
Standards and Conventions

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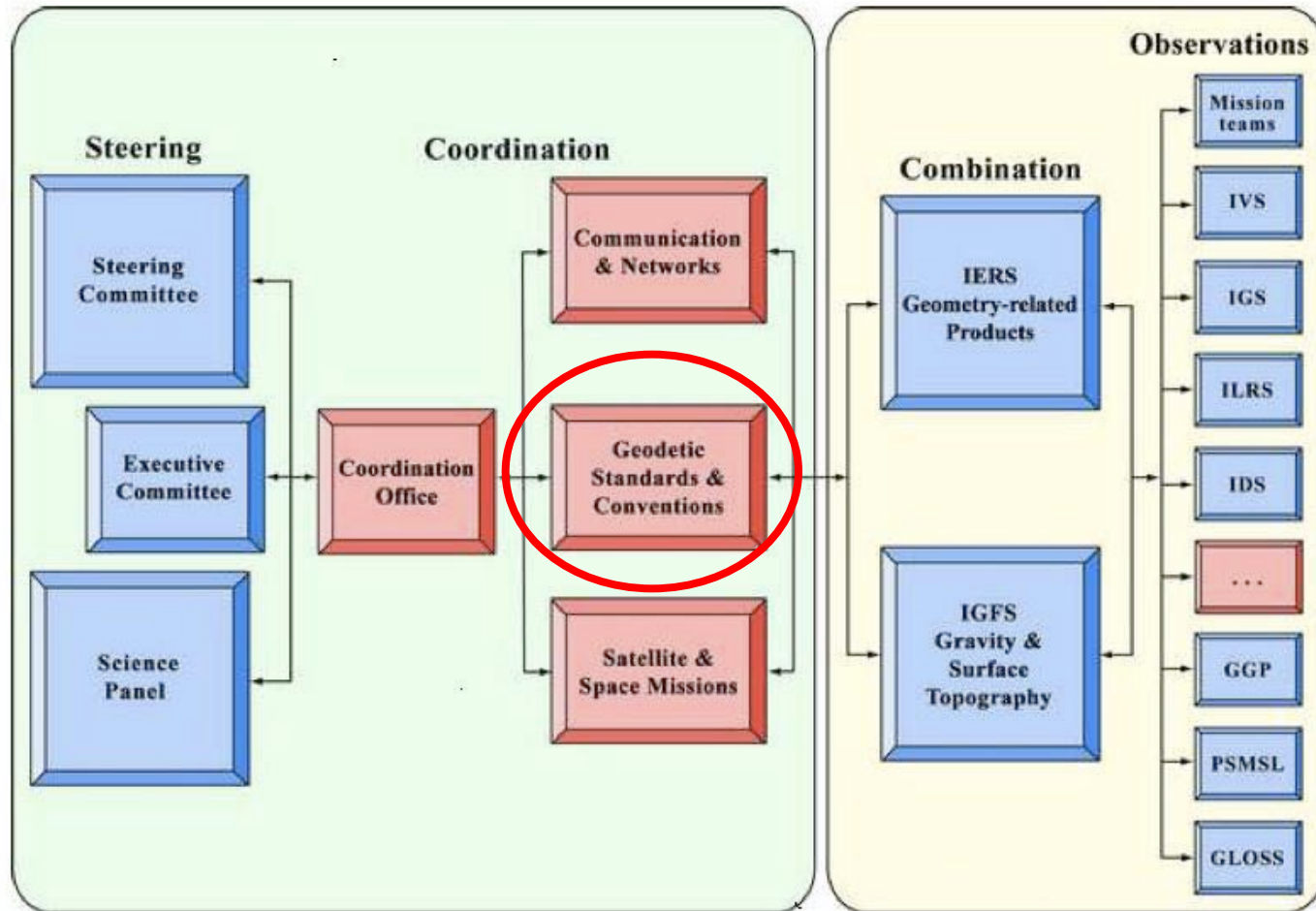
Unified Analysis Workshop 2009
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Bureau for
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GGOS Bureau for Standards and Conventions



GGOS, 2008



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GGOS Bureau for Standards and Conventions

- Successor of the GGOS Working Group on Conventions Models Analysis (CMA, Chair: Hermann Drewes)
- Hosted by
 - Institut für Astronomische und Physikalische Geodäsie (IAPG) of Technische Universität München Munich, Germany
 - Deutsches Geodätisches Forschungsinstitut (DGFI), Munich, Germanyunder the umbrella of the Forschungsgruppe Satellitengeodäsie (FGS).
- Director: Urs Hugentobler (IAPG), Secretary: Detlef Angermann (DGFI).
- Members: Johannes Bouman (DGFI), Michael Gerstl (DGFI), Thomas Gruber (IAPG), Burghard Richter (DGFI), Peter Steigenberger (IAPG).
- Corresponding Members: Mike Craymer (liaison to ISO/TC211, Registry Control Body, Registry for geodetic codes and parameters), Jozef Adam.



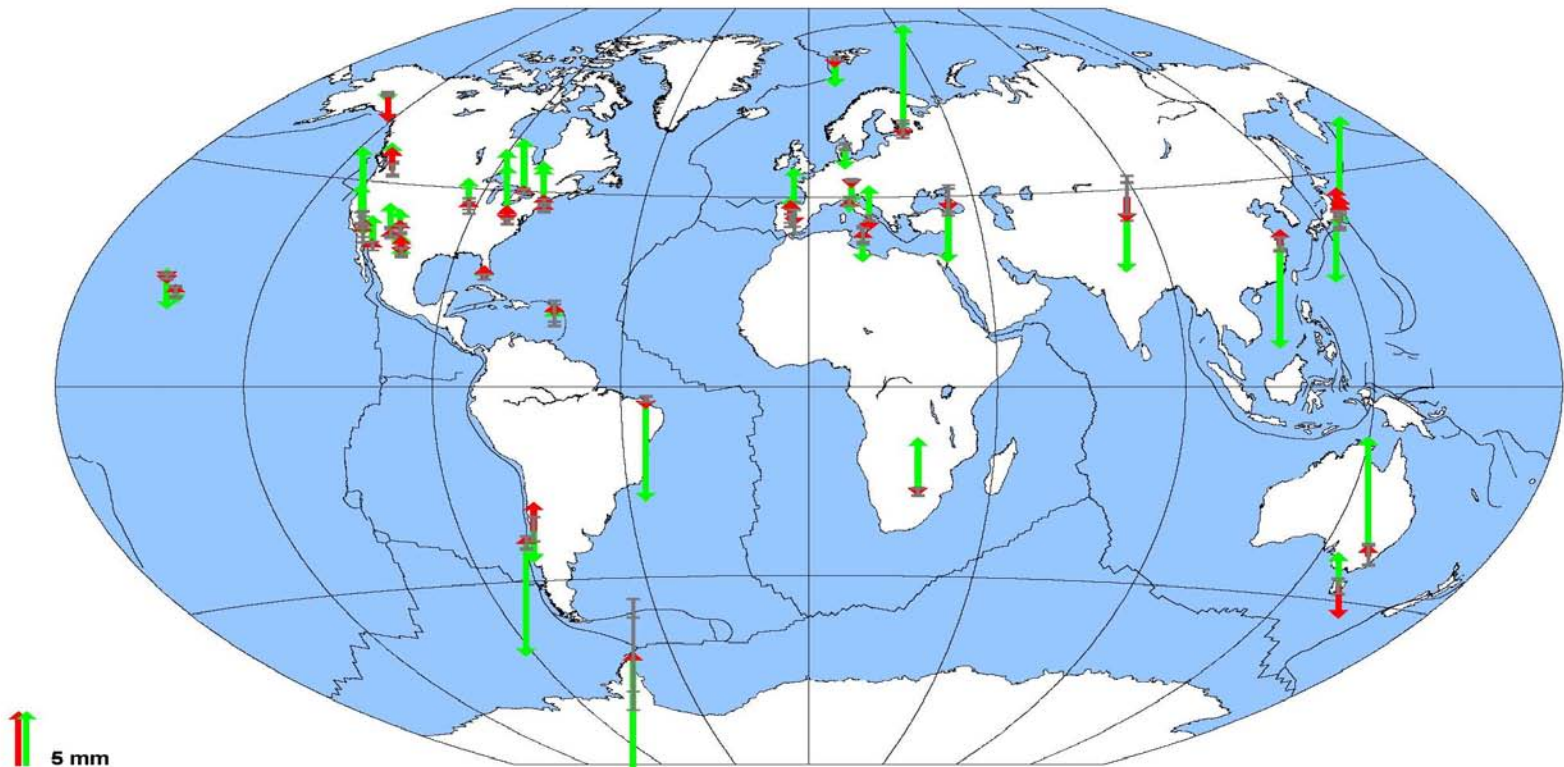
GGOS Bureau for Standards and Conventions

Objectives of the BSC are

- to *keep track of the strict observance* of adopted geodetic standards, standardized units, fundamental physical constants, resolutions and conventions in the generation of the products issued by the IAG Services;
- to *review, examine and evaluate* all standards, constants, resolutions and conventions adopted by IAG or its components and recommend their use or propose the necessary updates;
- to *identify gaps, inconsistencies, and deficiencies* in standards and conventions and to initiate steps to remove them;
- to *propose the adoption* of new standards and conventions where necessary;
- to *propagate standards and conventions* to the wider scientific community and promote their use.



Handling of Mean Pole for Pole Tide



GIB – DGFI (consistent with IERS Conventions)

GSFC – DGFI (inconsistent with IERS Conventions)

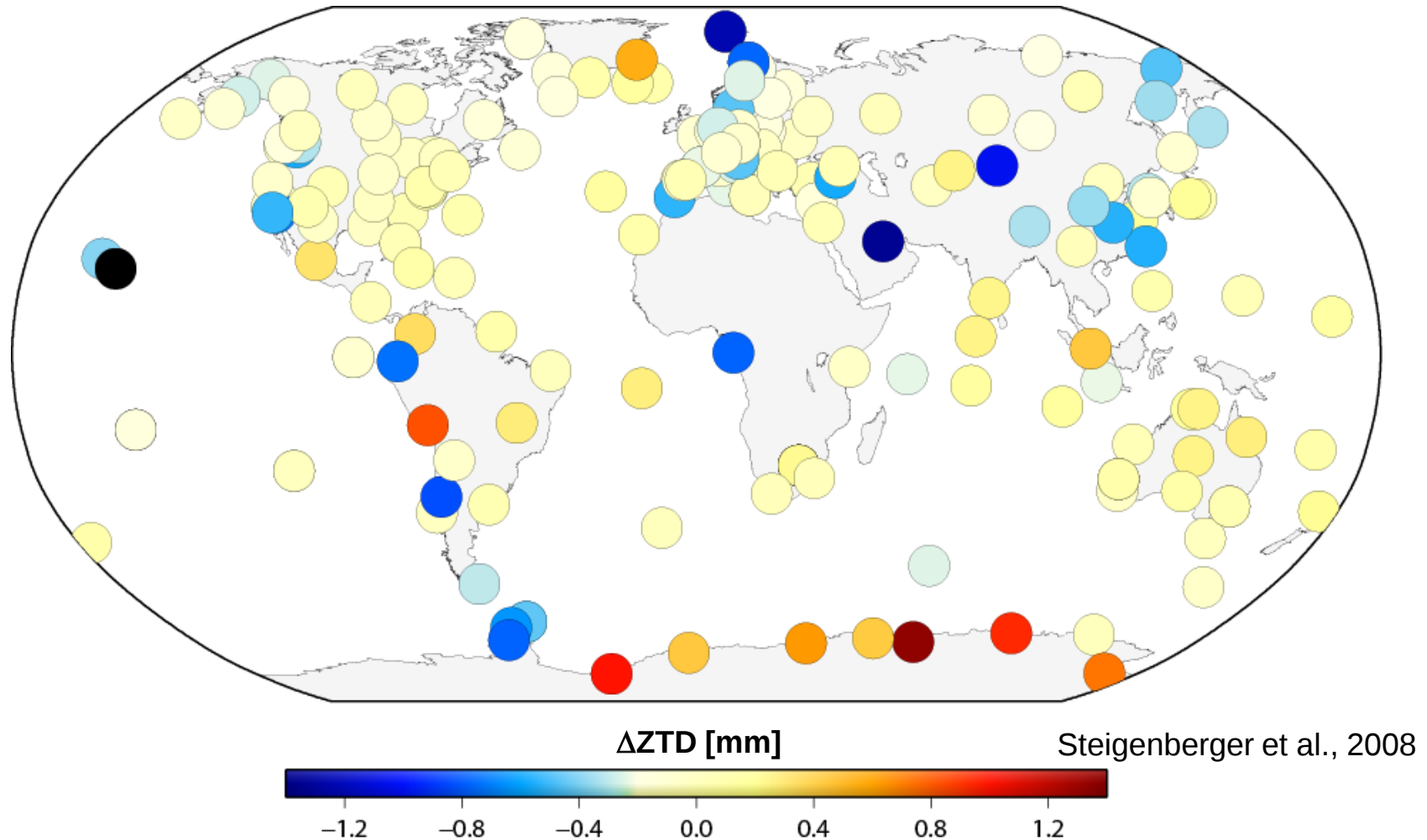
GGOS-D



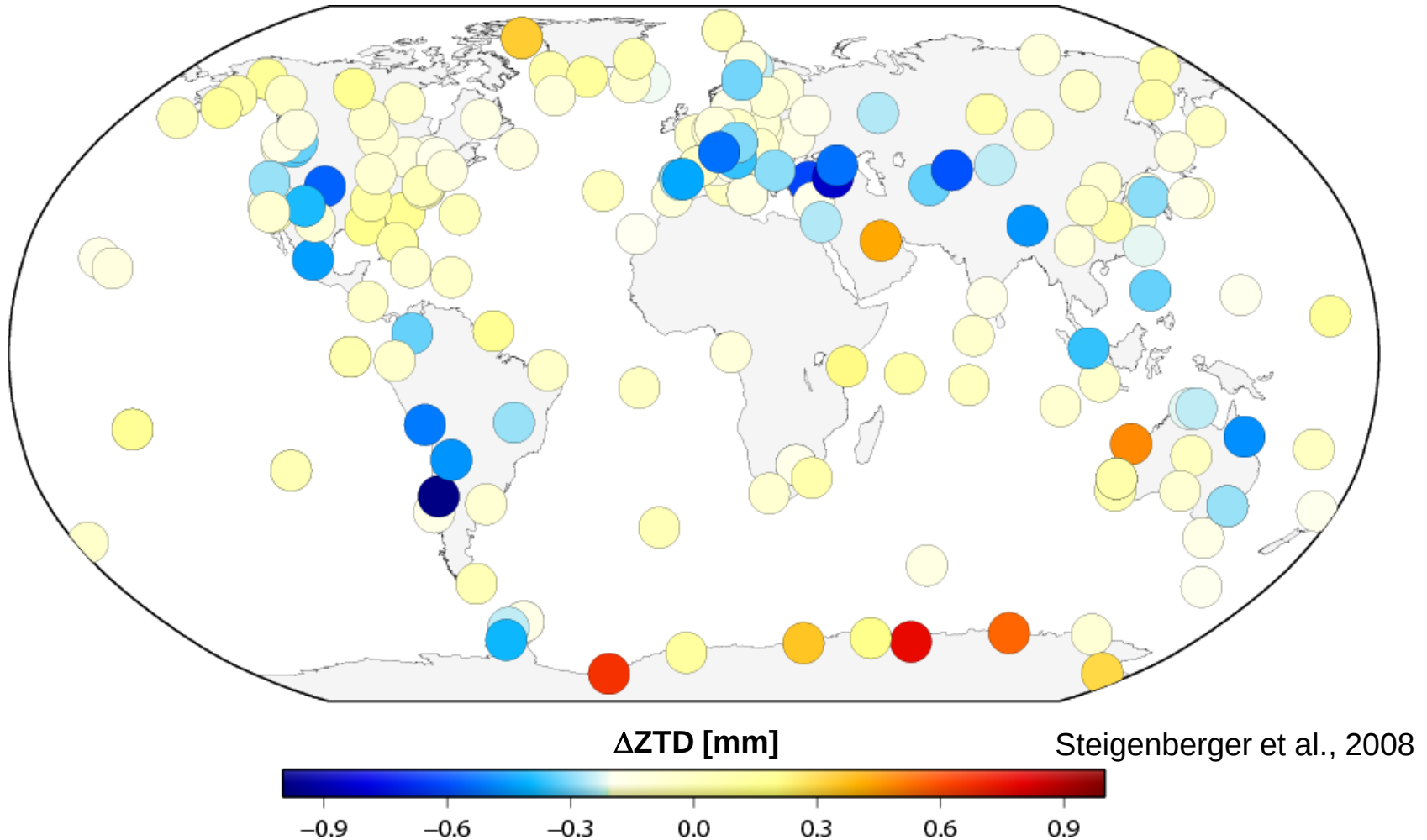
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Hydrostatic Delay, ECMWF vs. GPT

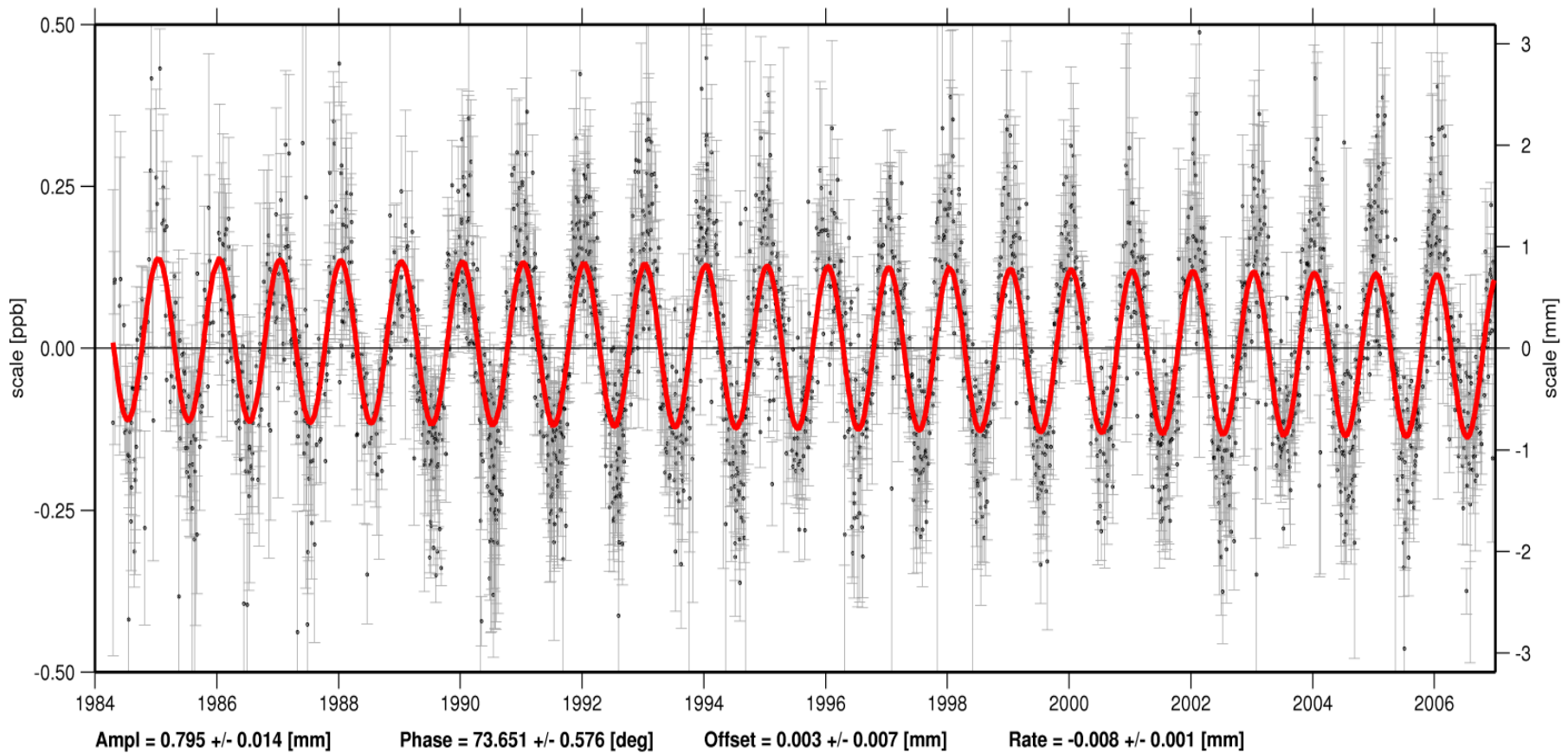


Mapping Functions, VMF1 vs. GMF



Thermal Deformations for VLBI

- Scale variations



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Constants

Quantity	GRS80	IERS2003	
GM	$398.600\,5 \cdot 10^{12}$	$398.600\,441\,8\,(8) \cdot 10^{12}$ $398.600\,441\,8 \cdot 10^{12}$	m^3s^{-2}
J2	$1082.63 \cdot 10^{-6}$	$1082.635\,9\,(1) \cdot 10^{-6}$	
a_e	6 378 137	6378 136.6 (1)	m
1/f	298.25722	298.25642 (1)	
ω	$7.292\,115 \cdot 10^{-5}$	$7.292\,115 \cdot 10^{-5}$ $7.292\,115\,146\,7 \cdot 10^{-5}$	rad s^{-1}
W_0	62 636 860.85	62 636 856.0 (5)	m^2s^{-2}

Best estimates, consistent set of constants, uncertainties

Galileo OS SIS ICD Draft



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Time and Tide Systems

- Time System TT (practice) vs TCG (IAU & IUGG Resolutions, 1991)

$$\begin{aligned} GM &= 398.6004418 \cdot 10^{12} \text{ m}^3\text{s}^{-2} && \text{(TCG value, IERS 2003)} \\ &398.6004415 \cdot 10^{12} \text{ m}^3\text{s}^{-2} && \text{(TT value, EGM96, EIGEN, ...)} \end{aligned}$$

Use of other constants consistently!

- Tide system, IAG Resolution 16 of 18th General Assembly (1983):
 - zero-tide for geopotential quantities
 - mean-tide for station displacement quantities

In practice for geometrical quantities: tide-free (ITRF)

→ source for confusion when combining geometric and gravimetric quantities

Conclusions

- Compile an *inventory* of used constants, standards, conventions:
 - BSC to collect available information
 - polling of Services with standardized form
- S/W comparisons, benchmark tests.
- All GGOS products, i.e. all products of IAG services, shall be accompanied with a *standards sheet* → metadata.
- *SINEX*: mandatory keyword
 - TIME_SYSTEM: TT_SCALE, TCG_SCALE
 - TIDE_SYSTEM: MEAN_TIDE, ZERO_TIDE, TIDE_FREE
- SINEX conventions block?