Only a few minerals in meteorites (mainly phosphates) contain small amount of uranium; the fact that ^{238}U undergoes fission with fission-decay constant $\lambda_f \sim 8.2\mathrm{x}10^{-17}$ yr^{-1} allows one to use this isotope as a chronometer. By measuring the U concentration in the crystals (by reactor irradiation) and the density of the spontaneous-fission tracks it is relatively easy to calculate the "fission-track age" if ^{238}U is the main source of fission tracks.

However the fission-track dating of extraterrestrial samples compared with the terrestrial ones has some peculiar features due to presence of a number of other potential track sources except the spontaneous fission of ^{238}U, such as the spontaneous fission of presently extinct ^{244}Pu, heavy nuclei of cosmic rays and induced fission by cosmic ray primaries. Only tracks from the spontaneous fission of U and Pu are suitable for fission-track dating. The competing effects of these fissioning elements, whose half-lives differ by a factor of ~50, form a basis for a fission-track chronology for samples older than ~ 4.0 Gyr. Over small intervals in time (~ few x10^8 yr) the track density from spontaneous fission of ^{238}U is nearly constant. However, the contribution from ^{244}Pu doubles every 82 Myr providing a very sensitive measure of the age of a studied sample.

The results of the determination of the fission-track age of the Marjalahti pallasite (stony-iron meteorite) are presented.

Thorough examination of fossil tracks in the phosphate (whitlockite) crystals coupled with U content determination in whitlockites allowed us to estimate the contributions of all possible track sources to the total track density and to calculate a value of the model fission-track age. It was found out that whitlockite crystals of the Marjalahti pallasite contain fossil tracks due to galactic cosmic rays (VH, VVH nuclei); induced fission of U and Th by cosmic rays; spontaneous fission of ^{238}U; spontaneous fission of extinct short-lived ^{244}Pu nuclei presented in significant quantities in the early solar system. The initial ratio $(^{244}\mathrm{Pu}/^{238}\mathrm{U})_0$ at the time of the pallasite parent body formation (taken as 4.6x10^9 yr) was estimated as 0.015. A great track density attributed to the extinct ^{244}Pu testified to the high value of the fission-track age. The model fission-track ages of (4.37±0.02)x10^9 yr for the Marjalahti pallasite was calculated.

The comparison of the represented data with petrographic analyses allowed us to interpret a value of the fission-track age as the time of the last intensive shock/thermal event in the cosmic history of the pallasite.

UZ0603009

FALLOUTS VARIATIONS OF COSMOGENIC ^{7}Be, PRECIPITATION AND SOLAR ACTIVITY (2004-2005, SAMARKAND)

Kungurov F.R.[1], Muminov A.T.[2], Muminov I.T.[2], Safarov A.N.[1]
[1]*State University, Samarkand, Uzbekistan*
[2]*Research Institute of Applied Physics, Tashkent, Uzbekistan*

Monthly values of A_i – activity of ^{7}Be in atmospheric fallouts in 2004-2005 in Samarkand (research was done with method [1]) with corresponding data on P_i – quantity of precipitation [2], S_i – visual indices of solar activity of small symmetric semishadow class [3], average values $q_i=(S_{i-1}+S_i)/2$, S_iP_i and q_iP_i (standardized values of $A'_i=A_i/54$ Bk/m^2 and $P'_i=P_i/44{,}5$ mm are used) – figure 1, are compared in this work.

Consideration of these dependencies (figure 1 and tables 1 and 2) shows: A_i is minimal when P_i=0 and are maximal when P_i and q_i are maximal, but for intermediate values of A_i straight dependence from P_i and q_i is broken in many cases, - A_i variations character are better reproduced by S_iP_i and q_iS_i values.

Conducted analysis allows to conclude:

- A_i variations character is most satisfactorily described by multiplication of qP,
- For satisfactory quantitative description of A_i variations necessary, besides S and P values, to consider factors, connected with different processes taken place in atmosphere.

Table 1. Values of A'_i, P'_i, S_i, $S_iP'_i$, and q_iP_i in 2004 and 2005

Year	2004						2005					
Months	A'_i	P'	S	SP'	q	qP'	A'_i	P'	S	SP'	q	qP'
1	1.92	1.91	0.67	1.28	1.33	2.54	2.25	0.94	0.92	0.86	0.67	0.63
2	1.08	0.37	1.07	0.40	0.87	0.32	0.79	0.56	0.59	0.33	0.79	0.44
3	2.13	2.44	0.78	1.90	0.92	2.24	1.83	1.45	0.13	0.19	0.36	0.52
4	1.71	1.13	0.91	1.03	0.85	0.96	1.54	0.42	0.95	0.40	0.54	0.23
5	2.46	0.97	1.19	1.15	1.05	1.02	3.83	0.72	0.19	0.14	0.57	0.41
6	0.46		0.72		0.96		0.71	0.19	0.00		0.10	0.02
7	1.79	0.30	0.54	0.16	0.63	0.19			0.79		0.40	
8	0.58		0.78		0.66		1.83	0.35	0.35	0.12	0.57	0.20
9	0.46		0.55		0.66				0.31		0.33	
10	1.54	0.48	1.00	0.48	0.77	0.37	0.71	0.11	0.10	0.01	0.20	0.02
11	5.42	2.66	2.00	5.32	1.50	4.00	1.38	0.74	0.17	0.13	0.14	0.10
12	2.50	1.82	0.43	0.78	1.22	2.22	2.00	0.41	0.36	0.15	0.26	0.11

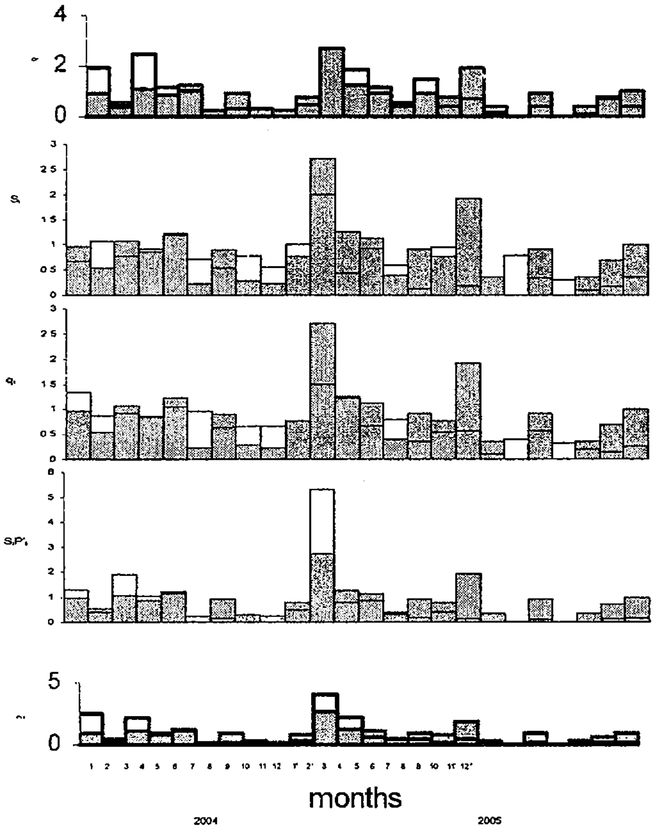

Fig. 1. Comparison of values of $A'_i/2$ (shadowed) with P'_i, S_iq_i, $S_iP'_i$, $q_iP'_i$ (light) in 2004 (1,2,..., 12) and 2005 (1', 2', ..., 12')

Table 2. P'/A', S/A', q/A', SP' and qP' ratios in 2004 and 2005

Year	2004					2005				
Month	P'_i/A'	S/A'	q/A'	SP'/A'	qP'/A'	P'_i/A'	S/A'	q/A'	SP'/A'	qP'/A'
1	1.00	0.35	0.69	0.67	1.32	0.42	0.41	0.30	0.38	0.28
2	0.34	1.00	0.81	0.37	0.30	0.71	0.75	1.00	0.42	0.56
3	1.15	0.37	0.43	0.89	1.05	0.79	0.07	0.20	0.10	0.28
4	0.66	0.53	0.50	0.60	0.56	0.27	0.62	0.35	0.26	0.15
5	0.39	0.48	0.43	0.47	0.41	0.19	0.05	0.15	0.04	0.11
6		1.56	2.09			0.27		0.14		0.02
7	0.17	0.30	0.33	0.09	0.11					
8		1.34	1.14			0.19	0.19	0.31	0.07	0.11
9		1.20	1.43							
10	0.31	0.65	0.50	0.31	0.24	0.15	0.14	0.30	0.01	0.03
11	0.49	0.37	0.28	0.98	0.73	0.54	0.12	0.10	0.10	0.07
12	0.73	0.17	0.48	0.31	0.89	0.21	0.18	0.13	0.07	0.06
Avg	0.44	0.69	0.76	0.39	0.47	0.31	0.21	0.25	0.12	0.14

References:

1. Kungurov F.R., Muminov A.T., Muminov I.T., Muhamedov A.K., Safarov A.N. Scintillation γ-spectrometrical method of atmospheric fallouts of ^{7}Be activity determination. The third Eurasian conference. Nuclear science and its application. Book of abstract, Tashkent, 2004, p. 183-184.
2. Data of hydrometeorological department of Samarkand.
3. http://www.alexeyryback.ru/index.htm.

STRUCTURE OF ANGULAR DISTRUBUTION OF ELECTRON BREMSSTRAHLUNG BEAM FORMED BY SLIT COLLIMATOR

Aliev M.K.[1], Alimov G.R.[1], Kumakhov M.A.[2], Muminov A.T.[1], Norboev K.N.[3], Osmanov B.S.[3], Salikhbaev U.S.[4], Safarov A.N.[3], Skvortsov V.V.[1], Suleymanov R.D.[3], Yuldashev B.S.[4]

[1]*Research Institute of Applied Physics, Tashkent, Uzbekistan*
[2]*Institute of Roentgen Optics, Moscow, Russia*
[3]*State University, Samarkand, Uzbekistan*
[4]*Institute of Nuclear Physics, Tashkent, Uzbekistan*

The total external reflection (TER) effect for X-rays was experimentally discovered by Compton in 1922 [1]. This phenomenon is observed at the incidence of X-rays on the boundary between two media at the angles which are smaller than the critical. The latter is given by the following formula:

$$\theta_{кр} = eh\left(ZN_A\rho / Am_e\varepsilon_0\right)^{1/2} / 2\pi E_x \qquad (1)$$