



A decimetric radio source 500" away from a flaring site: Possible scenarios from GMRT solar radio observations

S. K. Bisoi^{*(1)}, H. S. Sawant⁽²⁾, P. Janardhan⁽³⁾, Y. Yan⁽¹⁾, L. Chen⁽¹⁾, and A. K. Awasthi⁽³⁾

(1) National Astronomical Observatories, Chinese Academy of Sciences, Beijing 100012, China; e-mail: susanta@nao.cas.cn; yyh@nao.cas.cn; ljchen@nao.cas.cn

(2) INPE – National Institute for Space Research, Sao Jose dos campos, SP, Brazil; e-mail: hssawant@gmail.com

(3) Astronomy & Astrophysics Division, Physical Research Laboratory, Ahmedabad 380009, India; e-mail: jerry@prl.res.in

(4) University of Science and Technology of China, Hefei 230026, China; e-mail: arun@ustc.edu.cn

The radio emission far away from a flaring site are usually observed in solar radio images at metric wavelengths. However, it is not commonly observed at decimetric wavelengths. Here we present observations of an unusual decimetric source emission located 500 arcsec away from a flaring site using the first high time cadence (0.5 s) Giant Meterwave Radio Telescope (GMRT) solar radio images at 610 MHz associated with a GOES C1.4 class solar flare that erupted on 2015 June 20. The decimetric radio sources don't have any corresponding coronal or magnetic features nearby. In addition, we also present high time cadence solar images from GMRT associated with a GOES M1.0 class solar flare and a coronal mass ejection (CME) that erupted after GOES C1.4 flare on 20 June 2015, which show decimetric radio sources rather located near the flaring site. Also, observed are type-III burst activity by the Solar Broadband Radio Spectrometer at Yunnan Astronomical Observatory coinciding with the decimetric burst activity that observed by GMRT. Based on a multi-wavelength analysis and potential field source surface extrapolation, we suggest that the source electrons of the decimetric radio source and type III bursts were originated from a common electron acceleration site located near the flaring site. Also, we show that the distant decimetric radio source is actually the apparent radio source, that results due to the wave-ducting effect, wherein the ducting of radio waves produced lower in the corona leads to the displacement of true radio source emission.