

Sublimation of Snow Daily Weather Blog

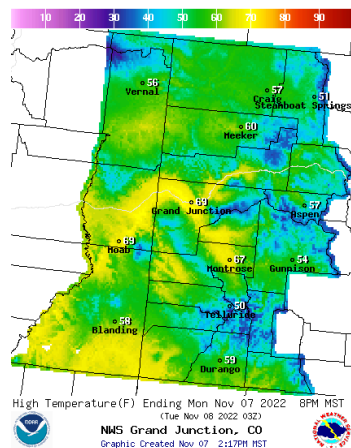
Discussion of observations from the site, Gothic, and synoptic events weather around the region for Winter 2022-2023

Week 8: December 12 to December 18, 2022

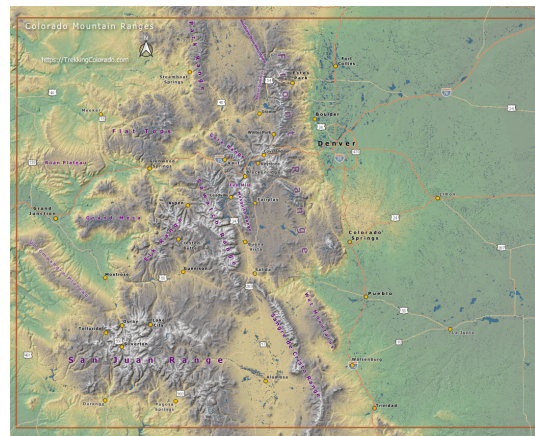
Resource Links

- [Surface Analysis Maps](#)
- [Windy.com for Forecast](#)
- [Tropical Tidbits Forecast](#)
- [billy barr site](#)
- [Grand Junction Area Forecast Discussion](#)
- [SOS Field Project - EOL/ISFS Home](#)

County Warning Area



Mountain Ranges of CO



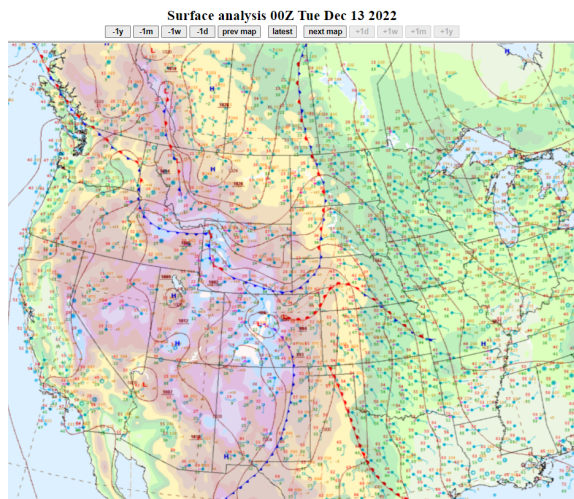
December 12, 2022

Daily Weather Discussion

From billy barr: cloudy and warm overnight. Then cloudy with little warming through the morning, picking up a bit in the afternoon and becoming windy.

Synoptic Overview

Lots to go over here: The deepening low shifted large scale lift to the front range (further north) as it moved east, but also added a broad deformation axis over the central/northern CO mountains with a divergent zone aloft. Wrap around moisture is expected as this low progresses over the day. However, a lack of snow further south due to good mixing overnight and a slower than expected progression of the cold front. A more convective mode of precipitation is expected for the afternoon, so it may impact smaller areas. Conditionally unstable air (air that is shallower than the dry adiabatic lapse rate but steeper than the moist adiabatic lapse rate) will continue to advect north as the cyclone moves east. A combination of this air combined with surface cyclogenesis as the cold front kicks east should bring the most enhanced lift, but this will likely only impact northern CO with high snow amounts in the northern mountains. The lee side of the cyclone will tap into some Gulf moisture. Snowfall should taper off into Wednesday, December 14 as cold air dominates over the next few nights, but cloud cover should modulate temperatures.



Equipment Notes

- Blowing snow with transport seen in the SWE time series
- Front arrived around 5 PM with changes in wind speed and direction

2022 Dec 12 - Dec 13

Dec 12 0800 2022 GMT Dec 12 1600 Dec 13 0000

(degC) RH.c(2m.c(%))

Dec 12 0100 Dec 12 0900 Dec 12 1700

2022 MST 2022 MST 2022 MST

(m/s) 2m.c(deg)

Dec 12 0100 Dec 12 0900 Dec 12 1700

2022 MST 2022 MST 2022 MST

Energy Budget

H.2m.c [avg=-16.1] Rsum.uw [avg=-7.8] Gsol.d [avg=3]

LE.2m.c [avg=11.7] Rsum.9m.d [avg=-7.8]

Dec 12 0100 Dec 12 0900 Dec 12 1700

2022 MST 2022 MST 2022 MST

Time(MON DAY HHMM), tic=HR

SOS: preliminary field observations NCAR 21:07 Dec 12 2022 MST

Good mixing all day

5 Minute Average spd.c Profiles

2022 Dec 12 01:00-Dec 13 00:00 MST

01:00 02:00 03:00 04:00 05:00 06:00

07:00 08:00 09:00 10:00 11:00 12:00

13:00 14:00 15:00 16:00 17:00 18:00

19:00 20:00 21:00 22:00 23:00 00:00

Heights (m)

spd.c(m/s) 01:00-06:00 MST

spd.c(m/s) 07:00-12:00 MST

spd.c(m/s) 13:00-18:00 MST

spd.c(m/s) 19:00-00:00 MST

SOS: preliminary field observations NCAR 22:07 Dec 12 2022 MST

Warm most of the day

5 Minute Average T.c Profiles

2022 Dec 12 01:00-Dec 13 00:00 MST

01:00 02:00 03:00 04:00 05:00 06:00

07:00 08:00 09:00 10:00 11:00

13:00 14:00 15:00 16:00 17:00 18:00

19:00 20:00 21:00 22:00 23:00 00:00

Heights (m)

T.c(degC) 01:00-06:00 MST

T.c(degC) 07:00-12:00 MST

T.c(degC) 13:00-18:00 MST

T.c(degC) 19:00-00:00 MST

SOS: preliminary field observations NCAR 22:07 Dec 12 2022 MST

wDiv,w_ave.10m 2022 Dec 12 - Dec 13

Dec 12 0800 2022 GMT Dec 12 1200 Dec 12 1600 Dec 13 0000 Dec 13 0400

wDiv w_ave.10m

(m/s)

Dec 12 0100 Dec 12 0500 Dec 12 0900 Dec 12 1700 Dec 12 2100

2022 MST 2022 MST 2022 MST 2022 MST 2022 MST

Time(MON DAY HHMM), tic=HR

SOS: preliminary field observations NCAR 22:07 Dec 12 2022 MST

December 13, 2022

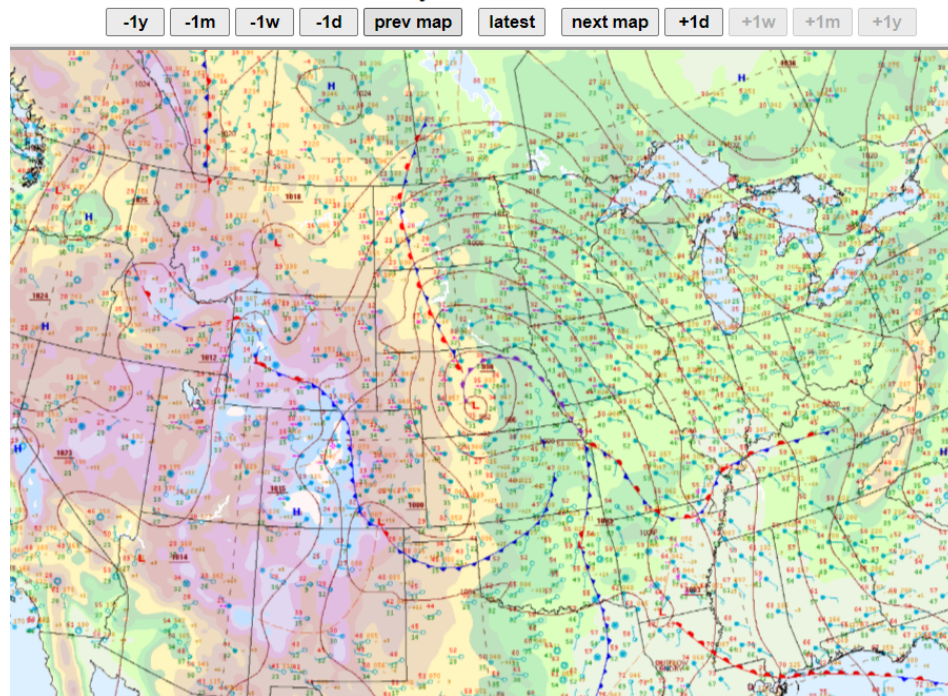
Daily Weather Discussion

From billy barr: Cloudy, windy and cold for the day with only a trace of new snow.

Synoptic Overview

Snow wrapping up in the northern regions with the strong low pressure system working its way into the Plains. Moisture came in from the north so northern ranges seemed to get more as not much was seen in the Crested Butte area. Northwest flow veers more northerly. This will continue to be an efficient snow maker for impacted areas (not Gothic though) with instability growing throughout the region. Warmer temperatures expected tomorrow with some warm air advection at mid levels.

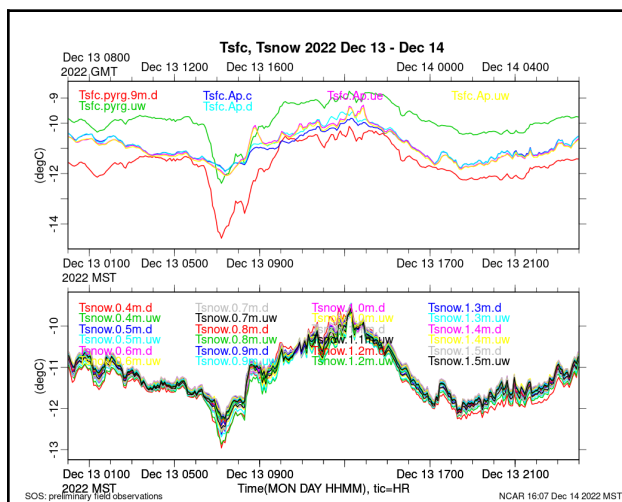
Surface analysis 00Z Wed Dec 14 2022



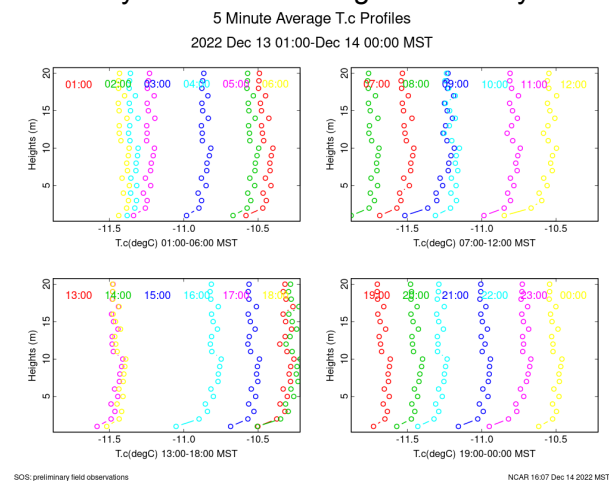
Equipment Notes

- Everything seemed to be up today. Keeping an eye on swe over the next couple days to see if it is decreasing
- Surface temperatures are still too warm. Reached out to see if we can address this.

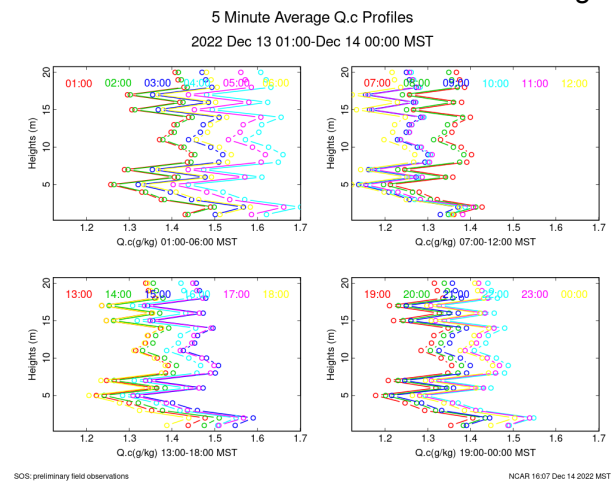
Figures



Generally isothermal throughout the day

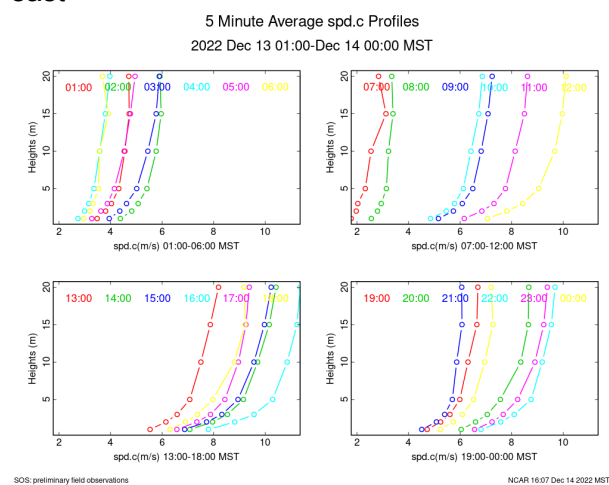


Wonder how these vertical fluxes are looking

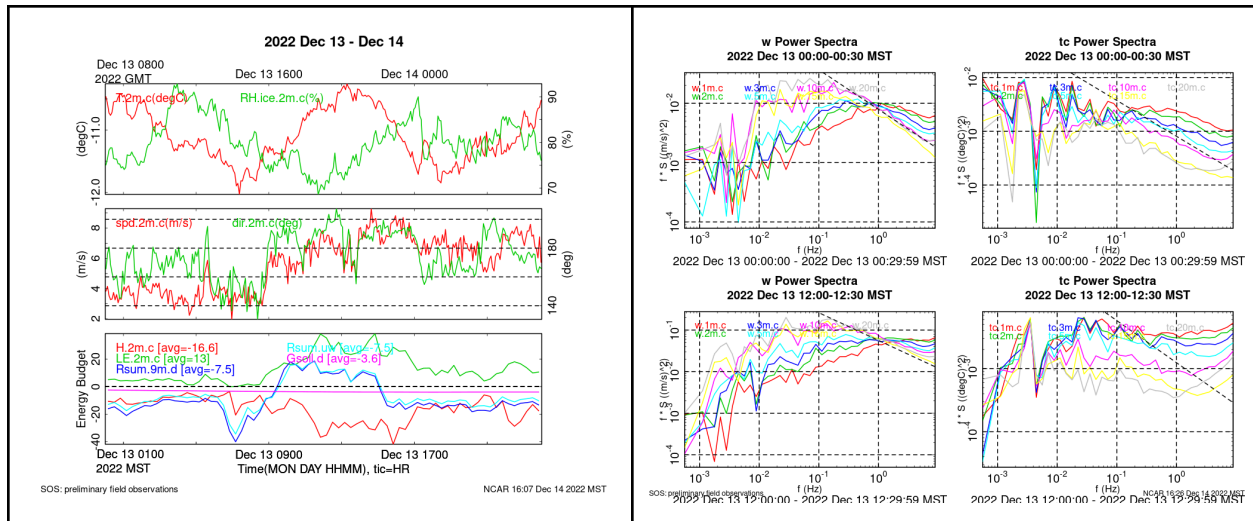


Sensible and latent heat fluxes are pretty large today!

Relatively windy here with the system out east



Looks like these wind speed spectra plots are a bit different today



December 14, 2022

Daily Weather Discussion

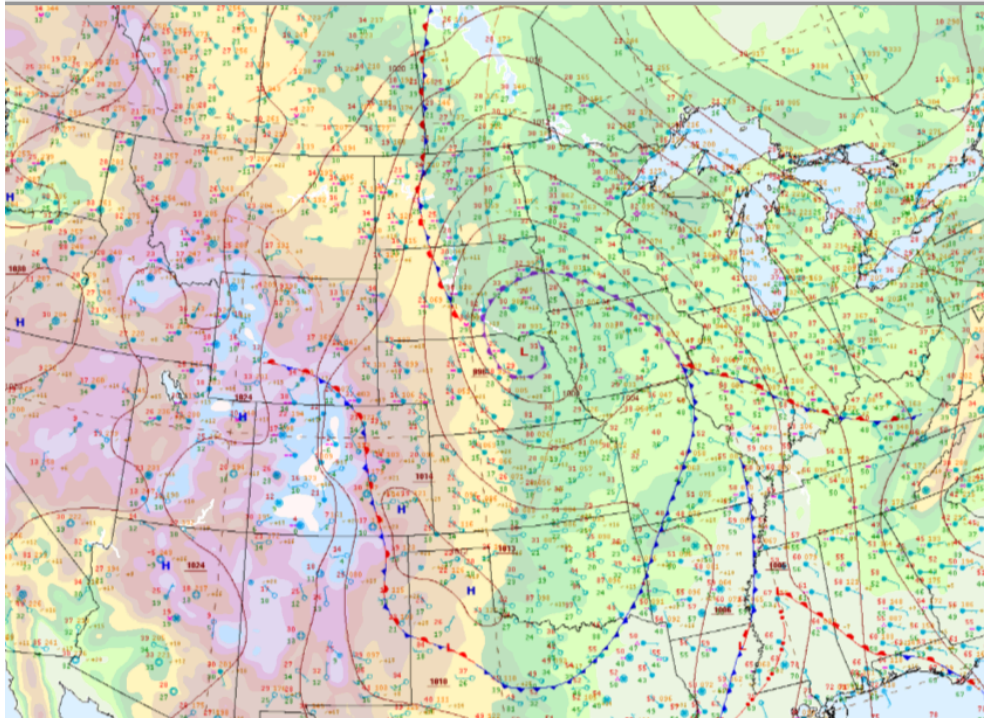
From billy barr: cloudy, windy with a mild low temperature, then a slow but gradual clearing through the morning but windy with very slow warming through the day. The morning had the 2nd day in a row with the strongest winds coming at lower elevations- very much a rarity- though that changed in the afternoon. A bit more clearing at sunset.

Synoptic Overview

Low clouds throughout the area over the day work to modulate temperatures with generally northerly flow. Scattered snow showers are expected in the region tomorrow as a shortwave rotating around the larger low moves through the area. Cold air will be ushered in behind this disturbance as 700 mb levels get well below zero.

Surface analysis 15Z Wed Dec 14 2022

[-1y](#) [-1m](#) [-1w](#) [-1d](#) [prev map](#) [latest](#) [next map](#) [+1d](#) [+1w](#) [+1m](#) [+1y](#)

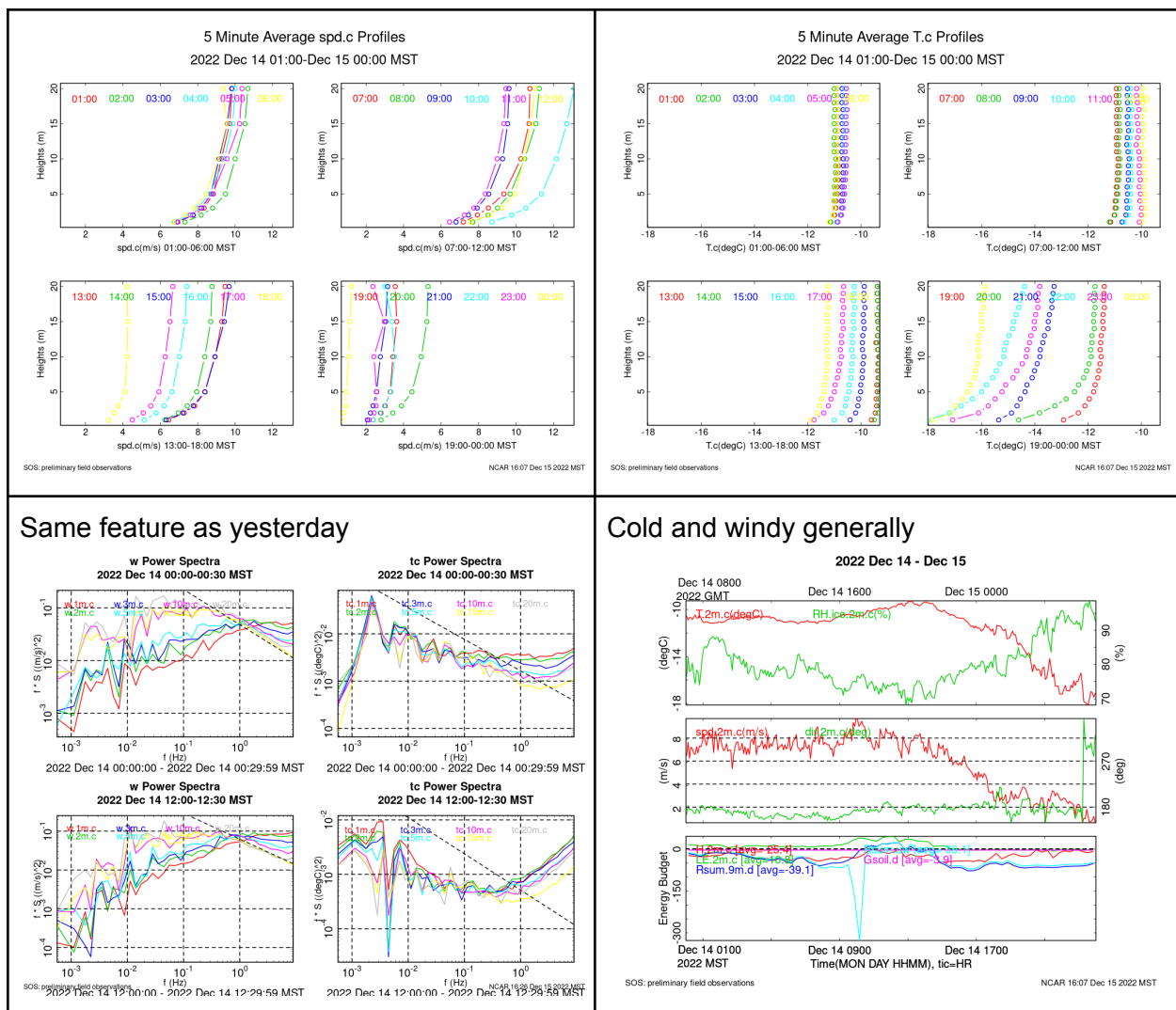


Equipment Notes

- Same as yesterday. SWE is decreasing so could take a look at sublimation conditions. Snow also could have simply been blown away though.

Figures

Very windy	Cold with strong inversion developing at night
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December 15, 2022

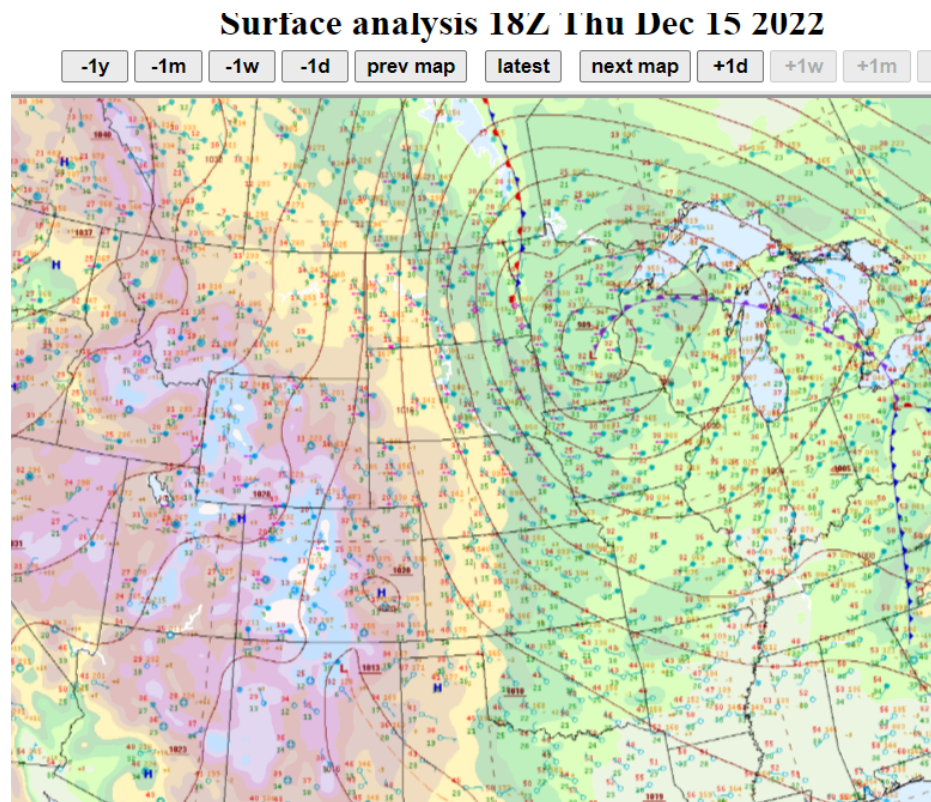
Daily Weather Discussion

From billy barr: clearing and cool overnight with clouds building just before sunrise, becoming cloudy soon after and staying cold, cloudy and breezy all day.

Synoptic Overview

Snow showers have lingered as anticipated this morning in response to residual moisture, favorable orographics, and ample cold air in the DGZ, but focused along the Continental Divide. Not much snow in the Gothic area. Cold air is the main story as an arctic pulse will come down

from the north into the region and drop temperatures significantly going into the weekend (December 16-18).

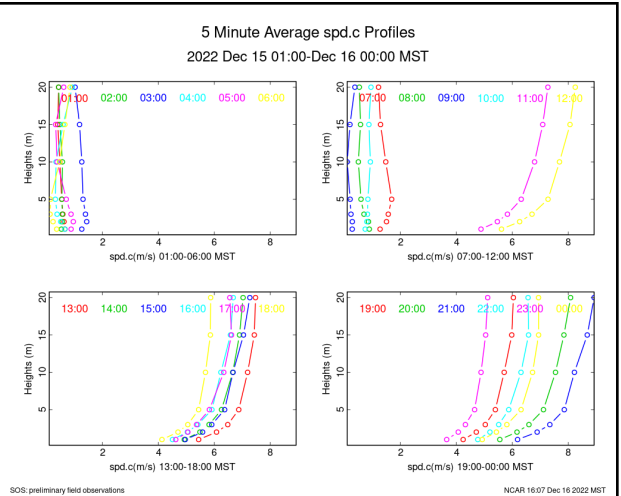
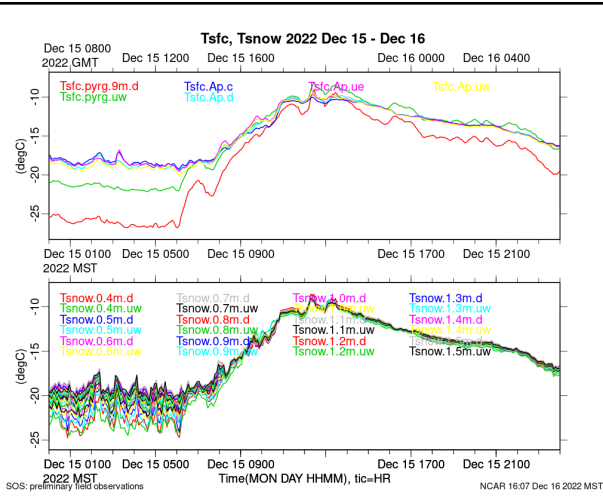


Equipment Notes

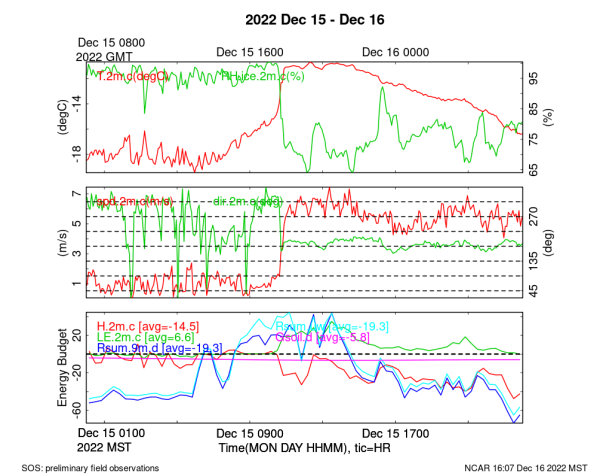
- Q soil is back alive again with heat driving downwards with extra cold temperatures
- Super dry cold air
- Swe increases with possible light snow? Or just blowing snow

Figures

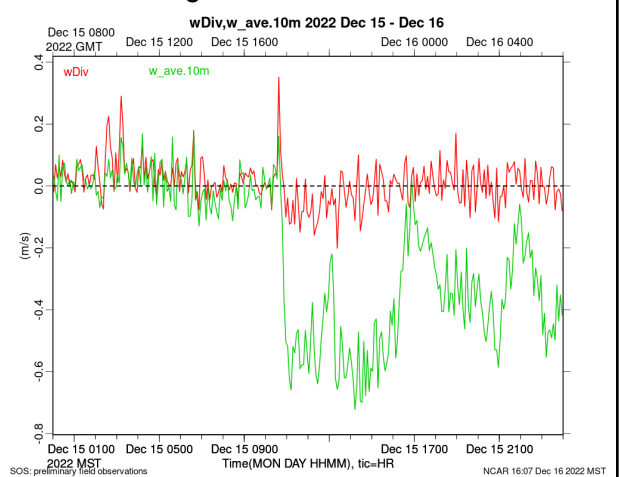
Near surface gradients!	Calm and then windy
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Front arrival here

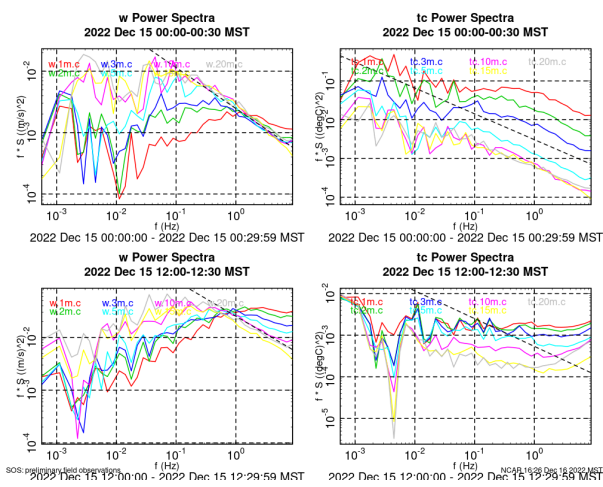


Strong downward motion here too as the air dried out and got warmer

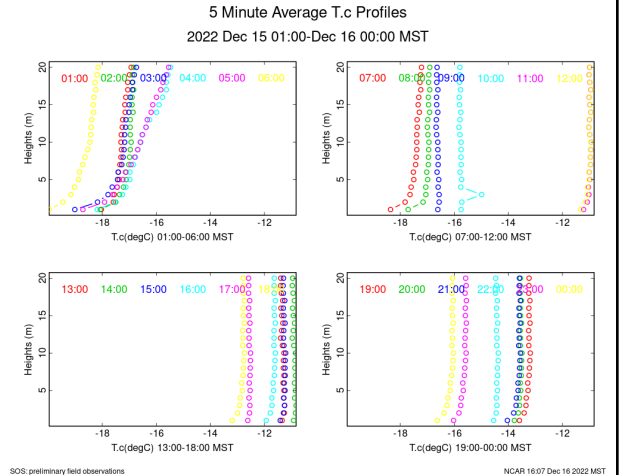


winds from the South. Not a well discussed feature here, so could be interesting to look at

Less mixed, more turbulence dampred



Interesting temp gradient with strong inversion



December 16, 2022

Daily Weather Discussion

clear, windy and cool with a slow warming through the day, though staying cold even though a cloudless day with wind becoming light from midafternoon on.

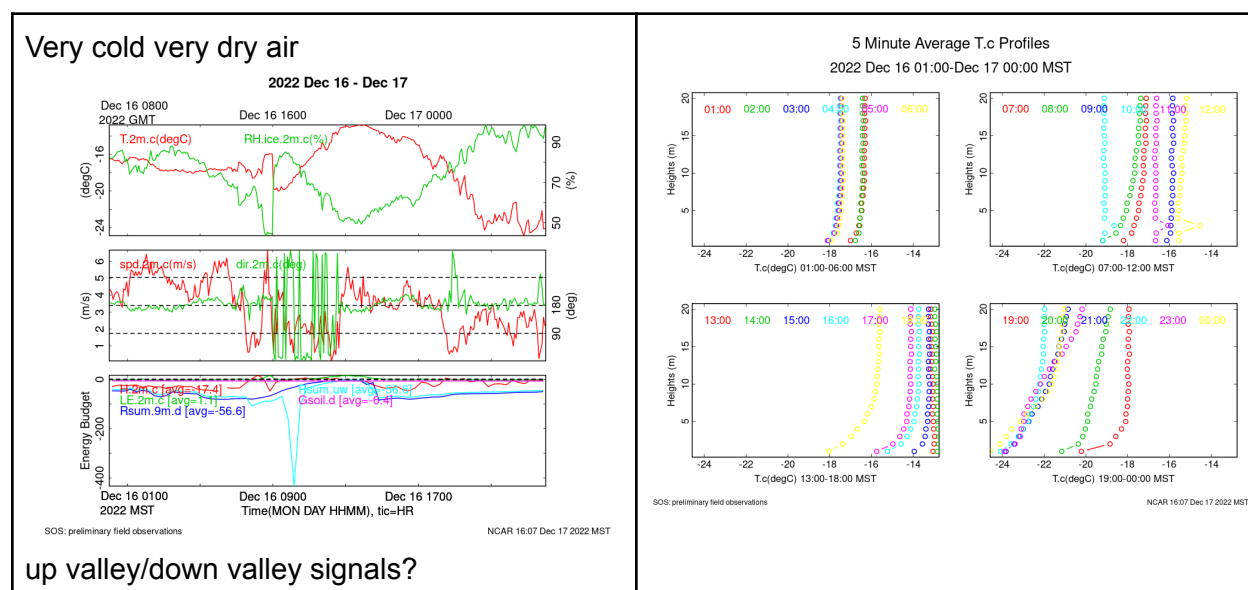
Synoptic Overview

Flow will gradually veer to the west/northwest through this weekend (December 16-18) with more cold air being brought south into the area. The entire region will dry out after a last bit of precipitation finishes up today. This incoming air mass is exceptionally dry, with precipitated water values between 10-40% of normal. Snow should come to an end by the afternoon with a few lingering flurries over the northern peaks along the Divide as this drier air moves in and the upper low across the midwest lifts northeast into the northern Great Lakes and across Ontario Canada. The upper flow shifting from north to west-northwest will shut down the orographic component and forcing from the polar jet. Now we are moving out of the rather busy and involved set of systems that occurred with upper level troughs and jet features present.

Equipment Notes

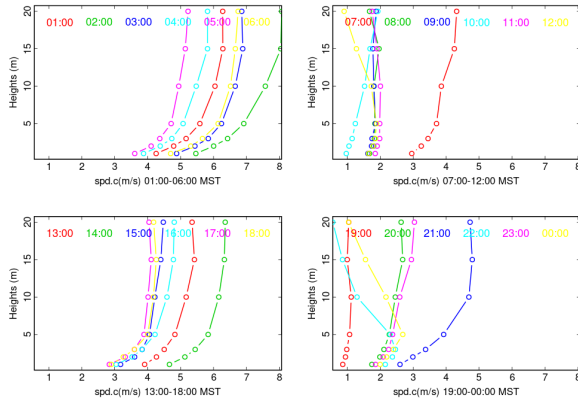
- Some clipping on the longwave radiometer for some of these values
- SWE values generally consistent
- Pillow 2 has significantly less snow.

Figures



Pretty windy here too

5 Minute Average spd.c Profiles
2022 Dec 16 01:00-Dec 17 00:00 MST

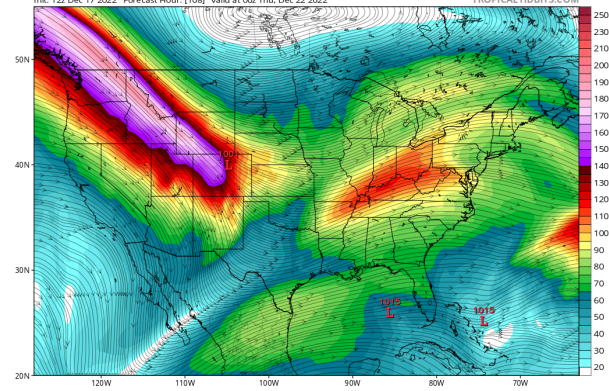


SOS: preliminary field observations

NCAR 16:07 Dec 17 2022 MST

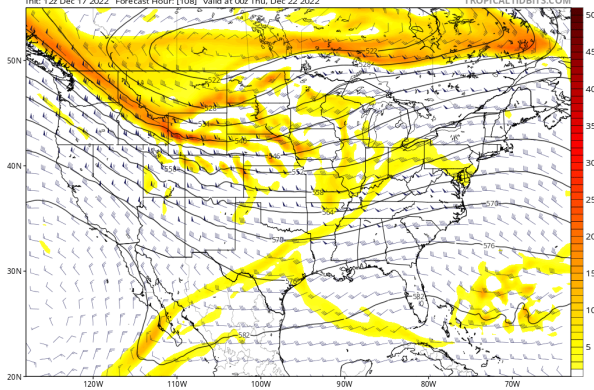
Forecast: Super strong polar jet feature coming in later next week around Dec 22

ECMWF 250mb Wind Speed/Streamlines (kt) & MSLP Extrema (mb)



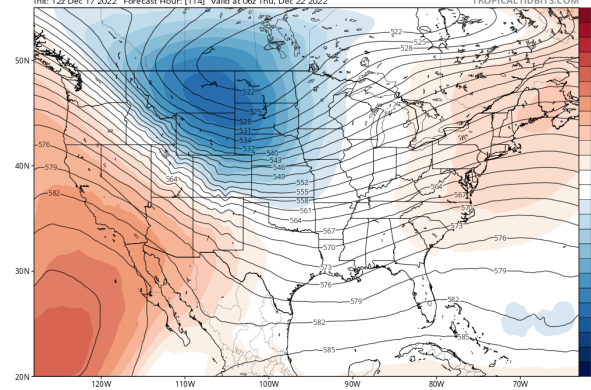
Forecast: Future system on Dec 22 with vorticity and wind accompany lower down

ECMWF 500mb Geopotential Height (dam), Cyclonic Vorticity ($10^3 s^{-1}$, shaded), and Wind (kt)



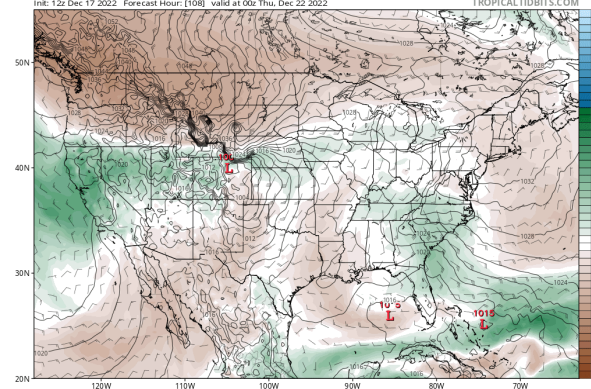
Forecast: Super tight gradients wind incoming with this future system!

ECMWF 500mb Geopotential Height & Normalized Anomaly (based on CFSR 1981-2010 Climatology)



generally dry but some moisture is being brought in from the west with this

ECMWF MSLP (mb), Total Precipitable Water Normalized Anomaly, & 850mb Wind (kt)



December 17, 2022

Daily Weather Discussion

From billy barr: clear and easily the coldest day of the year followed by a slow but steady warming, though with no clouds or wind it feels much warmer.

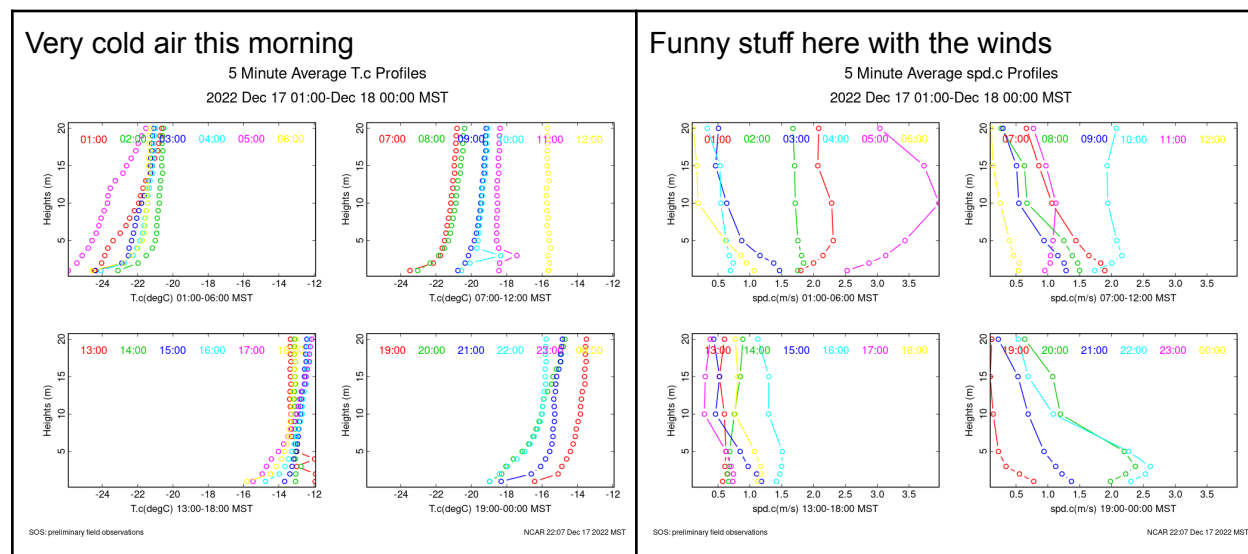
Synoptic Overview

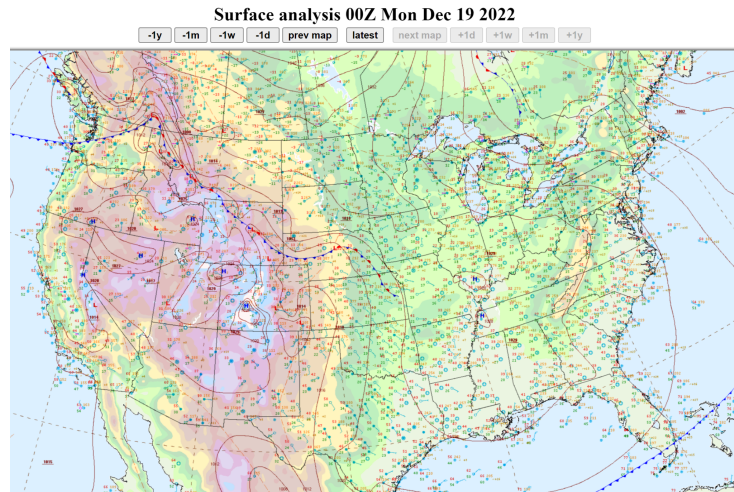
Increasing cloud cover is possible with a small disturbance tomorrow. If clouds persist, cloud cover will raise some of those cold temperatures. Expect similarly cold weather for the mornings in the Gunnison valley, but could be slightly milder. Cold will linger a bit more but shift to more seasonal values as we move into a zonal flow regime. With the next system coming into the PNW early next week, we should see some interesting impacts from jet features coming in.

Equipment Notes

- Pillow 3s signal went haywire...
- -26 overnight near the surface
- Very dry air still

Figures

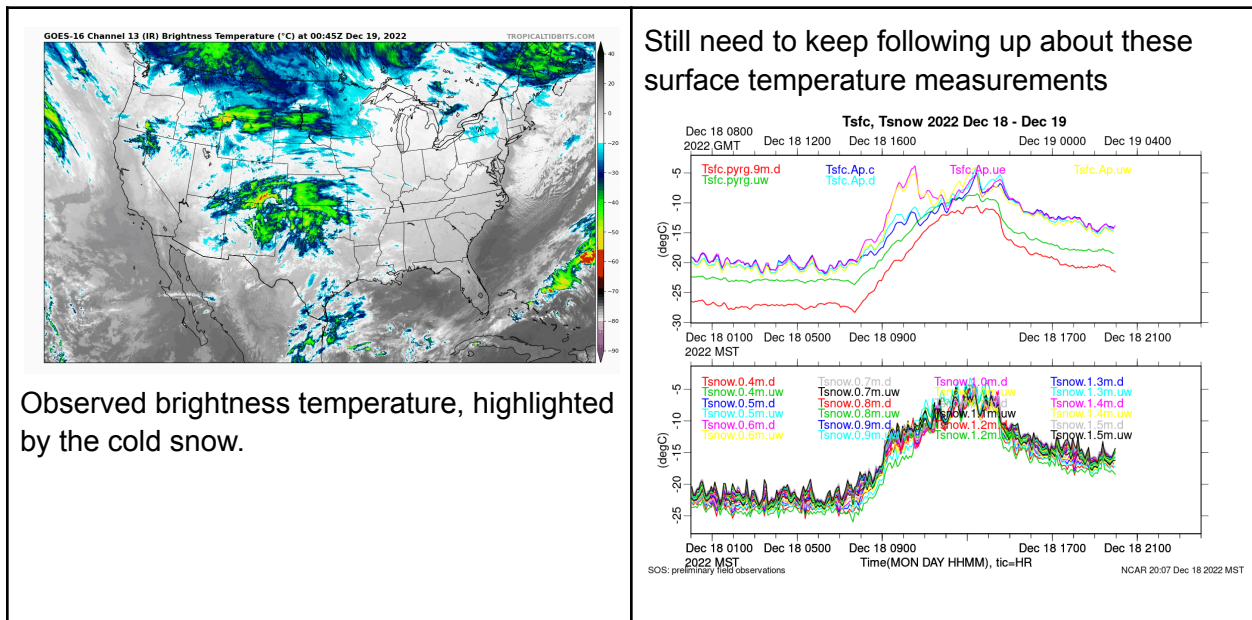




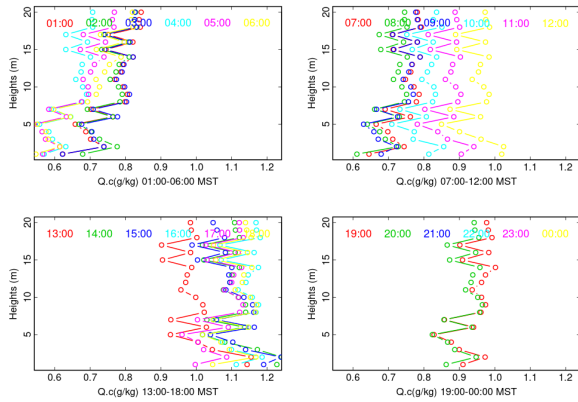
Equipment Notes

- Snow pillow 3 came back online halfway through the day
- Temperature at surface has the same issues as normal

Figures



5 Minute Average Q.c Profiles
2022 Dec 18 01:00-Dec 19 00:00 MST



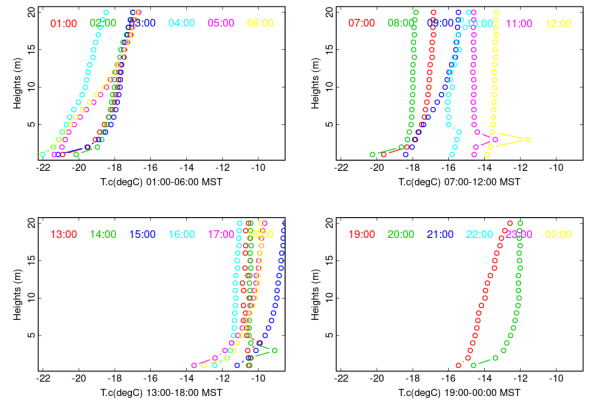
SOS: preliminary field observations

NCAR 20/07 Dec 18 2022 MST

super dry air with this cold air mass

Nice inversion persisted over the day

5 Minute Average T.c Profiles
2022 Dec 18 01:00-Dec 19 00:00 MST

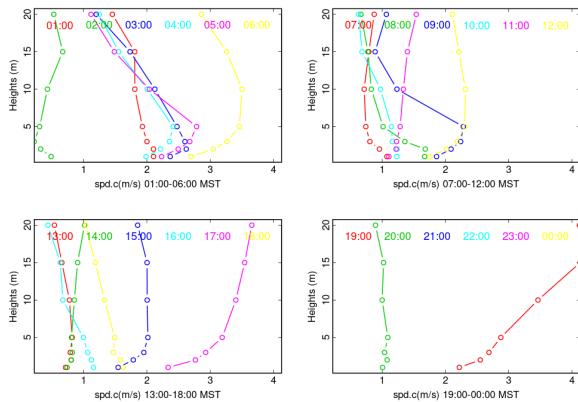


SOS: preliminary field observations

NCAR 20/07 Dec 18 2022 MST

Low level winds with some interesting features.

5 Minute Average spd.c Profiles
2022 Dec 18 01:00-Dec 19 00:00 MST



SOS: preliminary field observations

NCAR 20/07 Dec 18 2022 MST