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Discussions

Interactive comment on "On the stability interpretation of Extended Column Test results" *by* Frank Techel et al.

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Due to the high variability of snow, it is nearly impossible for instability tests to accurately predict stable or unstable conditions 100% of the time. However, instability tests have proven to be a useful avalanche forecasting tool for both backcountry recreationalists and avalanche forecasters.

Classifying instability test results is the trickiest part of stability assessment. This paper explores a new instability classification for the Extended Column Test (ECT). The ECT is the most widely used instability test by backcountry recreationalists and practitioners. Snowpilot shows that roughly 77% of snowpit profiles with instability tests have at least one ECT (Snowpilot data 2019).

While this paper does an overall good job exploring different test result classifications for the ECT, there is room for improvement. One flaw is comparing ECT classifications with Rutschblock (RB) classifications. The RB was the first quantifiable instability test that assessed both initiation and propagation on a specific slab/weak layer combination. The RB has proven to be an effective test, however, it is gradually losing popularity with backcountry recreationalists due to its cumbersome nature. Snowpilot shows that over the past ten seasons, the RB has been entered as a test result into less than 1% of snowpit profiles that have at least one instability test. This is significantly lower than the ECT which is entered into 77% of profiles with instability tests.

Because the ECT has nearly replaced the RB, more emphasis should be placed on how to interpret the ECT effectively without correlating it to the RB. Currently, the ECT works on a binary classification scale, stable or unstable. An ECTP test result under standard loading steps is considered an unstable result. A test result of ECTN or ECTX is considered a stable result.

It does make sense to integrate a number classification with a specific ECT test result, but this paper presents number classifications in a way that may be confusing to backcountry practitioners. This paper suggests that a Class 1 stability rating indicates low stability or mostly unstable conditions. This classification is confusing in two ways. One, it uses the word low stability to indicate unstable conditions, possibly Considerable to High danger. Backcountry practitioners could potentially associate low stability with a low danger, which would be a dangerous interpretation. Second, backcountry practitioners could potentially associate Class 1 (unstable conditions) with Level 1 on the North American Danger Scale which is a Low danger or generally stable conditions.

Changing the number classifications around so that Class 4 predicts highly unstable conditions and Class 1 predicts stable conditions would be more consistent with the number classifications of the current North American Avalanche Danger Scale. Combining Class 2 and Class 3 to form an intermediate classification could present interpretation problems. Replacing the word intermediate with the word moderate may lead to easier interpretation. One possible solution could be a four-level classification scheme that follows the current danger scale. Example: Class 1) Mostly Stable Conditions ECTN or ECTX, Class 2) Moderately Unstable Conditions ECTP >_21, Class 3) Considerably Unstable Conditions ECTP 12-20, Class 4) Highly Unstable Conditions ECTP<_11.

Avalanche education and snow science are fluid practices and examining different ways to classify instability test results will ultimately help us better understand snow stability and avalanches. Developing a numerical classification scheme for the ECT seems like a logical step in expanding the current binary classification of stable or unstable. From a practitioner standpoint, aligning the classification numbers with the current North American Danger Scale could make for easier interpretation. In regard to the Rutschblock, data suggests that backcountry recreationalists and practitioners are rarely using the RB as a consistent instability test. Due to the low % of RB's being conducted in the field, focusing on the development of a more thorough ECT classification is worthwhile.

Please contact me with any questions or for clarification on any items comment on above. Thank you for your time and effort.

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Snopilot Data
15,540 snowpits with stability tests

Code:	CT	ECT	RB	SB	ST	PST	Total
2010	411	426	9	2	52	77	555
2011	590	630	12	6	88	110	842
2012	477	459	17	1	85	89	658
2013	364	403	7	1	29	81	525
2014	391	457	5	2	53	97	605
2015	339	472	5	7	33	82	600
2016	1707	1926	25	14	177	324	2555
2017	2879	3436	17	9	301	574	4363
2018	3382	3691	30	6	378	583	4777
2010	74.05%	76.76%	1.62%	0.36%	9.37%	13.87%	100.00%
2011	70.07%	74.82%	1.43%	0.71%	10.45%	13.06%	100.00%
2012	72.49%	69.76%	2.58%	0.15%	12.92%	13.53%	100.00%
2013	69.33%	76.76%	1.33%	0.19%	5.52%	15.43%	100.00%
2014	64.63%	75.54%	0.83%	0.33%	8.76%	16.03%	100.00%
2015	56.50%	78.67%	0.83%	1.17%	5.50%	13.67%	100.00%
2016	66.81%	75.38%	0.98%	0.55%	6.93%	12.68%	100.00%
2017	65.99%	78.75%	0.39%	0.21%	6.90%	13.16%	100.00%
2018	70.80%	77.27%	0.63%	0.13%	7.91%	12.20%	100.00%

Fig. 1.