UV background measured by Universitetsky-Tatiana satellite

We analyse data from ultraviolet (UV) detector on board the Universitetsky-Tatiana satellite [1][2] [3][4] measured in period from January 2005 to March 2007. To estimate JEM-EUSO detector duty cycle, we select from Tatiana measurements data on the night side i.e. where Sun zenith angle was higher than 108°. Because Tatiana satellite was flying on polar orbit and JEM-EUSO will be located at ISS, correction to ISS trajectory was applied. UV measurements of Tatiana satellite did not cover uniformly all Moon phases and moon zenith angles. This effect was also corrected. However we should admit that correction to ISS trajectory, moon phase and zenith angle uniform distribution in data were not change background result significantly.
Figure X. show UV light intensity distribution in Tatiana measurements in the backgroud units 500 ph/(m^2 ns sr).

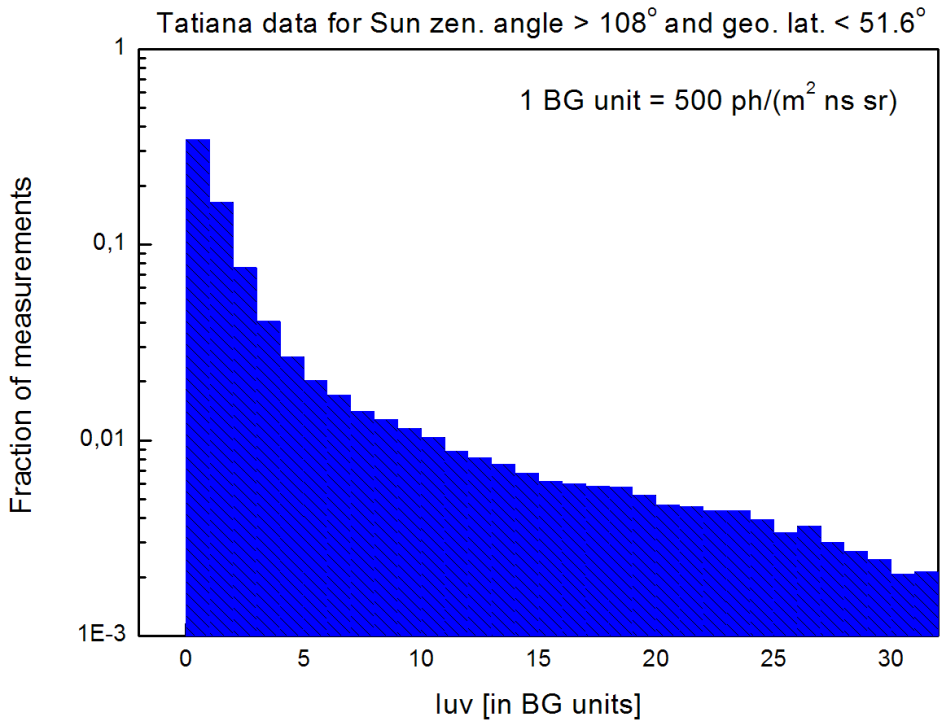

Figure X. Fraction of UV light intensities (300 - 400 nm) from Tatiana measurements with S_{ZA} > 108° and geographical latitude < 51.6°.

We estimate a JEM-EUSO duty cycle as measurements whose will be realized in time when UV background will be less than 3xBG (i.e. less than 1500 ph/(m^2 ns sr)). As show table X. this correspond to 55.6% of Tatiana measurements in time when Sun zenith angle was greater than 108° and geo. latitude was less than 51.6°. This leads to estimation of duty cycle as 20.98% of time at ISS orbit. Average UV light intensity during period with the UV intensity less than 3xBG was 521.27 ph/(m^2 ns sr).

Table X.

BG in 500 ph/(m^2 s sr) less than BG x	Fraction of measurements on orbit with S_{ZA}>108°[%]	Sum [%]
BG x 1	34.4205	34.4205
BG x 2	16.5006	50.9211
BG x 3	7.6335	58.5546
BG x 4	4.0558	62.6104
BG x 5	2.6692	65.2797

BG x 6	2.0302	67.3099
BG x 7	1.7067	69.0166
BG x 8	1.3996	70.4161
BG x 9	1.2782	71.6943
BG x10	1.1520	72.8463

Citation

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