Evolution of the fraction of snow cover over the last decade in an Arctic site (Ny-Ålesund, Norway) using ground-based cameras.

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The fraction of snow cover is a key parameter useful for describing the spectral behavior of the surface and for evaluating the presence of snow at the surface in limited areas. Such an information is usually retrieved remotely using satellite sensors having sometimes problems with vegetation and cloud covers. Close-range sensing using ground-based cameras is an important source of data that can be involved for the preparation of long time series concerning the snow cover. This study presents the support provided by terrestrial photography for the estimation of the fraction of snow cover in an Arctic site (Ny-Ålesund Research Station in Svalbard, Norway): panoramic images taken for twenty years were analyzed using an automated snow-no-snow detection algorithm based on spectral similarity. The available cameras are located at the Zeppelin Observatory (475 m a.s.l.) and at the Climate-Change Tower (60 m a.s.l.). While the first camera provides different views over the Kongfjord since 2000, the second one has started to operate in 2018 looking at the Brøggerbreen glaciers. The analysis is based on two components: the orthorectification of different views; and the estimation of the snowed area. The quality check of the final estimations is approached controlling the stability of the camera view geometry, the data corruption and the presence of visibility biases (mist, snowfall and rainfall). Different masks are considered in order to define the snow distribution in the different geomorphological domains (coastal plain, glacier front, mountains). The preliminary results are presented in terms of time-series concerning the presence of snow cover area with particular attention to the melting seasons.