

# MINOS Underground Telescope

<http://>

PI:

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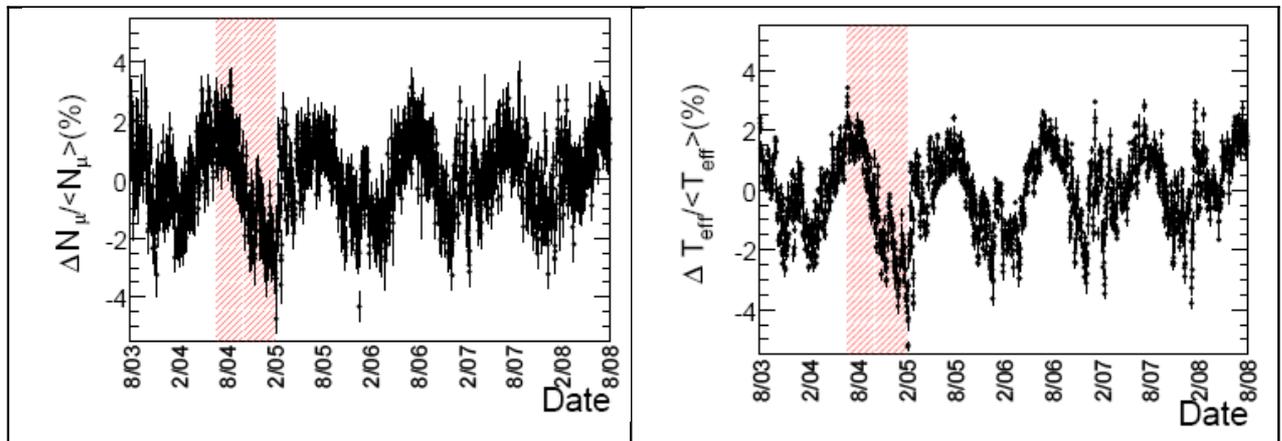
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## *Basic informations MINOS:*

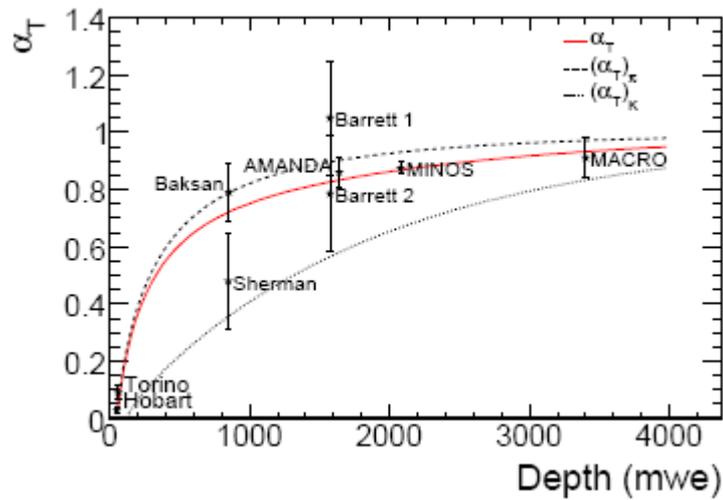
Geographic latitude	<b>0.0° N</b>
Geographic longitude	<b>0.0° W</b>
Altitude	sea level
Standard pressure, mbar [hPa]	
Deep underground	720 m, 2080 mwe
Detector type	scintillator
Площадь детектора, m <sup>2</sup>	
acceptance.	<b>6.91 × 10<sup>6</sup> cm<sup>2</sup>sr</b>
In continuous operation since	<b>Since August 2003</b>
Time resolution	<b>1 hour</b>

A far detector at the Soudan Underground Mine State Park in northern Minnesota. (<http://en.wikipedia.org/wiki/MINOS>) A scintillator and steel tracking calorimeter located 720 m underground (2080mwe, meters water equivalent). It has a 5400 ton mass and a  $6.91 \times 10^6 \text{ cm}^2 \text{ sr}$  acceptance. Because of its depth, MINOS detects cosmicray muons with energy at the surface,  $E > 700 \text{ GeV}$ . These high energy muons are mostly produced from the decays of the mesons produced in the primary hadronic interaction.



The daily deviation from the mean rate of cosmic ray muon (left) and mean effective temperature (right) arrivals from 8/2003-8/2008, shown here with statistical error bars. The periodic fluctuations have the expected maxima in August, minima in February. The hatched region indicates the period of time when the detector ran with the magnetic field reversed from the normal configuration.

Получено, что температурный коэффициент при корреляции наблюдаемых вариаций со среднемассовой температурой равен  $(0.874 \pm 0.009 \text{ stat} \pm 0.010 \text{ syst}) \text{ \%}/^\circ\text{C}$  ( $\rho=0.900$ ).



The theoretical prediction for  $\alpha_T$  as a function of detector depth. The dashed (top) curve is the prediction using the pion-only model (of MACRO) and the dotted (bottom) curve is the prediction using a kaon-only model. The solid (middle) curve is the new prediction including both K and  $\pi$ . These curves are illustrative only as the definition of effective temperature used to calculate the experimental values also depends on the K/ $\pi$  ratio. The data from other experiments are shown for comparison only, and are from Barrett 1, 2 [2], AMANDA [4], MACRO [11], Torino [12], Sherman [15], Hobart [16] and Baksan [17].

**MINOS**

Detector Name	Площадь, м <sup>2</sup>	Count (imp/sec)	Count error (%/hour)	P <sub>m</sub> (GV)	$\beta$ (%/hPa)	Viewing Lat °N lon °E
MINOS		25				