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Latitudinal beaming of Jupiter's decametric and hectometeric radiation from the Juno Waves investigation

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The first detection of Jupiter's auroral radio emissions from a terrestrial observer in 1955 revealed the existence of magnetic fields at a planet other than Earth. These non-thermal radio sources are located along auroral magnetic field lines at emission frequencies very close to the local gyrofrequencies via the electron cyclotron maser instability. Since their discovery, long-term monitoring from Earth-based radio observatories and near-equatorial spacecraft have improved our knowledge of the low-frequency radio emissions including hectometric (HOM) and decametric (DAM) radio components. Yet these observations were unable to provide information on the latitudinal distribution of the radio emissions. Since 5 July 2016, the Juno spacecraft has toured Jupiter as its first polar explorer in a 53-day eccentric orbit. During each perijove pass, Juno has collected auroral radio data from 50 Hz to 41 MHz using the radio and plasma wave instrument (Waves). Using the Waves data from the first three orbits of Juno, the initial study shows a J-shaped occurrence probability within the non-Io-related DAM (non-Io-DAM) emissions at 16.5 and 19.5 MHz over a broad latitude range. We extended this analysis by incorporating more data to characterize the latitudinal beaming of Jovian HOM and DAM emissions. We found the complex frequency-dependent structures for both HOM and DAM emissions. The main HOM radio beaming tends to dominate over several degrees around the magnetic equator, while the beaming of non-Io-DAM seems to be isolated as a function of System III central meridian longitude and Jovicentric (or Jovimagnetic) latitude. In this presentation, we show the details of the statistical characteristics of Jovian HOM and DAM radio beaming using the Juno Waves data.