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Observations of the surface radiation budget and cloud radiative forcing from pan-Arctic land stations

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High-quality, continuous, long-term observations of radiative fluxes are collected from land stations surrounding the Arctic Basin, including through the Baseline Surface Radiation Network (BSRN). This work focuses on data acquired from Barrow, Alaska (1993-2016), Alert, Canada (2004-2016), Ny-Ålesund, Svalbard (1993-2016), Eureka, Canada (2007-2016), Tiksi, Russia (2011-2016), Oliktok Point, Alaska (2014-2016) and Summit, Greenland (2010-2012). The measurements include upwelling and downwelling longwave and shortwave fluxes, as well as direct and diffuse shortwave flux components, and surface meteorology. The observations are post-processed using the Radiative Flux Analysis (RFA) method, which, in addition to basic quality control, provides value-added metrics such as cloud radiative forcing (CRF), optical depth and fractional sky cover. These data are used to conduct a spatial and temporal analysis from the pan-Arctic surface stations. On average, the perturbation to the downwelling longwave at the surface caused by clouds is similar between the sites, but this result arises through different combinations of cloud properties. Interannual variability in CRF at any one site is found to be similar to the differences between sites, except in autumn. Properties of the environment that are not properties of the clouds themselves (e.g., surface albedo) are shown to be amongst the largest sources of variability in CRF.