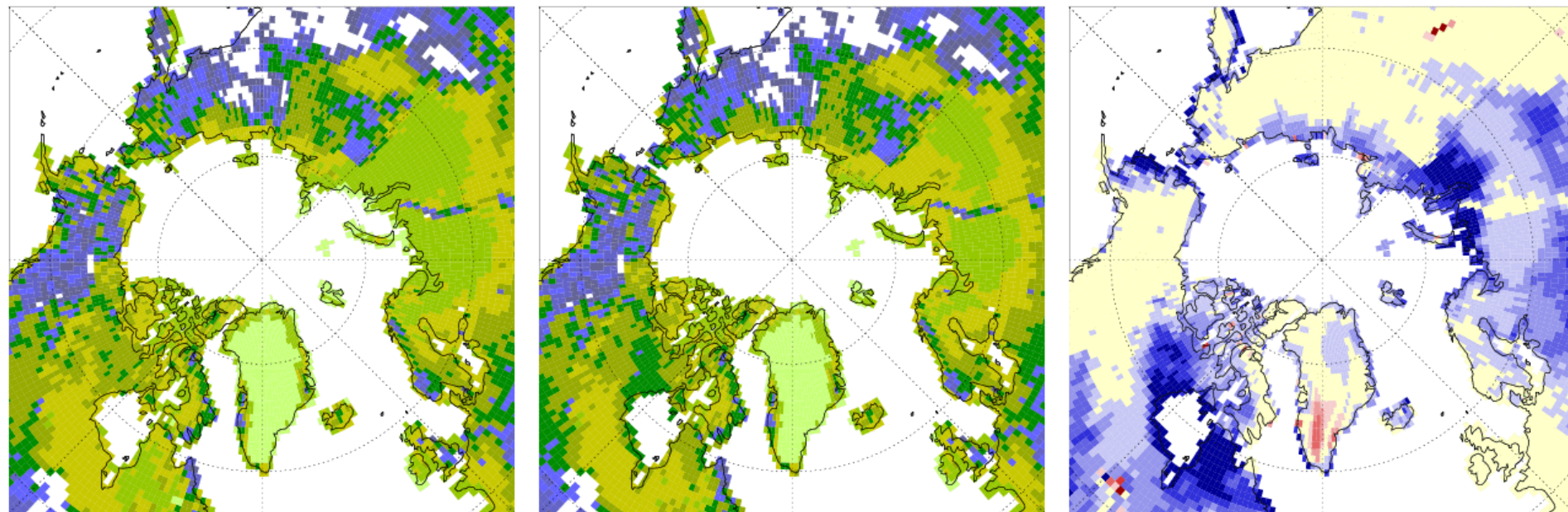
ERA-Interim, 0.5x0.5, 1980-2014

Heat Flux Into the Surface (FGR)

December FGR: Old

December FGR: New

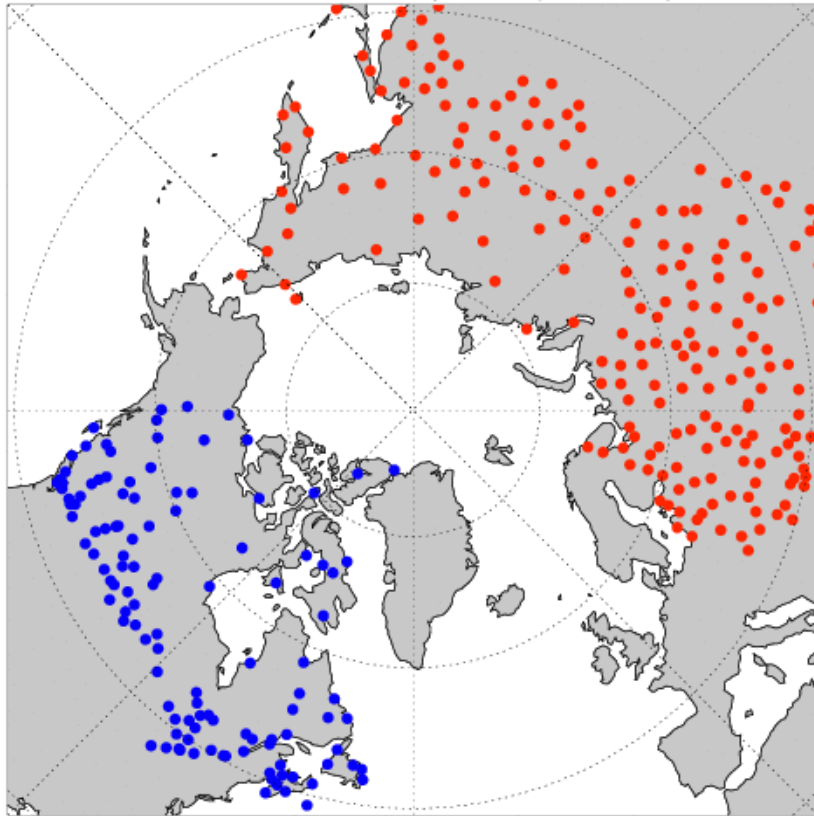
December FGR: Difference



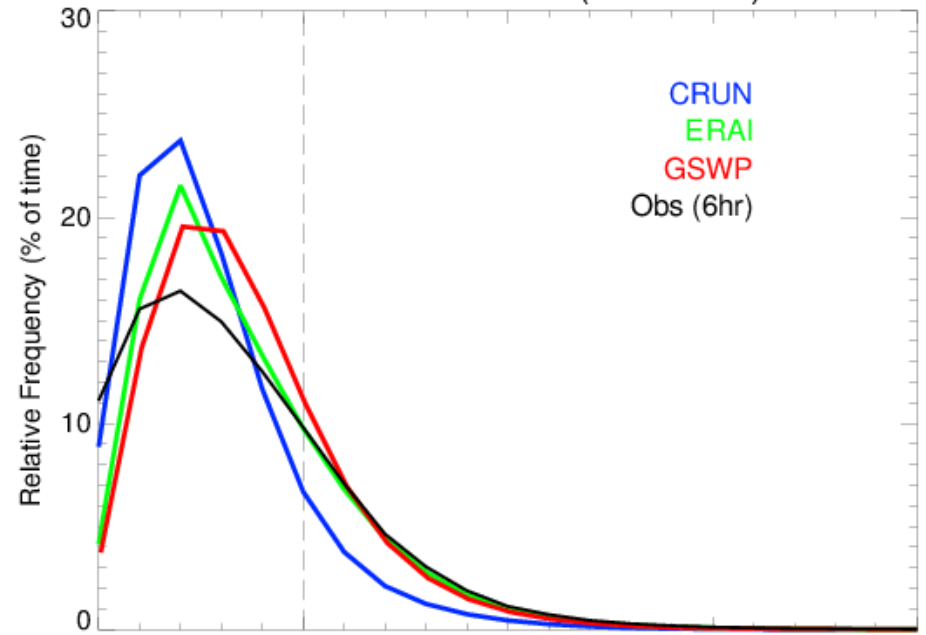
ERA-Interim, 0.5x0.5, 1980-2014

Wind Verification

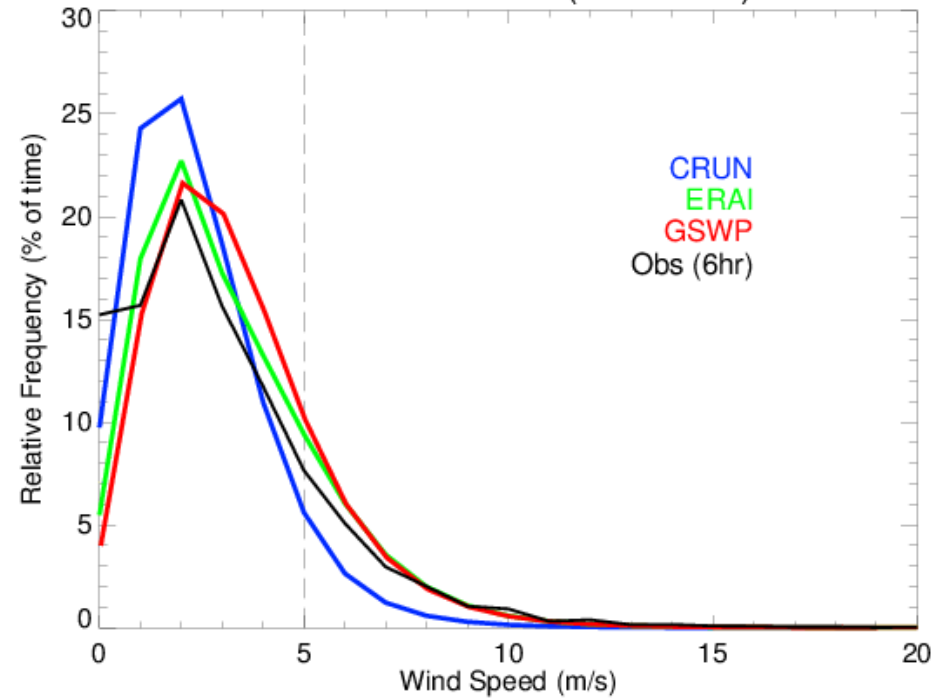
WMO Stations with 6-hrly Winds (1980-1999)



All Canadian Stations (1980-1999)

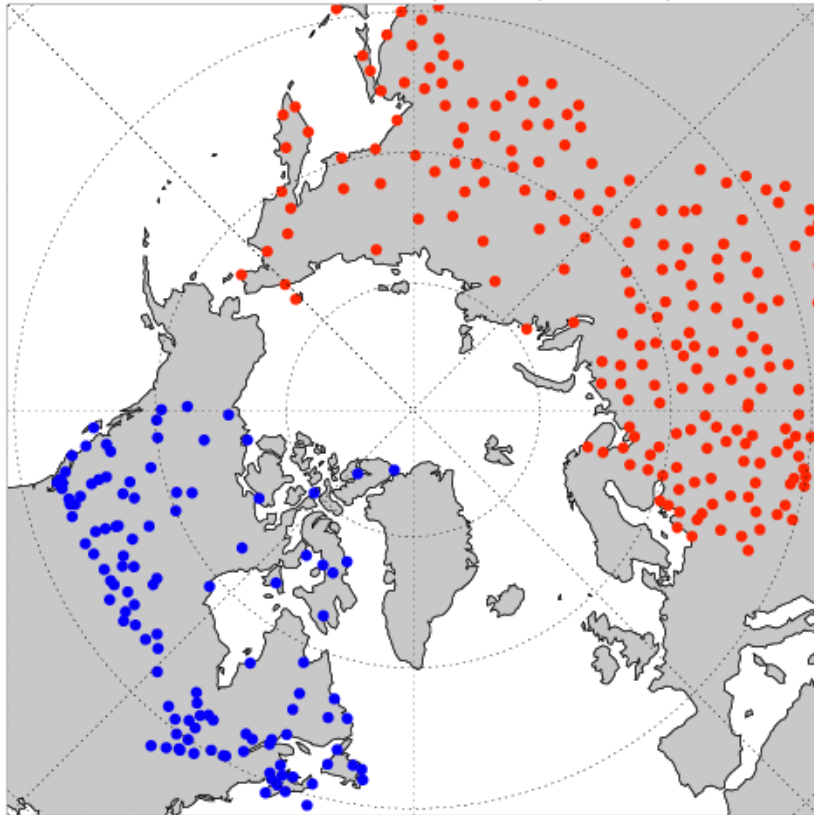


All Russian Stations (1980-1999)

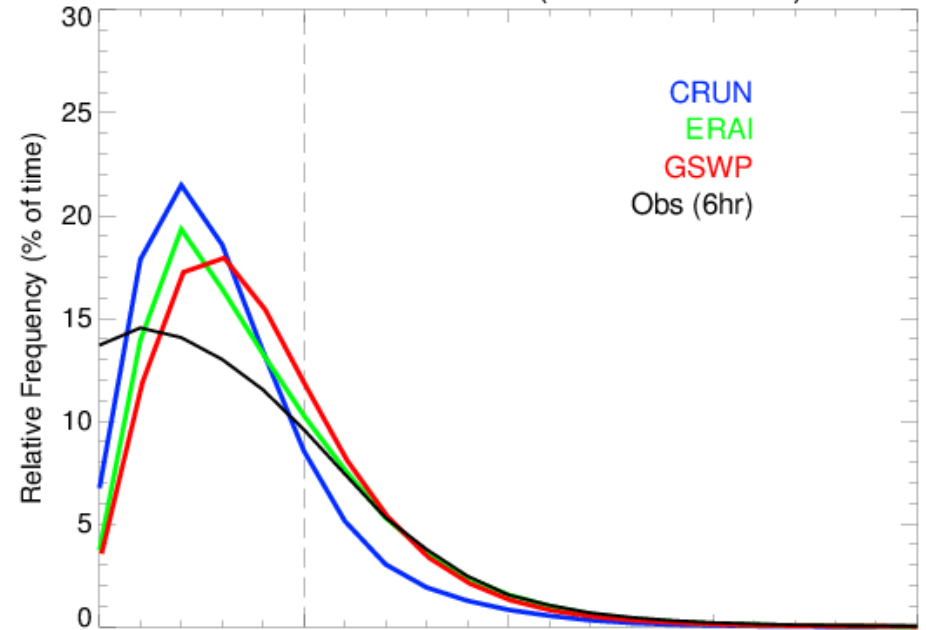


Wind Verification: DJF

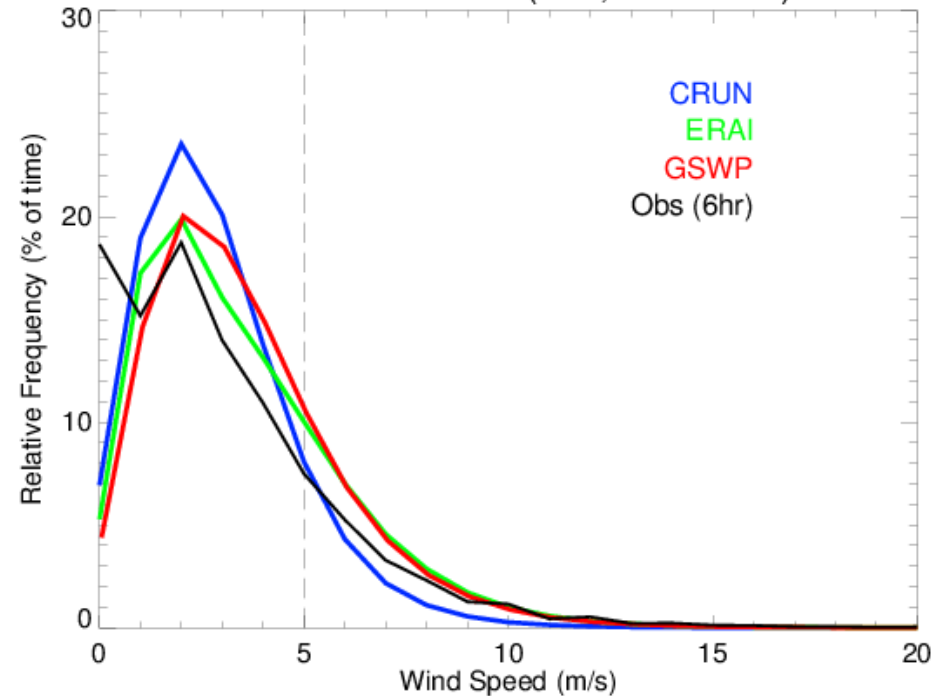
WMO Stations with 6-hrly Winds (1980-1999)



All Canadian Stations (DJF: 1980-1999)



All Russian Stations (DJF, 1980-1999)

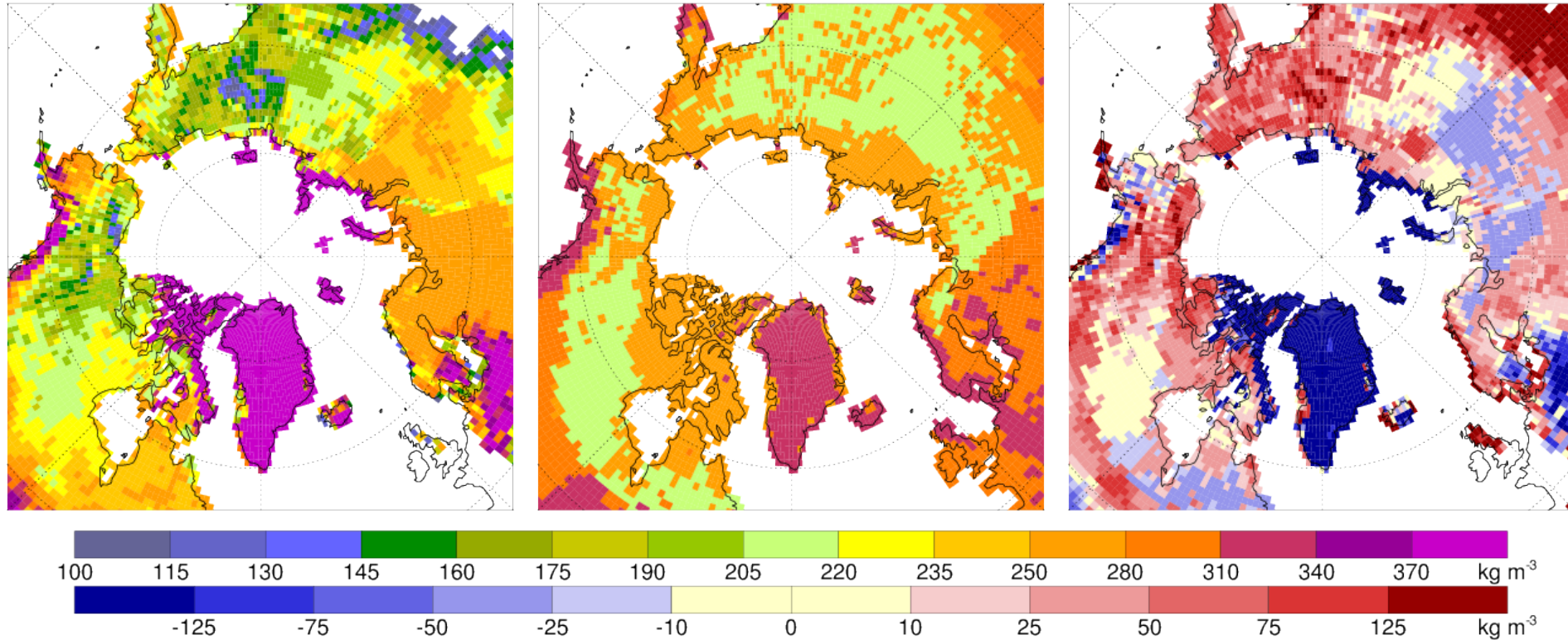


CLM Snow Density vs Sturm et al., (2010)

February Density: Old

February Density: Sturm

February Density: Difference



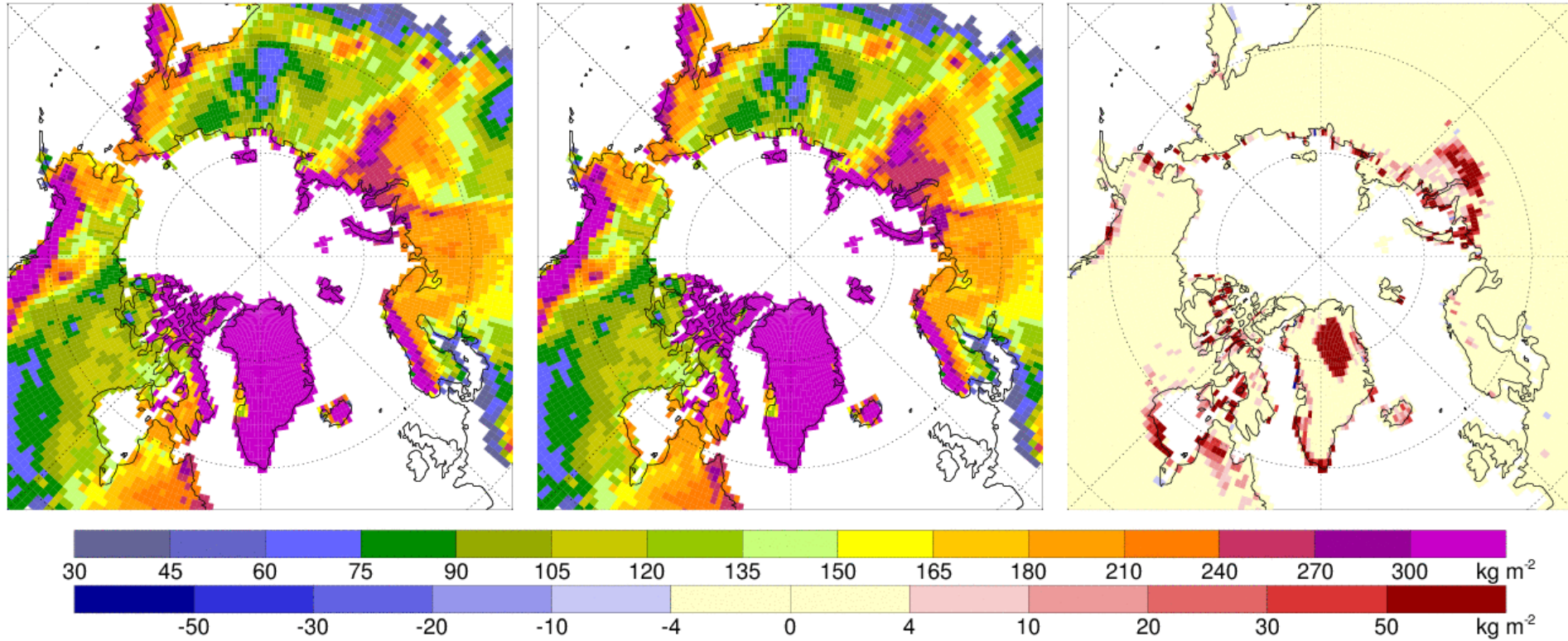
ERA-Interim, 0.5x0.5, 1980-2014

Snow Water Equivalent (SWE)

February SWE: Old

February SWE: New

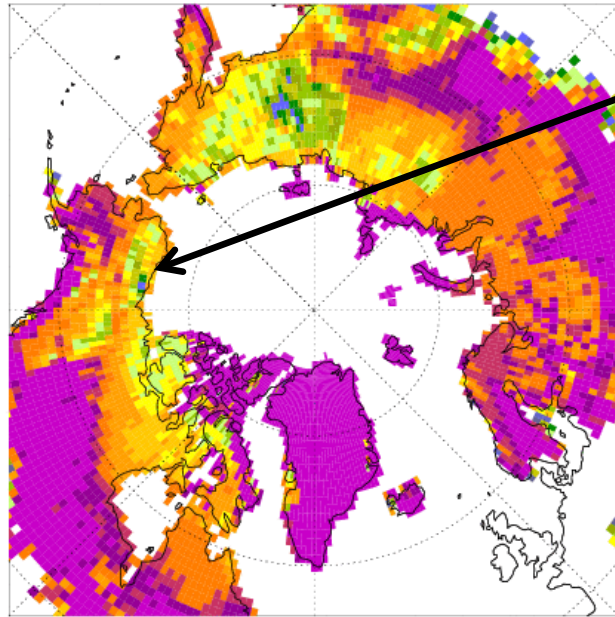
February SWE: Difference



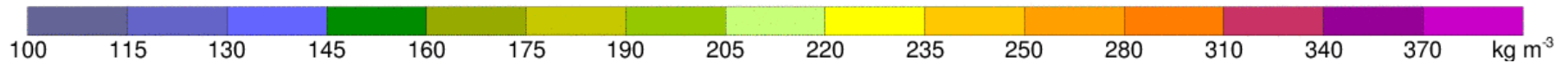
ERA-Interim, 0.5x0.5, 1980-2014

Observed Density

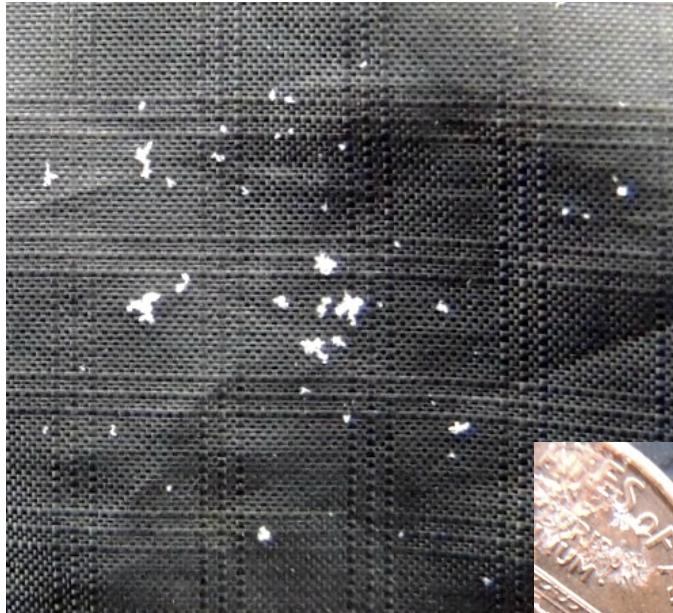
April Density: Old



280-300 kg m⁻³
Observed



Snow is not just “snow”



Antarctica, 2015/09

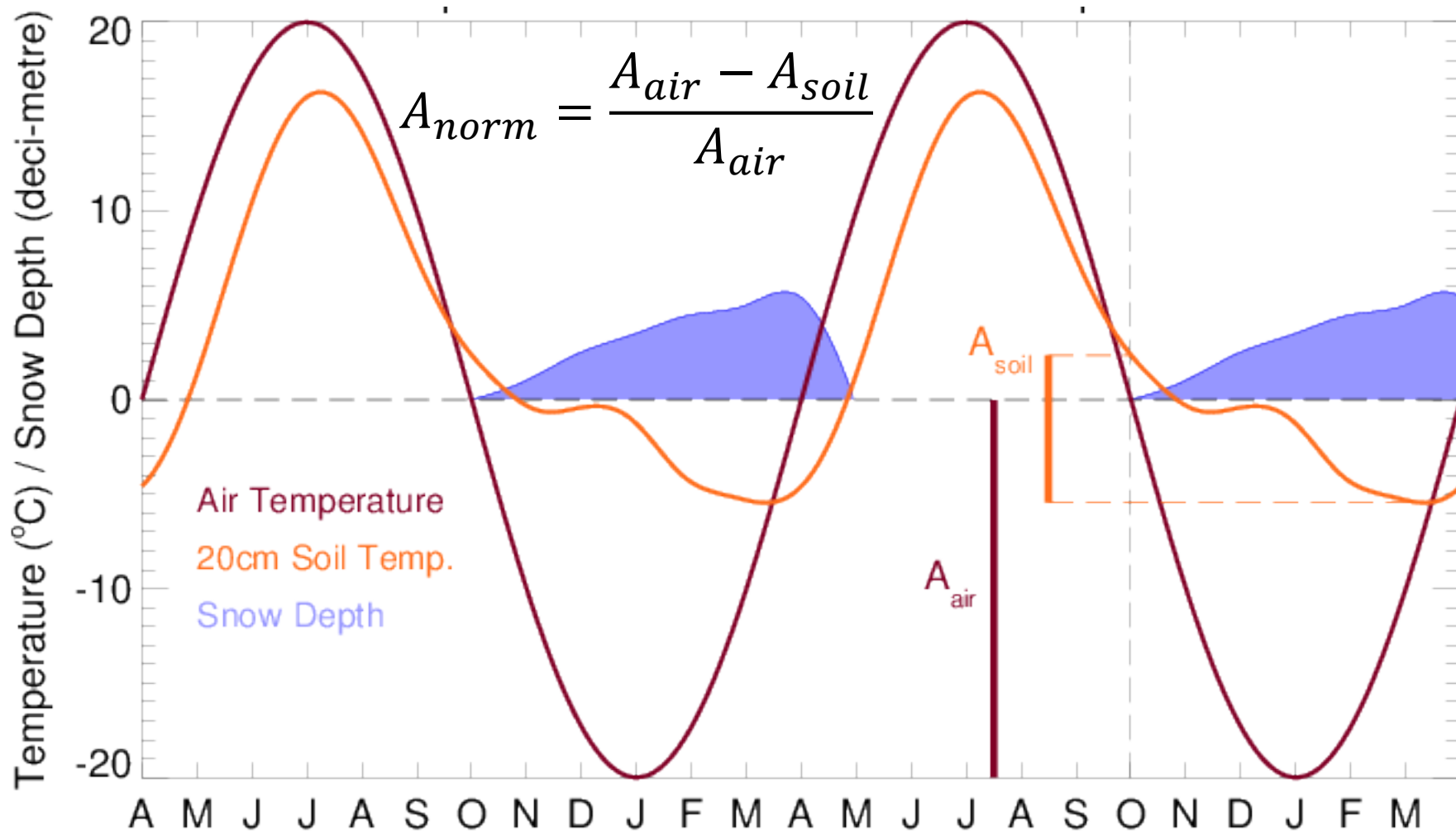


Colorado, 2015/11

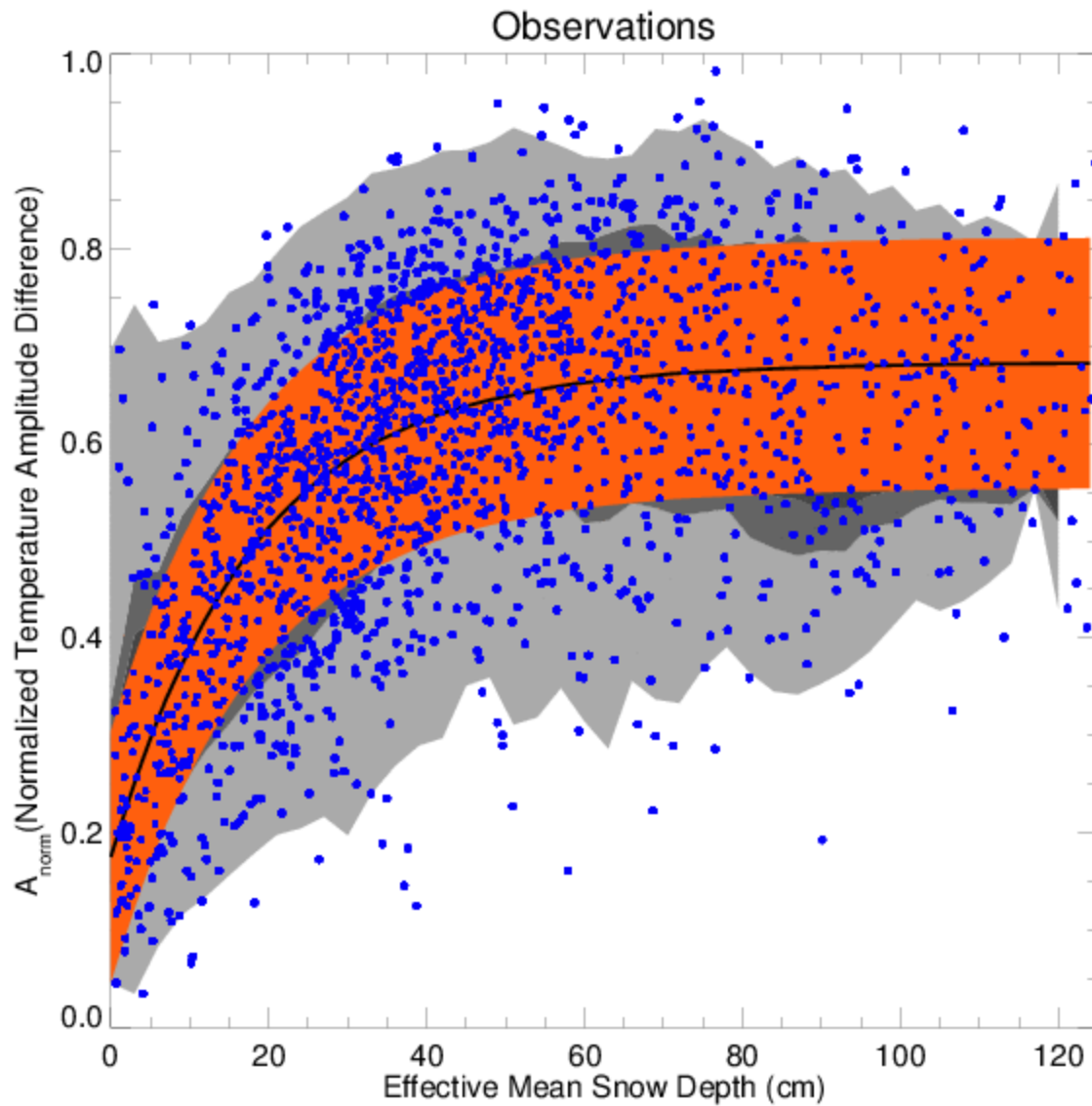


Arctic Alaska, 2012/04

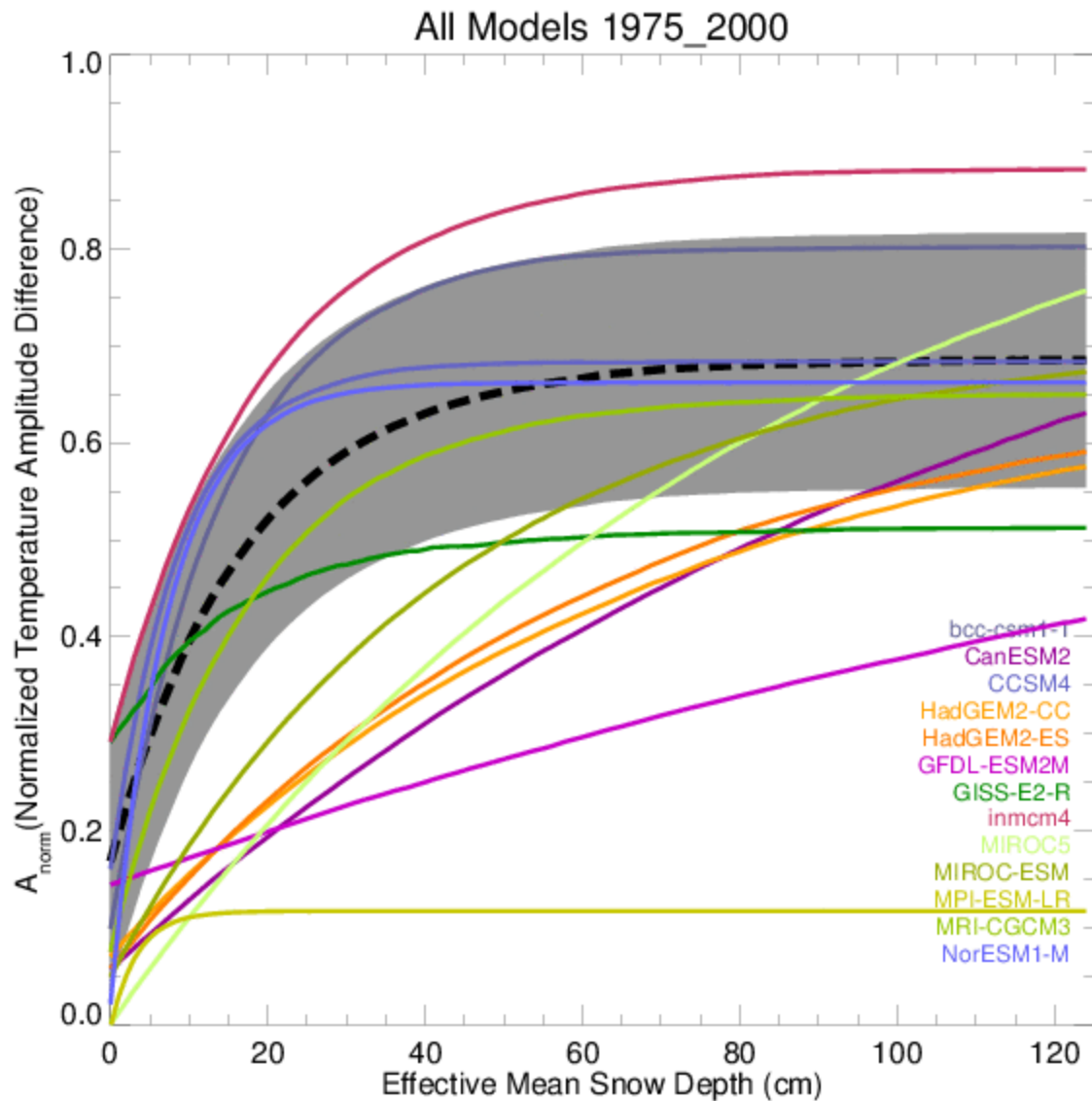
Process: Atmosphere-Land Heat Transfer



Observations Match Theory



Models Compared



The End – Back to my density investigations ...

