CENTER FOR SNOW & AVALANCHE STUDIES

CODOS UPDATE FOR BERTHOUD SUMMIT: VISITED MARCH 15, 2012

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SUMMARY

Dust layer D4 (March 6) was observed, with its characteristic brown/pink color, at the surface of the snowcover at our Berthoud Summit CODOS site and on surrounding terrain, where snowcover was present. The very large proportion of exposed bare ground in the Front Range is also likely contributing some additional "local" dust and vegetation material to adjoining snow covered terrain during wind events. Melt-freeze effects on the snowpack were limited to the surface and the snowpack retains some cold content. Since our site visit, a new D5 dust event (March 18) has landed on the D4 surface, entrained in just a few inches of new snow (dust was also reported in Boulder on Sunday, March 18). Dust-enhanced radiative forcing of snowpack warming will resume later this week as D5/D4 re-emerge.

SNOWPACK DISCUSSION

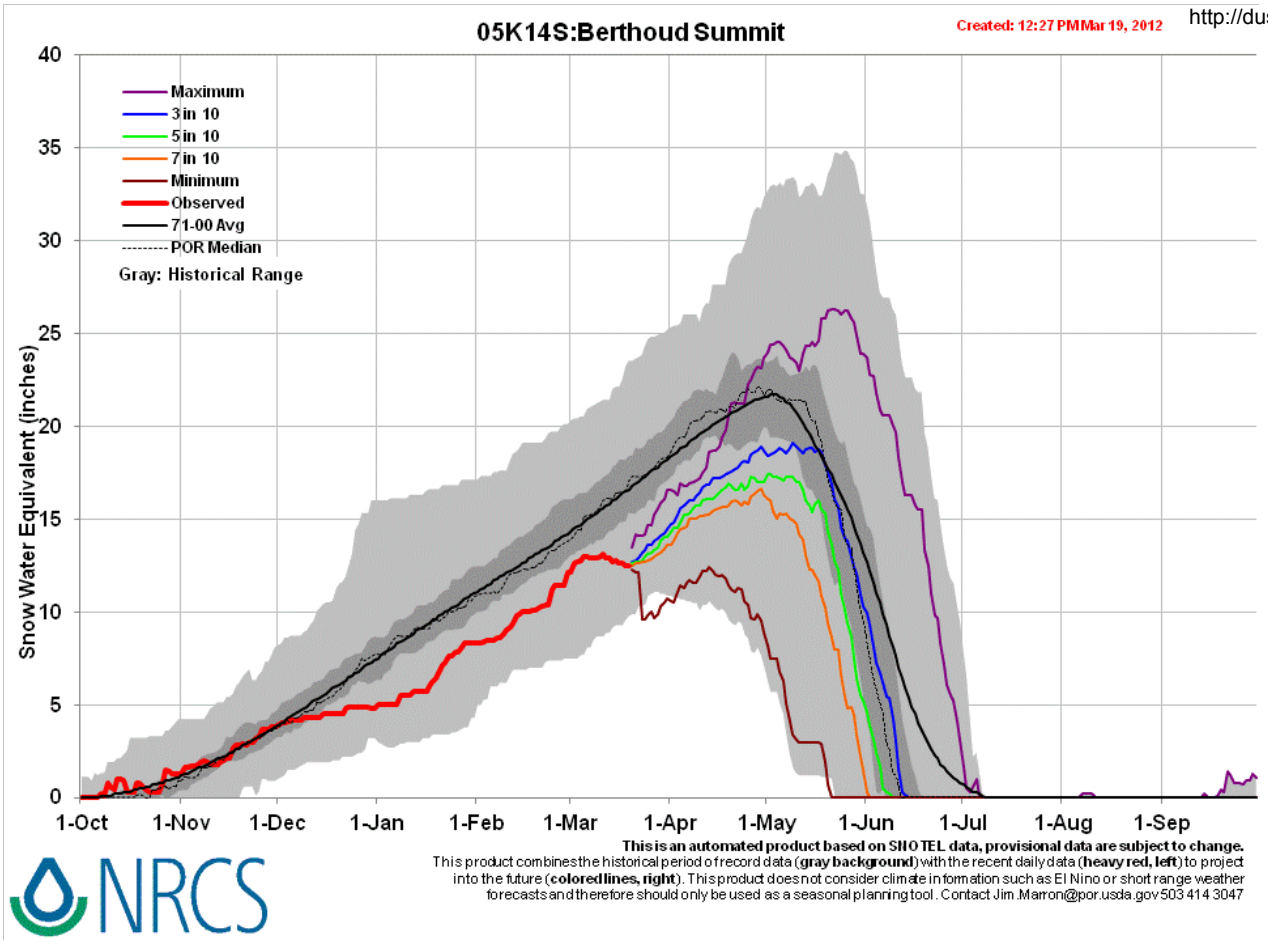
Total snow depth in this snow profile (pdf) was 44" and mean density of the snowpack was 308 kg/m3 (30.8% water content). Diurnal melt-freeze cycles had produced a strong melt-freeze crust at the snowpack surface, and some ice lenses in the top 8" of the snowpack, but the remainder consisted of increasingly weak, with depth, snow. The coldest snow temperature was -6.9° C, four inches below the surface, and the mean snow temperature was -2.6° C. As at the Grizzly Peak site, an additional dust layer, perhaps corresponding to event D1, was discernible five inches above the ground and another potential dust layer was located 17" above the ground.






MELT RATE

Berthoud Summit Snotel has reported virtually static SWE since the D4 event, March 6, and no measurable increase of SWE was reported with the new snow on Sunday, March 18, in association with D5. If the D5 event was deposited with any new snow, that D5 dust will rapidly merge with D4, enhance radiative forcing, and accelerate the warming of the snowcover to isothermal. At that time SWE losses would also accelerate, given that D5/D4 remains exposed at the snowpack surface.



FORECAST

The National Weather Service expects sunny skies and unseasonably warm temperatures to return soon after the current storm clears (Tuesday, March 20). Under the combination of strong solar radiation and warm air temperatures later this week, settlement of any new snow containing D5 will be very rapid and D5 will quickly merge with the D4 layer. Where the snowpacks in this locale are at or near isothermal temperatures, solar energy absorbed by the merged D4/D5 dust will begin and/or accelerate snowmelt rates and SWE losses. Where the snowpack retains cold content, energy absorbed by that D5/D4 dust will continue to accelerate warming of the higher elevation snowcover.