2015/2016 Snowpack Summary Archive

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Agassiz Peak Station (APS) at 11500'
Snowslide Canyon Snotel (SCS) at 9730′

Snowpack Summary for Thursday, April 28, 2016 - This will be our last update of the season.

Weather
From early February through March, High pressure and well above average temperatures have dominated Northern Arizona. April has been much wetter, with lower elevation rain, and mountain snow. The new snow settles and melts fast this time of year, except for upper-mountain northerly slopes that have a deeper snowpack and remain cooler.

As of early April, total snow accumulation at 10800′ amounted to 213″.

Snowslide Canyon Snotel weather-station (9730′ Inner Basin) reports a snow depth of 1″ (2.54 cm), and over the last week has reported temperatures between 24° and 60°F. Agassiz station reports temperatures between 12° and 48°F, with temperatures remaining below freezing for the last four days.

A series of wet systems enter our state over the next few days. Snow may accumulate below 8000′, and 8 to 18″ of snow is possible at higher elevations, near tree-line.

Summary
With the addition of new April snow, good skiing and riding has been reported from Arizona Snowbowl (now closed), the Inner Basin, and Abineau Canyon.

Many avalanche starting zones are bare. No avalanches have been reported since the small avalanche cycle on February 2.

Coverage on southerly and sun exposed slopes have melted. The best coverage can be found above 10000′ on northeast, north and northwesterly slopes. Northerly slopes may have pleasurable skiing conditions at higher elevations. With the sun at a higher apex now that we have passed the spring equinox, north facing shaded slopes will be the only option for 'powder like' turns with the new April and May snow.

On April 16th, the snow depth ranged between 3.5 to 8′ near 11000′ on the north side of Fremont Peak.

Watch for hard snow and ice creating some potential hazardous “slide for life” conditions on steep upper mountain slopes. **Ski crampons or mountaineering crampons and arrest tools may be advisable** in the morning before snow softens.

Storm slab and windslab formation may become an issue with these cold late season storms, especially on slopes >30° steep on northerly through northeasterly aspects above 10500′. Investigate how well the new snow is bonding to the older melt/freeze surface. Assess how well the snow is bonding between each storm event.

When the storms dissipate and the sun returns, watch for rapid warming which could send all the new snow sliding down the older melt/freeze surface. Watch for free water percolating through the snow, resulting in slush conditions with no cohesion = wet avalanche.

If there is not an extended night-time freeze, assess the cohesion of the snowpack, if it will support your weight, and if you are in an area with enough snow to initiate a wet slide. Even moderate sun exposure will exacerbate saturation in the snowpack.

Assessing the snowpack. Fremont Peak, April 16, 2016.

Stay safe and have a great summer, Team KPAC

Travelers are advised to exercise caution and make slope specific evaluations. As always, please treat this summary with appropriately guarded skepticism, make your own assessments, and contribute to our body of knowledge by reporting your observations.

Snowpack Summary for Saturday April 09, 2016

A huge thank you to all those who supported and attended the 6th Annual Mikee Linville Scholarship Fundraiser at Agassiz lodge.

Thank you to the Arizona Snowbowl for hosting the event, and the excellent musicians who provided great music, 'Indigo Grey' and 'Sol Drop'!

Weather

Since early February, high pressure and well above average temperatures have dominated Northern Arizona. A couple of light storms in March were the only relief from dry and very warm weather.

Precipitation totals in the last two months amount to 16″, bringing the total snow accumulation at 10800′ to 213″. Friday, April 8 delivered a moist 4″ of new snow, with another inch early Saturday morning, for a storm total of 5″.

Snowslide Canyon Snotel weather-station (9730′ Inner Basin) reports a snow depth of 20″ (51 cm). and over the last week has reported temperatures between 7° and 54°F. Arizona Snowbowl is reporting a settled undisturbed snow depth of 54″ at 10,800′.

A series of wet systems enter our state over the next few days. Sunday's forecast is for snow levels as low as 7000′, with chances for more precipitation Monday and Tuesday. 4-6 inches are possible at higher elevations.

In the next week, we may receive more moisture than the total amount we have received in the last two months. Moderate southwesterly winds are forecast to accompany the precipitation. We have a return to more winter like temperatures at higher elevations and potential for preserving new snow in a powder form. Please refer to the Snotel link and Agassiz Peak weather links for wind and temperature status.

Summary

Overall: Springtime melt-freeze cycles have dominated until recently. The spatially variable snow cover at both high and low elevations is spring-like and melt freeze crusts can be found on all aspects when temperatures are cold enough to refreeze, otherwise, the snowpack becomes saturated and may not support the weight of skier or rider.

Many avalanche starting zones are bare. No avalanches have been reported since the small avalanche cycle on February 2. Temperature gradients remain near isothermal, meaning that all temperatures in the snowpack are nearly the same – within 1°C of freezing. If true melt freeze conditions dominate, bonding and rounding of grains promotes stability when there is a consistent freeze.

However, temperatures the last few evenings have failed to initiate a strong freeze of the remaining snowpack, creating punchy and unsupportable conditions as high as 11000′. Four inches of new snow Friday, April 8th fell on a ‘warm’ snowpack, effectively insulating heat within the snowpack. This heat affected the new ‘powder’, turning it wet and creating pin wheels and small wet sloughs; even on north facing terrain above 11000′. Saturday morning, April 9, lower temperatures near 25°F tempered the warmth and initiated a better freeze, improving conditions above 11000′, preserving a few surface inches for smooth turns.

Coverage on southerly and sun exposed slopes have melted. The best coverage can be found above 10000′ on northeast, north and northwesterly slopes. True north facing slopes may have pleasurable skiing conditions at higher elevations. With the sun at a higher apex now that we have passed the spring equinox, north facing shaded slopes are the only option for ‘powder like’ turns in the new 5″ of snow.

North Face of Fremont Peak. April 09, 2016

East face of Fremont Peak – April 04, 2016. Photo by Abe Snider

Above and near treeline, when and if the snowpack re-freezes, hard snow and ice has created some potential hazardous "slide for life" conditions in some areas. **Ski crampons or mountaineering crampons and arrest tools may be advisable** in the morning before snow softens. If there is not an extended evening freeze, assess the cohesion of the snowpack if it will support your weight, and if you are in an area with enough snow to initiate a wet slide. Even moderate sun exposure will exacerbate saturation in the snowpack.

Humbling yet interesting skiing can still be found. Hopefully the arrival of new snow and lower temperatures will provide for renewed powder potential!

If we get the upper end of precipitation amounts that are forecast, then storm slab and windslab formation may become an issue. Investigate how well the new snow is bonding to the older melt/freeze surface. Because there are several storm events forecast, assess how well the snow is bonding between each event. Look for deposition of less dense or more hollow layers between main precipitation and wind events. On Saturday, April 9th a slightly reactive graupel layer was found 3 inches down in the snowpack on the northerly aspects of Fremont Peak.

Should these storm systems produce decent snow, watch out for reactive storm and wind slab problems on slopes >30° steep on northerly through northeasterly slopes above 10500′.

After the storms, watch for rapid warming which could send all the new snow sliding down the older melt/freeze surface. Watch for free water percolating through the snow, resulting in slush conditions with no cohesion = wet avalanche.

So far, little evidence of wet slide activity has been observed. Much of the snowpack has disappeared from southern aspects where wet slides are most prevalent. Also, breezy days may have created generalized cooling and delayed melting. This seems to have moderated rapid and potentially dangerous thaw instability, which may have otherwise led to wet avalanches during this prolonged period of unseasonable warmth.

Stay safe and have a great spring and summer, Team KPAC

Travelers are advised to exercise caution and make slope specific evaluations. As always, please treat this summary with appropriately guarded skepticism, make your own assessments, and contribute to our body of knowledge by reporting your observations.

Snowpack Summary for Thursday March 17, 2016 - Happy Saint Patrick's Day!

HISTORICAL NOTE: On St. Patrick's Day in 2005 (eleven years ago) Kachina Peaks Avalanche Center was born. The concept was hatched over adult beverages at Altitude Bar and Grill among notorious local backcountry skiers. The were planning ahead and reflecting on that monumental snow year where total snowfall was 465 inches, tying the all time record.

Weather

Snowslide Canyon Snotel weather-station (9730′ Inner Basin) reports a snow depth of 36″ (91 cm). Arizona Snowbowl reports a base depth of 52″ (132cm).

Breakdown of the high pressure over our region was short lived, allowing only modest precipitation to fall on San Francisco Peaks. At 10,600 feet, Snowbowl reported 4 inches of new snow on March 7th and another 3 inches on March 12th. High pressure has now reestablished, bring dry conditions, warmer than normal temperatures and light winds through at least this coming weekend.

Daytime temperatures will gradually build throughout the week, resulting in highs 10-15 degrees above normal. Low temperatures on the Peaks will continue to drop into the upper 20s F.

Last week Agassiz station (11500′) reported seasonally normal temperatures with lows in the 20's and highs in the low 30s °F. The "Inner Basin" Snotel (9730′) reported temperatures ranging from 18° and 51°F during the same period. Strong storm and post storm winds accompanied each of the quick moving systems on March 7th and 12th. Wind velocities ranged form 30-40 mph with gust of 53 mph out of the S and SE on March 12th. Above treeline, what little snow fell was quickly whisked away and/or sublimated back into the atmosphere.

Summary

Overall: Condition have returned to a spring time melt freeze cycle. The spatially variable snow cover at both high and low elevations is spring-like and melt freeze crusts can be found on all but the coldest aspects. Many avalanche starting zones are becoming bare. No avalanches have been reported since the small avalanche cycle on February 2 and none seem likely. Weak layers (depth hoar and near surface facets) within the snowpack can still be found, but these are gradually stabilizing as temperature gradients remain near isothermal. This means that all temperatures in the snowpack are nearly the same; within 1°C of freezing. When isothermal condition dominate, bonding and rounding of grains promotes stability.

There may be isolated pockets of new wind slab from recently transported snow, but even these areas are likely thin and stabilizing quickly posing little hazard. Coverage is still fair to marginal above 9500′ except on southerly and sun exposed slopes, which have melted away.

March 4th, 2016

Wind buffed, to chattery sublimation crusts, to near corn skiing conditions can be found in areas above treeline where snow still exists. Hard wind slab and ice has created some potential hazardous “slide for life” condition in some areas. Ski crampons or mountaineering crampons and arrest tools may be advisable in the morning before snow softens. Below treeline is a duke’s mixture of conditions, highly variable by aspect and shade. Some humbling, yet interesting skiing can still be found. Hopefully the arrival of new snow will change all of this.

Here is our most recent Avanet Snow Profile.

Forecasted warmer temperatures will tend to further stabilize a snowpack over time, unless the temperatures consistently remain above freezing, or become so warm that the snowpack

is melting and free water is percolating through the snow, resulting in slush conditions with no cohesion = wet avalanche.

So far, little evidence of wet slide activity has been observed. Much of the snowpack has disappeared from southern aspects where wet slides are most prevalent. Also, breezy days may have created generalized cooling and delayed melting. This seems to have moderated rapid and potentially dangerous thaw instability, which may have otherwise led to wet avalanches during this prolonged period of unseasonable warmth.

The return of spring weather may signal the culmination of viable and attractive backcountry conditions. However, we must always keep in mind that on The San Francisco Peaks snow can fall year-round and the end of winter is often erroneously predicted. We have certainly been surprised on may occasions over the years. Get out there while you still can, or maybe it will all turn around and we will be skiing in June. **For the moment, we will suspend further snowpack summaries until significant new snow falls.**

Come support the Mikee Linville Backcountry Awareness Party/Fundraiser on April 2 at Snowbowl – Agassiz Lodge. This event raises money for avalanche course scholarships. The event will feature: silent auction, raffle, live music, fun beverages, funny costumes and fine skiing on the area.

Check out the new Know Before You Go video. Be sure to inventory your backcountry gear and stock the ten essentials while on tour.

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Thank you for your interest and support of the Kachina Peaks Avalanche Center.

Safe travels, Team KPAC

Snowpack Summary for Saturday March 5, 2016

Weather

Snowslide Canyon Snotel weather-station (9730′ Inner Basin) reports a snow depth of 40″ (102 cm). Arizona Snowbowl reports a base depth of 52″ (132cm).

The end of the iron clad high pressure system that has dominated the region for the past two and a half weeks appears to be finaly breaking down!

Warm! The first few days of March have continued February's trend of **near and record breaking high temperatures**. This week Agassiz station (11500′) reported temperatures between 31° and 43°F – often not dropping below freezing at night. The "Inner Basin" Snotel (9730′) reported temps between 24° and 53° over the past week.

The forecast calls call for a breakdown in high pressure which will allow stormy conditions to enter the region. The first of these is expected to arrive on Sunday with a marked cool down, wind and light precipitation.The snow level is estimated at around 6000 feet. The general breakdown of high pressure will set up a pattern change that is expected to allow a number of Pacific storms to enter the region next week. Estimates of precipitation potential is still unclear, but at least there is some hope of the return of winter.

Summary

Overall: Currently, the snowpack is spring-like and melt freeze crusts can be found on all but the coldest aspects. No avalanches have been reported since the small avalanche cycle on February 2. Recent investigations have revealed that previously observed persistent weak layers (depth hoar and near surface facets) within the snowpack are stabilizing as temperature gradients have reached near isothermal connotations. This means that all temperatures in the snowpack are nearly the same; within a degree C of freezing. When isothermal condition dominate, bonding and rounding of grains promotes stability. There still may be pockets of instability, but they are likely few and far between. Some areas of hard wind slab still exist. In some cases these sit on top of weak basal or near surface facets. We would anticipate these conditions primary on north to northeast aspects and cross-loaded areas near or above treeline. Recent pit analysis on a variety of aspect (E,NE, N) have revealed high strength, moderate to poor structure and an absence of fracture propagation energy. Winds have ben moderate, at time delaying thaw due to sublimation cooling. Very little snow is available for transport, since it is all locked up in hard windslab or melt/freeze crusts, thus new wind slabs are unlikely. This may change with the addition of new snow and winds.

Coverage is fair above 9500′ but most southerly and sun exposed slopes have melted away. On Friday, March 4th, it was still possible to piece together snow patches from the Inner Basin to Lockett Meadow, but just barely.

March 4th, 2016

Wind buffed, to chattery sublimation crusts, to near corn skiing conditions can be found in areas above treeline where snow still exists. Hard wind slab and ice has created some potential hazardous “slide for life” condition in some areas. Ski crampons or mountaineering crampons and arrest tools may be advisable in the morning before snow softens. Below treeline is a duke’s mixture of conditions, highly variable by aspect and shade. Some humbling, yet interesting skiing can still be found. Hopefully the arrival of new snow will change all of this.

Here is a recent Avanet Snow Profile.

Warmer temperatures tend to stabilize a snowpack over time, unless the temperatures consistently remain above freezing, or become so warm that the snowpack is melting and free water is percolating through the snow, resulting in slush conditions with no cohesion = wet avalanche.

Despite recent warm high elevation nighttime temperatures and well above freezing days, little evidence of wet slide activity has been observed. Much of the snowpack has disappeared from southern aspects where wet slides are most prevalent. Also, persistent daytime breezes may have created generalized cooling and delayed melting. This seems to have moderated rapid and potentially dangerous thaw instability, which may have otherwise led to wet avalanches during this prolonged period of unseasonable warmth.

We hope you have enjoyed the excellent spring weather, and we hope this is about to change. Practice your avalanche rescue skills with some beacon drills, because the "snow sacristy" decision trap may be about to show its ugly head as winter returns to Northern Arizona.

Let's also review ALPTRUTH.

Check out the new Know Before You Go video. Be sure to inventory your backcountry gear and stock the ten essentials while on tour.

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Thank you for your interest and support of the Kachina Peaks Avalanche Center.

Safe travels, Team KPAC

Snowpack Summary for Friday, February 19, 2016

Weather

Snowslide Canyon Snotel weather-station (9730′ Inner Basin) reports a snow depth of 47″ (120cm). Arizona Snowbowl reports a base depth of 56″ (142cm).

Very light amounts of rain and snow fell on Thursday, February 18th, but we've had no significant precipitation since February 1st.

Warm! The region has experienced some **record breaking temperatures** over the last week or so. This week Agassiz station (11500′) reported temperatures between 32° and 44°F – that's some **warm night-time lows**!!! The "Inner Basin" Snotel (9730′) reported temps between 22° and 55° over the past week.

The forecast calls for more high pressure and above normal temperatures. Treeline forecast has highs near 40°F and lows in the teens. From NOAA:
"...ABOVE NORMAL HIGH TEMPERATURES (10 TO 15 DEGREES) AND CONTINUED DRY. FORTUNATELY OR UNFORTUNATELY VERY NICE WEATHER...ESPECIALLY FOR FEBRUARY."

Summary

Overall: The snowpack has become quite spring-like and melt freeze crusts can be found on most aspects and elevations. No avalanches have been reported since the small avalanche cycle on February 2. Some investigations have revealed that persistent weak layers within the snowpack are stabilizing, but spatial variability exists: our snowpack continues to have areas of wind slab on top of weak basal or near surface facets, primary on north aspects and crossloaded areas near or above treeline. Little powder-snow is available for transport, thus new wind slabs are unlikely.

View from Cleaver Ridge. Feb. 17, 2016.

Below Treeline: Coverage is fair above 9500′ but southerly and sun exposed slopes are melting off. Except for the southern slopes in Beard Canyon (Zipper, Cut-off, Corn Palace), most southerly aspects of the Inner Basin have become bare. The southern slopes of Beard Canyon may lose much of their snow in the next week or so – if the warm temperatures continue.

Packed-powder skiing conditions can be found in shaded, wind sheltered north facing higher-elevation terrain, but is in short supply.

Near and Above Treeline: Crampons would be helpful in the ice and hard snow of the alpine terrain. Wind slabs can be found on all aspects, though coverage on south facing terrain is shrinking. Stability tests of these slabs is inconsistent, with a high degree of variability.

Stability tests at treeline on a west aspect, 115 cm pit, resulted in repeated failures of a wind slab on top of persistent depth hoar. Near surface facets were evident below melt/freeze crusts. However, the overall temperature gradient has abated to near isothermic (constant temperature throughout) conditions, indicating a transition to equilibrium metamorphism, which typically strengthens the bonds in persistent weak layers (depth hoar, facets, and surface hoar).

A 30-50cm thick layer of large basal facets capped by a 10cm four-finger hardness wind slab was observed near 11200′ in a steep northerly couloir of Beard Canyon. These large (>5mm) basal facets were bonding and had reached a hardness of four finger minus. It should be noted

that the starting zones of northerly chutes near treeline have not transitioned into a spring-like snowpack, and these zones may not be able to support significant loads of new snow, nor the weight of a skier or rider.

No storms are in the forecast, and continued warm weather may allow these problem layers to gain some strength, depending upon elevation and aspect.

Warmer temperatures tend to stabilize a snowpack over time, unless the temperatures consistently remain above freezing, or become so warm that the snowpack is melting and free water is percolating through the snow, resulting in slush conditions with no cohesion = wet avalanche.

Melt/freeze cycles depend upon a consistent freeze to stabilize instabilities created by warming. Watch for water percolating into the snowpack; mainly on southerly, and sun exposed slopes. If the surface gets slushy, move away from steep slopes or to less sun-exposed terrain. A Feburary 17th, a tour revealed that thinner easterly slopes (near 11000′) became too warm and isothermal at 11:00am, while thicker southerly-slopes (near 10500′) became isothermal at 12:30pm. An isothermal snowpack on a steep slope can collapse under its own weight, or with the added weight of a person.

Enjoy the spring weather! Get with family and friends, have a BBQ, and practice your avalanche rescue skills with some beacon practice. Let's also review ALPTRUTH.

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Safe travels, Team KPAC

Snowpack Summary for Monday, February 8, 2016

Weather

Snowslide Canyon Snotel weather-station (9730′ Inner Basin) reports a snow depth of 52″ (132cm). Arizona Snowbowl reports a base depth of 68″ (172cm).

The first day of February deposited 1 to 2 feet of snow on the San Francisco Peaks with moderate SW winds. Since then, treeline winds have been moderate to strong (50+ mph) from the NW through NE. Near treeline and higher, northerly aspect avalanche starting zones have lost snow due to sublimation (the transition of a substance directly from the solid to the gas phase without passing through the intermediate liquid phase).

Agassiz station (11500′) reported temperatures between -3° and 38°F. Earlier this week, windchill temperatures hit -20 (and lower!) at high elevation ridge-lines. This past weekend a warming trend started, and near treeline temperatures are forecast to be near or above 40°F by mid week.

The "Inner Basin" Snotel (9730′) reported temps between -8° and 44° over the past week.

Summary

Overall: Backcountry skiing conditions improved this week in regard to decreased avalanche potential. Some evidence of instabilities have been reported and a small avalanche cycle occurred on a southerly slope near treeline on the afternoon February 2. Some investigations have revealed that persistent weak layers within the snowpack may be stabilizing, but spatial variability exists, and our snowpack continues to have areas of wind slab on top of weak basal or near surface facets.

Below Treeline: Coverage is good above 9500′; below 9500′, sun exposed slopes will be getting thin with this week's warming trend. Lower elevations (<9000′) will be losing much snow with the forecast warm weather. Powder skiing conditions can be found in shaded, wind sheltered north facing higher-elevation terrain, but even that terrain may develop crusts by mid-week.

Observations from Doyle Peak, NE aspect at 10400′, demonstrate that decreasing temperature gradients are helping to stabilize the 1.5 meter thick snowpack, with faceted layers bonding, rather than weakening. On the contrary, collapsing (whumphing) new snow was observed near 10700′ on a north aspect of Doyle Peak. Investigations suggested that a buried surface hoar layer was the culprit. It did not appear that this layer was widespread. Our snowpack is highly variable.

Near and Above Treeline: Recent tours revealed hard and soft windslabs and sastrugi above treeline, and powder snow in sheltered areas. Crampons would be helpful in the ice and hard snow of the alpine terrain. Wind-slabs can be found on nearly any aspect. Tests of these slabs is inconsistent, some cracking was observed, but no wide-spread reactive slabs were found. We suspect that warming temperatures combined with night-time refreezing will help bond new and old slabs to the underlying snowpack.

The spring-like forecast calls for 40°F temperatures near treeline this week. Warmer temperatures tend to stabilize a snowpack over-time. However, the first warm days after a storm, and very warm days can destabilize the snowpack. Melt/freeze cycles depend upon a consistent night-time refreeze to stabilize instabilities created by warming.

The rapid warming of persistent near-surface slabs may become an issue. Even at temperatures of freezing or near freezing, warming of the snowpack can reduce strength and increase tension on slabs. As temperatures increase further, especially mid-day, watch for water percolating into the snowpack; mainly on southerly, and sun exposed slopes. If the surface gets slushy, move away from steep slopes or to less sun-exposed terrain.

One day after the last storm, Tuesday, February 2nd, warming temperatures likely caused some small avalanche activity on southerly sun-exposed slopes.

Enjoy the spring weather! Get with family and friends, have a BBQ, and practice your avalanche rescue skills with some beacon practice. Let's also review ALPTRUTH.

Check out the new Know Before You Go video. Be sure to inventory your backcountry gear and stock the ten essentials while on tour.

Travelers are advised to exercise caution and make slope specific evaluations. As always, please treat this summary with appropriately guarded skepticism, make your own assessments, and contribute to our body of knowledge by reporting your observations, and enrolling in an avalanche course. Courses this season are reaching capacity early, so enroll sooner than later.

Thank you for your interest and support of the Kachina Peaks Avalanche Center.

Safe travels, Team KPAC

Snowpack Summary for Saturday, January 30, 2016

Weather
Snowslide Canyon Snotel weather-station (9730′ Inner Basin) reports a snow depth of 44″ (112cm). Arizona Snowbowl reports a base depth of 60″ (152cm).

Near treeline, winds have been moderate (and some strong gusts) primarily from the WNW through NE. Now winds are blowing from the SW as a strong storm approaches.

The near treeline environment stayed cold earlier in the week, with -5°F wind-chill values on Monday, then daytime temperatures went above freezing for the second half of the week.

Agassiz station (11500′) reported temperatures between 15° and 37°F. The "Inner Basin" Snotel (9730′) reported temps between 1° and 47° over the past week.

From the local NOAA forecast discussion:
A COLD STORM SYSTEM WILL AFFECT OUR AREA FROM SUNDAY THROUGH MONDAY…WITH WIDESPREAD PRECIPITATION AND FALLING SNOW LEVELS. HAZARDOUS WINTER DRIVING CONDITIONS ARE POSSIBLE STARTING SUNDAY IN THE MOUNTAINS…

With this event, we may get 1 to 2+ feet of snow with strong west to southwest winds.

Summary
Overall: No evidence of new avalanches has been reported since January 17th. However, **if the forecast pans out we anticipate another avalanche cycle starting with this next storm.**

Take note of current coverage prior to this next storm: Above and below treeline, wind hardened and sun affected slabs and crusts are potential smooth bed surfaces, especially in the steeper 35-40 degree starting zones.

Below Treeline: Backcountry skiing has been variable the past two weeks: coverage is good above 9000′; below 9000′, sun exposed slopes are getting thin. South-side excursions off Agassiz peak reveal soft snow in the shade, melt/freeze crusts and variability on any sunny aspect, with snow diminishing dramatically below 8000′. Recrystallized powder skiing conditions can be found in shaded, wind sheltered north facing terrain.

Above Treeline: Recent tours revealed very hard slabs, crusts and sastrugi near and above treeline. Crampons would be helpful in some cases. Persistent north winds have stripped much of the higher elevation terrain with north aspects, creating a variety of wind slabs on south and

west aspects. These slabs are not consistent, and have failed with moderate energy in stability tests on a layer of near surface facets.

Refer to this video from the Utah Avalanche Center for similar snowpack conditions documenting a recent fatal avalanche on a south aspect (wind slab on top of near surface facets): https://vimeo.com/152783554

Current forecast calls for 1 to 2 feet or more of snow near treeline and strong winds in a relatively short time (~24 hours). We expect the development of wind slabs. As the storm exits, expect wrap around (reverse) winds – thus windslabs, wind-loading, or cross-loading may development on any aspect.

Potential new snow will be falling on top of our weak, faceted snowpack. We have documented our persistent slab problem, and it is quite possible that new snow, windslabs, and/or a backcountry skier, rider, or snow shoer could push these persistent slabs or newly deposited slabs over the tipping point.

The entire snowpack is a pancake stack of layers from this winter's precipitation, with gravity moving it all downhill at slightly different rates. The pack is being stretched, like a rubber band, and each layer has a different cohesion factor, that changes throughout the season. Poorly bonded angular grains between these layers, (facets, depth hoar, surface hoar), are most often the culprit in hard slab avalanches as rapid loading of new snow, or the added weight of a skier or rider, exceeds the cohesive strength of the snowpack.

Waiting a few days after snow and wind events, allowing the snowpack to adjust to added weight, can significantly reduce the risk of triggering an avalanche. Most avalanches occur within 24 hours of a storm, and over 90% of accidents are either triggered by the victim, or someone in the victim's party.

No surface hoar has been reported this week, but surface hoar and buried surface hoar have been observed this season. Warm temperatures the past few days have likely minimized this threat. It is worth noting that in the Sierra Nevada Range of California, surface hoar buried by new snow has produced avalanches this season.

Before the next avalanche cycle, now may be a good time to practice your avalanche rescue skills with some beacon practice. Let's also review ALPTRUTH.

Check out the new Know Before You Go video. Be sure to inventory your backcountry gear and stock the ten essentials while on tour.

Travelers are advised to exercise caution and make slope specific evaluations. As always, please treat this summary with appropriately guarded skepticism, make your own assessments, and contribute to our body of knowledge by reporting your observations, and enrolling in an avalanche course. Courses this season are reaching capacity early, so enroll sooner than later.

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Safe travels, Team KPAC

Snowpack Summary for Sunday, January 24, 2016

Weather

Snowslide Canyon Snotel weather-station (9730′ Inner Basin) reports a snow depth of 47″ (120cm). Arizona Snowbowl reports a base depth of 61″ (155cm).

Since January 13th, the upper mountains have experience moderate to gale force winds primarily from the WNW through NNW. Strong southwesterly winds have also blown. Very strong northerly winds blew Thursday, January 21st.

The near treeline environment stayed cold earlier in the week, with ~0°F wind-chill values. Agassiz station (11500′) reported temperatures between 17° and 29°F, then on January 21st, Thursday the high hit 38°F. Temperatures reached 32°F this past Friday and Saturday, January 22 and 23..
The "Inner Basin" Snotel (9730′) reported temps between 9° and 42° over the past week.

About 1″ of new snow fell during a short weak system early last Wednesday morning.

We have slight chances for precipitation on Sunday, and unsettled blustery weather forecast the first half of next week. High pressure and a warming trend is forecast for later this week.

From the local NOAA forecast discussion:
LOOKING AHEAD TO NEXT WEEKEND…A STRONGER STORM SYSTEM COULD BE IN OUR FUTURE FROM SUNDAY INTO MONDAY [Feb. 1st]. EXPECT MUCH COOLER TEMPERATURES WITH INCREASING CLOUDS AND RAIN/SNOW CHANCES. YOU KNOW THE ROUTINE, MAKE SURE AND CHECK BACK AS DETAILS COME INTO FOCUS.

Summary

Evidence of avalanche crowns on northerly aspects of Core Ridge, January 17, 2016. Photo by Nick Martin. *Click to enlarge*.

On Sunday, January 17th, crown lines were observed on the northerly slopes of upper Core Ridge. We are uncertain, but it appears that the avalanche may have happened within two days of the photo. Windslabs are a likely cause and observations of WNW windslab formation support this.

It may also be possible that strong north winds removed snow and exposed older avalanche evidence, possibly from the January 4-8 events. We are not sure.

Overall: Avalanche hazard has decreased this week and we have had no significant new snow for two weeks. There is significantly less powder-snow available for transport near and above treeline, and energetic windslabs are becoming less an issue. The main problem now may be persistent slabs that are poorly bonded or perched on top of facets.
Below Treeline: Backcountry skiing has been variable this week: coverage is good above 9000′; below 9000′, sun exposed slopes are getting thin. South-side excursions off Agassiz peak reveal soft snow in the shade, melt/freeze crusts and variability on any sunny aspect, with snow diminishing dramatically below 8000′. Powder skiing conditions can be found in shaded, wind sheltered north facing terrain.
Above Treeline: Recent tours revealed very hard slabs, crusts and sastrugi near and above treeline. Crampons would be helpful in some cases. Persistent north winds have stripped much of the higher elevation terrain with north aspects.

Cold temperatures continue and slopes are subject to continued faceting, primarily NW through NE slopes. Stability tests reveal inconsistent results on these slopes, but persistent slabs may get pushed to the limit with new snow, wind-loading, or the weight of a skier or rider. Some test results indicate moderate energy and poor strength in wind loaded areas. With much less snow available for transport, and a predicted warming trend later this week, the snowpack may gain strength in the near future.

Between the first and second week of January we saw a variety of persistent slabs. The 50+ inches of snow which loaded the snowpack in early January was deposited on top of buried facets on east, westerly and northerly aspects. Repeated northerly wind events have occurred in the last two weeks, creating a variety of heavy, dense, hard wind slabs on top of weak, unconsolidated facets.

Basal facets, which form in the snowpack near the ground, also know as depth hoar, was the weak layer that released a slab at the end of Soft Core Ridge (NE aspect, Inner Basin, 10500′) around January 7th. Depth hoar is a common persistent weak layer, and lingers in the snowpack, particularly on northerly and northeast aspects. Near surface faceting has also been observed, with moderate reactivity.

With spring-like weather, the rapid warming of persistent near-surface slabs may become an issue. Even at temperatures of freezing or near freezing, warming of the snowpack can reduce strength and increase tension on slabs. As temperatures increase further, especially mid-day, watch for water percolating into the snowpack; mainly on southerly, and sun exposed slopes. If the surface gets slushy, move away from steep slopes or to less sun-exposed terrain.

No surface hoar has been reported this week, but surface hoar and buried surface hoar have been observed this season. It is worth noting that in the Sierra Nevada Range of California, surface hoar buried by new snow has produced avalanches this season.

Before the next avalanche cycle, now may be a good time to practice your avalanche rescue skills with some beacon practice. Let's also review ALPTRUTH.

Check out the new Know Before You Go video. Be sure to inventory your backcountry gear and stock the ten essentials while on tour.

Travelers are advised to exercise caution and make slope specific evaluations. As always, please treat this summary with appropriately guarded skepticism, make your own assessments, and contribute to our body of knowledge by reporting your observations, and enrolling in an avalanche course. Courses this season are reaching capacity early, so enroll sooner than later.

Thank you for your interest and support of the Kachina Peaks Avalanche Center.

Safe travels, Team KPAC

Saturday, January 16, 2016 Update:
We forgot to mention the wide spread whumphing/settling that has been observed in the Inner Basin this past week. We also want to emphasise the problems that the observed surface hoar can cause.
What is surface hoar? And some thoughts about surface hoar?

Snowpack Summary for Friday, January 15, 2016

Weather
Snowslide Canyon Snotel weather-station (9730′ Inner Basin) reports a snow depth of 52″ (132cm). Arizona Snowbowl reports a base depth of 69″ (175cm).

Earlier this week moderate to strong winds blew from the NW through NE, transporting snow. The last day has seen moderate to strong winds predominately from the W through SW

Treeline wind-chills reached -11° F on January 11th. **Frigid!**
By midweek, treeline temperatures reached 33° F. Treeline wind-chill values are now back to 0° F or less. BRRRRR!
This week, the Snowslide Canyon Snotel reported temperatures between 0° and 40° F.

3″ of new snow was reported by the Snowslide Canyon Snotel from today's fast moving system. Moderate to strong west through north winds are forecast through the weekend. Extended forecast models have been inconsistent, but there are chances of snow this week.

Summary
Last week large amounts of snow fell from a series of productive storm systems, with a northerly wind event Sunday–Monday. As a result, at least three avalanches occurred, though more may have released without observation:

~2′ crown line at the end of Soft Core Ridge (35.334086, -111.659974). NE (60°) aspect, 40° steep, 10500′ elevation. Occurred ~January 7th, 2016. Photo taken January 9th.

1. Debris from a small soft slab avalanche was observed on a SW aspect of Agassiz on Monday December 11, at 11700′. This event was probably the result of wind loading. The avalanche had a crown depth of 20-40 centimeters, a width of 25 feet and ran approximately 250 feet (Destructive Force classification D1).

2. We found evidence of a D2 avalanche at the end of Soft Core Ridge (35.334086, -111.659974). NE (60°) aspect, 40° steep, 10500′ elevation. This would have been large enough to bury or kill a person. The failure occurred in or near the bottom of the snowpack, in a depth hoar layer, with most of the snowpack sliding on a harder, thin crust. Snowpack next to the avalanche was relatively thin (3-4′ deep). This likely happened near or on January 7th. See photo.

3. We saw evidence of a D2-D3 avalanche in a ENE chute of Humphreys Cirque. The force of this avalanche may have been enough to destroy a wood framed house. This likely occurred on or near January 7th.

Overall: Great skiing/riding has been done this week and coverage above 8000′ is good for Arizona in January. However, our peaks have developed a highly variable and somewhat complex snowpack. ***We urge a conservative approach to backcountry travel,*** and conduct a thorough analysis before committing to any slopes steeper than 30° – especially as we receive more snow and wind. It seems to be an atypical winter for the Kachina Peaks Wilderness. We've had decent snow, long cold spells (which have accentuated kinetic metamorphism; creating a weak, faceted snowpack), and avalanches in each month since November.

Approximately 3″ of snow water equivalent (SWE) fell between January 4-8, which is ~135 pounds per square yard (3′ x 3′) of weight on the snowpack. The thin snowpack prior to this storm was in most locations comprised of weak, faceted grains, which may not have the strength to sustain the addition of new snow and the weight of a skier/rider.

Before committing to skiing a slope, consider this pneumonic for assessing conditions: **ALPTRUTH** (courtesy of Ian McCammon/Snowpit Tech.)

A-valanches? Evidence of avalanche activity observed or reported in the last 48 hours?

L-oading? By new snow, wind or rain? Wind transports snow up to 10 times as fast as snowfall.

P-ath? Are you in an avalanche path or starting zone?

T-errain? Slope angle between 30-45 degrees; gullies, cliffs, terrain traps? What are the consequences of an avalanche?

R-ating? What is the danger rating; or is the rate of precipitation 1″/hour or more?

U-nstable? Signs of instability: cracking or collapsing of snowpack; whumpfing; hollow sounding slab?

T-haw? Has the temperature increased to near freezing or above? Melting of snow surface, or rain on snow?

H-uman? Are you and your group openly communicating about these factors and possible safe alternatives?

Avalanche hazard will increase with new snow-load and forecast winds, particularly in areas which had a thin snowpack prior to January 4, and/or wind loaded earlier this week.

There is plenty of snow available for transport from the 50-60 inches received last week, and the current forecast calls for moderate to strong NW winds. Watch for loading of leeward SE slopes, and look for cross-loading of steep high-elevation gullies. As more systems move through this week, we could see winds from all directions.

Persistent northerly winds from late evening on Sunday, January 10-Monday January 11 transported light powder snow to south facing aspects. This resulted in a wind slab of varying depth, from 10-30 cm or more above treeline. Wind slabs may or may not support the weight of a skier, and thus are the culprit in many avalanche accidents.

Stability testing of wind slabs above treeline have shown reactivity between the slab and bed surface. Wind slabs earlier this week failed on isolation of the column, or on the first or second

tap with moderate energy.

We have found evidence of persistent slab problems on Fremont Peak and the end of Soft Core Ridge.
Our pit in the Corner Chute area of Fremont Peak reveals ~70cm of new snow sitting on top of a harder layer. Between these two layers is a subtle and thin faceted layer that shows propagation potential. We are not sure how much force would be required to release this persistent slab. Perhaps new snow and the added weight of backcountry travelers.

Temperature gradients reveal that weak layers may not strengthen in the near future. Investigations at (10500′) on Soft Core Ridge, reveal a more persistent deep slab problem with the weak layers much lower in the snowpack – see avalanche 2 above.

Post Christmas surface hoar formed in the Sickle Moon Path of Doyle Peak and was buried by ~3′ (90cm) of new snow. Our investigations from last Sunday reveal that this layer was settled and locked in place by the new snow. Our tests revealed no instabilities. However, our investigations on January 13th reveal that cold temperatures are continuing to facet the upper snowpack. We saw large surface hoar forming in the “Hippy Trees” area – the basin between Fremont Peak, Agassiz Peak, and Soft Core Ridge. See photo.
Preserved Surface Hoar buried under new snow can easily fail due to shear forces in the creeping snowpack!
What is surface hoar? And some thoughts about surface hoar?

Surface Hoar on January 13th, 2016

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Thank you for your interest and support of the Kachina Peaks Avalanche Center.

Safe travels, Team KPAC

Snowpack Summary for Friday, January 8 , 2016

Weather

El Niño kicked in this week, nearly doubling our snowpack after a series of strong pacific

systems entered Arizona. 25″ of new snow has fallen at the Inner Basin Snotel site in the last 4 days, adding 2-3″ of SWE to the snowpack at that location.

Snowslide Canyon Snotel weather-station (9730′ Inner Basin) reports a snow depth of 57″ (145 cm). Arizona Snowbowl reports a base depth of 68-72″.

Winds have been light to moderate from the southwest.

Over the last 4 days, temperatures have ranged between 20° and 39° F. at the Snowslide Canyon Snotel, and between 13° and 27° F at the Agassiz Peak Station.

A few more inches are possible as the current system exits our area. A weak system moves through Saturday/Sunday with chances of light snow amounts. Light to moderate West/Northwest winds are expected this weekend. Those winds may become strong near treeline. Temperatures are expected to stay below freezing at treeline, even as the sun comes out this next week. By Thursday, January 14th another deep low may enter our area.

Summary

Overall: New snow has accumulated rapidly over the last few days, and we suspect that natural avalanches have occurred near treeline where large amounts of new snow loaded persistent weak faceted snow or buried surface hoar. Our investigations reveal wide spread spatial variability within the snowpack. Test pits have indicated that some avalanche prone slopes could be loaded to near the tipping point. We urge backcountry travelers to give the snowpack a day or more to settle, and investigate the snowpack thoroughly before making decisions. As always, make sure you limit avalanche exposure to only one person at a time as you travel. Coverage has drastically improved and many obstacles are becoming buried by the deepening snowpack.

Avalanche hazard has increased over the last 4 days. On Thursday, settling and whumphing were observed on northerly and westerly aspects below treeline. All the new snow is perched on top of a mix of windslabs, depth hoar, and possibly buried surface hoar. Surface hoar on northerly aspects was reported in our last summary, and on Thursday buried surface hoar was found ~70cm below the snow surface in Flying Dutchman Glade, a westerly aspect.

Some test pits have shown good stability, but other pits on the same slopes have shown poor stability. These discrepancies, illustrate what is know as “spatial variability”, one of the more

disconcerting realities in avalanche forecasting. The truth is, we are uncertain of how widespread the instabilities are. Under these conditions we urge a conservative approach to backcountry travel and a reminder not to base critical decisions on results from a single test pit.

Keep an eye out for wind loading on northwesterly through easterly Slopes.

Remember, **2 to 4+ feet of new snow has fallen on top of a weak/faceted snowpack. It could be right at the tipping point. Stay alert and aware.**

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Travelers are advised to exercise caution and make slope specific evaluations. As always, please treat this summary with appropriately guarded skepticism, make your own assessments, and contribute to our body of knowledge by reporting your observations.

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Safe travels, Team KPAC

Snowpack Summary for Saturday, January 2, 2016 - Happy New Year!

Weather

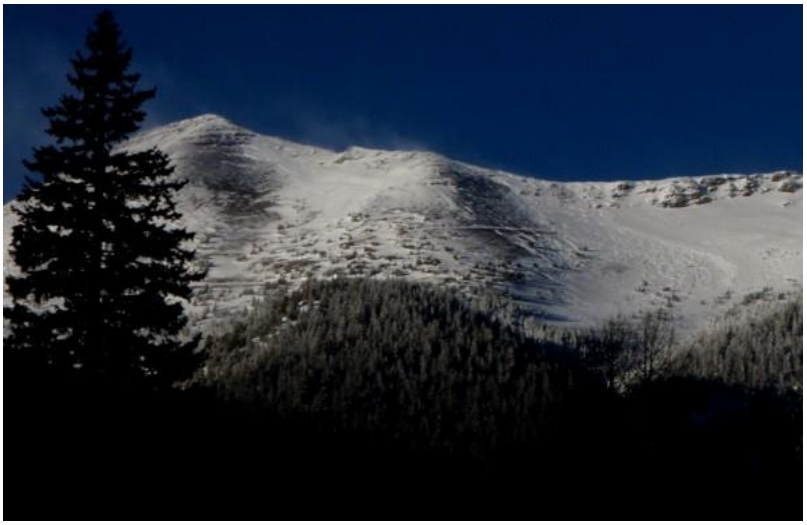
Snowslide Canyon Snotel weather-station (9730′ Inner Basin) reports a snow depth of 32″ (81 cm). Arizona Snowbowl reports a snow depth of 38-41″.

Cold, mainly dry weather has been the norm this week following the Christmas storm. 3-6″ of dense snow fell at mid to high mountain elevations on Christmas eve and day – most of which was redistributed or sublimated in the windy aftermath. Mid to high mountain elevations experienced rime ice formation. On December 26th wind howled out of the north to northeast averaging 20-35 mph with gust in 40-50 mph range recorded (Agassiz Peak Station). These are optimal snow transport velocities. Wind chill temperature at this location dropped to -30° F.

FRIGID – Over the last six days, the Snowslide Canyon Snotel reported temperatures between -2 and 28° F, with Agassiz Peak Station reported temperatures between 3 and 23° F. Wind chill temperatures at Agassiz Peak Station have periodically plummeted to double digits below zero.

Cold high pressure has encroached upon Northern Arizona with nighttime low temperatures reflective of decades ago. Winds have been light to moderate. Over the coming weekend, temperatures will rise to seasonal normals as a precursor to wet weather forecast for next week. Beginning Monday, a series of wet weather disturbances are predicted to move across our region through the week, and as quoted from the NOAA weather service bulletin:

“A MORE NOTABLE CHANGE IN THE WEATHER PATTERN IS STILL ON TRACK FOR MONDAY INTO NEXT WEEKEND AS A SERIES OF MOIST WEATHER DISTURBANCES MOVE ACROSS THE SOUTHWEST UNITED STATES. THE FIRST SYSTEM ON MONDAY IS EXPECTED TO BE THE WARMEST WITH SNOW LEVELS CURRENTLY FORECAST IN THE 5500-7500 FT RANGE AND THE HEAVIEST PRECIPITATION ACROSS SOUTHERN ARIZONA. SUBSEQUENT DAYS LOOK COLDER WITH MORE SUBSTANTIAL PRECIPITATION ACROSS NORTHERN ARIZONA. SNOW AND WINTER DRIVING CONDITIONS APPEAR LIKELY OVER THE HIGHER ELEVATIONS OF NORTHERN ARIZONA NEXT WEEK WITH MORE SPECIFIC DETAILS SHAKING OUT OVER THE COMING DAYS. STAY TUNED.”



Avalanches in the IB and Snowslide Paths near Agassiz Peak. First observed on December 29, 2015. Photo taken December 30.

Summary

Evidence of avalanches were observed during the past week in the Inner Basin (see photo). These were slab avalanches on north and northeast aspects at high elevations, speculated to be natural occurrences caused by recent wind slabs failing on old facets. Other smaller avalanche remnants were also observed on northerly slopes. These likely happened during the Christmas eve storm or during the subsequent wind event.

The structure of our snowpack is weak and continues to further weaken with the combination of relatively thin cover and cold ambient air temperatures. These conditions create a temperature gradient in the snowpack, a favorable environment for kinetic metamorphism (i.e. facet growth). Above threshold temperature gradients were measured in the upper regions of the snowpack in several locations. Mid and high elevation slopes on colder north and northeastern aspects seem like the culprits.

Such conditions will promote rapid near-surface faceting on an already fragile snowpack structure. A problem may arise with the addition of new snow, potentially this coming week. If loading from new or wind blown snow reaches precipitation totals or snowfall rates of more than 1 inch per hour, instability will result. **High level of caution and prudence will be required if more than 12 inches of new snow falls in 24 hours, 8 inches in 12 hours, or a total of 1 inch of snow water equivalent (SWE) loads our fragile snowpack.**

SURFACE HOAR: Surface hoar and some needle forms were recently observed in the Inner Basin. As is typical, surface hoar distribution was reported as variable, but generally in basin glades and meadows, but also perched on a wind slab within the Sickle Moon slide path on Doyle Peak, and other sheltered locations. Buried surface hoar can be a persistent weak layer, unevenly distribruted and worthy of attention. More on surface hoar.

Dense slabs are currently mixed into the snowpack, either as surface wind slabs or buried in upper half of the pack depending upon elevation, aspect and exposure to wind. Large, 2-3mm basal facets are widespread, and near surface faceting is occurring within the top layers of the snowpack on shaded north and northwest aspects near treeline and below. Unsupportable 'sugar snow' has been observed on all aspects. Weak, faceted snow forms well in cold, thin snowpacks, especially near rock bands, and windward ridge lines.

Recent stability tests of north/northeast slopes on Doyle and Fremont peaks show poor bonding between slabs and underlying weak facet layers. Testing on west facing aspects at treeline show moderate stability, but poor structure. **Significant new snow or wind-loading will push these slopes near or over the tipping point.**

Avalanche hazard will increase with any significant new snow – particularly in the presence of wind speeds between 20-40 mph. Look for windslabs developing on leeward slopes, and cross loading chutes and terrain features. Winds will typically be out of the southwest, then becoming northerly or northeasterly as the storm exits: windslabs or wind-loading could develop on any aspect.

The dense snow and rime event have increased coverage, and there are reports of good skiing. However, the snowpack is still thin and obstacles exist.

Check out the new Know Before You Go video. Be sure to inventory your backcountry gear and stock the ten essentials while on tour.

Travelers are advised to exercise caution and make slope specific evaluations. As always, please treat this summary with appropriately guarded skepticism, make your own assessments, and contribute to our body of knowledge by reporting your observations.

Thank you for your interest and support of the Kachina Peaks Avalanche Center. Happy New Year!!

Safe travels, Team KPAC

Snowpack Summary for Thursday, December 24, 2015 - Merry Christmas!

Weather

Snowslide Canyon Snotel weather-station (9730′ Inner Basin) reports a snow depth of 32″ (81 cm). Arizona Snowbowl reports a snow depth of 38-40″.

Unsettled weather has been the norm this week. With approximately 2-6″ of snow falling at mid to high mountain elevations.
The combination of supersaturation, below freezing temperatures and wind have conspired to

create a favorable environment for rime production below, near, and above treeline on exposed areas (see photo below).

Over the last four days, the Snowslide Canyon Snotel reported temperatures between 20 and 40° F, with Agassiz Peak Station reporting temperatures between 15 and 20° F.

A cold low pressure system is currently developing over Northern Arizona with 5-12″ of snow forecast for treeline. The system will come in with strong southwesterly winds, switching to northeast winds by Saturday, with projected wind speeds of up to 60 mph at treeline.

Overall:
No avalanches have been observed or reported since November 11. Shaded and northerly slopes near treeline and below with thin coverage continue to facet with strong temperature gradients.

Backcountry travel conditions remain variable: a pleasant tour is possible, but cover above treeline is thin to non-existent on many slopes. **Rock and log obstacles** hidden within the new snow and thin snowpack are current hazards, as well as potentially unsupportable wind slabs. New rime ice may pose a traction problem.

Avalanche hazard will increase with this Christmas storm – especially if we reach or exceed forecast precipitation amounts. Look for windslabs developing on leeward slopes, and cross loading chutes and terrain features. Winds will be out of the southwest, then becoming northerly or northeasterly as the storm exits – so windslabs or wind-loading could develop on any aspect.

Although rime generally bonds well with the surface on which it forms, heavy rime in combination with new snow and wind slab resulting from the approaching Christmas storm has the potential of loading underlying weak layers to the point of failure, or to the point where the addition of a skier or boarders weight could create the straw that breaks the camel's back. Rime is also an indicator of wind direction, forming on surfaces facing into the wind.

Large facets, temperature gradients, and unsupportable sugar snow have been observed on northerly through westerly, shaded aspects near treeline and below. These slopes will become suspect if we get a significant precipitation event. Pit profile. Current stability tests show

moderate to strong bonding within the snowpack at treeline on NNW aspects. However, these layers and wind slabs from last weekend's north wind event are perched on top of very weak, faceted snow.

Much above treeline terrain has been scoured by winds, however some east and northeasterly aspects have decent coverage above treeline.

If this Christmas Storm becomes a significant event, then give the backcountry snowpack some time to settle and bond before approaching slopes over 30 degrees.

Rime ice. Arizona Snowbowl – 11500′, December 24, 2015.
Are you prepared?

Watch for rock outcroppings and trees – our observations suggest that these could become touchy trigger points.

Good backcountry touring has been reported, however exits and approaches have been thin and tricky.

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Travelers are advised to exercise caution and make slope specific evaluations. As always, please treat this summary with appropriately guarded skepticism, make your own assessments, and contribute to our body of knowledge by reporting your observations.

Thank you for your interest and support of the Kachina Peaks Avalanche Center. Happy Holidays!!

Safe travels, Team KPAC

Snowpack Summary for Friday, December 18, 2015

Weather

Snowslide Canyon Snotel weather-station (9730′ Inner Basin) reports a snow depth of 32″ (81 cm). Arizona Snowbowl reports a snow depth of 40-46″.

Saturday through Monday, two cold low pressure systems deposited ~30″ of snow with southwesterly winds. Early Sunday, strong to extreme northerly and westerly winds blew up to 80 mph.

Over the last three days, the Snowslide Canyon Snotel has reported temperatures between approximately -4 and 35° F. Yesterday, December 17, air temperature at noon near 11800′ was 25° F. with a breezy westerly wind (location: 35.333312, -111.677950).

High pressure builds today and Saturday, with slight chances of precipitation Saturday night and the middle of next week.

Overall:
The overall hazard has decreased since the rapid accumulations of snow on Monday. No avalanches have been observed or reported. Shaded and northerly slopes near treeline and below continue to facet with strong temperature gradients. Variable conditions exist, and good tours can be had, but cover above treeline is thin to non-existent on many slopes. It appears that the biggest problems are **rock and log obstacles** hidden within the new snow and thin snowpack.

Large facets, temperature gradients, and unsupportable sugar snow have been observed on northerly through westerly, shaded aspects near treeline and below. These slopes will become suspect if we get a significant precipitation event. Pit profile.

Yesterday near treeline, on a sunny, east-southeast aspect, we observed a temperature gradient that was insufficient to produce further faceting near the bottom of the snowpack.

Much above treeline terrain has been scoured by winds, however some east and northeasterly aspects have decent coverage above treeline.

Pockets of windslabs have been observed on east, west, and south slopes at and above treeline, but wide-spread, unstable windslabs are not a concern at this time.

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Travelers are advised to exercise caution and make slope specific evaluations. As always, please treat this summary with appropriately guarded skepticism, make your own assessments, and contribute to our body of knowledge by reporting your observations.

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Safe travels, Team KPAC

Storm Update for Monday, December 14, 2015

Weather

Snowslide Canyon Snotel weather-station (9730′ Inner Basin) reports a snow depth of 38″ (97 cm). Arizona Snowbowl reports a snow depth of 42″ (107 cm) at 10800′ on a sheltered westerly aspect.

On Saturday a cold low pressure system with southwesterly winds deposited 12-18″ of snow near treeline. Early Sunday, strong to extreme northerly and westerly winds blew up to 80 mph. Today another system is producing heavy snowfall, with the snotel reporting an accumulation of 3″ per hour, and Agassiz station recording light southwesterly winds with moderate to strong gusts. NOAA predicts another 7-12″ near treeline by Tuesday morning. Treeline winds are predicted to be strong to moderate from the west-southwest, switching to west-northwest tonight.

Total accumulation for the current snowfall at 10,800′ is 14″ as of 2:30 pm Monday. Total winter snow accumulation is 77″.

Temperatures will remain cold, with high pressure returning by Wednesday. Increased chances of precipitation return by Saturday night, December 19th.

Summary

Overall current problems are:
1. **Storm snow:** rapid accumulations of new snow of over 1″ per hour may exceed the strength of the current snowpack. Loose snow or soft slab avalanches are likely primarily near treeline and above on terrain exceeding 35 degrees.
2. **Windslabs**: Sunday mornings' strong north winds have loaded south aspects along ridgelines as well as cross loading other terrain features. Evaluation of these slabs show weak bonding and moderate to high fracture energy in stability tests. These slabs are on top of weak faceted snow (primarily near treeline and below) or wind and sun hardened surfaces.
3. **Obstacles** in the thin snowpack, and hidden within the new snow.
4. Slipping/sliding on steep hard/icy snow surfaces where new snow has not bonded well

The overall hazard has increased as new snow loads a thin faceted snowpack and hard/icy surfaces. New soft slabs up to a foot or more in depth are likely to be human triggered in steep terrain. At the mid and upper elevations, the weight of a single person could trigger dangerous avalanches which may step down into the wind slabs created Sunday morning.

Natural avalanche activity is possible, especially in association with wind loading. Cautious route finding and a conservative approach to avalanche terrain and run out zones are essential for safe travel in the mountains this week.

We recommend staying off slopes that are greater than 30°, and staying out of avalanche runout zones. Waiting at least 24 hours after strong precipitation and wind events is advised.

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Safe travels, Team KPAC

Snowpack Summary for Friday, December 11, 2015

Weather

Snowslide Canyon Snotel weather-station (9730′ Inner Basin) reports a snow depth of 21″ (53 cm). Arizona Snowbowl reports a depth of 25″ (64 cm) at 10800′ on a sheltered westerly aspect.

The last two weeks have been without precipitation. A week of cold temperatures was followed by a week of very warm daytime temperatures. Flagstaff set a new record of 63° F. on Tuesday, December 8th. Due to temperature inversions, Agassiz peak station did not dip below 32° F (0° C) between Saturday and Thursday this week.

For the next four days, NOAA predicts much colder temperatures, winds, and increasing chances for precipitation as two low pressure systems move through Northern Arizona. As of 5pm Friday, we've received reports that ~2 inches of fresh graupel has fallen at Arizona Snowbowl.

Summary

Overall: Backcountry coverage is thin. Much of the snow at and above tree-line has been lost to wind (3 weeks ago) and warm temperatures. Southerly facing aspects have lost much or most of their snow. Decent coverage for touring can be found on northerly and westerly slopes, but it's a mix of hard windslabs and ice above treeline; and facets below treeline on northerly slopes. Current problems are: weak faceted snow; obstacles in the thin snowpack; slipping/sliding on steep hard/icy snow surface; and borderline supportable crusts. Last weeks warm temperatures resulted in a melt freeze crust on the snow surface on below 10,500′.

No avalanches have been reported since November 11th. The snowpack has gained some strength on sun exposed aspects, however instabilities may exist on isolated terrain features and faceted snow continues to develop on northerly and shaded slopes.

The current snowpack is highly variable depending upon aspect, elevation and exposure to wind and sun. Recent investigations on west and northwest aspects at or above treeline reveal a snowpack with average depths of 80-100 cm; composed of alternating wind or sun crusts, or

wind slabs with weak faceted snow in between. Significant loading of this snowpack may prove problematic.

Our shallow and poor snowpack structure will continue to create weak faceted snow with next weeks cold temperatures. However, stability tests indicate moderate strength and low energy or consistency in slab failure results.

Watch your footing on steep slopes. We've had several reports of icy slopes worthy of using crampons above treeline.

Facets continue to develop on northerly and shaded locations below treeline, as cold, clear nights promote vapor movement through the snowpack. Water vapor, and thus density, of the snow decreases in these conditions, resulting in 'sugar snow'. These areas will provide little support to skis or snowboards, and may create an unsupportable snowpack for the next storm event.

Coverage above treeline on southwesterly slopes – viewed from the upper catwalk at Arizona Snowbowl, December 9, 2015.

Two low pressure systems will bring southerly winds, cooler temperatures, and increasing chances for precipitation. Current point forecasts predict 6″ to 12+" of new snow near treeline by Tuesday morning. Winds are forecast to be at and above optimum snow transport thresholds.

Should these storms produce significant snow or wind loading then ask yourself this:
1. How is the snow reacting under my feet?
2. How well is the new or wind transported snow bonding to the old icy surfaces?
3. Is the new or wind transported snow significantly loading weak faceted (sugar) snow below?
4. Are there signs of instability (cracking, whumpfing, other avalanche activity)?

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Travelers are advised to exercise caution and make slope specific evaluations. As always, please treat this summary with appropriately guarded skepticism, make your own assessments, and contribute to our body of knowledge by reporting your observations.

Thank you for your interest and support of the Kachina Peaks Avalanche Center.

Safe travels, Team KPAC

Snowpack Summary for Thursday, November 26, 2015 - Happy Thanksgiving!

Weather
Snowslide Canyon Snotel weather-station (9730′ Inner Basin) reports a snow depth of 22″ (56 cm) and 5.3″ of SWE. Arizona Snowbowl reports a depth of 30″ (75 cm) at 10800′ on a sheltered westerly aspect.

The most recent storm of November 15/16, brought cold temperatures and ~12″ of new snow to the inner basin Snotel (9730′). Temperatures there have ranged between 49° and 18° F over the last seven days.

Cold temps, slight chances for precipitation, and strong southwesterly winds are forecast through the holiday weekend.

Summary

Overall: Coverage below treeline and on sheltered slopes is good for November, but is still thin. Last week, northerly slopes experienced strong winds that stripped off much of the snow at and

above tree-line. Current problems are obstacles in the thin snowpack, and slipping/sliding on steep hard snow, and wind loading on south aspects.

No avalanches have been reported since November 11th. After last weekend's warm temperatures, the snowpack appears to have gained some strength on sun exposed aspects, however instabilities may exist on isolated terrain features and faceted snow is developing on northerly and shaded slopes.

Hard melt/freeze crusts may exist on sun exposed slopes, and hard wind-packed snow may exist near and above tree-line. **Watch your footing on steep exposed slopes, as the surface is becoming worthy of crampons as wind and sun morph the snow surface.**

Following the last precipitation event, warmer than average temperatures have caused rapid settlement and generally good bonding. On sunny aspects, snow ablation by wind and melt are creating bare spots.

Northerly and shaded locations below treeline are experiencing ideal conditions for facet development as cold, clear nights promote vapor movement through the snowpack. Water vapor, and thus density, of the snow decreases in these conditions, resulting in 'sugar snow'. These areas will provide little support to skis or snowboards, and may create an unsupportable snowpack for the next storm event.

Moving into the holiday weekend, a large, mainly dry low pressure system will bring strong wind, cooler temperatures, but little hope for significant precipitation.

Winds are forecast to be at and above optimum snow transport thresholds. However, there is little snow available to move with most of the snow surface locked up as hard windslab or melt freeze crusts.

When was the last time you practiced avalanche rescue with your partners?
During our recent beacon practice, we experienced some common search problems:
1. Failing to do a fine grid search for precise burial pinpointing
2. A search party member not switching to search mode
3. Skiing too fast when in search mode and riding past and below the buried transceiver (mock victim).

Check out the new Know Before You Go video. Be sure to inventory your backcountry gear and stock the ten essentials while on tour.

Travelers are advised to exercise caution and make slope specific evaluations. As always, please treat this summary with appropriately guarded skepticism, make your own assessments, and contribute to our body of knowledge by reporting your observations.

Thank you for your interest and support of the Kachina Peaks Avalanche Center.

Safe travels, Team KPAC

Snowpack Summary for Friday, November 20, 2015.

Weather

Snowslide Canyon Snotel weather-station (9730′ Inner Basin) reports a snow depth of 26″ (66 cm) and 5.8″ of SWE. Arizona Snowbowl reports a depth of 31″ (79 cm) at 10800′ on a sheltered westerly aspect.

Since mid October, we have been in a consistent pattern of precipitation followed by high pressure – this pattern repeats about every 7-10 days. The most recent storm of November 15/16, brought cold temperatures and ~12″ of new snow to the inner basin Snotel (9730′). Temperatures there have ranged between 44° and 11° F over the last five days.

Strong northerly post-storm winds transported snow on November 17 and 18.

The current treeline forecast predicts above freezing temperatures over the next four or five days, then windy and colder weather may move in with increased changes of precipitation.

Summary

Overall: Two snowpacks are currently present: Above and below treeline (@ 11,500′). Significant north winds scoured terrain at treeline and above, leaving little coverage on northerly aspects and creating wind slabs on leeward/south facing slopes. However, coverage below treeline and on sheltered slopes continues to improve with each new storm event. Over the next few days watch for windslabs on south aspects that may become more sensitive with warming temperatures over the weekend, or the added weight of a skier or rider.

High winds and transported snow on November 17. Westerly slopes of the Temptation Chutes.

On Tuesday (11/17), we observed extremely high winds stripping northerly slopes and windslab development leeward which includes south aspects and westerly/downslope cross loading near treeline. Wind slabs may support the weight of a skier or rider initially, then subsequently fail. Look for signs of instability, such as cracking, whumpfing and slopes settling.

Stability testing below treeline in a sheltered, westerly aspect at 11,000′ indicates moderate re-activity at the boundary between this weeks 12″ of snow and the former snow surface. The weak layer at the interface is preserved graupel, though this particular grain type tends to gain strength with time. Developing facets were observed at the base of the snowpack in the October snow.

The next storm system is forecast to arrive around November 24th. If this becomes a major event, watch for new windslab development and loose unconsolidated point and release slides or soft slabs on steep slopes.

Kinetic processes that create weak layers are active this time of year metamorphosing the snow due to: a shallow snowpack, cold air temperatures, and shorter days as we approach the winter solstice. We encourage backcountry travelers to dig down and look for sugary, faceted-snow-crystal weak layers, and conduct stability tests for reactivity between storm layers. Check the KPAC avalanche course schedule to sign up for a three day Level 1 course to enhance your skills and safety.

Powder enthusiasts are exploring the slopes, and with Arizona Snowbowl opening for the weekend, lift access to the backcountry will become easier.

When was the last time you practiced avalanche rescue with your partners?
During our beacon practice last week we experienced some common search problems:
1. Failing to do a fine grid search for precise burial pinpointing
2. A search party member not switching to search mode
3. Skiing too fast when in search mode and riding past and below the buried transceiver (mock victim).

It's time to review and practice avalanche rescue skills, and check out the new Know Before You Go video. Be sure to inventory your backcountry gear and stock the ten essentials while on tour.

Travelers are advised to exercise caution and make slope specific evaluations. As always, please treat this summary with appropriately guarded skepticism, make your own assessments, and contribute to our body of knowledge by reporting your observations.

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Safe travels, Team KPAC

Snowpack Summary for Friday, November 13, 2015.

Weather

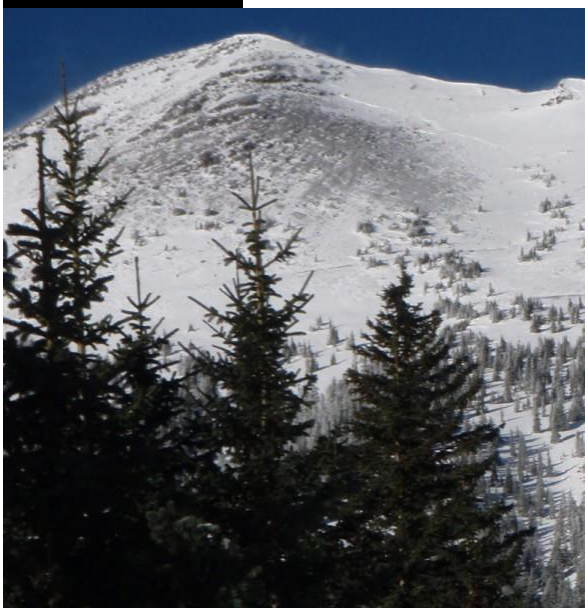
Snowslide Canyon Snotel weather-station (9730′ Inner Basin) reports a snow depth of 51 cm (20″).

Middle to late October brought light snows above 9000′, followed by warm high-pressure conditions. Early November brought our first significant storm of the season with over a foot (30 cm) deposited at elevations above 9000′, 18″ (47 cm) at 10800′, and more at higher elevations. The most recent storm of Nov. 10th brought cold temperatures and 4″ of dense snow at 9700′ in the inner basin. Temperatures there have ranged between 43° and 7° F over the last five days. Southerly storm winds and Northerly post-storm winds transported snow on November 10 and 11.
Current forecast calls for 4-8″ of snow on November 15/16 and a high temperature of 16° F on Monday, November 16.

Summary

Overall: Coverage is fairly thin depending upon aspect, and many early season obstacles exist. Slab avalanches on Northerly aspects may become an issue with this next storm system of Nov 15/16.

Surprisingly, the first slab avalanche of the season was reported on November 11th in the Inner Basin, on the northeast face of Agassiz Peak. This is one of the earliest (in the season) slab avalanches ever recorded, potentially foreshadowing the season to come. From the photograph, and observations of surface conditions, the avalanche appears to be a soft slab running to the ground, probably on November 10th. The likely scenario is storm and wind transported snow, loading and failing on a thin layer of old facets (metamorphosed October snow) perched on the interface with the ground.



Avalanche Crown in the starting zone of the Inner Basin avalanche path (NE aspect of Agassiz peak).
Photo from 11/11.

With a similar storm approaching towards the end of the weekend, **we recommend watching for windslabs at and above treeline.** Northerly through Easterly aspects may be most susceptible to windslab creation during and right after the main precipitation event, but post storm winds may switch directions and create windslabs on other aspects.

Kinetic processes that can create weak layers are in play this time of year due to a shallow snowpack , residual summer heat in the ground, and cold air temperatures.
Case in point:
On Tuesday in the Inner Basin we analyzed a 32° NE slope near 10500′. We found 50-60cm of snow and got some moderate reactivity from stability tests. An Extended Column Test (ECT) did not propagate, however it failed on the 11th tap (first tap from the elbow), Q2 (resistant planar). The weak layer was ~15cm from the ground and on top of a harder snow layer. **Should we get significant new snow or wind-loading, you will want to dig down and look for this or similar layers. Always ask yourself, what is under my feet?**

Powder enthusiasts are already exploring the slopes. Keep in mind that hikers at the ski area are essentially touring in backcountry conditions until the ski area opens. For more information about travel in the area, check: safety and uphill hiking/skinning at Arizona Snowbowl.

It's time to review and practice avalanche rescue skills, and watch the new Know Before You Go video.

Travelers are advised to exercise caution and make slope specific evaluations. As always, please treat this summary with appropriately guarded skepticism, make your own assessments, and contribute to our body of knowledge by reporting your observations.

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Safe travels, Team KPAC

Snowpack Summary for Friday, November 06, 2015.
Welcome to 2015/2016 season! This is our first update.

Weather
Snowslide Canyon Snotel weather-station (9730′ Inner Basin) reports a snow depth of 53 cm (21″).

Middle to late October brought light snows above 9000′, followed by warm high-pressure conditions. Early November brought our first significant storm of the season with over a foot (30 cm) deposited at elevations above 9000′, 18″ (47 cm) at 10,800′, and more at higher elevations. The Agassiz weather station is not yet online, but it appears that the peaks experienced moderate to strong Southwesterly winds. Light winds and high pressure returns, with treeline temperatures pushing 40° F by Saturday.

Summary
Overall: Coverage is fairly thin depending upon aspect and many early season obstacles exist. This is a time to pick less-rocky slopes, or be patient and wait for more snow coverage. Watch for loose storm snow on shaded aspects, and point releases on warm aspects as high pressure builds through the weekend and temperatures increase.

Don't let early season powder fever cloud your judgement and obscure reality. Many obstacles and rocks exist in this thin snowpack, float lightly and scan for submerged hazards.

Observations from Abineau Canyon, on the north aspect of Humphreys Peak, indicate a 30+ inch snowpack, with distinct layering during the storm and a 5″ basal layer from the October storms. Density changes and moderate to low reactivity were observed in the top foot of snow.

Kinetic processes that can create weak layers are in play this time of year due to the shallow snowpack and residual summer heat in the ground. As we approach the solstice, conditions for weak layer development will persist. However, there has not been much time for significant weak layers to develop in the older October snow. Post October-storms and the warm temperatures likely strengthened grain bonds with melt freeze processes on sun exposed slopes.

That said, if you do go to the Alpine slopes, you should investigate to test these ideas. Also, look for abrupt density changes in the new storm snow and test the bonding between layers. Wind slabs above treeline may also be a factor.

Until significant weak layers have opportunity to form, loose snow avalanches are more likely than slab avalanches on shaded aspects.

40° F temperatures are forecast for treeline this weekend – watch for loose snow avalanches created by powder snow losing its cohesion due to warm temperatures and melting, especially on sun exposed slopes.

Looking Forward: Cold clear nights could produce surface hoar over the next few days. If so, the surface hoar could get buried in next week's forecasted precipitation event on tuesday. This could be a problem on northerly alpine slopes.

Powder enthusiasts are already exploring the slopes. Keep in mind that hikers at the ski area are essentially touring in backcountry conditions until the ski area opens. For more information about travel in the area, check safety and uphill hiking/skinning at Arizona Snowbowl.

It's time to review and practice avalanche rescue skills, and watch the new Know Before You Go video.

Travelers are advised to exercise caution and make slope specific evaluations. As always, please treat this summary with appropriately guarded skepticism, make your own assessments, and contribute to our body of knowledge by reporting your observations.

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Safe travels, Team KPAC

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