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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Synoptic atmospheric circulation patterns associated with deep persistent slab avalanches in the western United States" *by* Andrew R. Schauer et al.

Anonymous Referee #1

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The study builds on previous research and covers a novel approach to relate large scale weather patterns in early winter season combined with recent snowfall amounts to major and minor avalanche cycles with avalanches fracturing deep in the snow cover. These cycles are generally difficult to foresee and can cause considerable damage and loss of human lives. The study covers different climatic regions in western US and long data series. The analysis takes avalanche activity data with snow cover characteristics into consideration. The study is well organized and the paper well written. The results are valuable for the community in that it adds knowledge on the relationship of climatologic snow cover characteristics to avalanche activity. To underline the strength of the method and to put it into a forecasting perspective, I recommend to show and discuss

in more detail the cases, when long- and short-term weather patterns are typical for deep slab avalanche cycles, but the cycle does not occur as well as on the advantages over a pure correlation with 72h storm totals. Furthermore, please consider are a few more small comments below.

Introduction: Line 34: Please cite literature on avalanche formation in persistent weak layers for wet avalanches. Line 57: Please also consider the work by Sturm, Holmgren et al. (1995) Climatic snowpack classification system; with classes for the seasonal snowcover according to stratigraphic and textural attributes.

Study locations and methods: All study sites are ski resort, explain in more detail how disturbed/undisturbed the snow cover is by skiers and explosives, and how this has changed over time and how this may influence avalanche activity and avalanche size. Please show your definition of wet versus dry avalanche (where is the snow wet? - in the starting zone and/or path and/or deposition zone). How it it recorded? Deep wet avalanches are often correlated with first wetting of deep layers. Is this data available? Avalanche classification: Avalanche dynamic studies show, that the crown-depth but also the amount of erodable snow (new and old snow) in avalanche paths determines the dynamics and runout length of large avalanches. Hence, it is important, from where the measurements of the 72h storm totals are. Is there a difference in altitude of the location the measurement and the avalanche crown and/or the avalanche path? Please explain in more detail.

Discussion: Please discuss the reverse case in more detail, where typical long- and short-term weather patterns for deep slab cycles are present, but no minor or major deep slab avalanche cycles occurred. Please discuss the advantage of the presented method over simple correlation with 72h storm totals.

line 405: There is also subset -> There is also a subset line 436: wetter -> weather

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