ATMOSPHERIC ELECTRIC FIELD EFFECT IN DIFFERENT NEUTRON

MULTIPLICITIES ACCORDING TO EMILIO SEGRE' OBSERVATORY ONE MINUTE DATA

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On the basis of cosmic ray and atmospheric electric field one minute data obtained by NM and EFS of Emilio Segre' Observatory (hight 2025 m above s.l., cut-off rigidity for vertical direction 10.8 GV) we determine the atmospheric electric field effect in CR for total neutron intensity and for multiplicities m?1, m?2, m?3, m?4, m?5, m?6, m?7, and m?8, as well as for m=1, m=2, m=3, m=4, m=5, m=6, and m=7. For comparison and excluding primary CR variations we use also one minute data on neutron multiplicities obtained by NM of University "Roma Tre" (about sea level, cut-off rigidity 6.7 GV). In February 2000 were observed 14 periods of thunderstorms with different durations (up to about 1000 min), the maximum strength of electric field was 110 kV/m. Thunderstorms were observed also in March 2000 (6 periods with maximal field 112 kV/m), in April 2000 (9; 70 kV/m), in May 2000 (4; 10 kV/m), in October 2000 (10; 70 kV/m), in November 2000 (5; 50 kV/m), in December 2000 (7; 88 kV/m), in January 2001 (12; 62 kV/m), in February 2001 (10; 88 kV/m). According to the theoretical calculations of Dorman and Dorman (1995) the electric field effect in the NM counting rate must be caused mainly by captchuring of slow negative muons by lead nucleus with escaping few neutrons. As it was shown in Dorman et al. (1999), the biggest electric field effect is expected in the multiplicity m=1, much smaller in m=2 and negligible effect is expected in higher multiplicities. We will control this conclusion on the basis of our experimental data. Obtained results give a possibility to estimate total acceleration and deceleration of CR particles by the atmospheric electric field.

REFERENCES

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