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Jovian active longitude derived from CML-Io phase diagram

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Recent investigations by Galopeau *et al.* (*J. Geophys. Res.* 112, 2007) have shown that some specific Jovian 'active' longitudes favour the Io-controlled Jovian decameter radiation by considering that the emissions are produced near the local gyrofrequency by the cyclotron maser instability (CMI), along an active magnetic field line carried away by Io along its revolution around Jupiter, within a hollow cone of constant angle θ. The active field line is supposed to present a lead angle δ relatively to Io's position. This model can explain why the occurrence probability of the radio emission is larger in some specific regions of the central meridian longitude (CML)-Io phase diagram: the so-called Io-A, Io-B, Io-C and Io-D 'sources'. Long term observations allow us to define four boxes representing the typical Io-controlled source regions. The precise location of these four boxes strongly constrains the range of possible active longitude for both northern and southern radio emissions. Our model also allows us to derive the half-angle θ of the hollow cone describing the emission beaming. We analyse the effect of the emission frequency and the value of the lead angle δ on the active longitude range and emission angle θ. Our study shows that a common active longitude can only explain part of the emissions coming from restricted zones of the CML-Io phase diagram. It is particularly clear for the Io-D source.