

**Northern Madison Range, Chippewa Area on Lone Mountain**  
**Snowboard triggered avalanche, one partially buried, minor injury**

**Gallatin National Forest**

**26 February 2014**

SYNOPSIS

On Wednesday, February 26, a lone snowboarder descended the Chippewa area on Lone Mountain and triggered an avalanche on an ESE aspect. He was caught, carried downhill, and partially buried with a minor foot/ankle injury. The avalanche broke over 500 feet wide and ran 250 feet vertical. The slope angle near the trigger point ranged from 35-39 degrees. The crown was 2-3 feet deep. This avalanche broke on a thin layer of faceted snow crystals that formed in late January. US Classification is SS-ARu-O-R4-D2.

LOCATION

Coordinates near the trigger point and crown:  
N 111.46564 W 45.26936  
Elevation at crown: 9558 feet  
Elevation at toe of debris: 9350

PHOTOS

Overview: <http://www.mtavalanche.com/images/14/chippewa-ridge-avalanche>  
Burial location: <http://www.mtavalanche.com/images/14/burial-location-chippewa-avalanche>  
Trigger point: <http://www.mtavalanche.com/images/14/trigger-point-chippewa-avalanche>  
Snowpack: <http://www.mtavalanche.com/images/14/snowpack-crown-chippewa-avalanche>  
Other skier triggered avalanche the next day:  
<http://www.mtavalanche.com/images/14/little-bridger-avalanche-lone-mountain>  
Cornice triggered avalanche one week later:  
<http://www.mtavalanche.com/images/14/large-natural-avalanche-big-sky-3-5-14>

WEATHER

During the last two weeks of January (1/15/14 – 1/28/14), there was a period of high pressure with warm sunny days and clear cold nights and minimal precipitation. A few inches of snow fell on January 23. Snowfall occurred 22 out of 28 days leading up to this accident. Most days leading up to this avalanche had snowfall containing only a few tenths of an inch of snow water

equivalent (0.2-0.3 inches), and there was no major loading event. However, wind loading was significant because strong winds occurred for over two weeks leading up to this avalanche. These winds consistently averaged 10-30 mph and frequently gusted to 50-60 mph. Wind direction was generally westerly, a little NW and mostly SW. The day of the avalanche was one of the few in February with clear sunny skies, and there were many people in the backcountry.

### AVALANCHE

A lone snowboarder left the boundaries of the Big Sky Resort on Wednesday, February 27 and entered the Chippewa area which has a line of cliffs that are popular among many backcountry riders in that area. He dropped past a line of trees above the cliffs and triggered the avalanche. He was carried approximately 250 vertical feet and partially buried next to a tree. He extricated himself and returned to the resort without assistance. The avalanche was witnessed by a member of the Big Sky Ski Patrol and a Level 2 avalanche class.

### SNOWPACK

This avalanche broke on a thin layer of facets that formed during dry weather during the last two weeks of January. During that time, both an ice crust and a layer of small facets formed on the snow surface. Near the end of those two weeks, several inches of snow fell. Another ice crust and a layer of facets formed in that new snow. North aspects generally did not have the ice crusts but had the facets. Both ice crusts and both layers of facets were seen in the crown of this avalanche. It was unclear exactly on which layer this avalanche broke.

This faceted layer formed on many slopes throughout the advisory area. Due to variations in wind, solar input, other meteorological factors, and local terrain effects this layer was highly variable. While it appeared to be most reactive on southerly aspects with an ice crust, this pattern did not always hold true. Northerly aspects also contained this layer and produced avalanches. The day after this avalanche occurred, two skiers triggered but were not caught in an avalanche on a northerly aspect about 3/4 of a mile to the north.

Not only was this layer variable the moment it formed and was buried, it strengthened at different rates on different slopes. There was no clear pattern as to where this layer was weaker or stronger.

One week later, a falling cornice triggered an avalanche on another NE facing slope on Lone Mountain. This avalanche was notable because it also broke on the January facets and propagated about 1000 feet wide.