

Geosci. Instrum. Method. Data Syst. Discuss., referee comment RC1
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Comment on gi-2021-9

Anonymous Referee #1

Referee comment on "Accounting for meteorological effects in the detector of the charged component of cosmic rays" by Maxim Philippov et al., Geosci. Instrum. Method. Data Syst. Discuss., <https://doi.org/10.5194/gi-2021-9-RC1>, 2021

The paper by Philippov et al. presents a study of the impact of meteorological conditions on the CARPET detector count rate and methods of its correction. The paper is novel and important and can be recommended for publication after a moderate revision related to some clarifications. Detailed comments are listed below.

One general comment is that the authors perform consequent corrections (first for pressure, then for temperature/height) but this does not guarantee the optimal solution, because they may correlate with each other. A more robust method can be a multi-regression analysis when both meteorological variables (barometric pressure and temperature/height) are considered simultaneously. The authors may want to comment on that.

The grammar should be checked as the paper contains some small grammatical and linguistic errors.

Other comments:

- Line 14: check coordinates: Moscow is in the northern and eastern hemispheres.
- Line 16: "temperature coefficients" -> "temperature correction coefficients".
- Line 18: please define what is the "upper air". Normally, the stratosphere is not considered as the upper atmosphere.
- Line 33-34: should "any of" be replaced by "both", since it is about coincidence?
- Lines 46 and 48: please check the coordinates, the hemispheres are wrong.
- Line 56: what is meant by the "nuclear-active" particles?
- Line 57-58: the second part of the sentence "therefore, it is necessary" is not logically connected to the first part. Please revise.
- (1). A standard way of barometric correction is via an exponential formula, not linear.

The latter is an approximation working only in a narrow range of pressure changes. Please explain that the linear relationship is sufficient.

- Line 70: is CARPET-MOSCOW the same as Dolgoprudny?
- Line 74: why was only one month chosen for the analysis? Was the temperature stable?
- Line 79: How exactly were the NM data used?
- Line 83: Fig.3 contains no "upper horizontal time series" whatever it could be.
- Line 88: what is $\beta_{\sigma p}$? Is it the same as β in line 75?
- Line 95-98: the positive and negative effects need to be explained in more detail as a reader may not be familiar with that.
- 3: the ΔH -effect is also usually modeled by an exponential relationship.
- Line 156: what is the "temperature coefficient density"? The density of what?
- 4: panels d and e, representing different correction methods, are significantly different from each other, suggesting that the correction methods do not agree. The authors should comment on that and propose a preferred method.
- Table 1: what is the last column (n)?