



Local VLBI Correlation and Analysis at Geodetic Observatory Wettzell

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The Geodetic Observatory Wettzell (GOW), jointly operated by the Federal Agency for Cartography and Geodesy (BKG), Germany and the Technical University of Munich, Germany is equipped with three radio telescopes for Very Long Baseline Interferometry (VLBI). Extended local correlation capabilities, however, have been missing at the Observatory so far. A computing cluster forming the GOWettzell Local Correlator (GOWL) was installed in September 2017 as well as the Distributed FX (DiFX) [Deller et al., (2011)] software correlation package and the Haystack Observatory Post processing System (HOPS) for fringe fitting and post processing of the correlated output. Data pre-processing including ambiguity resolution (if necessary) as well as the generation of the geodetic database and NGS card files is carried out with nuSolve, the final analysis is either carried out with our local processing software (LEVIKA [Schüler et al., 2018] short baseline analysis) or with the Vienna VLBI and Satellite (VieVS) software. The local correlator GOWL serves three main purposes:

1. It is primarily designed for relative positioning of the three Wettzell radio telescopes, i.e., to derive the local ties between the three telescopes from VLBI raw data in addition to the conventional terrestrial surveys carried out.
2. The local correlator closes the gap between the observation work and geodetic analysis. The closure of this missing piece in the measurement/analysis chain is important to provide timely quality feedback to the VLBI engineers regarding the status of their telescopes.
3. Finally, GOWL [Phogat et al., 2018] serves as a critical backup infrastructure. This means that it is not foreseen to carry out routine operational work, which resides with the Bonn Correlator operated at the Max-Planck- Institute for Radio astronomy, but is available in case of dedicated and special needs.

We will present an overview of the correlation capabilities and results obtained so far. Regarding the local ties at Wettzell, we are studying the local baseline between RTW (20 m) and TTW1 (13.2 m) in detail, since 2016. These local sessions are usually scheduled with VieVS. Here we report the method and first results of local baseline estimated with VLBI and further compared with the local tie measurements. Moreover, we also present initial results from the AGGO radio telescope testing as well as from individually scheduled session including the O'Higgins VLBI telescope at Antarctica. Finally, we want to present different observing prospects and future plans.

References

- [Deller et al., (2011)] A. T. Deller, W. F. Brisken, C. J. Phillips, J. Morgan, W. Alef, R. Cappallo, E. Middelberg, J. D. Romney, H. Rottmann, S. J. Tingay & R. Wayth. DiFX-2: A More Flexible, Efficient, Robust, and Powerful Software Correlator, *PASP*, 2011, 123, 275-287
- [Schüler et al., 2018] T. Schüler, C. Plötz & A. Phogat. LEVIKA SBA - Wettzell Radio-Telescope Positioning with a Tailor-Made Analysis Software, In *Proceedings of the IVS 2018 General Meeting, Svalbard, Norway, 3-6 June 2018*.
- [Phogat et al., 2018] A. Phogat, C. Plötz, T. Schüler, H. Hase, G. Kronschnabl, A. Neidhardt, J. Kodet, U. Schreiber, W. Alef, H. Rottmann, L. La Porta & S. Bernhart. Implementation and First Results of the Local Wettzell VLBI Correlator GOWL, In *Proceedings of the IVS 2018 General Meeting, Svalbard, Norway, 3-6 June 2018*.