

## **Playing CSI: a case study of the November 12, 2009 Bozeman, Montana snow event**

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On Wednesday November 11, 2009 the National Weather Service called for the passage of a front across southwestern Montana ahead of a weak low pressure system along the Washington coast. An estimated four to six inches of snow was forecast in the Bozeman area. However, by Thursday afternoon on November 12, over 16 inches of snow were recorded in Bozeman with up to 30 inches of snow in the surrounding mountains. The Galatin National Forest Avalanche Center reported multiple small slab avalanches in the Bridger Mountains, with at least one partial burial. Heavy precipitation was not widespread regionally and in the days following the event a persistent local valley inversion was created that kept high temperatures in Bozeman nearly 16F below average and 20F less than other nearby stations for days. The storm was incorrectly diagnosed by the NWS as “coming right out of the Pacific Northwest...off the coast” (Benoit 2009) when in fact the storm generated ample snowfall due to unstable and unbalanced ascent resulting from interactions of the geostrophic polar jet, subtropical jet, and cold trough. Preliminary analysis indicated the potential role of convective symmetric instability in this event however the non-quasi-geostrophic nature of the unbalanced flow via jet interaction paradigm offers strong evidence for questioning this. Here we examine the meteorological conditions leading to this type of snow event as well as discuss some implications for avalanche hazard generation and persistence.