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The topological model for the large-scale dynamic changes of magnetic field in large solar flares

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Large solar flares strongly influence interplanetary and terrestrial space by virtue of hard electromagnetic radiation, high-energy particles, shock waves and fast flows of plasma with magnetic field. A large flare is complex phenomenon in the solar atmosphere with many manifestations. Fortunately, when we can neglect fine structure and small-scale rapid processes (this is not the case of small flares), we can develop a model based on the topological properties of the large-scale magnetic field in an active region. Such topological model (Somov B.V., Cosmic Plasma Physics, Kluwer Academic Publ., Dordrecht, 2000) concentrates on the general evolution of the global structure of a flare. The model allows us to consider the large-scale magnetic restructuring and dynamic processes in the solar atmosphere. We calculate the position and shape of two chromospheric ribbons and the brightest kernels of HXR emission on the ribbons. The results demonstrate convincingly that the observed large-scale dynamics of some flares observed by RHESSI is determined by fast magnetic reconnection at separators in the corona.