

Soil radon in winter months under cool temperate deciduous stands in Hokkaido, Japan

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Monitoring sites: Sapporo and Tomakomai

Location : 43° 03'N,
141° 21'E

Geology : **alluvial sediment**

Vegetation : cool temperate

deciduous stand

Annual temperature: 6~9 °C

Annual precipitation :

800~1600 mm

Location: : 42° 40'N,
141° 36'E

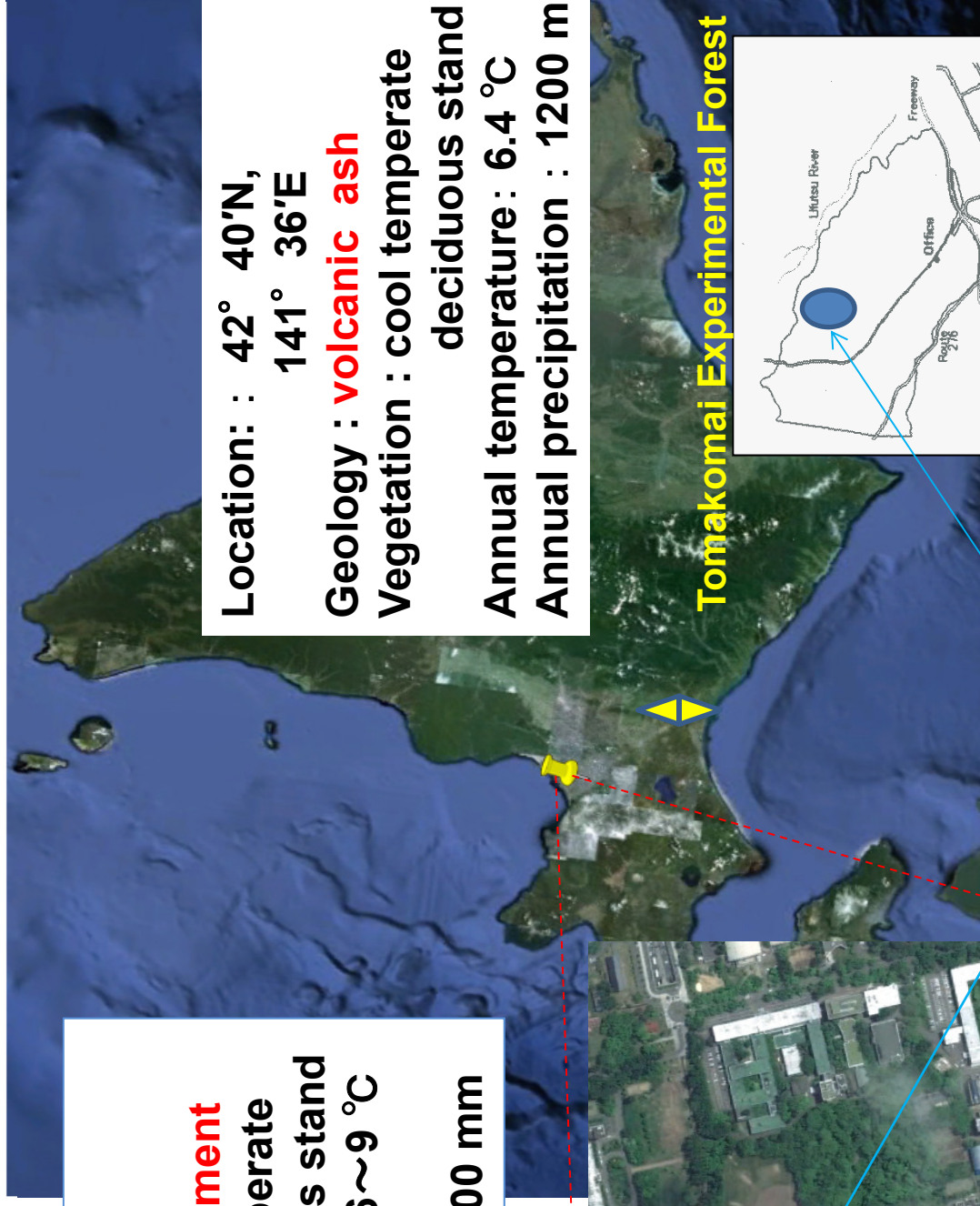
Geology : **volcanic ash**

Vegetation : cool temperate

deciduous stand

Annual temperature: 6.4 °C

Annual precipitation : 1200 mm



Hokkaido University

Tomakomai Experimental Forest



Site

Seasonal view of the semi-natural woods on the campus of Hokkaido University



March



Early April



Early May



July



Late October



October

Seasonal view of the Tomakomai Experimetal Forest of Hokkaido University



Early May



June



November

August



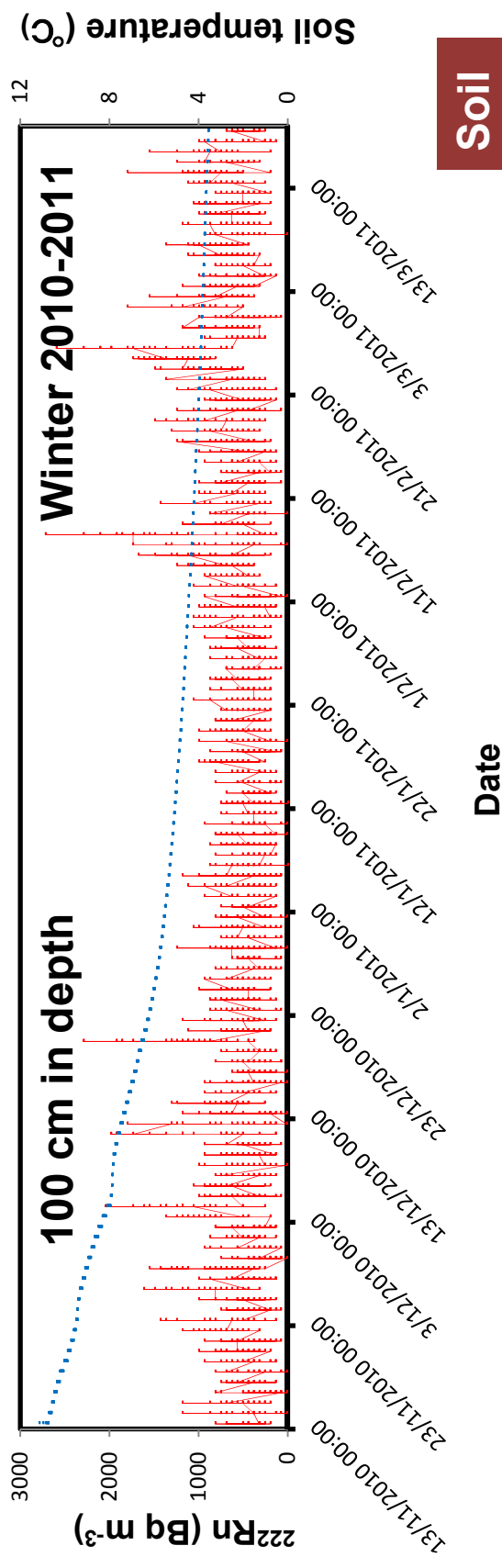
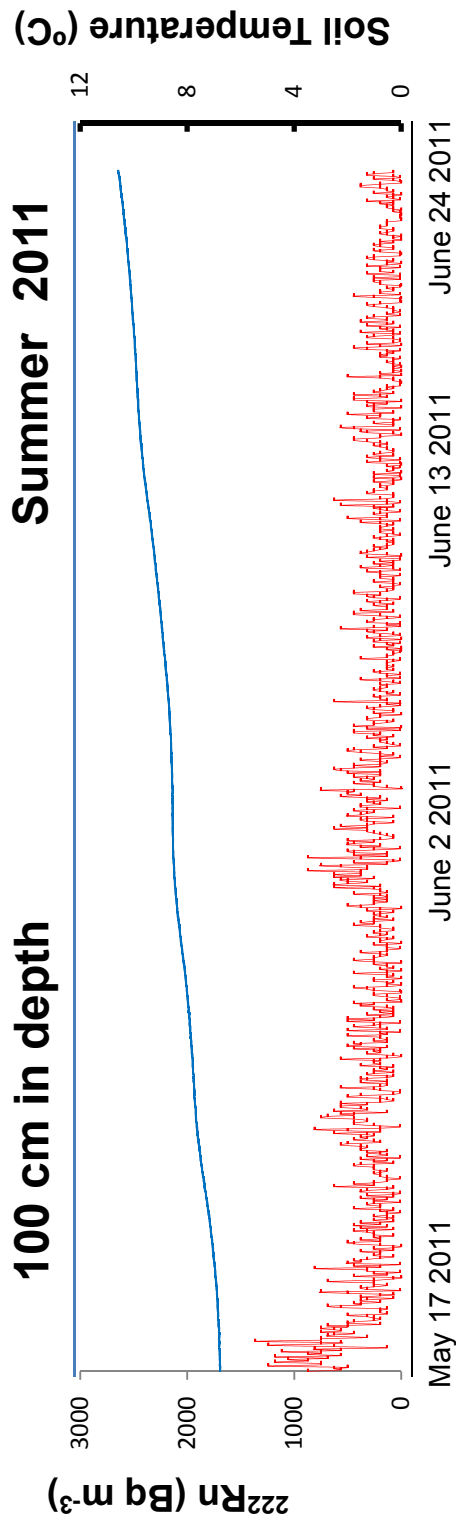
Previous results

on

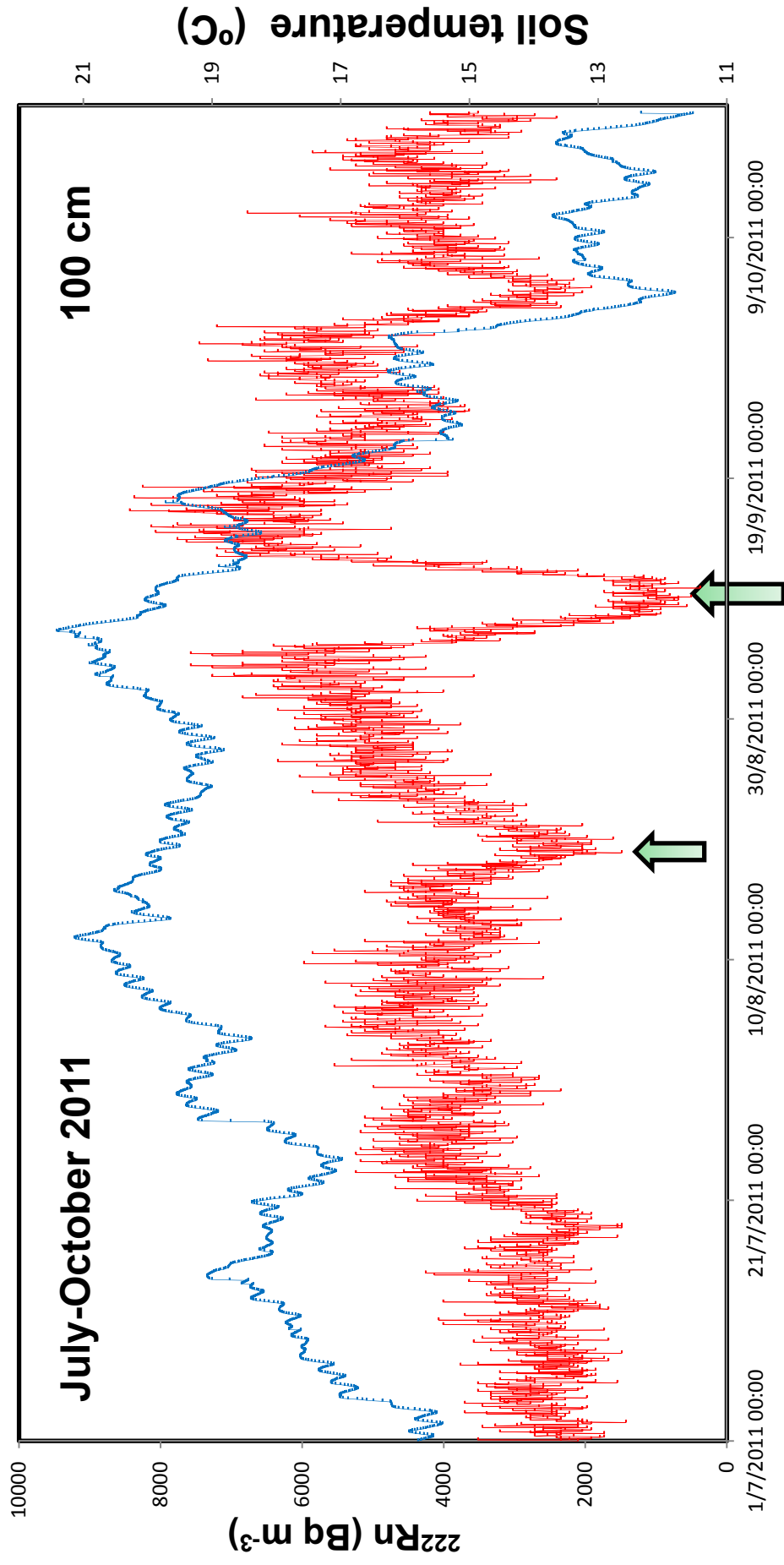
^{222}Rn in soil air

(Tomakomai vs Sapporo)

Time series plots of ^{222}Rn and temperature in soil at Tomakomai site



Time series plots of ^{222}Rn and temperature in soil at a depth of 100 cm on the campus of Hokkaido University monitored from July.1- Oct.18 2011

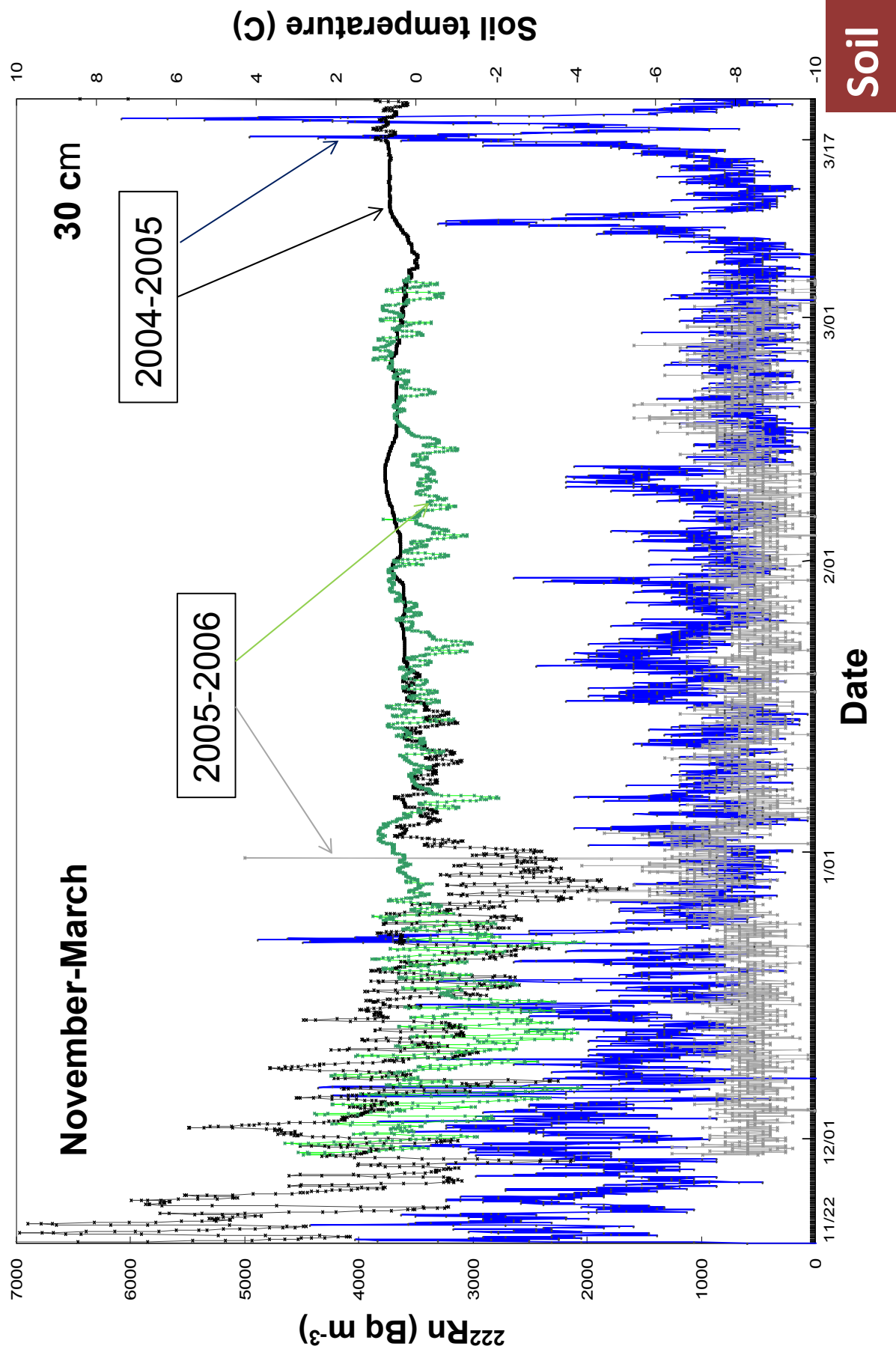


Low pressure front + Rain

Date

Soil

Time series plots of ^{222}Rn and temperature in soil air in winter months on the campus of Hokkaido University



Outline of the study

Soil radon

Factors affecting ^{222}Rn in soil



Summer time
Diurnal trend
Temperature
(soil, air)
Rain

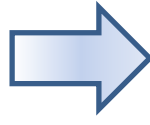


Winter time
(30 cm in depth)
Soil Temp: 0°C
Lower Rn level
Low variability

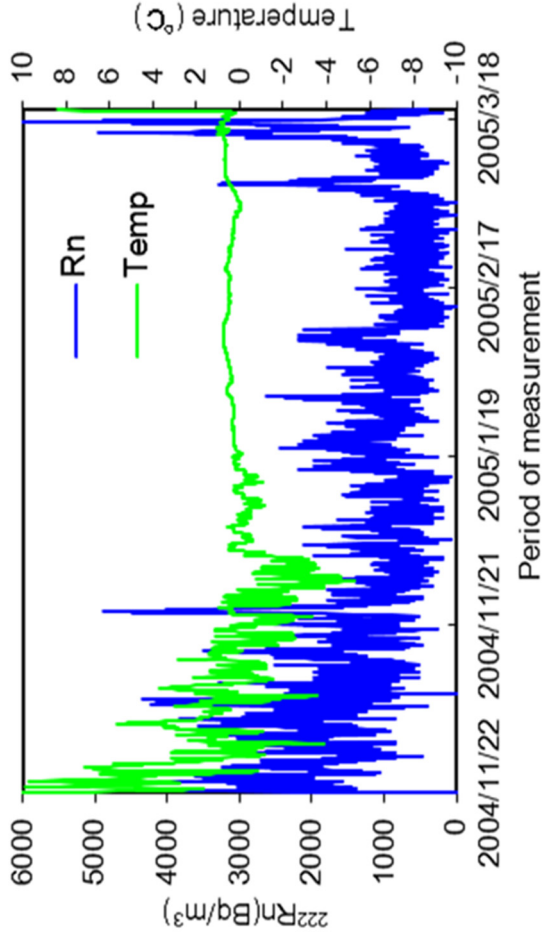


Higher soil radon level in winter

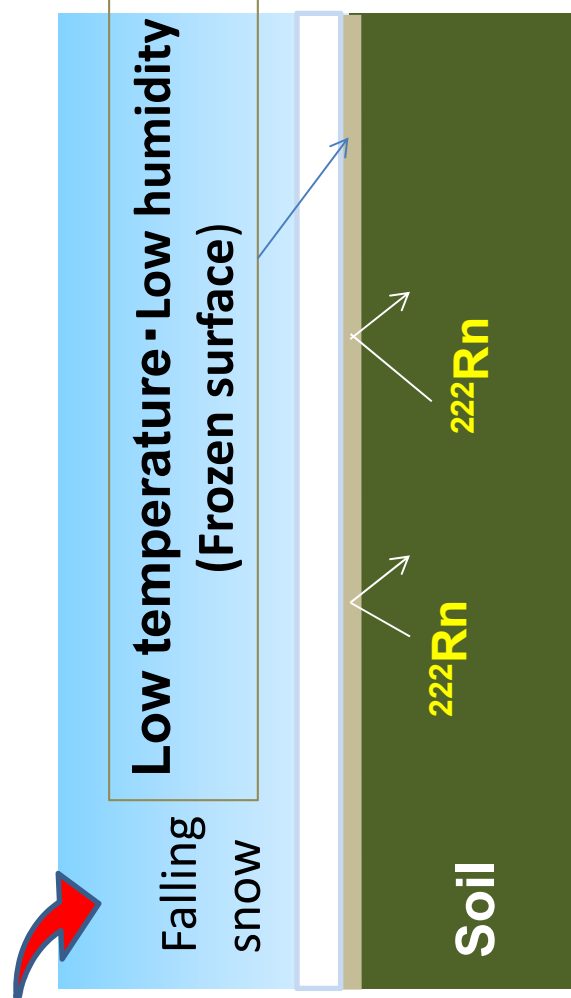
Winkler et al. *Sci. Total Environ.*, 272,
273–282, (2002)



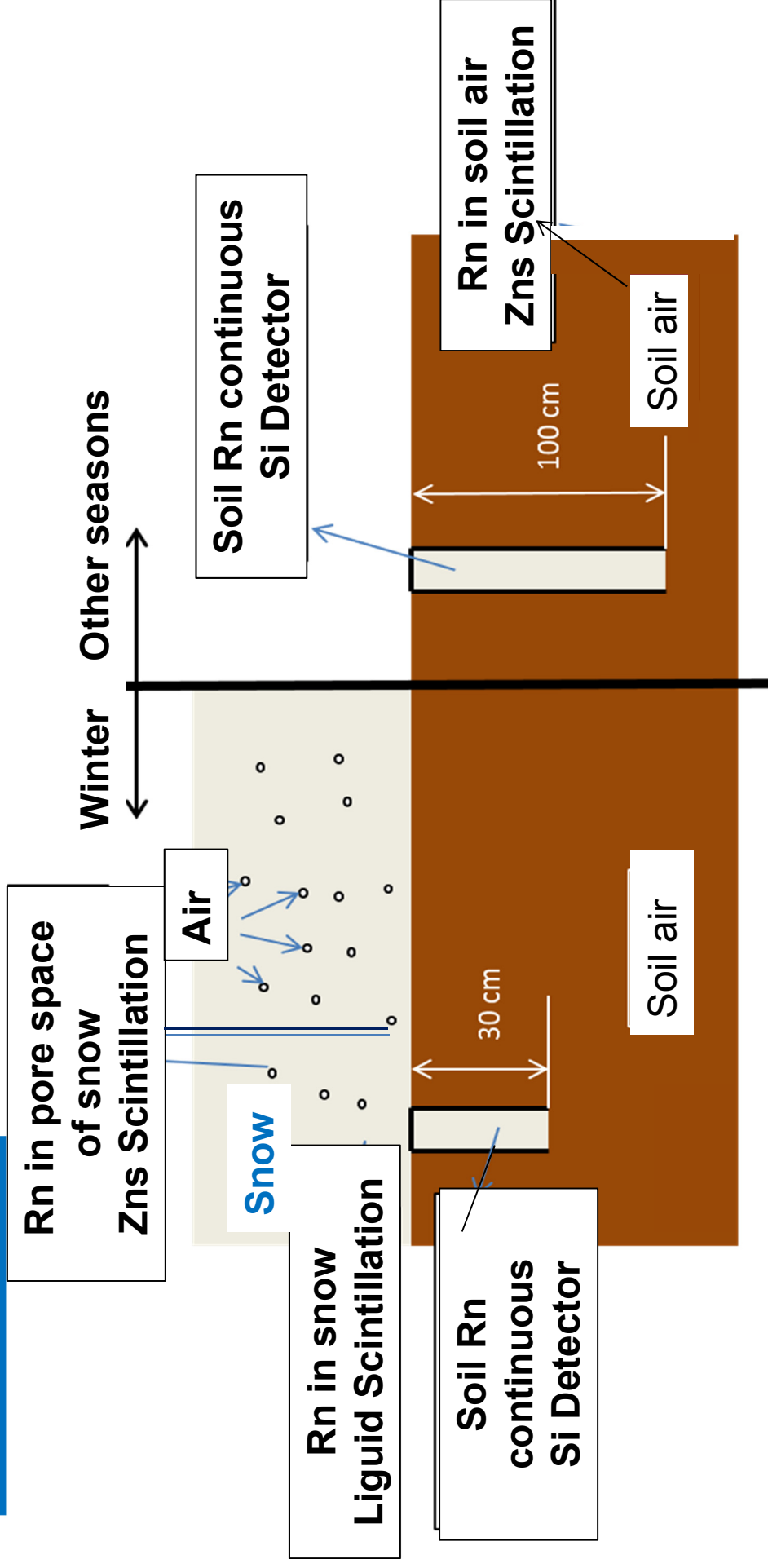
^{222}Rn in winter?



Time series of ^{222}Rn and temperature in soil air (Nov. 22 2004~Mar. 20 2005)



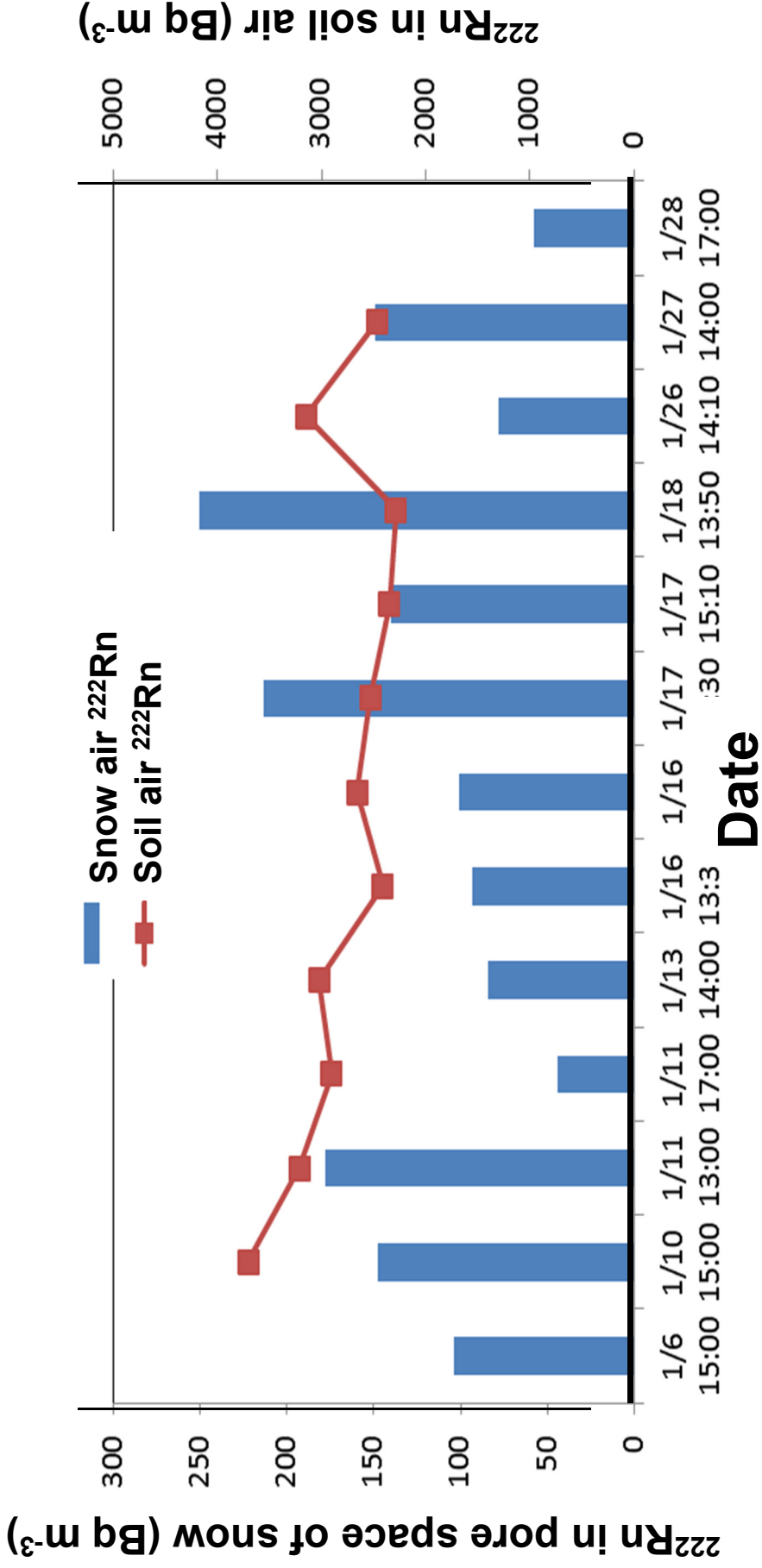
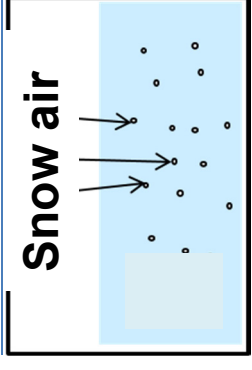
Procedure



1. Time series data on soil radon (^{222}Rn)
2. Radon in pore space of snow just above the ground surface
3. Radon in snow

Results

Comparing data on ^{222}Rn in soil air and ^{222}Rn in pore space of snow deposited on the ground

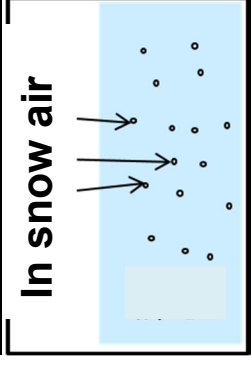


Soil ^{222}Rn : 2300-3700 Bq/m^3 (Low variability)

Snow pore ^{222}Rn : 40-250 Bq/m^3

Results

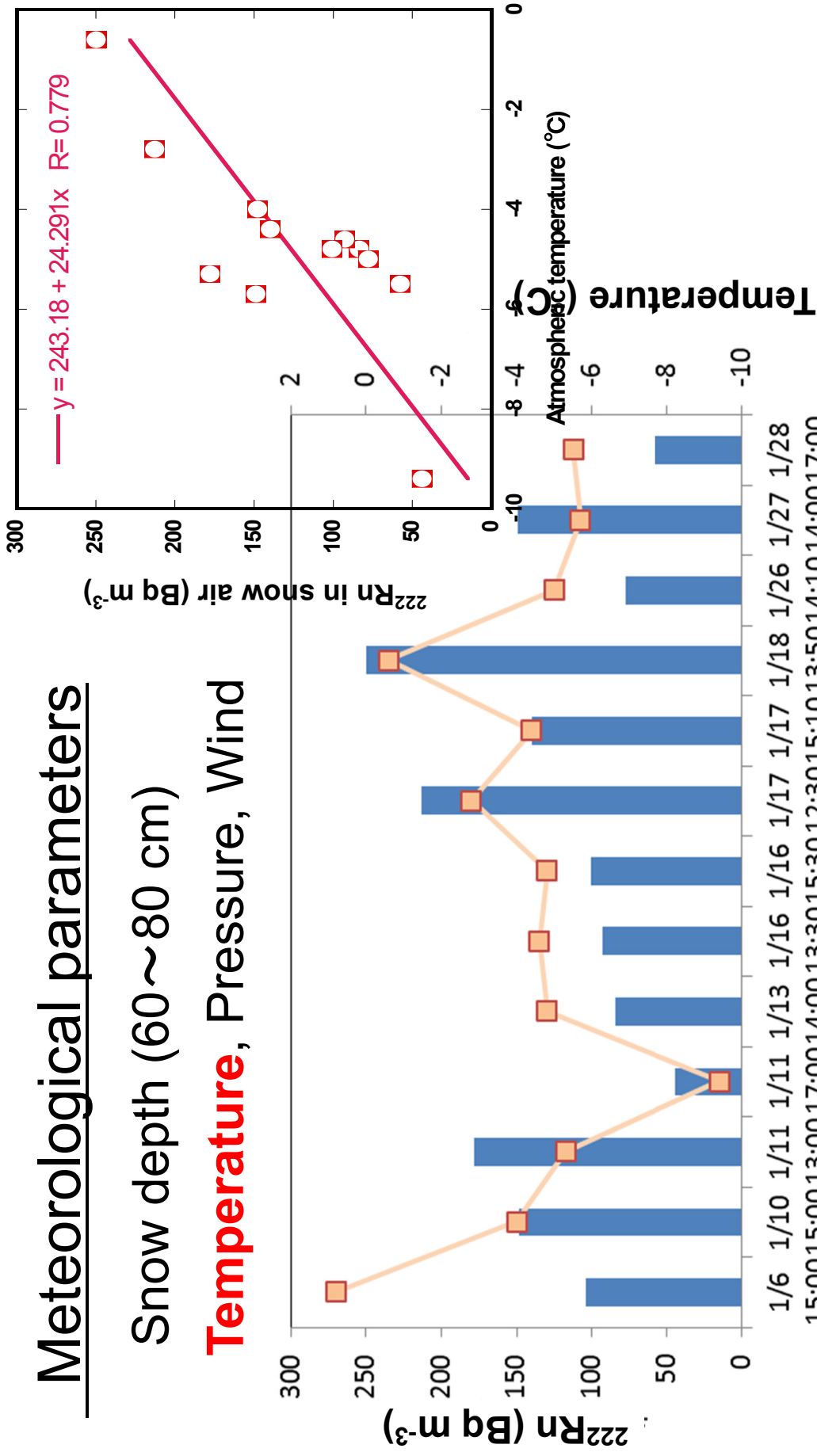
Meteorological parameters affecting ^{222}Rn concentration in the pore space of snow



Meteorological parameters

Snow depth (60~80 cm)

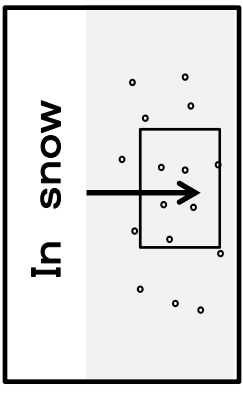
Temperature, Pressure, Wind



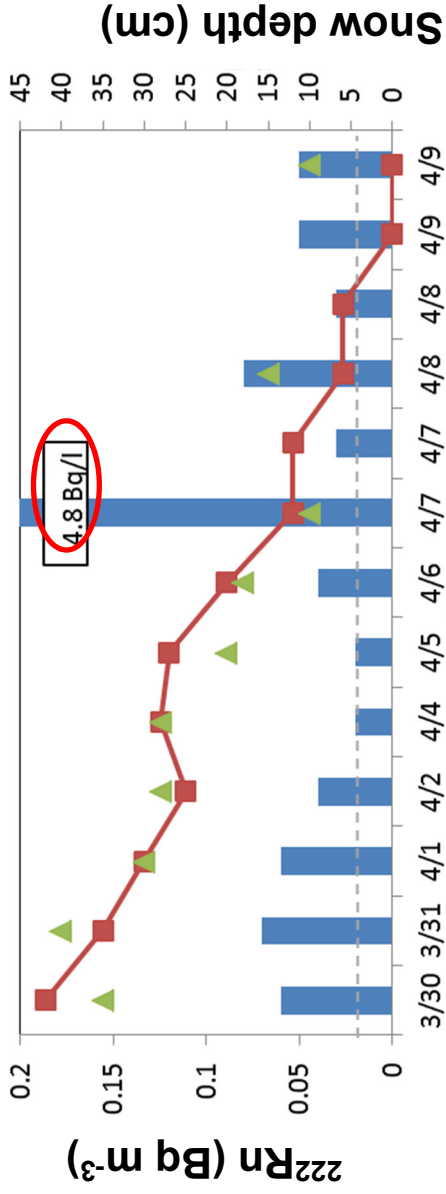
Date

Results

^{222}Rn concentration in snow



March-April 2011

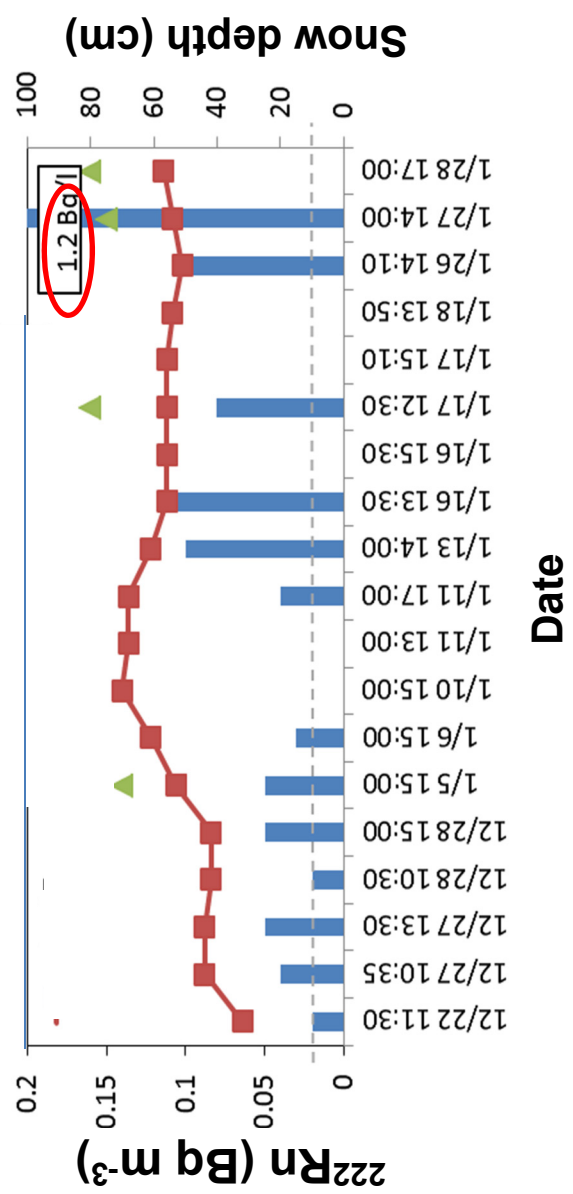


High ^{222}Rn in snow

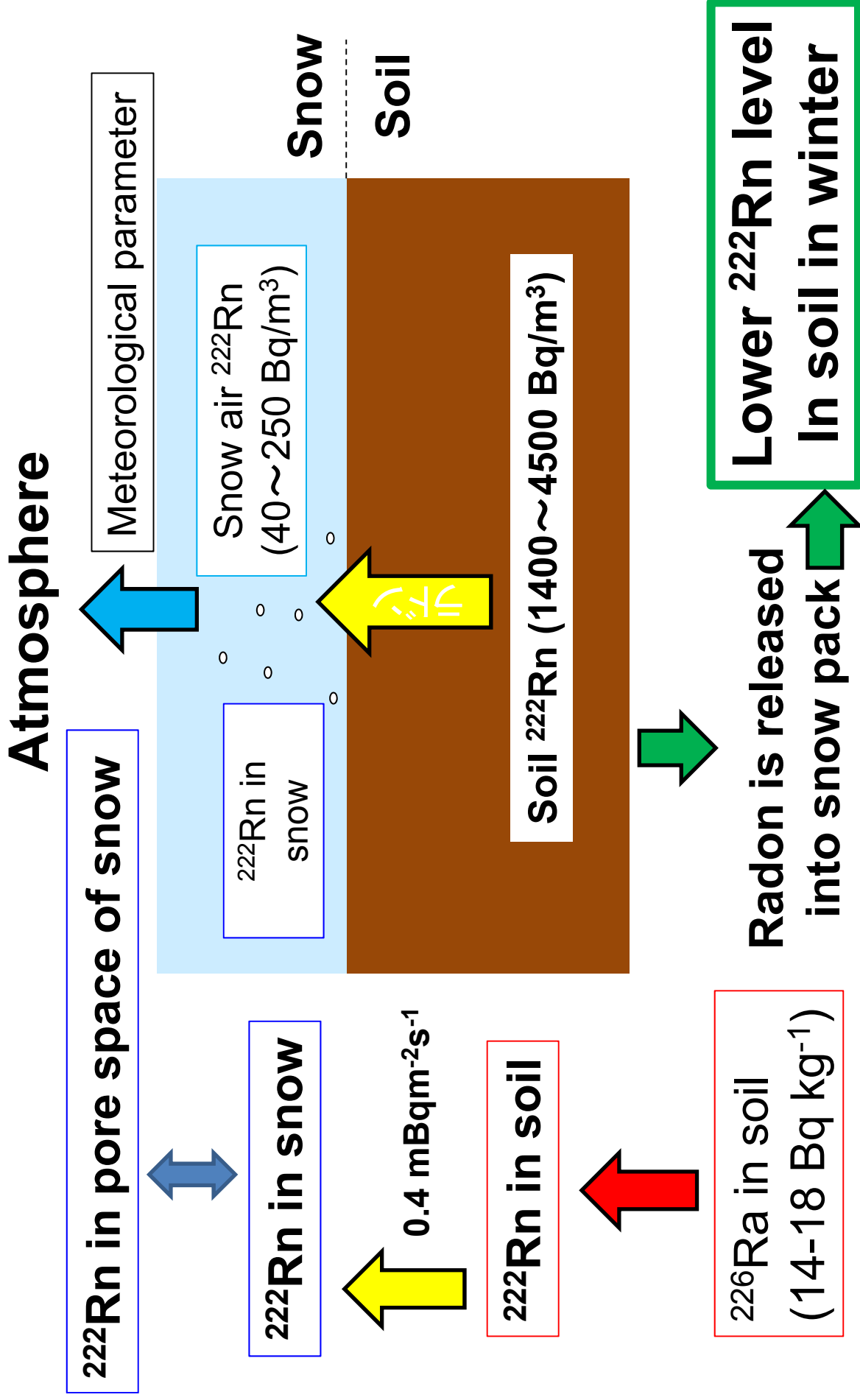
Possible Reasons

1. High ^{222}Rn in soil air
2. Soil ^{222}Rn to Snow
3. Soil ^{222}Rn dissolved into Snow

Dec - Jan 2012



Summary: Behavior of radon in soil in winter



**Thank you for
your attention!**

Ryoko FUJIYOSHI

(We have such a nice nature on the
campus.) Photo by Dr. J. Kaneko

