General Comments

As noted in my previous review, the experimental procedures presented in this manuscript are highly informative and will undoubtedly be valuable for researchers interested in particle motion. The authors' efforts to investigate the growth mechanism of the thin snow plate extending leeward from the edge are commendable, and the overall experimental procedure is well documented.

However, as also noted in my earlier review, I still feel that the study falls short of clarifying the growth mechanism of natural snow cornices. The differences between this miniature experiment and real snow cornices found in nature cannot be explained solely by variations in terrain size, successive precipitation, and duration. The authors' explanations remain unsatisfactory in this regard. I would like to emphasize once again that the authors appear to be examining fundamentally different phenomena.

If the authors wish to assert that the thin plate observed in this study is relevant to understanding natural snow cornice formation, they should provide a clear scenario—ideally illustrated with schematic figures—that shows how the thin plate would develop step by step into a real cornice, specifying the key mechanisms involved at each stage.

Before addressing the detailed points within the manuscript, I must also point out several discrepancies between the authors' responses and the content of the revised manuscript:

Discrepancies Between Author Replies and Manuscript

Contact Collision Explanation:

The authors state in their reply:

"For clarity, we will add the following sentences before introducing the maximum compression displacement of particles in Section 3.2: 'During contact collision, snow particles will be compressed and deformed, undergoing plastic deformation and brittle failure (Wang et al., 2020).'"

However, neither the text nor the reference appears in the manuscript.

Sintering Force Description:

In the reply, the authors note:

"Sentences in lines 26–27 will be deleted, and we will add: 'In which, Fb is the sintering force, calculated as the product of the ice tensile strength and the contact surface area

(Szabo and Schneebeli, 2007). Sintering begins upon particle deposition and plays a crucial role in stabilizing and preserving the cornice structure.'"

Yet, this explanation and the notation for Fb are not included in the manuscript.

The same applies to subsequent mentions of sintering effects—the manuscript still lacks these explanations.

Order of Magnitude Description:

The authors replied:

"The size of snow particles follows a distribution function, and different sized particles experience different magnitudes of force. Therefore, we present orders of magnitude rather than exact values."

Yet the manuscript contains no mention or expression of "order of magnitude."

Missing Reference:

The following reference, cited in the authors' reply, does not appear in the manuscript:

Enliang Wang et al., 2021, Cold Regions Science and Technology, 182, 103215.

Specific Comments

Figure S1:

It seems the authors intended to show that shear stress becomes negligible, but it is difficult to interpret what is being presented. More detailed explanations are required, particularly regarding the reason for plotting two data series between 0.7 and 2 (x/H).

Since computer simulations of airflow were conducted, I strongly recommend including a representative airflow pattern around the edge. This would be extremely helpful in explaining the particle movements discussed later.

Line 58 & Figure 1:

The description of the wind tunnel setup is inadequate. Please include key specifications such as the length and size of the working section.

Line 67:

The authors mention preliminary tests comparing two types of snow and concluding that dendritic snow is more suitable. Were the particle sizes of both types the same? Since the manuscript later emphasizes particle size as a key factor, it's important to clarify this point.

Line 80:

The phrase "for 4–5 s during cornice growth" would be clearer if supplemented with figures showing the time evolution of the thin plate's length and thickness.

Line 109:

Since fresh dendritic snow tends to orient perpendicular to the wind to maximize resistance, particle size might be underestimated when viewed from the side. This effect would be negligible for rounded particles but should be considered for dendritic ones.

Line 137:

Are any particles ejected by collisions with saltating particles? If so, they might move slowly and contribute to edge growth. Please clarify this point.

Line 143:

The statement “smaller particles, with better followability with the wind” suggests that their impact speed should be higher, which conflicts with Figure 7. Additionally, larger dendritic particles typically have more branches, potentially increasing their likelihood of being trapped at the edge. I recommend introducing quantitative parameters such as specific surface area to strengthen this discussion.

Lines 158–164:

These descriptions are speculative and qualitative. As noted earlier, it would greatly improve the discussion to include airflow patterns around the edge. If direct measurements using a hot-wire anemometer were not conducted, simulated streamlines or vortex separations would be very helpful.

Lines 169–170:

There's an inconsistency here. The authors state that creeping particles (about 14%) are larger and settle near the front end of the cornice, but later conclude that smaller particles are more likely to adhere at the edge. This contradiction needs to be resolved.

Lines 176–181 & Figures 6–7:

How many particle trajectories were analyzed to derive the appearance ratios in Figure 6? Is the sample size sufficient for quantitative conclusions? Also, how were impact speeds and angles in Figure 5 determined under the complicated particle movement? Were these captured at time step 4? If so, negative angles should appear in Figure 7 as well.

Moreover, Figure 7's horizontal axis is labeled "impact velocity or angle," while the figure caption refers to "particle adherence velocity or angle." This should be unified for clarity.

Lines 182–218 & Figure 7:

The explanation for why higher-speed particles adhere at certain positions but not near the edge remains unclear. Generally, high-speed, low-angle impacts would result in rebound. Further, do you have evidence that the vertical component of velocity predominantly dictates particle behavior? A clearer discussion is needed.

Lines 218–266:

The model describing forces between particles at the edge feels redundant, as all subsequent discussions are qualitative. As noted previously, quantitative validation using experimental snow and environmental data is essential. The claim that smaller dendritic particles adhere more readily due to a higher Fc/Fg ratio can be easily speculated without introducing the model.

Given the complexity of dendritic particle shapes, factors such as branching and interlocking likely have greater influence. Additionally, the dependence of Fc/Fg on particle size is unclear. If the authors wish to explore particle size effects more rigorously, I strongly recommend analyzing the cornice structure post-experiment to measure particle size distributions and dendricity. This would greatly enhance the study's credibility.

Line 224:

The authors state that wind velocity and shear stress near the cornice edge approach zero. Please provide clear evidence for this. Figure S1 is unsatisfactory and hard to interpret. Moreover, since the ridge model differs from natural terrain shown in the reference, the airflow at the edge may not reduce to zero but instead decrease rapidly on the leeward side.

Line 275:

The claim about increases in both the thickness and length of the cornice should be supported by time-series data. If such data were obtained, please present them.

Additional Comment:

Looking at Figures 4 and 6, it appears that snow accumulation on the flat surface at the model's right end increased. This area may play a key role in conveying rolling particles toward the edge and increasing the cornice root's thickness. This process could be crucial to understanding how thin plates evolve into full cornices in nature. This process deserves attention in future discussions and analyses.