Onsala Space Observatory — IVS Analysis Center Activities

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Abstract This report briefly summarizes the activities of the IVS Analysis Center at the Onsala Space Observatory during 2023–2024.

1 Activities during the Past Two Years

The IVS Analysis Center at the Onsala Space Observatory is operated by the Space Geodesy and Geodynamics (SGG) group at Onsala, in collaboration with Lantmäteriet. Besides VLBI analysis, we work, e.g., on GNSS analysis including GNSS interferometric reflectometry, sea level studies, gravimetry, ocean tide loading modeling, and radiometry. Here we focus on topics that are directly related to VLBI. During the last two years we worked primarily with the following:

- VLBI analysis and contribution to ITRF2020
- Investigating the VLBI scale drift
- Signal delays in the neutral atmosphere.

2 VGOS Analysis and Contribution to ITRF2020

We analyzed the first three years of VGOS data with C5++ in Kalman filter mode [1]. We contributed to the first update of the ITRF2020, called ITRF2023-u2023, and investigated improved modeling for future VLBI contributions to the ITRF [2].

3 Investigating the VLBI Scale Drift

We continued to investigate potential reasons for the apparent VLBI scale drift in ITRF2020 [3]. That included the importance of monitoring radio telescope reference points [4], stability of reference points of VGOS telescopes [5], and the modeling of station positions [6].

4 Investigations Concerning Signal Delays in the Neutral Atmosphere

We analyzed the operational VGOS data and compared the atmospheric signal delays estimated for the Onsala twin telescopes with independent data from GNSS and microwave radiometry at Onsala [7, 8]. We also investigated the potential of using the Onsala twin telescopes directly for radiometry measurements [9]. Data derived from the Onsala microwave radiometer were compared to corresponding results from GNSS [10]. We also developed a new model for tropospheric corrections for ground-based GNSS interferometric reflectometry [11].

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IVS 2023+2024 Biennial Report

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