# Atmospheric Non-Tidal Pressure Loading in GNSS–Analysis

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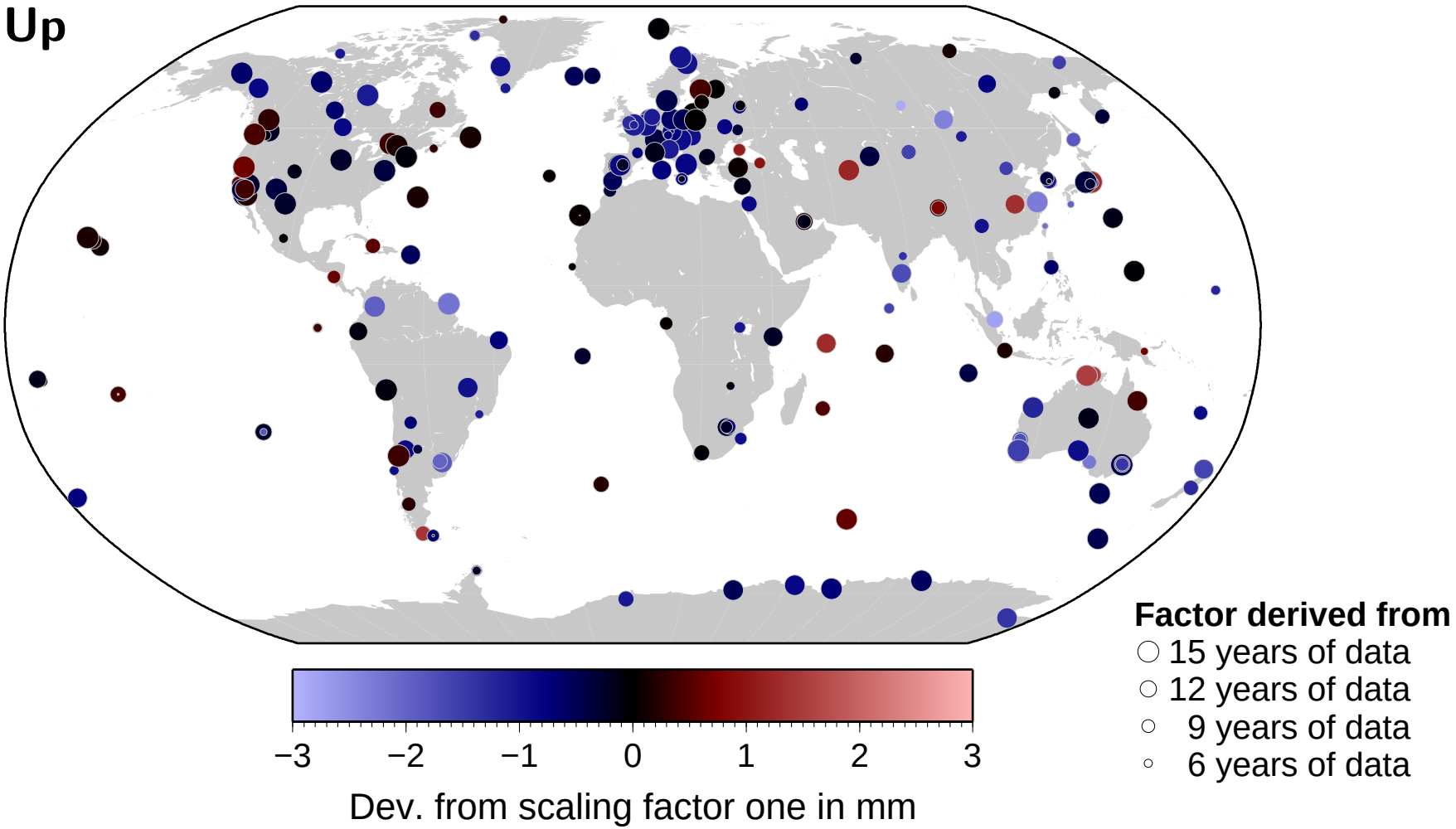
# APL effect can clearly be detected in GNSS data

## Estimated scaling factors for the atmospheric loading model

Deviation from one over 15 years, norm. with the RMS



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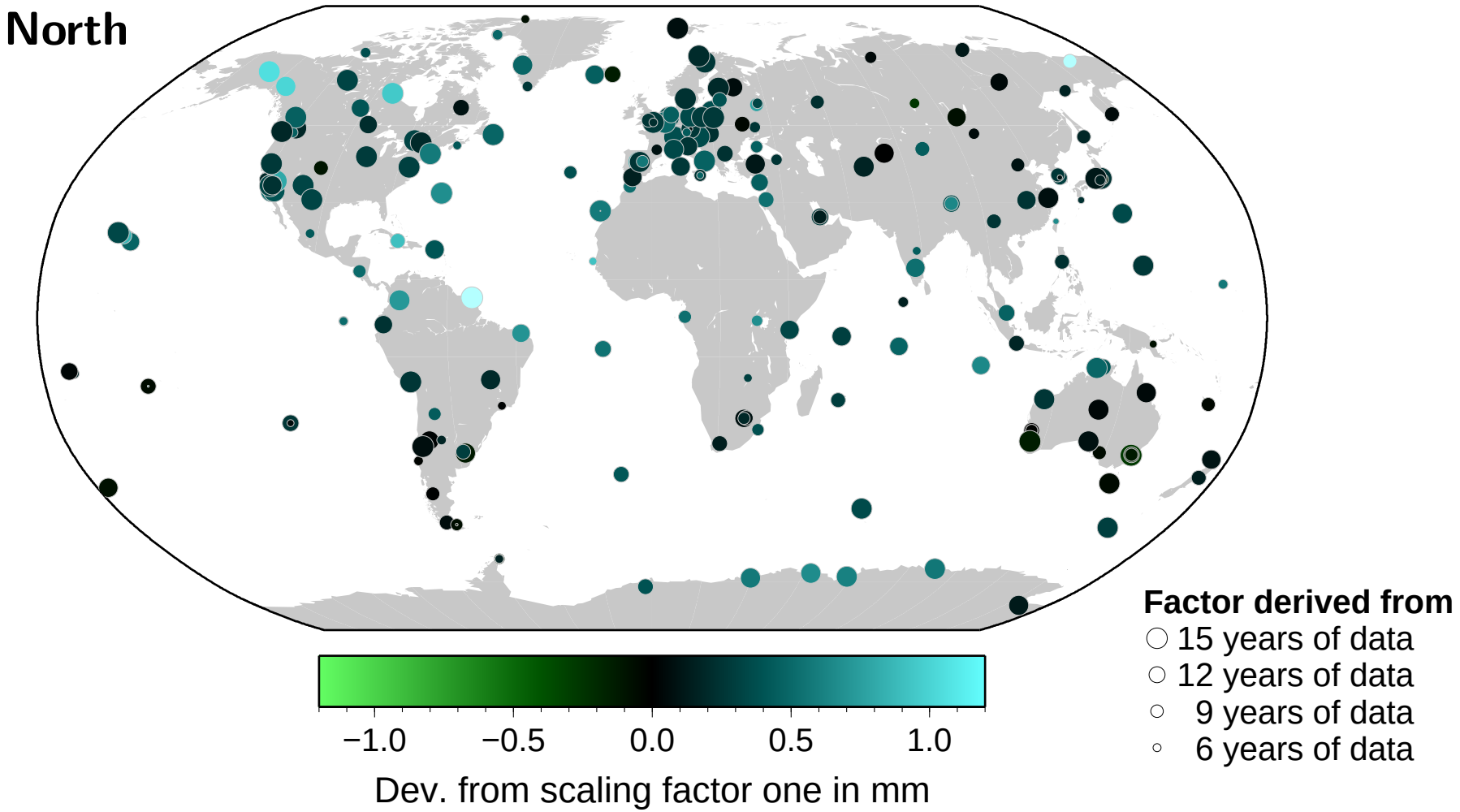

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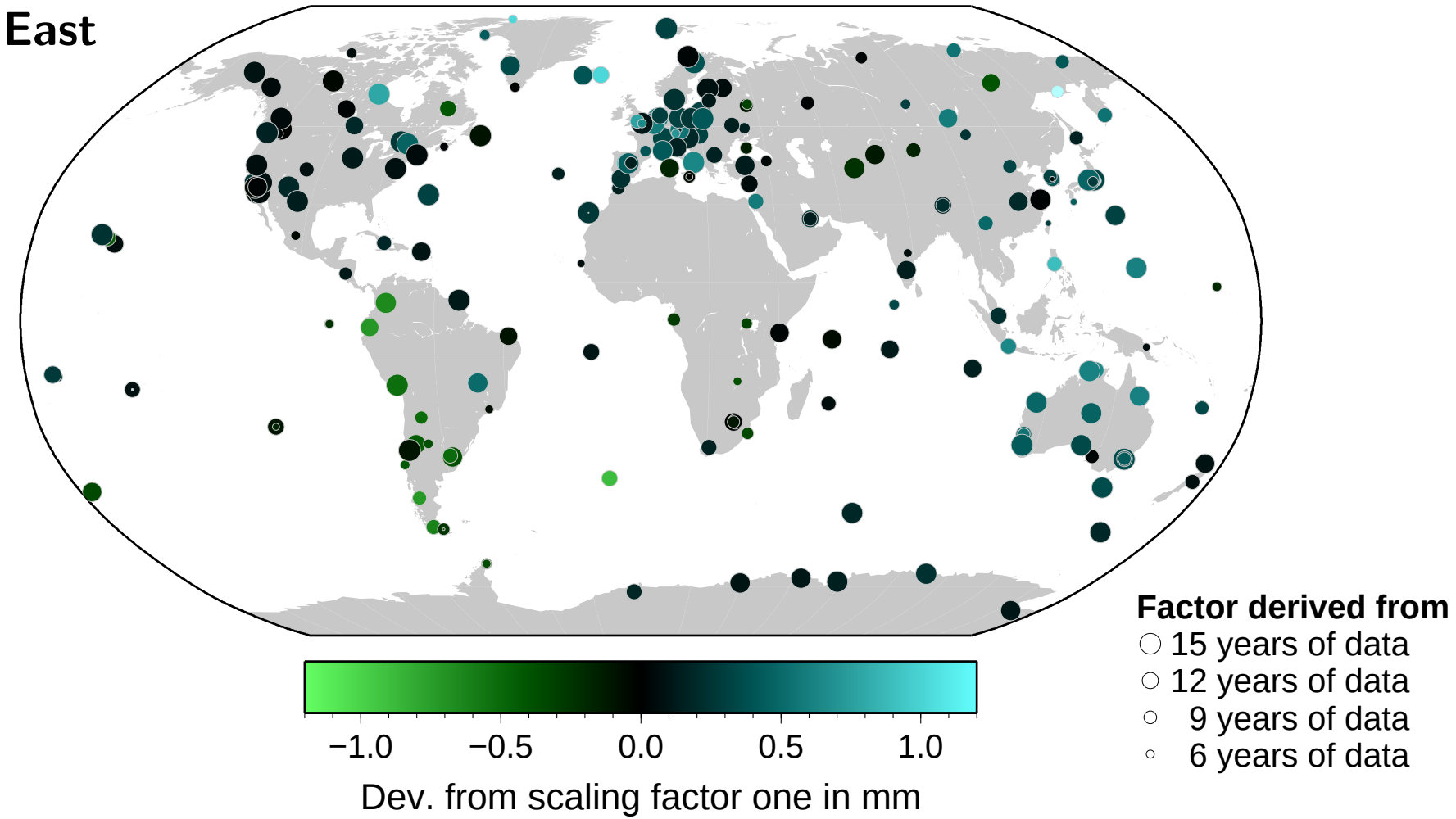

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- In consequence, GNSS–results must be corrected for the effect.

- What is the best/correct procedure?

  1. correction on observation level during the data processing
  2. correction of resulting coordinate time series

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   - ☹ APL effect may migrate into estimated parameters

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## CASE 2: Correction of resulting coordinate time series

Network solution
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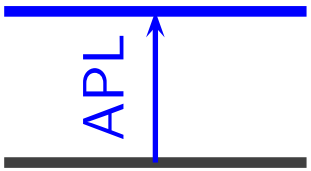

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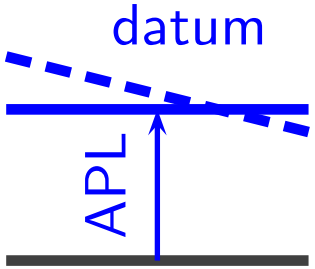

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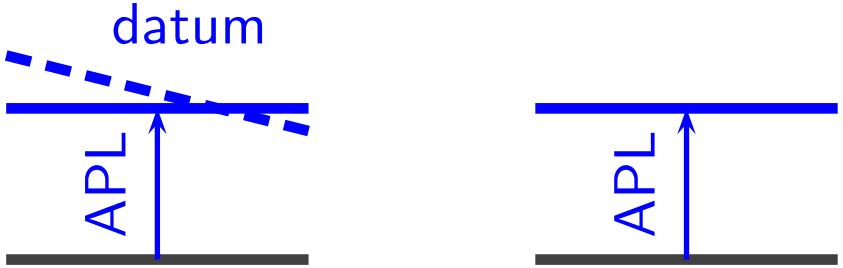

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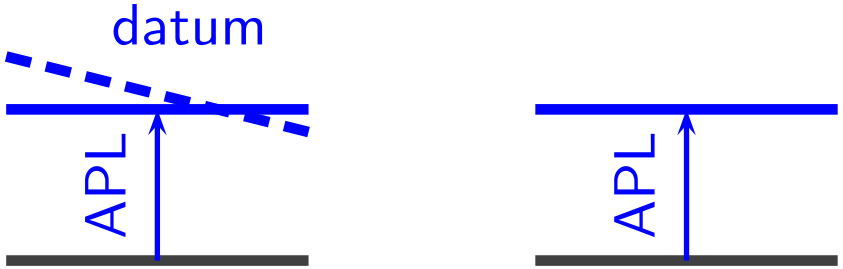


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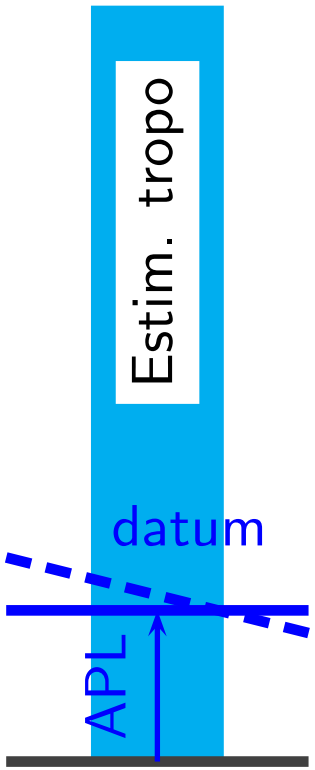


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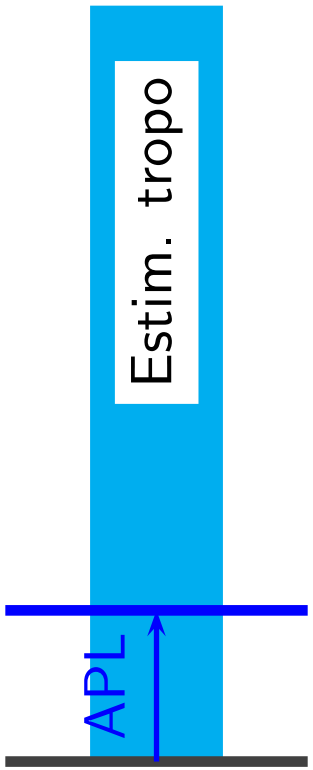


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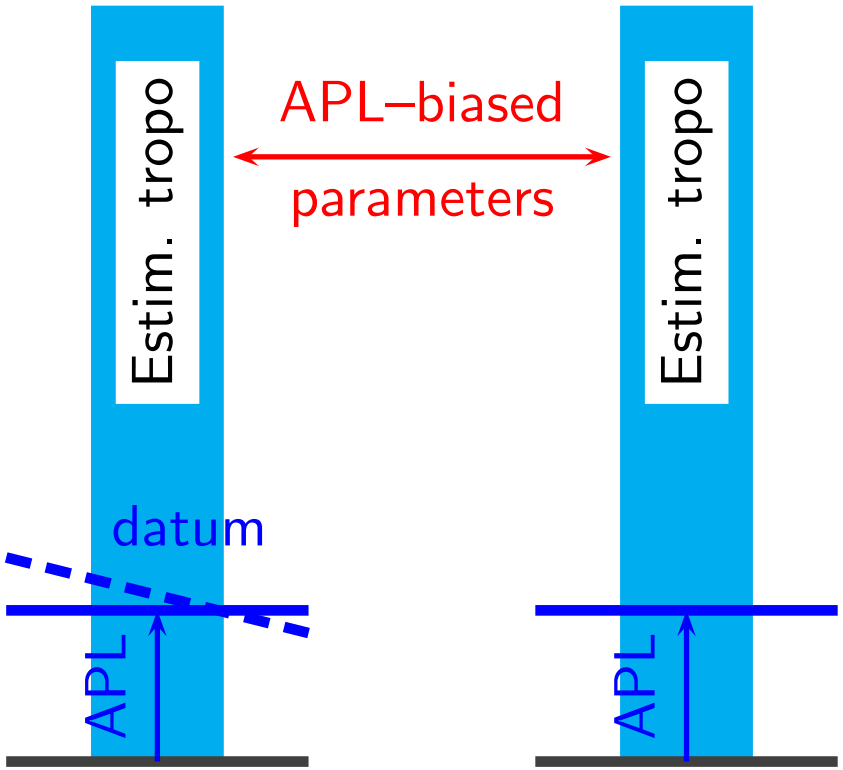


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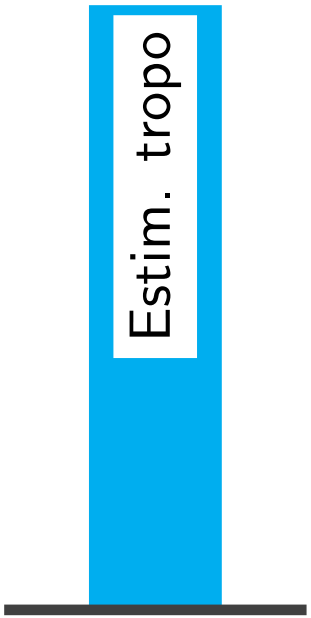


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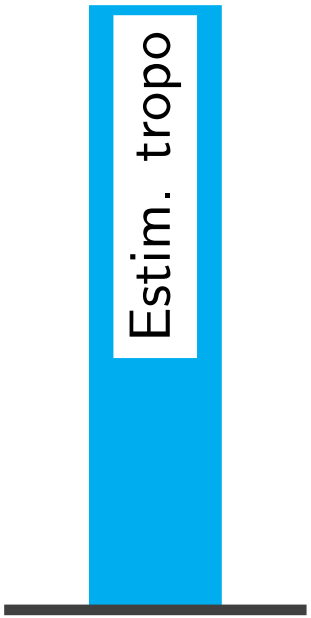


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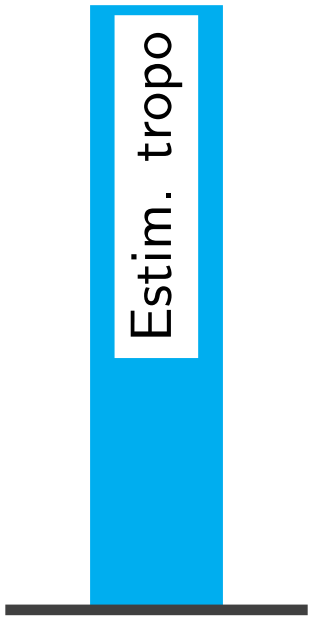


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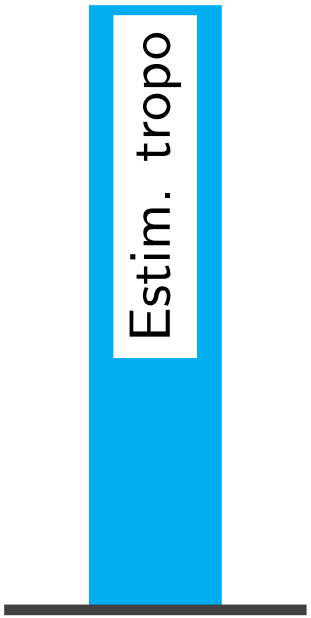


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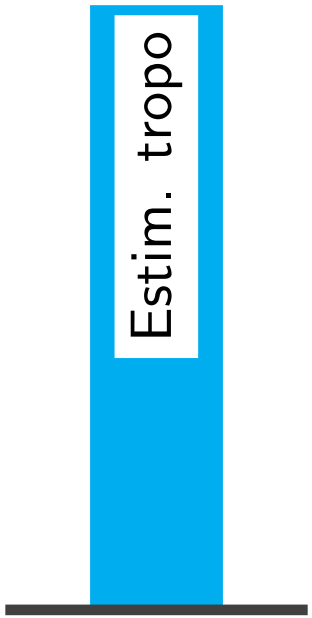


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All results are APL–corrected and fully consistent.

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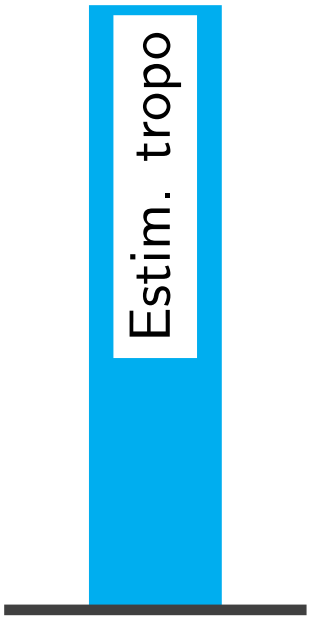


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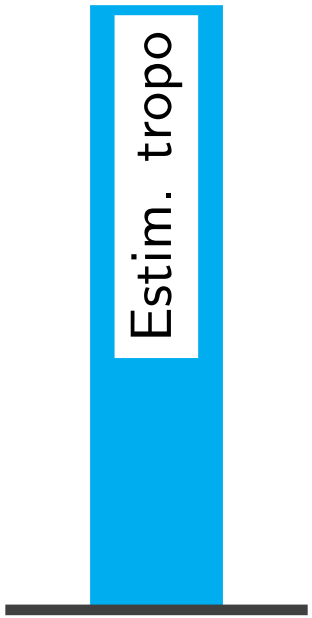


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- Results are APL–corrected as they come out of the PPP–solution.
- Grid with APL–corrections for the user community is needed.

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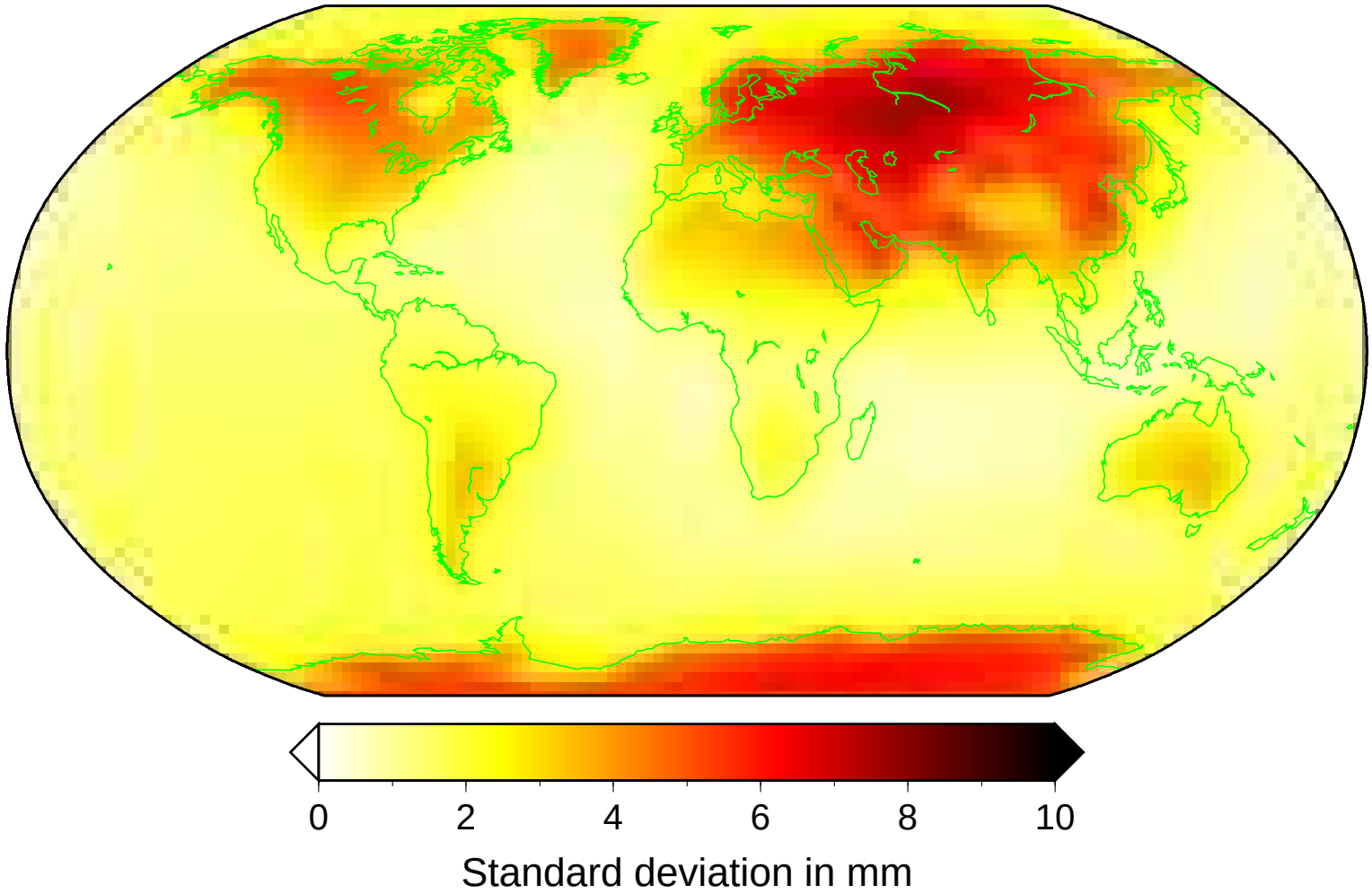
# Characteristics of APL effect

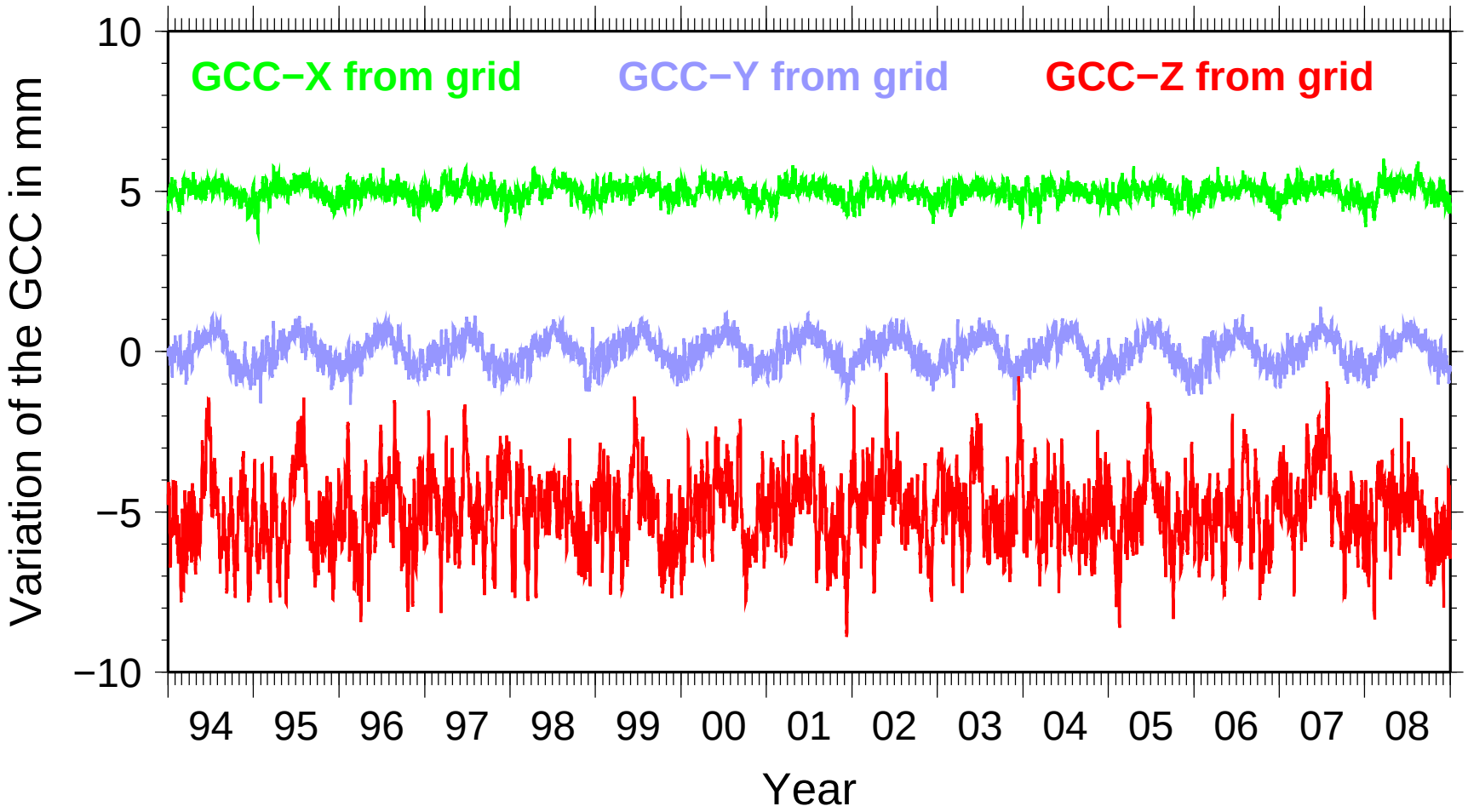
RMS of the non–tidal correction over 15 years




APL model from Petrov and Boy, 2004

# APL effect may translate to geocenter

APL model

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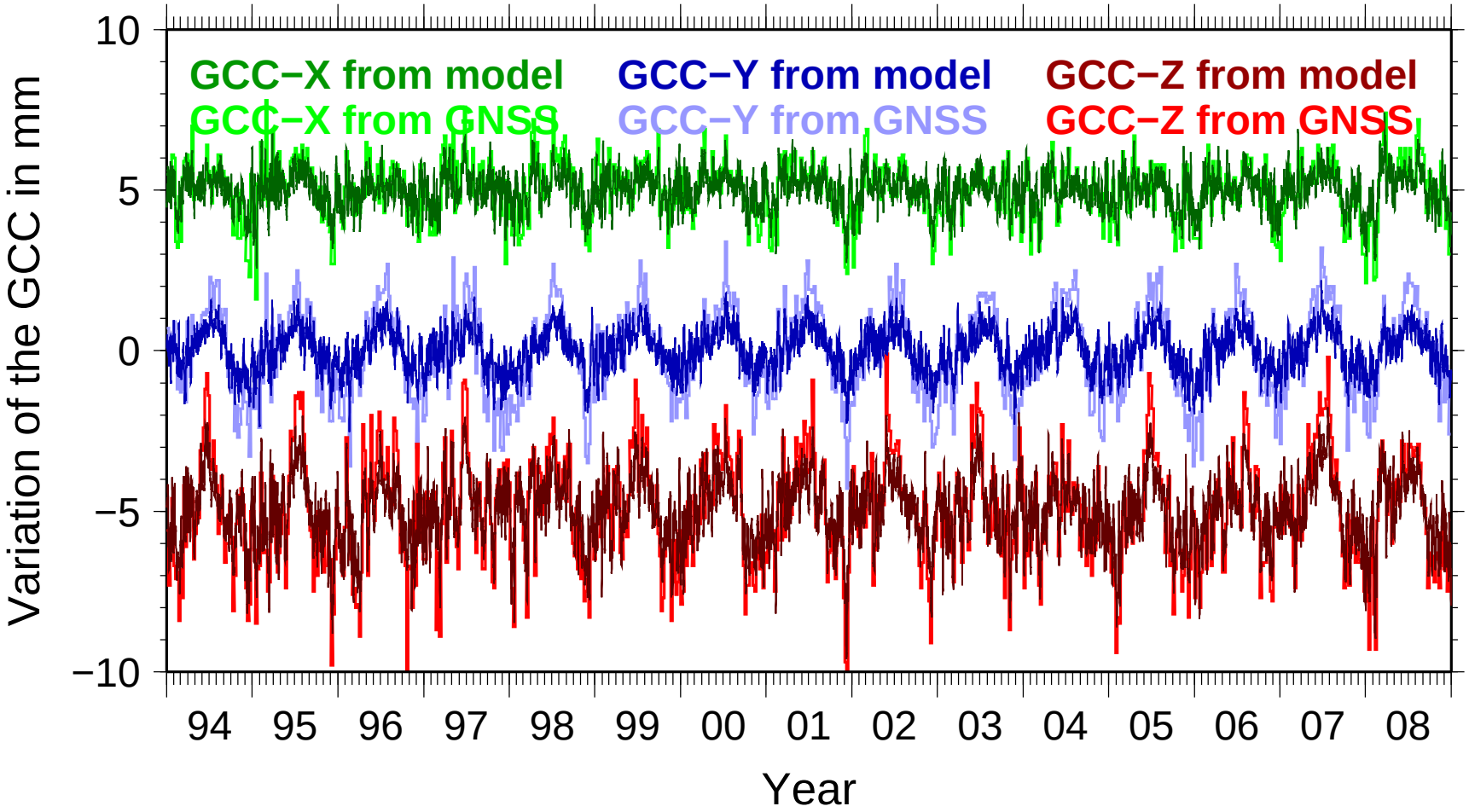
APL model versus translations from two GNSS–solutions

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# APL effect may translate to geocenter

- Previous slide: translations between weekly coordinates generated

(a) with correcting for APL directly on observation level

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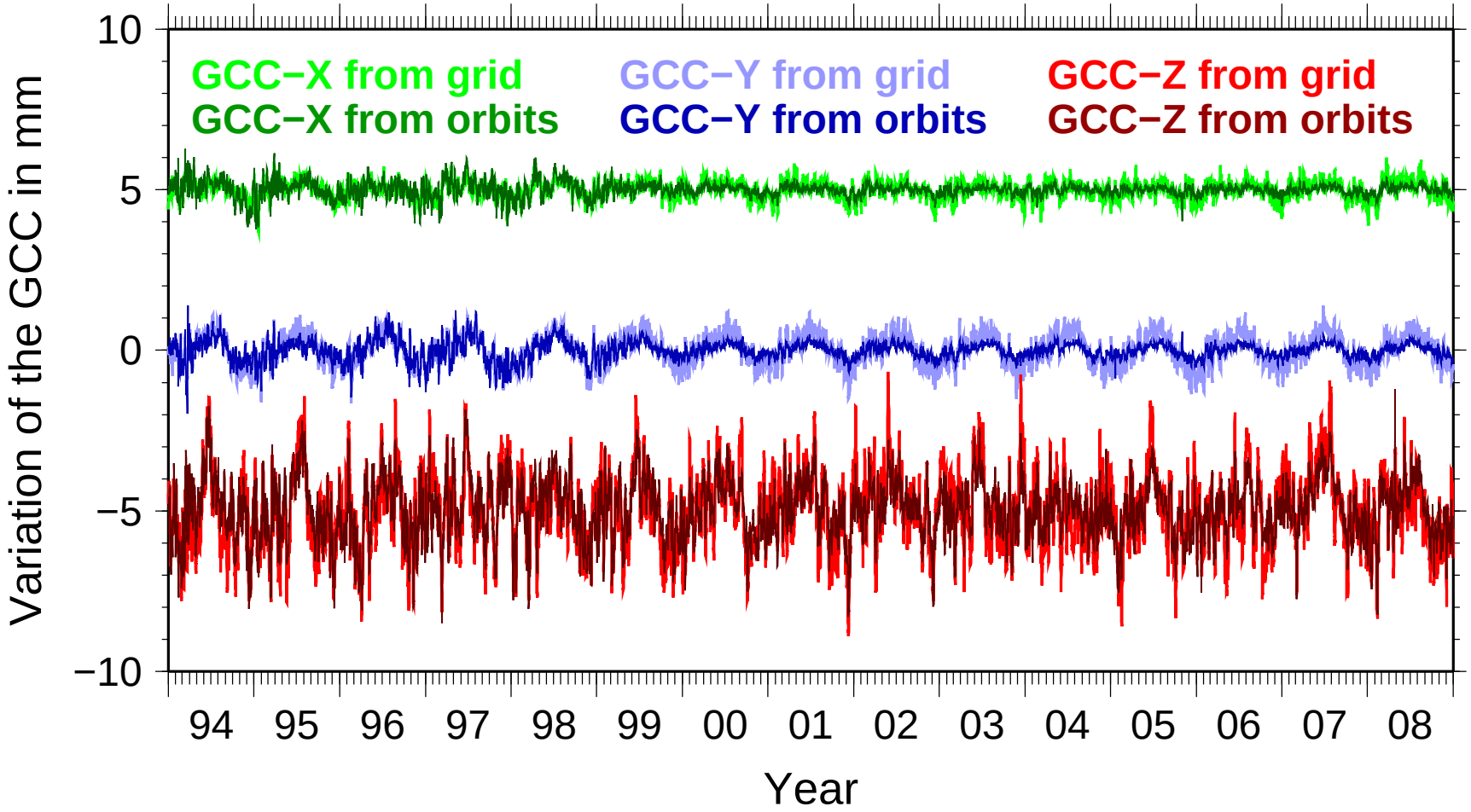
- The datum of the ground station coordinates in the two solutions is unified by applying the translations to the coordinates from solution (a). The corresponding orbits are computed.
- If the ground stations are in a consistent reference frame it can be expected that also the corresponding GNSS orbits will show no systematic differences.

# APL effect may mitigate into the orbits

Translation parameters between GNSS–orbits from solution (a) and (b)
after unification of the datum of the ground stations

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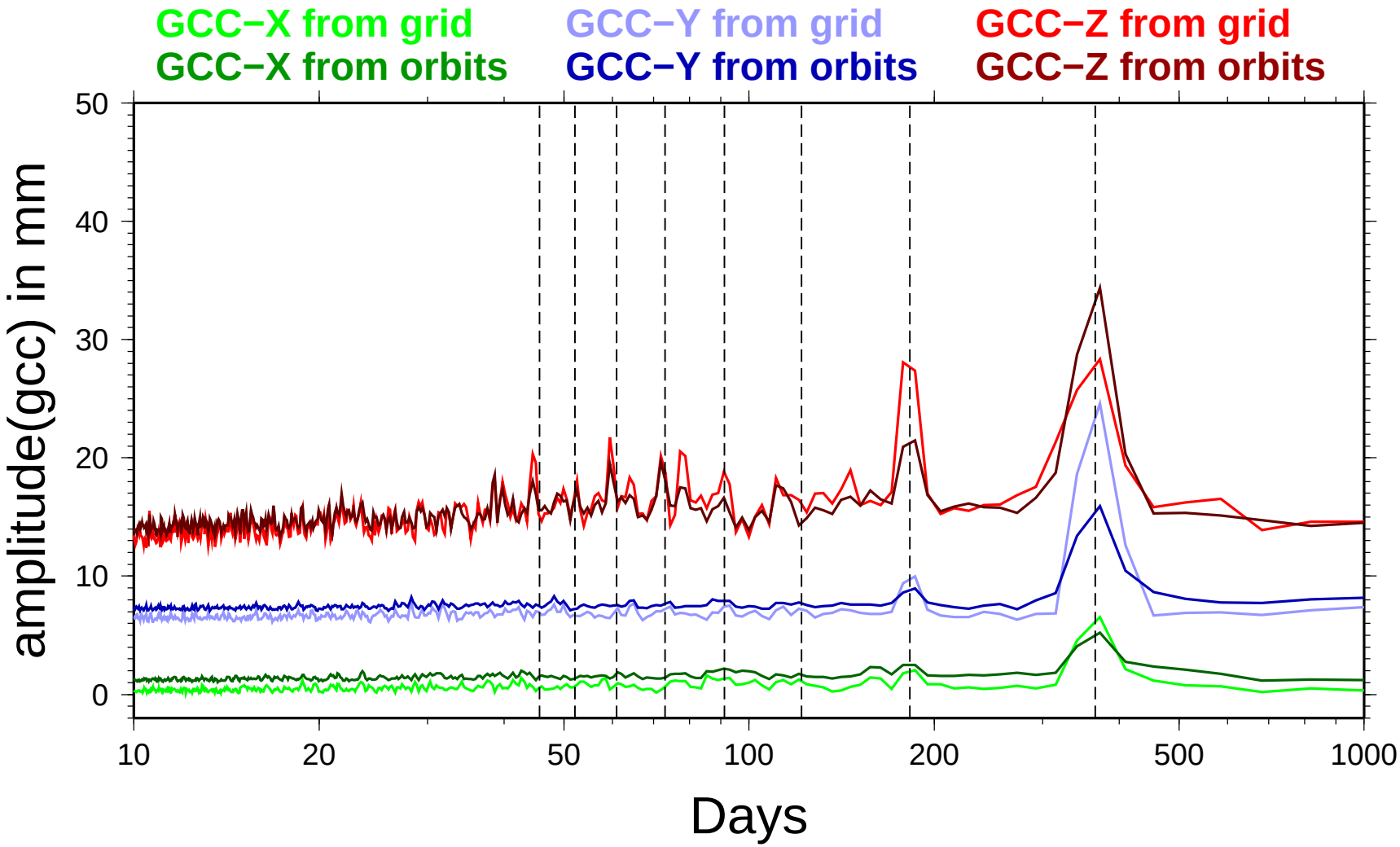

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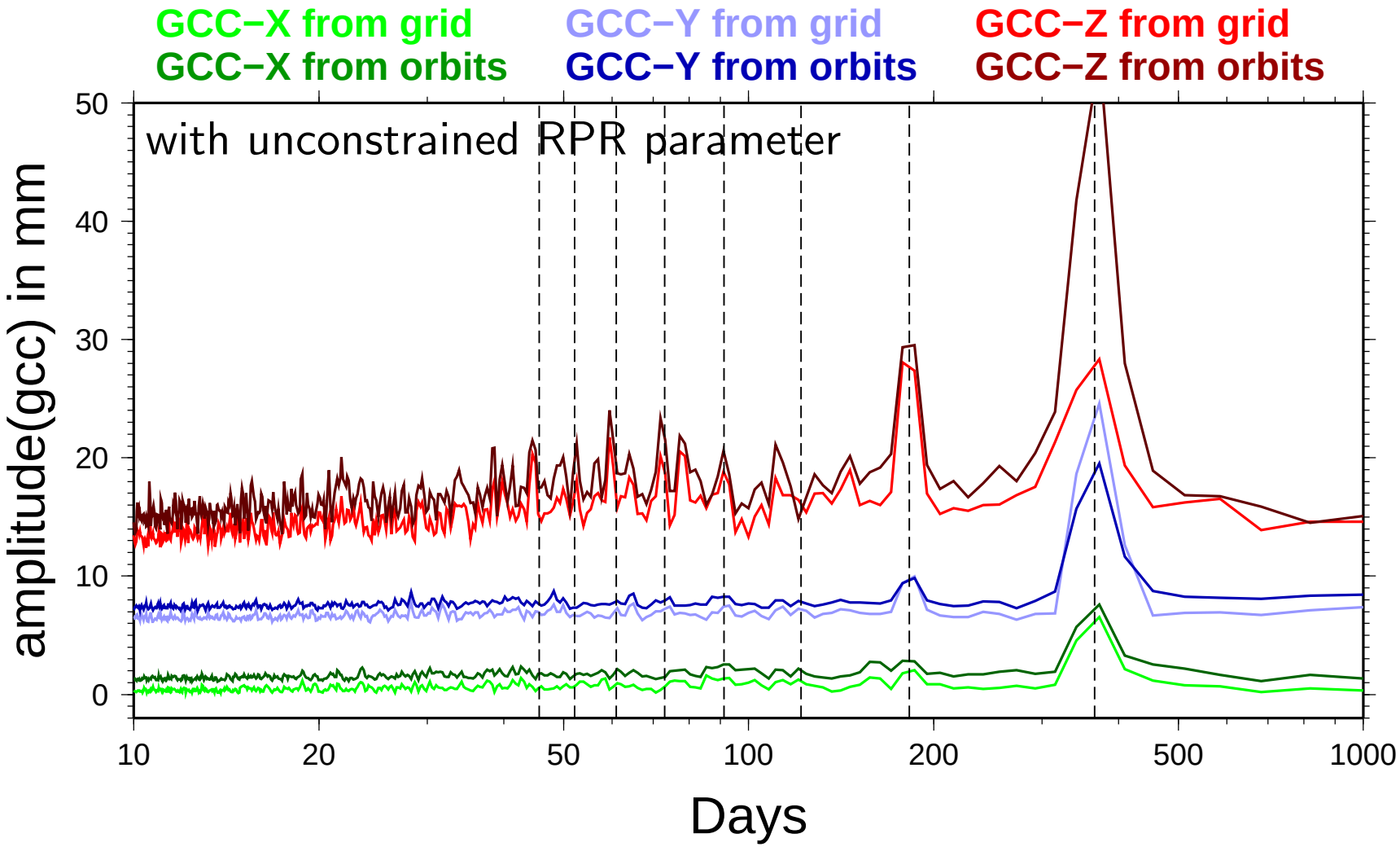

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  This is clearly not practicable.

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- What is the optimal compromise between latency of products and quality of the models providing the mass distribution for loading computations?