EGU2020-5918
https://doi.org/10.5194/egusphere-egu2020-5918
EGU General Assembly 2020

The growth of snow bedforms

Kelly Kochanski[1], Robert Anderson[2], and Gregory Tucker[2]
[1]University of Colorado - Boulder, Geological Sciences, United States of America (kelly.kochanski@gmail.com)
[2]University of Colorado - Boulder, Geological Sciences, United States of America

Wind-blown snow does not lie flat. It self-organizes into dunes, waves, ripples, and anvil-shaped sastrugi. These features, called snow bedforms, are high-speed analogues of sand features barchans, ripples, and yardangs. Snow bedforms appear within hours or days after a blizzard, and may migrate as fast as several meters per hour. They are widespread, and affect the albedo and thermal properties of snow across the polar regions, but thus far they have attracted little attention within aeolian geomorphology.

For the past three winters, I have documented the growth of snow bedforms in Colorado Front Range. I present time-lapse footage showing the movement of snow dunes, ripples and sastrugi (see tinyurl.com/bedform-videos). These observations show that (1) snow is only flat when winds are slower than 6.4 m/s (2) snow dunes adjust minute-by-minute to changes in wind speed, (3) the most widespread bedform, sastrugi, evolve by migrating and eroding downwind, and (4) snow waves and dunes deposit layers of cohesive snow in their wakes, and thus aid snow deposition in windy conditions. These observations provide the basis for new conceptual models of bedform evolution based on the rates of snowfall, aeolian transport, erosion, and snow sintering across the snowscape.