

### 3.6.2.3 Deutsches Geodätisches Forschungsinstitut (DGFI)

The activities of the IERS Combination Research Centre at DGFI concentrated on contributions to the IERS Combination Pilot Project, the IERS Working Group on Combinations at the Observation Level and to the project GGOS-D.

#### **IERS Combination Pilot Project**

DGFI provides individual SLR and VLBI solutions and combined SLR solutions to the ILRS and IVS, respectively, which serve also as input for the IERS Combination Pilot Project. DGFI has been accepted by the IERS as a Combination Centre for the inter-technique combination of the weekly/daily SINEX files provided by the Techniques' Services. The computation of weekly combined solutions is done with the DGFI software DOGS-CS.

#### **IERS WG on Combination at the Observation Level**

The focus of this IERS working group is on inter-technique combinations at the level of observations. This implies the common processing of the different space geodetic observations (VLBI, SLR, GPS, DORIS) by using a uniform software, the same modeling and standards. A proposal of creating such a WG was discussed at the IERS DB45 and a charter was proposed by R. Biancale at the IERS DB46 in Vienna, 2008. It was suggested that GRGS and DGFI will take over the joint responsibilities to initiate the activities. Other groups are welcome to participate in this WG. Existing close cooperation and future joint venture of DGFI with IAPG/FESG at Technische Universität München (TUM) involves TUM in the WG. In 2008 an initial work plan has been set up and test data sets have been exchanged between GRGS and DGFI for the inter-technique combinations.

#### **DGFI contributions to GGOS-D**

DGFI's work within the GGOS-D project is very closely related to the research performed as IERS Combination Research Centre. GGOS-D is funded by the German Ministry for Education and Research in the frame of the programme GEOTECHNOLOGIEN. The project involves four institutions: GeoForschungsZentrum Potsdam (GFZ), Bundesamt für Kartographie und Geodäsie (BKG) in Frankfurt/Main, Institut für Geodäsie und Geoinformation, Universität Bonn (IGG-B), and DGFI. Within the GGOS-D project, homogeneously processed observation time series have been generated for the different space geodetic observation techniques, as the basis for the computation of a GGOS-D terrestrial reference frame and for the generation of consistent, high-quality time series of geodetic-geophysical parameters. DGFI performed the following major activities within GGOS-D:

- VLBI and SLR observation time series have been homogeneously processed based on the unified standards and models

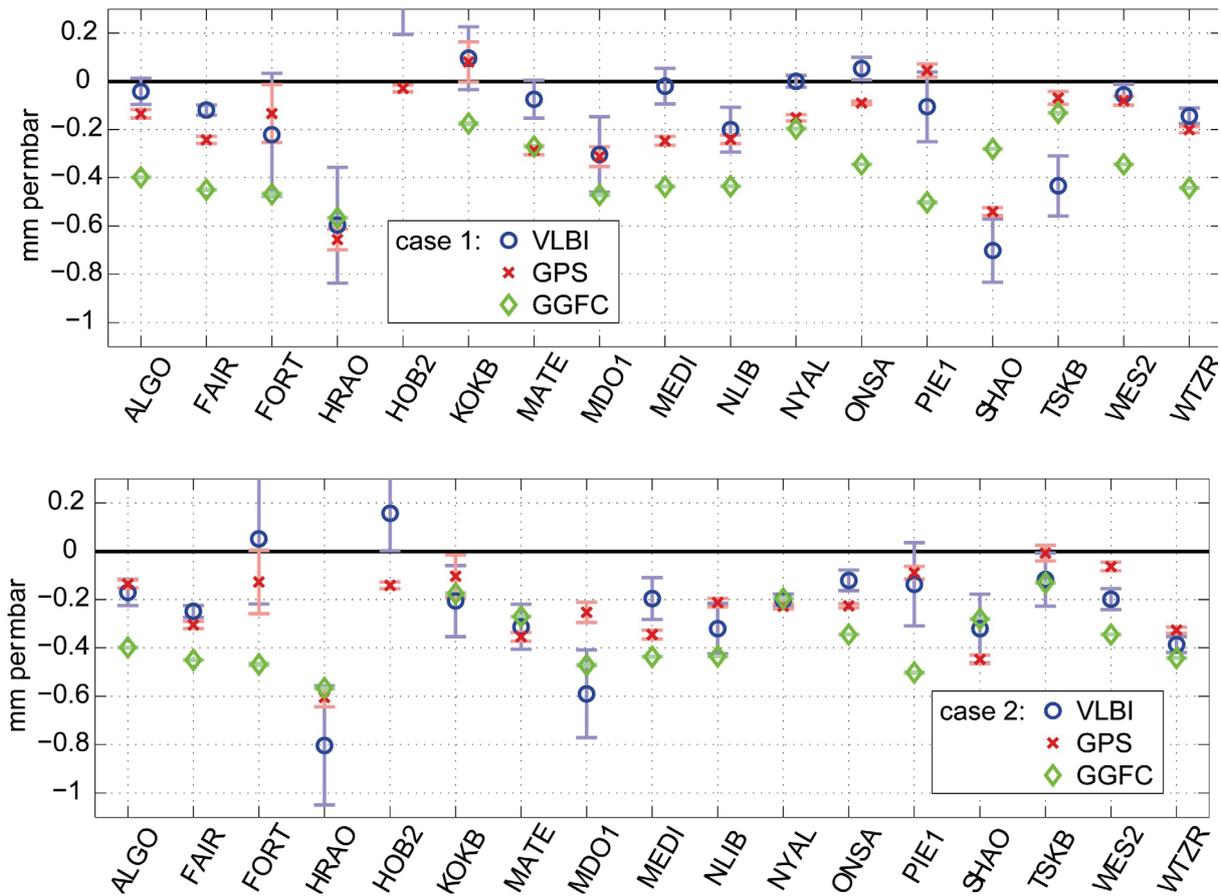


Fig. 1: Atmospheric loading regression coefficients and their formal errors, determined from VLBI (blue circles) and GPS (red crosses) height time series (top/bottom: Case 1 / 2), and coefficients provided by the GGFC (green diamonds).

that were implemented in the software packages OCCAM and DOGS-OC.

- The GGOS-D terrestrial reference frame has been computed from a combination of the VLBI, SLR and GPS long-time series. The work is closely related to the ITRS Combination Centre at DGFI and is therefore reported in Chapter 3.6.1.1.
- Time series of geodetic-geophysical parameters have been generated from the GGOS-D observation series.

As an example we provide results which have been obtained from the consistently processed VLBI and GPS observations. The work has been done in cooperation with GFZ Potsdam and TU Munich. Among other investigations, loading coefficients have been estimated from the GPS and VLBI height time series. The solutions were run twice: Case 1: Niell Mapping Function (NMF)

and constant a-priori zenith delay; Case 2: Vienna Mapping Function (VMF) and a-priori zenith delay from ECMWF. As shown in Figure 1 the agreement of the loading coefficients with those provided by the GGFC (Global Geophysical Fluids Centre) significantly improves for Case 2.

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**References**

Tesmer, V., Böhm, J., Meisel, B., Rothacher, M., Steigenberger, P.: Atmospheric loading coefficients determined from homogeneously reprocessed GPS and VLBI time series, 5th IVS General Meeting Proceedings, 2008.

*Detlef Angermann, Hermann Drewes, Rainer Kelm,  
Barbara Meisel, Manuela Seitz, Volker Tesmer*