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SASTRUGI GEOMETRICAL PROPERTIES AND MORPHOMETRY OVER TWO WINTER SEASONS AT COL DU LAC BLANC (FRENCH ALPS, 2700 m a.s.l)

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Some elements of snow surface roughness, such as ripple or sastrugi, are a direct manifestation of wind erosion and in turn modify the near-surface wind field and consequently the horizontal snow mass fluxes. This leads to a negative feedback between wind strength and surface roughness that must be taken into account in numerical models.
Formation of sastrugi, which are elongated metric-scale ridges of wind-packed snow whose longitudinal axis is parallel to the prevailing wind at the time of their formation, is still not well-understood. The first step to provide new information about the formation and evolution of such features is to integrate meteorological data and accurate description of geometrical properties.
But the complex and dynamic surface of sastrugi cannot be easily captured by manual measurements (Bellot et al., 2014), which furthermore must be frequent as the formation of new landforms can happen very quickly.
That's why the potential of a low-cost time-lapse terrestrial laserscan RLS (Picard et al., 2016) has been investigated during the winter seasons 2015-2016 and 2016-2017 at Col du Lac Blanc in the French Alps. This experimental test site, dedicated to drifting snow studies, and subject to the formation of sastrugi is well-suited for such study : accurate meteorological data, including drifting snow fluxes, are available each 10 minutes.
RLS covered a surface area of around 200 m2 for a spatial horizontal resolution of nearly 2 cm and monitored successfully surface roughness once a day during the whole winter seasons.
Sastrugi geometrical parameters, such as the frontal area and average height of roughness elements has been extracted from the RLS data and the sastrugi morphometry has be examined over two winter seasons in link with snow fall, drifting snow occurence and intensity and wind speed.