

# Supplementary material for micromechanical modeling of snow failure

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## 10      **1. Introduction**

This supplementary material is composed of two videos representing the discrete element simulations and the results of weak layer behavior under load-controlled test for two loading angles (0°, 35°). These videos show the temporal evolution of the stress and the bond damage during loading: DEM model where the actuator layer mass is colorized from white to blue, the weak layer ball displacement from red to green (white represents 0 displacements). The red sticks represent the position of the  
15 breaking bonds (top plot). The blue line shows the stress during the four phases of weak layer failure. The violet line corresponds to the proportion of broken bonds as functions of the strain (Bottom plot).

- Bobillier\_et al\_Micromechanical\_modeling\_snow\_failure\_Supplementary\_Material\_Video\_Compression.MP4.  
Unconfined load-controlled test under 0° loading angle. Normal stress and strain are shown.
- Bobillier\_et al\_Micromechanical\_modeling\_snow\_failure\_Supplementary\_Material\_Video\_Mixed\_mode.MP4.  
20 Unconfined load-controlled test under 35° loading angle. Shear stress and strain are shown.