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The Depth of Maximum Shower Development and Its Fluctuations: Cosmic Ray Mass Composition at $E_0 \geq 10^{17}$ eV

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We present a new data on Cherenkov light observations obtained during 1994-2009 period, after a modernization of the Yakutsk EAS array. A complex analysis of x_{\max} and its fluctuations $\sigma(x_{\max})$ was performed in a wide energy range. With the new data, according to QGSJet II model, an estimation was made of cosmic rays mass composition for $E_0 \sim 10^{17} - 3 \times 10^{19}$ eV. The result points towards a mixed composition with a large portion of heavy nuclei at $E_0 \sim 10^{17}$ eV and the dominance of light nuclei at $E_0 \sim 10^{19}$ eV. The analysis of $\sigma(x_{\max})$ energy dependence for the same energies qualitatively confirms this result. A shape of x_{\max} distribution at fixed energy 1018 eV is analysed to make more precise conclusion on cosmic ray mass composition.

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