



Ray-traced delays for the ICRF3

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The current realisation of the International Celestial Reference System (ICRS), the ICRF2, uses VLBI data from 1979 until March 2009. Since then the data set has grown and the distribution of stations around the globe has changed (more southern stations, e.g. the Austral network). The new data reveals a systematic bias in declination between the old ICRF2 solution and the new ICRF3 prototype solutions. We investigate the influence of different troposphere modelling approaches on this bias with the Vienna VLBI Software (VieVS). In particular, we examine the effect of using a priori ray-traced delays, which have been derived from re-analysis and operational data of the European Centre for Medium-range Weather Forecasts (ECMWF) with a spatial resolution of one degree and a temporal resolution of six hours. For example, we find a systematic effect in declination at the 100 μ s level when using ray-traced delays instead of the standard approach with the estimation of gradients. Furthermore, we discuss other modelling approaches and their effects on the ICRF3, like downweighting low elevation observations or the applications of constraints on gradients.