MULTIWAVE RATAN-600 OBSERVATIONS OF POST-ERUPTIVE PROCESSES ON THE SUN

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During two last decades, authors of some studies of post-eruptive arcades repeatedly came to the following unexpected conclusions. Microwave emission of arcades was excessively polarized, presumably due to contribution of non-thermal electrons. Their lifetime was much longer than the estimated cooling times, presumably due to the post-eruptive energy release. Finally, the plasma pressure exceeded the magnetic pressure ($\beta \geq 1$) in their hot top parts. CORONAS-F/SPIRIT observations in the high-temperature ($\sim$10 MK) line MgXII and multi-wave RATAN-600 observations along with data from other spectral domains provided important information to verify these conclusions and assumptions. All above facts were confirmed in analyses of this data set. They were explained in terms of the standard flare model ("CSHKP") elaborated by Yokoyama & Shibata (1998) to qualitative account for the chromospheric evaporation, but applied to late post-eruptive phase. In this case, high β conditions indicate magnetic reconnection processes responsible for the prolonged heating and particle acceleration. This approach allows to reconcile the listed facts with known estimates of parameters of the coronal plasma in post-eruptive arcades, and to remove seeming contradictions with habitual conceptions. We consider long-lived post-eruptive arcades observed on 22 October 2001, 2 November 1992, and 28–30 December 2001 and demonstrate that these conclusions are valid, because high-density hot regions in their top parts (thus, high β regions) existed for a long time, and their radio emission contained non-thermal component, which is indicative of the presence of accelerated particles.

References

Yokoyama T., Shibata K.: 1998, *ApJ*, **494**, L113.