

Properties of filaments in solar activity cycles N 15-24

Kseniia Tlatova, Valeriya Vasil'eva, Andrey Tlatov

Abstract

The series of solar filaments characteristics is represented. This series is obtained by processing of daily observations in the H-alpha line according to the Kodaikanal observatory in Kodaikanal (India, 1912-2002). The series is complemented by database of filaments properties according to Kislovodsk for the period 1959-2016, Sacramento Peak (USA, 1962-2002) and Meudon (France, 1982-2015). These data are unique because they trace the polarity inversion line which helps to identify the large-scale organization of the solar magnetic field. To select solar filaments boundaries, we have developed methods based on automatic allocation procedures of low-contrast objects on the solar disk, and methods of editing the selected structures in semi-automatic mode. More than 24 thousand photographic plates were processed in total for Kodaikanal with more than 326 thousand filaments being allocated.

Comparative analysis of solar filaments characteristics in 15-24 cycles of activity was carried out. The connection of solar filaments indices and long-term parameters of space weather is considered.