Abstract

This Technical Note describes the generation by an international team of the second realization of the International Celestial Reference Frame (ICRF2) at radio wavelengths using nearly 30 years of Very Long Baseline Interferometry (VLBI) observations. ICRF2 contains precise positions of 3414 compact radio astronomical sources, more than five times the number as in the first ICRF, hereafter ICRF1. Further, the ICRF2 is found to have a noise floor of only ≈ 40 μas, some $5-6$ times better than ICRF1, and an axis stability of ≈ 10 μas, nearly twice as stable as ICRF1. Alignment of ICRF2 with the International Celestial Reference System (ICRS) was made using 138 stable sources common to both ICRF2 and ICRF1-Ext2. Future maintenance of ICRF2 will be made using a set of 295 new "defining" sources selected on the basis of positional stability and the lack of extensive intrinsic source structure. The stability of these 295 defining sources, and their more uniform sky distribution eliminates the two largest weaknesses of ICRF1.