Snow: updates & metric

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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.)
Ice Sheets (vs. Seasonal Snow)

McMurdo Sound, Antarctica; Sept. 2015. Photo: A. Slater
Fresh Snow Density (i.e. during precip event)

Following Liston et al., 2007
Snow Density

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

ERA-Interim, 0.5x0.5, 1980-2014
Heat Flux Into the Surface (FGR)

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

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

All Canadian Stations (1980-1999)

Relative Frequency (% of time)

CRUN
ERAI
GSWP
Obs (6hr)

All Russian Stations (1980-1999)

Relative Frequency (% of time)

CRUN
ERAI
GSWP
Obs (6hr)

Wind Speed (m/s)

0 5 10 15 20

0 5 10 15 20

0 5 10 15 20
Wind Verification: DJF
CLM Snow Density vs Sturm et al., (2010)

ERA-Interim, 0.5x0.5, 1980-2014
Snow Water Equivalent (SWE)

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

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

\[ A_{\text{norm}} = \frac{A_{\text{air}} - A_{\text{soil}}}{A_{\text{air}}} \]

Slater et al., in prep
Observations Match Theory

Slater et al., in prep
Models Compared

Slater et al., in prep
The End – Back to my density investigations ...