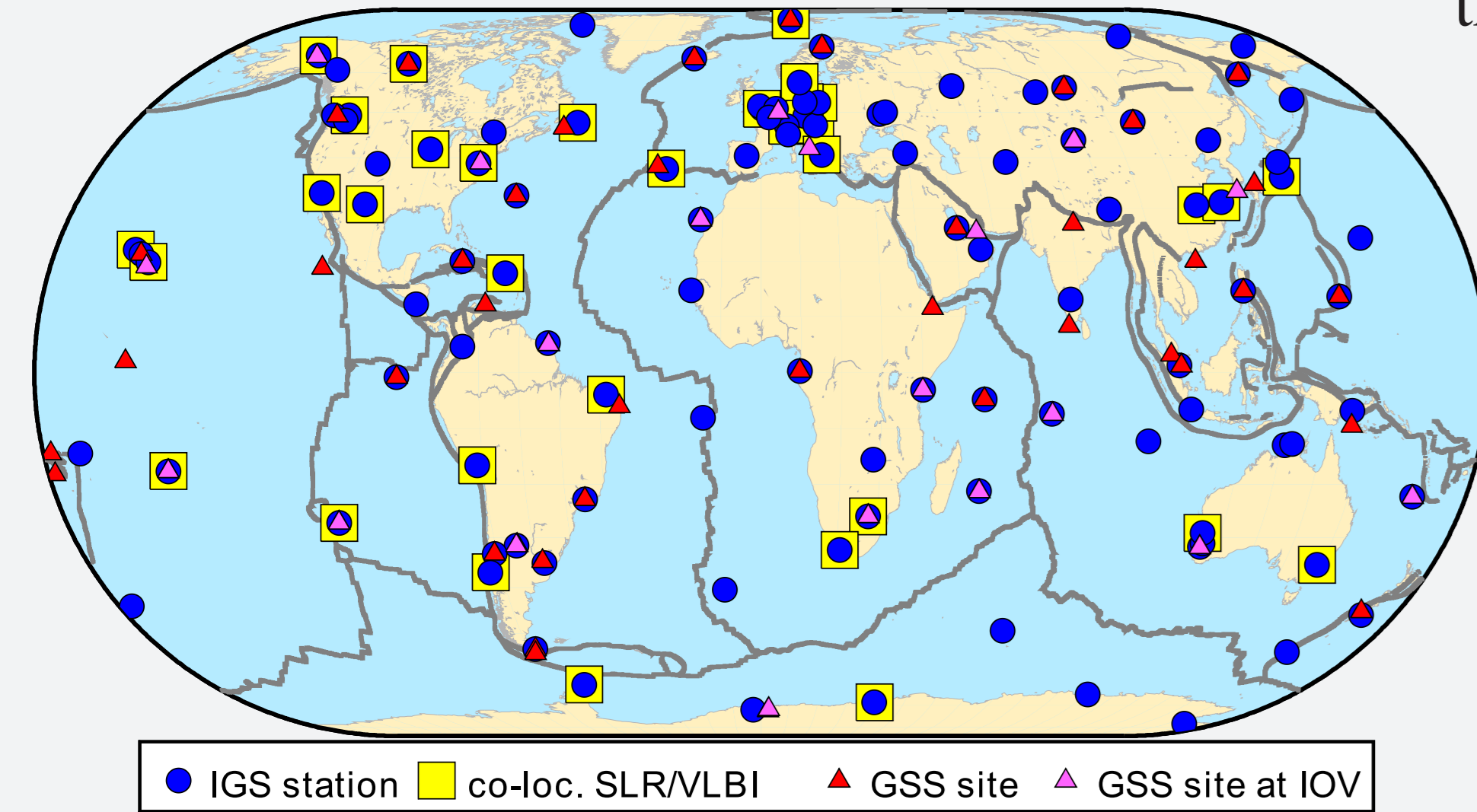


## Introduction

The Galileo Geodetic Service Provider (GGSP) Prototype, a project of the 6th Framework Program of the European Union, is running for nearly two years now. Its main purpose is the definition, realization, validation and maintenance of the Galileo Terrestrial Reference Frame (GTRF) and the implementation of a prototype for a permanent service.

## Galileo Terrestrial Reference Frame

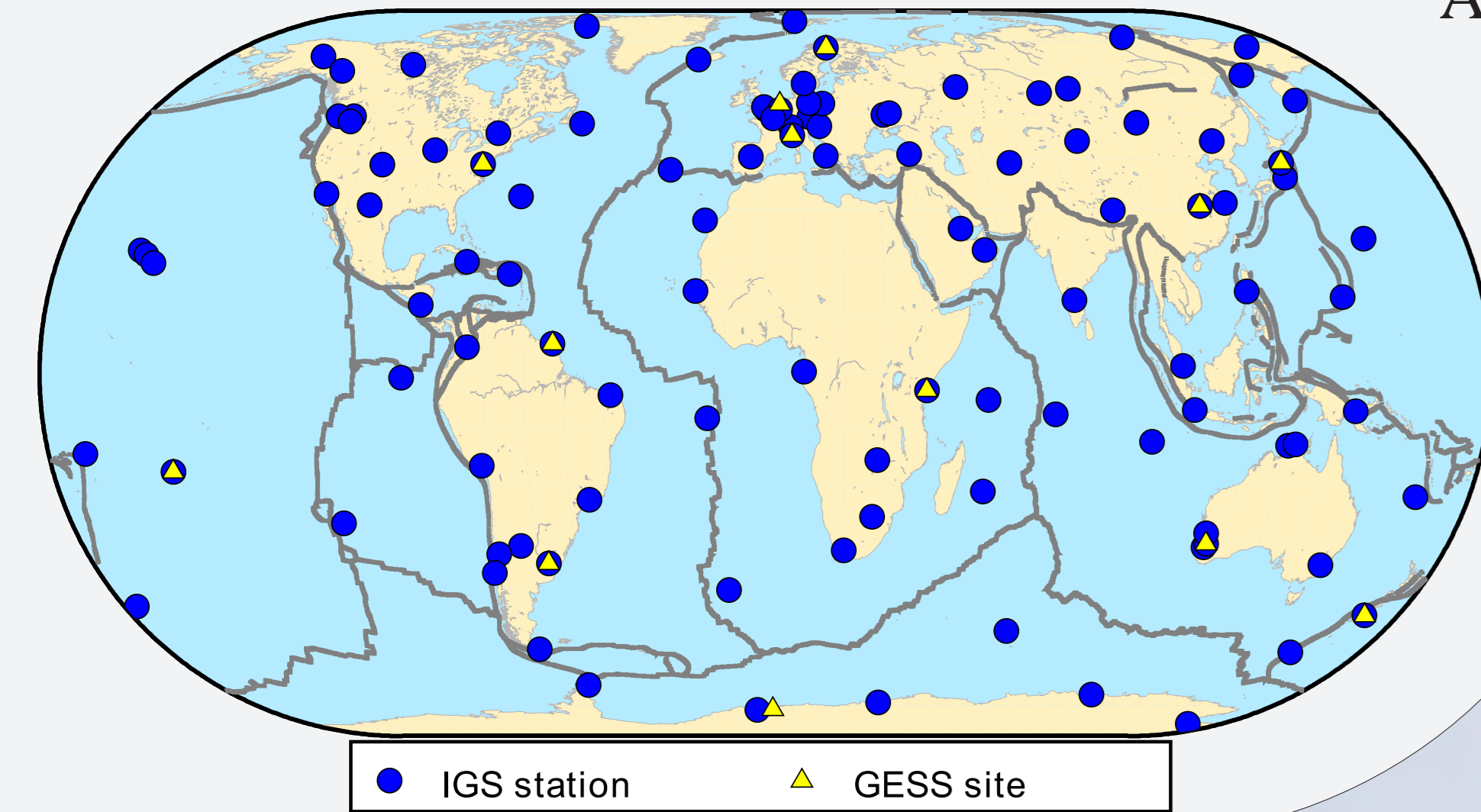
Since the Galileo Sensor Stations (GSS) – the Galileo tracking stations – will form a sparse global network, it is necessary to densify the network. Additional IGS stations will be used to get the highest possible precision and stability for the GTRF.



The connection to the ITRF is realized and validated by those IGS stations which are part of the ITRF. Special concern is given to co-location stations to other geodetic techniques like SLR and VLBI.

## Galileo Experimental Sensor Stations (GESS)

During the project it was decided to include the GESS into the GTRF realization.



Although they might not represent the final GSS distribution it is useful to get experience especially with the co-location Galileo/IGS sites.

## Examples of GESS site installation



Dunedin (New Zealand)



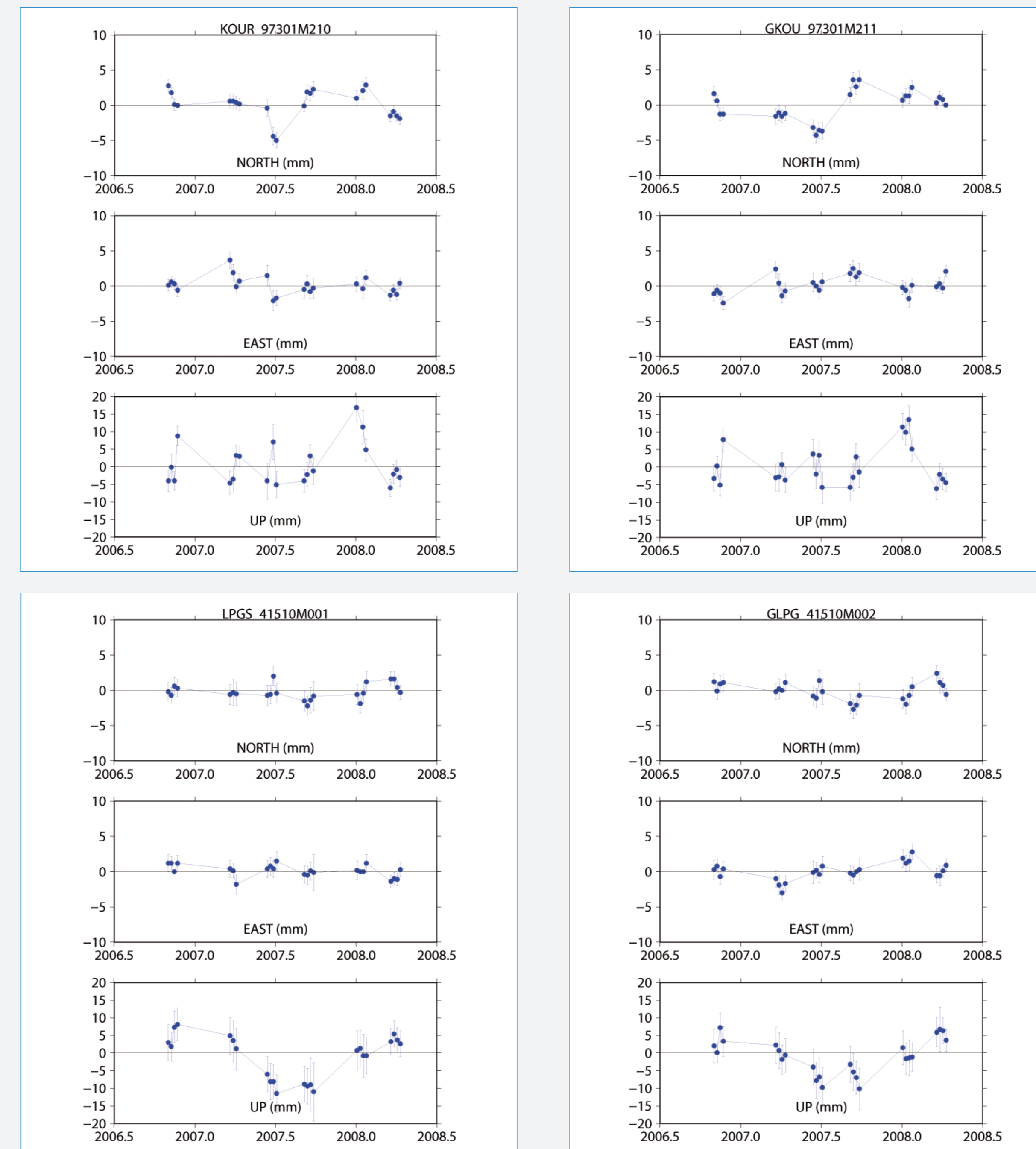
New Norcia (Australia)



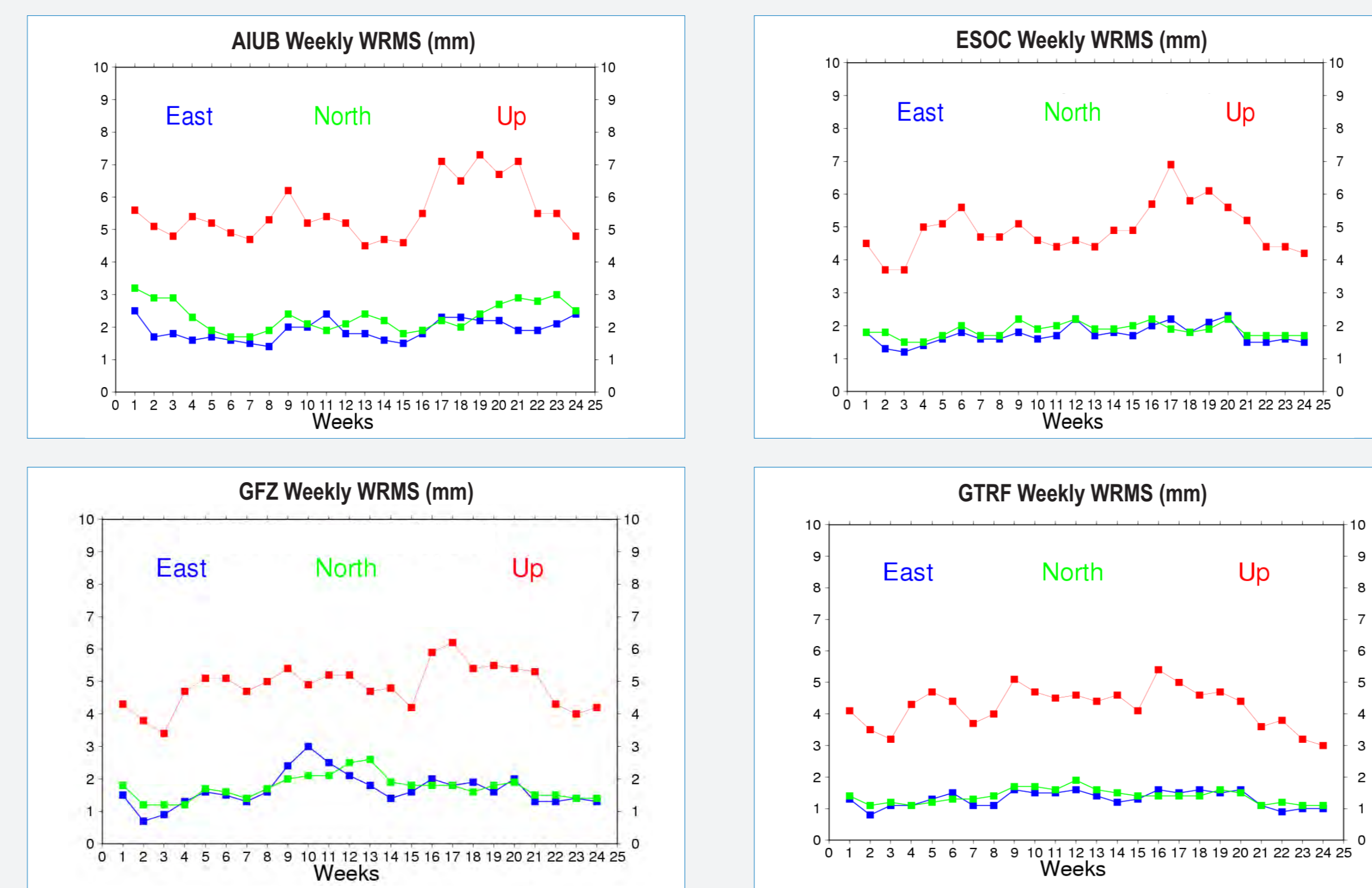
Mizusawa (Japan)

## GTRF realization

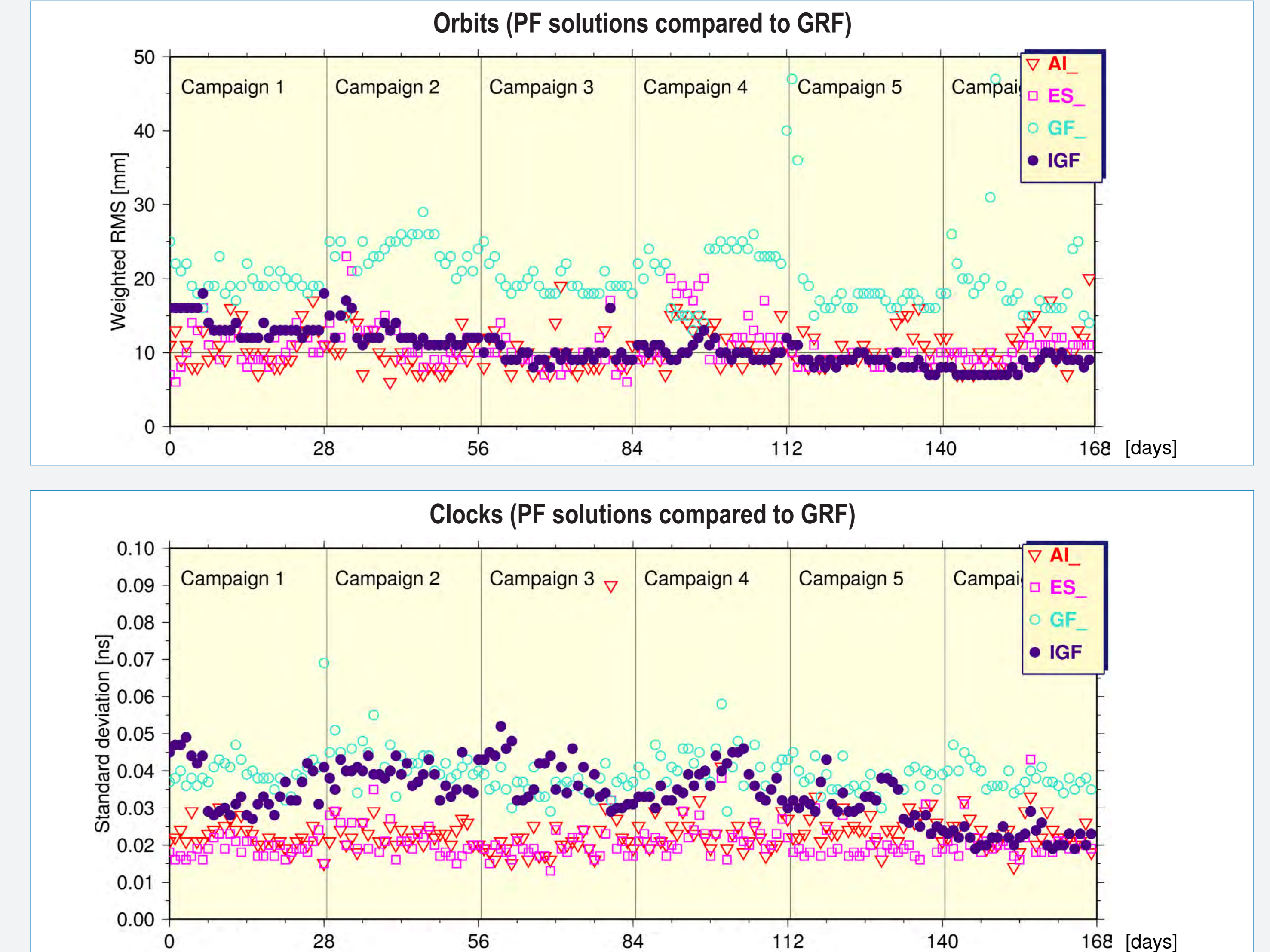
The initial GTRF was carried out on a campaign-wise basis. GPS observations have been used. Three analysis centres – AIUB, ESOC, GFZ – are applying the state-of-the-art approach estimating orbits, clocks and station coordinates. Orbit and clock combination is performed at GFZ, SINEX combination at IGN.



IGS and GESS residuals with respect to the cumulative solution at co-location sites



Internal precision - repeatability with respect to the cumulative solution



## From GGSP prototype to GRSP operational service

Recommendations for the transition phase, i.e. end of GGSP prototype until In-Orbit-Validation

- Continuation of GESS monitoring
- Continuation of processing of versioned GTRF realizations (starting of permanent processing in September this year)
- Simulations concerning number and distribution of GSS

Recommendations for the permanent GRSP

- Inclusion of GSS into the IGS
- Upgrade of existing IGS stations to GPS+GLONASS+Galileo stations
- Extension of IGS products (orbits, clocks etc.) with Galileo
- Development of user-specific products to increase the acceptance of the GRSP

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## Acknowledgment

The GGSP project is managed by the European GNSS Supervisory Authority (GSA) through EU 6FP funds.

## References

Gendt, G. et al. – GGSP: Realization and maintenance of the Galileo Terrestrial Reference Frame, Toulouse 2007