Metric radio bursts and fine structures observed on 20 January, 2005

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Abstract. A major radio event, associated with an X7.1/2B flare in AR720 and a fast CME, was observed on January 20, 2005 with the radio–spectrograph ARTEMIS–IV; it was particularly intense and with a complex radio signature with rich fine structure which was recorded in the 270–420 MHz range at high resolution (100 samples/sec). The fine structure is compared with similar results in the decimetric and microwave frequency range. It was found to match, almost, the comprehensive Ondřejov Classification in the spectral range 0.8-2 GHz.

Data Analysis & Results

In our dynamic spectra, obtained with the by the SAO receiver of the ARTEMIS–IV (Caroubalos & al. 2001; Kontogorgos & al. 2006, 2008), the continuum background was removed by means of high-pass filtering on the dynamic spectra (differential spectra in this case). The morphological characteristics of fine structure elements embedded in the metric continuum almost, match the comprehensive Ondrejov Catalogue (Jiříčka & al. 2001) in the 0.8-2 GHz range. The high resolution (100 samples/s) SAO recordings permitted the recognition and classification of the type III(U) and III(J) subcategory of the narrowband type III bursts in the metric frequency range; similar structures have been reported in the microwaves (Fu & al. 2004).

Our observations of fine structures are, briefly, presented in the following subsections; they match, almost, similar results in the decimetric and microwave frequency range (Jiříčka & al. 2001, 2002; Fu & al 2004; Mészárossová & al. 2005).

Broadband Pulsations, Fibers & zebra structures The pulsations last for hours and form the background of the dynamic spectra as the type IV continuum has been supressed (cf. figure 11 (a) & (b)); they are, for most of the same period, associated with fibers. The associated zebra structures cover almost the entire pulsation–fiber period.
The narrowband activity (figure 1(a)–(g)) included Spikes, Narrow Band Type III (and U) bursts as well as Dot Patches (first reported by Magdalenic & al. 2006, as Super Short Structures). In figures 1(a) & (b) a group of slowly & fast drifting narrow band structures outline a Lace Burst (cf. Karlický & al. 2001).

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