NORTHERNMOST CIVILIAN SETTLEMENT IN THE WORLD

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RADON in the ENVIRONMENT
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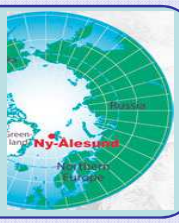
INTRODUCTION . Ny-Ålesund is situated at 78° 55´ N, 11° 56´ E on the west coast of Spitsbergen, the largest island in the Svalbard archipelago and since 1964, is an important centre for international Arctic scientific research and environmental monitoring. Coal mining was the origin for settlement there, but mining was put to an end after a serious accident in 1962, leaving behind numerous cultural remains of technical and industrial importance. Ny-Ålesund has also been the starting point of several historical attempts to reach the North Pole.



Exposure to indoor radon has been identified as the second leading cause of lung cancer after tobacco smoking. In an indoor environment, there are many factors affecting indoor radon concentrations. Those factors could be different in the Arctic regions.

It is well known that the Council Directive 2013/59 / Euratom of 5 December 2013, article 74, says that "Member States shall establish national reference levels for indoor radon concentrations. The reference levels for the annual average activity concentration in air shall not be higher than 300 Bq m^{-3}" so it is important to know the radon concentration in different places.

MATERIAL AND METHODS

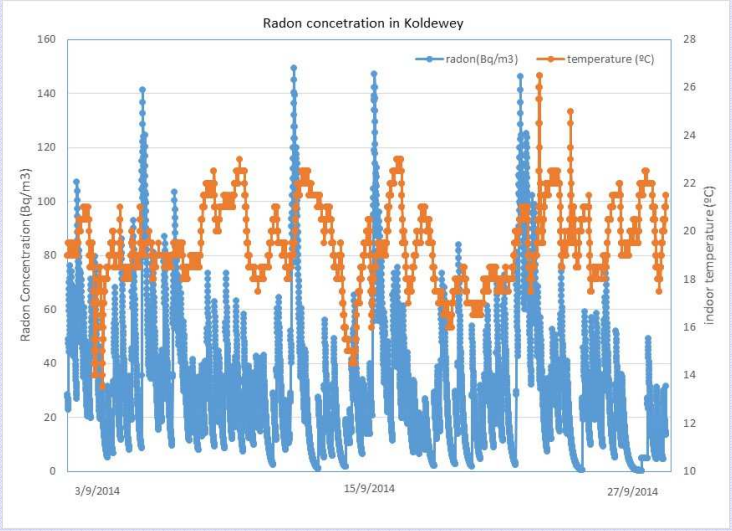
Indoor radon activity measurements were carried out in different locations at Ny-Ålesund from 3 to 27 September 2014 : Koldewey base (German base), KingsBay dining room, Marine Laboratory, and Gym facilities with five AlphaE devices from Saphymo GmbH.

The AlphaE is an ultra small continuous radon monitor for professional use. Due to the light-weight and small dimensions it can perfectly be used to measure the personal radon exposure and to manage personal doses. It is based on a silicon diode diffusion chamber. The calculation of dose is possible due to a user-settable equilibrium factor. The Alpha E systems were programmed to record a measurement every five minutes

Temperature				Precipitation			Wind	
Average	Normal	Warmest	Coldest	Total	Normal	Highest daily value	Average	Strongest wind
0.3° C	-0.3° C	9.0° C Sep 13	-8.1° C Sep 21	115.1 mm	46.0 mm	32.6 mm Sep 14	4.0 m/s	17.3 m/s Sep 18

Sumary of meteorological variables from 3 to 27 september 2014

	Rn Average (Bq m^3)	Rn Maximun (Bq m^3)
Koldewey (German base)	70 ± 20	145
Marine Lab	45 ± 15	68
Kings Bay (dining room)	54 ± 20	81
Gym facilities	30 ± 15	68



CONCLUSION

The lowest radon average concentration (30 Bq/m^3) was recorded in the Gym facilities, while the highest (70 Bq/m^3) was observed at Koldewey. The results of this study clearly show that the radon concentration in different locations at Ny-Ålesund are mostly low and below the proposed reference level of the Council Directive 2013/59 / Euratom

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