

# Effect of the overburden on the geoneutrino signal at SNO+

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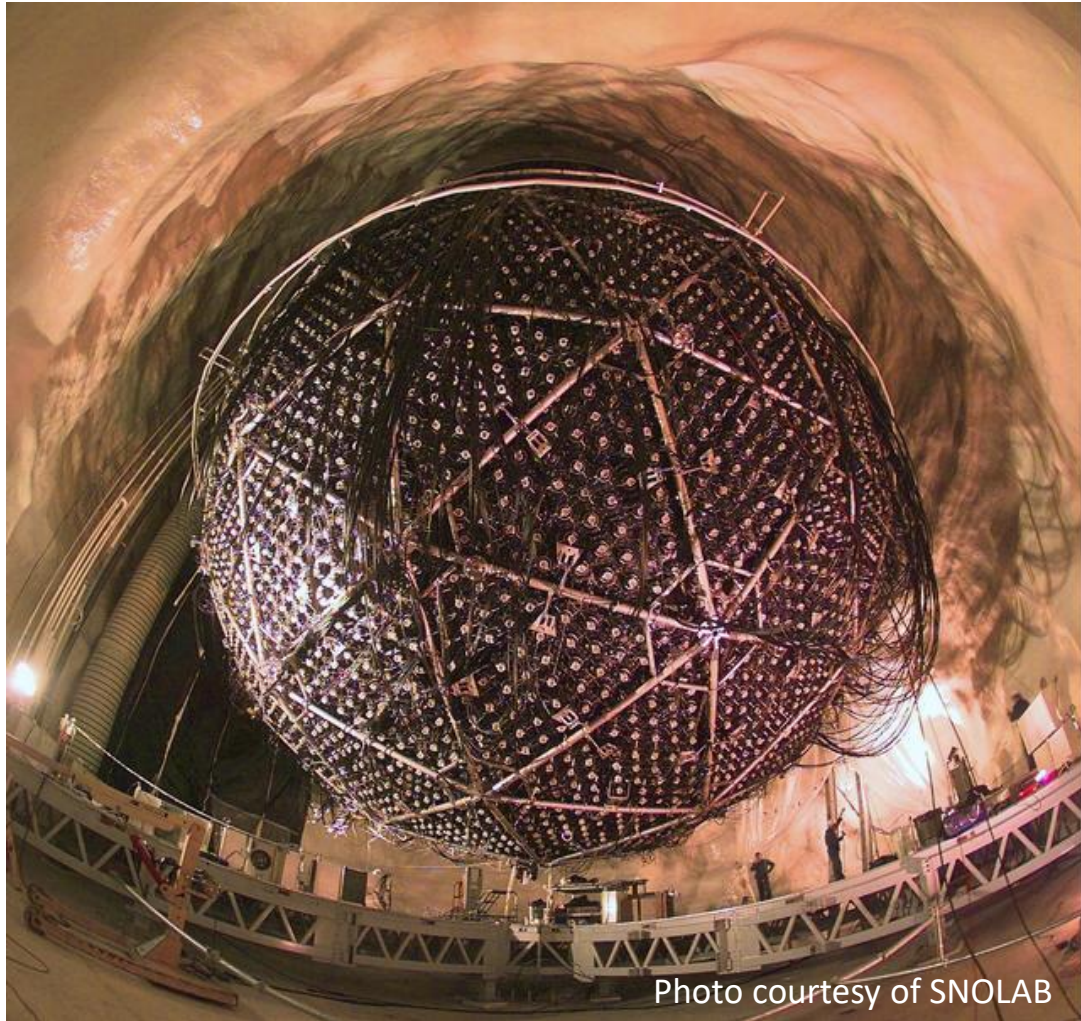


Photo courtesy of SNOLAB

SNO+ is a multipurpose kiloton-scale liquid scintillation detector located at **2092** m underground at SNOLAB, in the heart of Vale's Creighton mine close to Sudbury (Canada).

***How does the in-depth location of the SNO+ detector affect the prediction on the geoneutrino signal?***

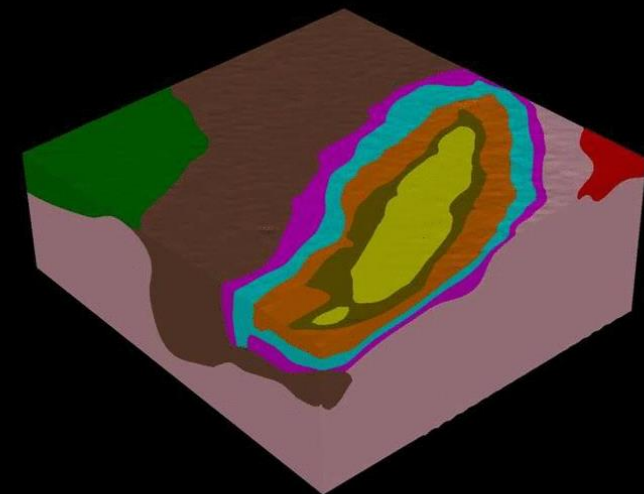
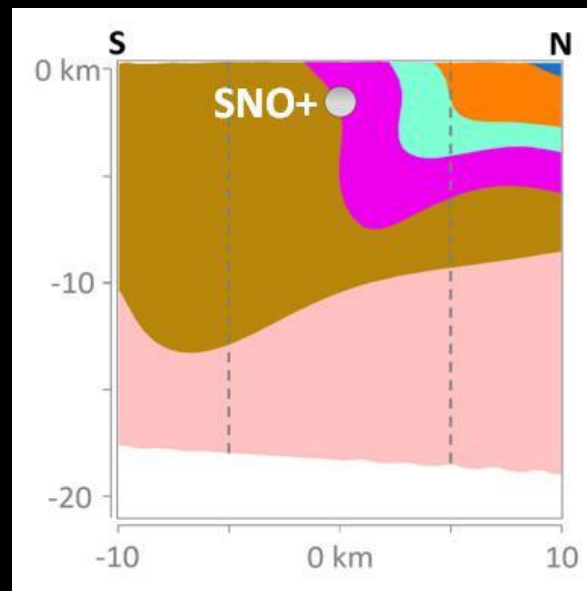
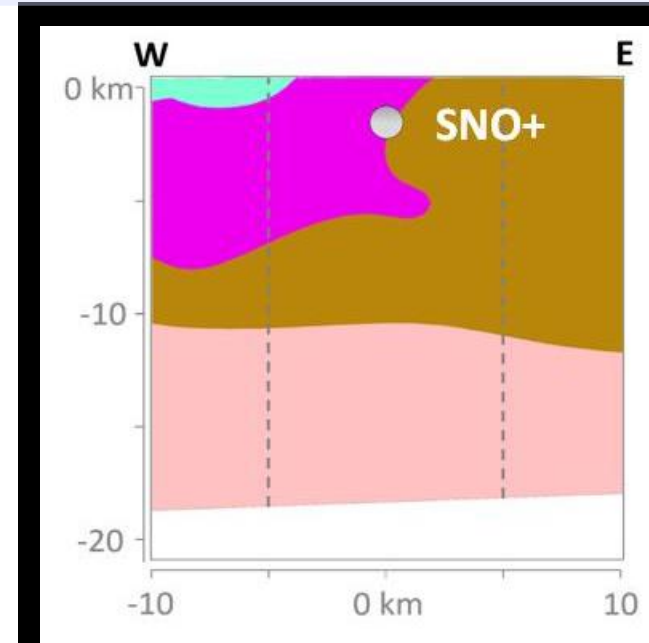
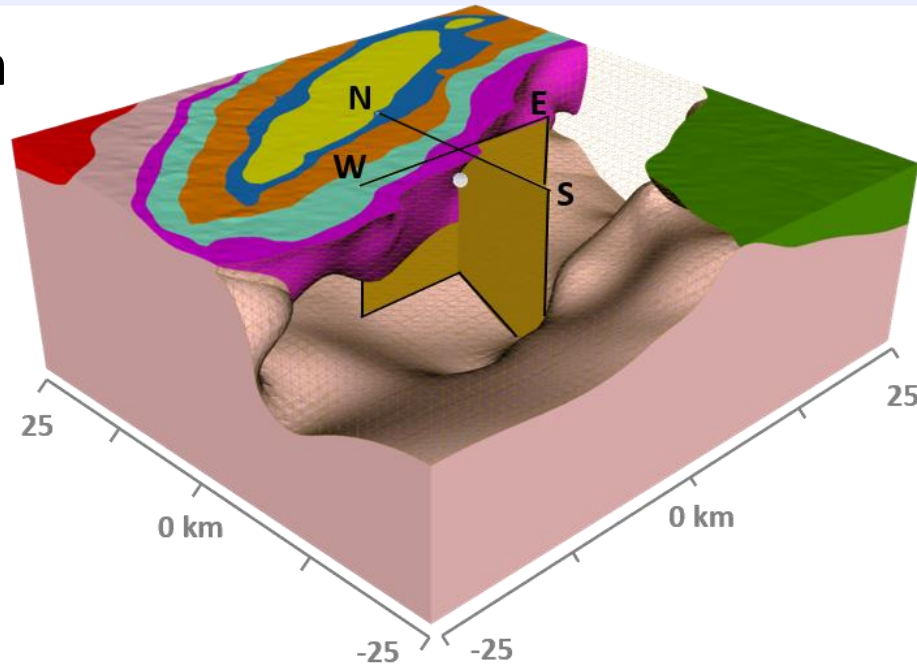
The geometrical effects have to be convolved with signal variations associated to the different geochemical and geophysical features of the surrounding geological units.

# The 3D model of the Close Upper Crust (CUC)

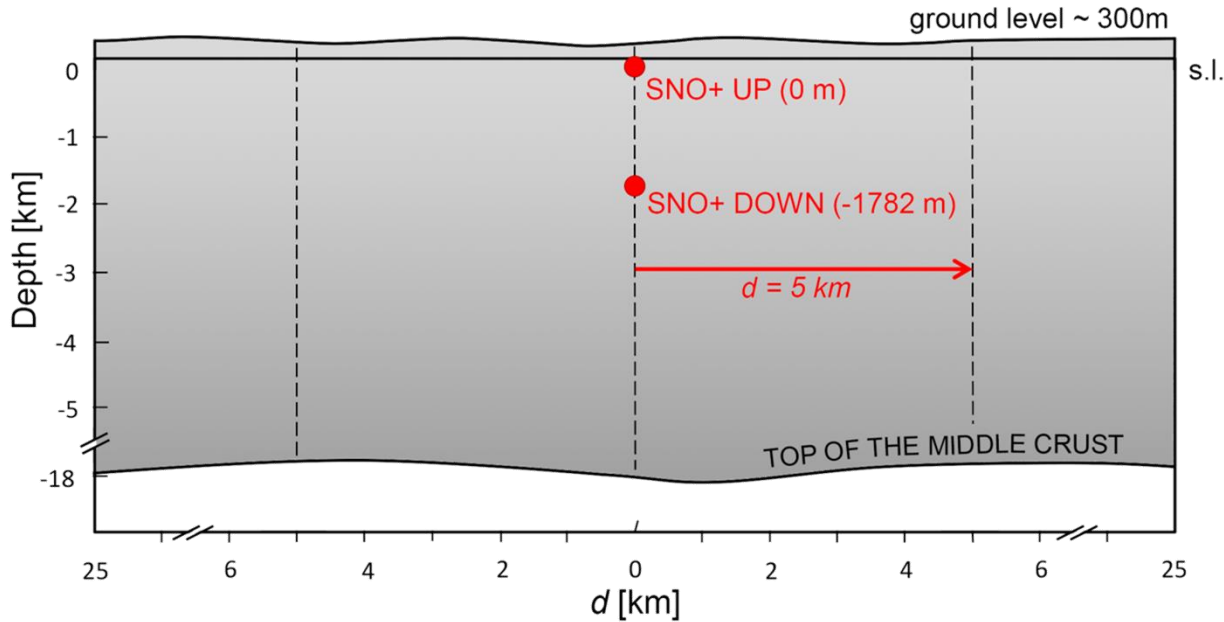
The CUC is the upper crust portion of **50 x 50 km** centered in SNO+ detector and comprises **9 representative aggregate units** of exposed lithologies.

The detector is in the contact zone between **NG (Sudbury, Igneous complex, Norite Gabbro)** and **HI (Huronian Supergroup)** units.

	U ( $\mu\text{g/g}$ )	Th ( $\mu\text{g/g}$ )
<b>NG</b>	$1.2^{+0.6}_{-0.4}$	$5.9^{+2.1}_{-1.6}$
<b>HI</b>	$2.3^{+4.0}_{-1.5}$	$8.0^{+15.3}_{-5.3}$



# The study of the effect of the SNO+ burial



We calculated the expected geoneutrino signal for two positions having depths of 0 m a.s.l. (**SNO+ UP**) and 1782 m b.s.l. (**SNO+ DOWN**, actual location).

✓ For SNO+, the expected signal from the CUC in the “up position” is  $S_{\text{UP}} = 6.3^{+5.6}_{-2.3}$  TNU, in the “down position” is  $S_{\text{DOWN}} = 7.7^{+7.7}_{-3.0}$  TNU

✓ The absolute signal difference estimated on the base of the refined 3D model is of  $1.4^{+1.8}_{-0.9}$  TNU

