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Estimation of VGOS Station Coordinates

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With the number of available VGOS (VLBI Global Observing System) sessions rising, precise coordinates for the participating stations become more important. While station coordinates can be estimated during the VLBI (Very Long Baseline Interferometry) analysis, the definition of the geodetic datum via Not-Net-Rotation (NNR) and No-Net-Translation (NNT) conditions requires at least three participating stations with precise a priori coordinates. The VGOS station network is currently independent of the International Terrestrial Reference Frame (ITRF), as none of the stations have participated in a solution for the ITRF in VGOS mode. By estimating the VGOS station coordinates based on ITRF coordinates, originating from local surveying and solutions of S/X observations by now converted stations, a link to the ITRF can be established. First a global solution, which is the combination of individual sessions on the normal equation level, of the five VGOS CONT17 sessions was calculated. The datum was defined by WESTFORD, ISHIOKA and WETTZ13S whereby the coordinates of the first two stations are known from S/X observations and of the latter from local surveying. With velocities from adjacent stations, the estimated coordinates were used to calculate a global solution of the 2019 VGOS sessions. The obtained coordinates were assessed on basis of formal errors, coordinate repeatability and comparisons of estimated Earth Orientation Parameters (EOP) time series with fixed station coordinates to the 14 C04 a priori dataset.