

ATMOSPHERIC EFFECTS ON THE UNDERGROUND MUON INTENSITY

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1. Introduction. We have previously reported that the barometric pressure coefficient observed for muons at Poatina (vertical absorber depth 357 hg cm⁻²) appears to be appreciably higher than would be expected from atmospheric absorption alone, e.g., Lyons et al. (1981). We have explored the possibility that the effect is due to an upper atmospheric temperature effect arising from an inverse correlation of surface pressure with stratospheric temperature, but we have been unable wholly to account for the observations by this means. In paper SH 4.4-4 presented to this Conference we refer to a new proportional telescope which has been operating at Poatina since about the beginning of 1983 and which has a long term stability suitable for studying variations of atmospheric origin.

2. New Results. Data from the proportional counter telescope for February to December 1983 have been analysed to obtain the total barometric coefficient, the result being -0.042 ± 0.004 % mb⁻¹. This is in agreement with the value obtained for the years 1972-76 with the smaller GM counter telescopes, namely -0.047 ± 0.002 % mb⁻¹ (Lyons et al., 1981). These values are to be compared with the coefficient to be expected on the basis of atmospheric absorption, -0.007 % mb⁻¹.

We plan to carry out a more detailed investigation using upper atmospheric data in conjunction with the muon data obtained with the new telescope, taking advantage of its long term stability to compare directly the results obtained in winter and summer, as well as from year to year.

3. Acknowledgements. We wish to thank the Hydro-Electric Commission of Tasmania and its staff for the excellent facilities provided at Poatina. This work is supported in part by the Australian Research Grants Scheme.

Reference.

Lyons, P.R.A., Fenton, A.G. and Fenton, K.B., (1981), 17th ICRC, Paris, Conference Papers 4, 300.