Geophysical Research Abstracts
Vol. 19, EGU2017-8757, 2017
EGU General Assembly 2017


# Synoptic atmospheric circulation patterns controlling avalanche activity in central Svalbard

Holt Hancock (1), Alexander Prokop (1), Markus Eckerstorfer (2), and Jordy Hendrikx (3)

(1) Arctic Geology Department, The University Centre in Svalbard, Longyearbyen, Norway (holth@unis.no), (2) NORUT, Tromsø, Norway, (3) Snow and Avalanche Lab, Montana State University, Bozeman, USA

Central Svalbard's avalanche activity is primarily controlled by the local and synoptic scale meteorological conditions characterizing the region's winter storms. Previous work has described Svalbard's direct-action snow climate as High-Arctic maritime based on the unique meteorological conditions and resulting snowpack stratigraphy observed in the region. To gain a better understanding of the broad-scale spatial controls on regional avalanche activity in Svalbard, this work investigates synoptic atmospheric circulation patterns associated with observed avalanche cycles during the 2007/2008 to 2015/2016 winter seasons. We use avalanche observations systematically recorded as part of the Cryoslope Svalbard project from 2007-2010 in combination with additional observations from notable avalanche events from 2010-2016 to develop a regional avalanche cycle history. We then compare the timing of these avalanche cycles to an existing daily calendar of synoptic types and NCEP/NCAR Reanalysis datasets to characterize the synoptic atmospheric circulation patterns influencing this avalanche activity. Our results indicate regional avalanche cycles are driven by cyclonic activity in the seas surrounding Svalbard under synoptic circulation patterns associated with warm air advection and moisture transport from lower latitudes to Svalbard. The character and spatial distribution of observed avalanche activity can be differentiated by atmospheric circulation type: mid-winter slushflow and wet slab avalanche cycles, for example, are typically associated with meridional southerly flow over the North Atlantic bringing warm air and heavy precipitation to Svalbard. Such analyses can provide a foundation upon which to improve the understanding of central Svalbard's snow climate to facilitate regional avalanche forecasting efforts.