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Vertical columns originated in layers of depth hoar and near-surface faceted crystals

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Vertical columns originated in layers of depth hoar and near-surface faceted crystals

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Within the winter subpolar climatic conditions, the deep layers of depth hoar crystals/sugar snow are common. In course of study snow profiles between Abisko and Kiruna (Northern Sweden) in March/April 2008, we have observed complexes of vertical columns composed of chain of depth hoar crystals repeatably. The height of columns reaches to 20 cm and about 5 cm in diameter, columns were formed in distance from several centimetres to some tens of centimetres between them. The best developed columns were formed by ice body inside. Within deeper snow profile (to 1 m) the columns formed two layers one above another.
Earlier, in May 2006, similar layers of columns we were discovered inside continuous snowpack near Riksgransen and inside rest of snow patches in Abisko as well. Columns were formed by harder firn grains. Their origin should correspond to International classification for seasonal snow (Collbeck at al.1990), subclass. No 8b „Ice column“. (Ice column from refreezing of draining meltwater within flow fingers). However, based on our knowledges from 2008, there should exist another way of their origin, e.g. temperature metamorphosis of depth hoar columns.
Consequently, analogous vertical columns were found within layers of near-surface faceted crystals in subalpine and mountain areas of the Krkonose Mountains (Central Europe).
We suppose the influence of space design of all three types of harder columns (originated in depth hoar, near-surface faceted crystals, refreezing of meltwater) and adjacent soft interspace as on the flux of air (gases) inside snowpack as on its stability. Photodocumentation of all forms is enclosed.