



Fig. S1 Effect of the number of dimensions of a model on simulated wet snow area. Figures S1 (a), (c), (e) and (g) refer to a 3D snow section with size  $10 \times 10 \text{ cm}^2$ ; Figures S1 (b), (d), (f) and (h) refer to a 2D snow section with size 10cm. The initial conditions (Figures S1c and S1d) are preferential flow paths of size equal to 1 cm and distance between paths equal to 5 cm. If the width of 3D preferential flow paths doubles, the ratio of wet snow area will become four times higher because both sides of the paths double (e). On the other hand, in a 2D simulation, wet snow area will double (f). If the distance between preferential flow paths reduces to 2.5 cm, the number of paths will become four times larger in a 3D simulation, while it will double in a 2D simulation.