The X/Ka 2023b Celestial Frame

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Abstract

The X/Ka-band (8.4/32 GHz) Celestial Reference Frame became one component of the ICRF-3 in 2018. In the five years since, the X/Ka data set has increased by about a factor of two as well as adding the much needed north-south geometry from Japan to Australia. The latest solutions have median formal precisions of ˜40 μas in α cosδ and ˜65 μas in δ. The large spherical harmonics distortions seen in the ICRF3-XKa are greatly reduced with the Z-dipole term reduced from 314 μas to statistical insignificance and with the quadrupole 2,0 magnetic term reduced to $\sim$100 μas. Noting that the X/Ka frame is derived from a limited geometry of only five observing sites, we discuss the susceptibility of this frame to geometric distortion. Finally, we discuss the prospects for future improvements.

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