SIMULATION OF SOLAR NEUTRON FLUX IN THE EARTH'S ATMOSPHERE

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We performed simulations of the solar neutron fluxes in the atmosphere of the Earth, associated with the X17 flare from September 07, 2005, and with the X1.3 and M3.9 flares from September 07, 2017. The input of the simulations was calculated on the basis of n_s signals, detected on ground level by the SNT-SN, and by the FIB scintillator of the Space Environment Data Acquisition-Attached Payload (FIB SEDA-AP) on board of the International Space Station (ISS). Since n_s can produce Extensive Air Showers (EAS) in the Earth's atmosphere, we used the CORSIKA code and FLUKA subroutines to simulate the particle fluxes, associated with the X17, X1.3 and M3.9 flares. We studied the average longitudinal variations of particle fluxes and energies through the atmosphere. Then, our analysis of the percentage of interactions and multiplicities as a function of particle energies, suggested that 11-14% of the n_s, released by the X17 flare, could overcome atmospheric attenuation and propagate from top of the atmosphere to the STN-SN (4500 m a.s.l.), without starting an EAS. On the other hand, n_s associated with the X1.3 and M3.9, were lost by atmospheric attenuation and production of new particles, therefore, they were not detected at ground level by the SNT-SN.