Title: **WP5: NRT at TUG – Status and Plans**

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Status of NRT implementation

- NRT is implemented according to D5.1 using L1B data and final GPS products

- GRACE time series starting from 2006 is currently being processed

- Primary focus:
  - Impact on solutions of NRT strategy compared to post processing
  - Finding software bugs and generally improve robustness

- Adaption of kinematic orbit processing to rapid products

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Kalman Solutions: Basic Concept at TUG

- State transition is based on least squares prediction

$$\mathbf{x}_t = \mathbf{B}\mathbf{x}_{t-1} + \mathbf{w} \qquad \mathbf{B} = \Sigma_\Delta \Sigma^{-1}$$
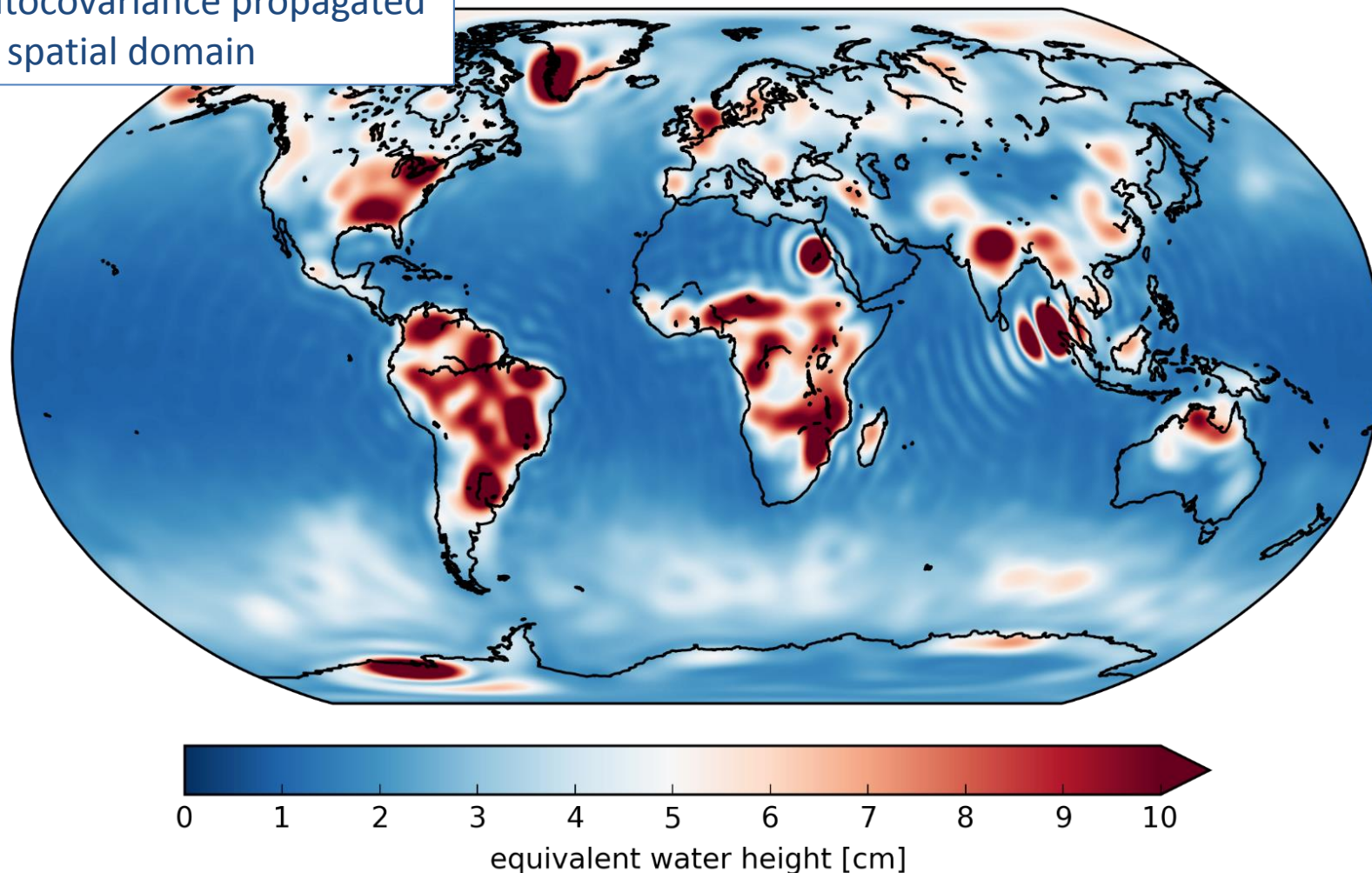
- Auto- and cross covariance can be derived in multiple ways:
  - assume the errors will be proportional to the amplitude of the signal
  - Use ensemble run differences
  - …?

- Currently, the model differences of ESA ESM and AOD are being investigated
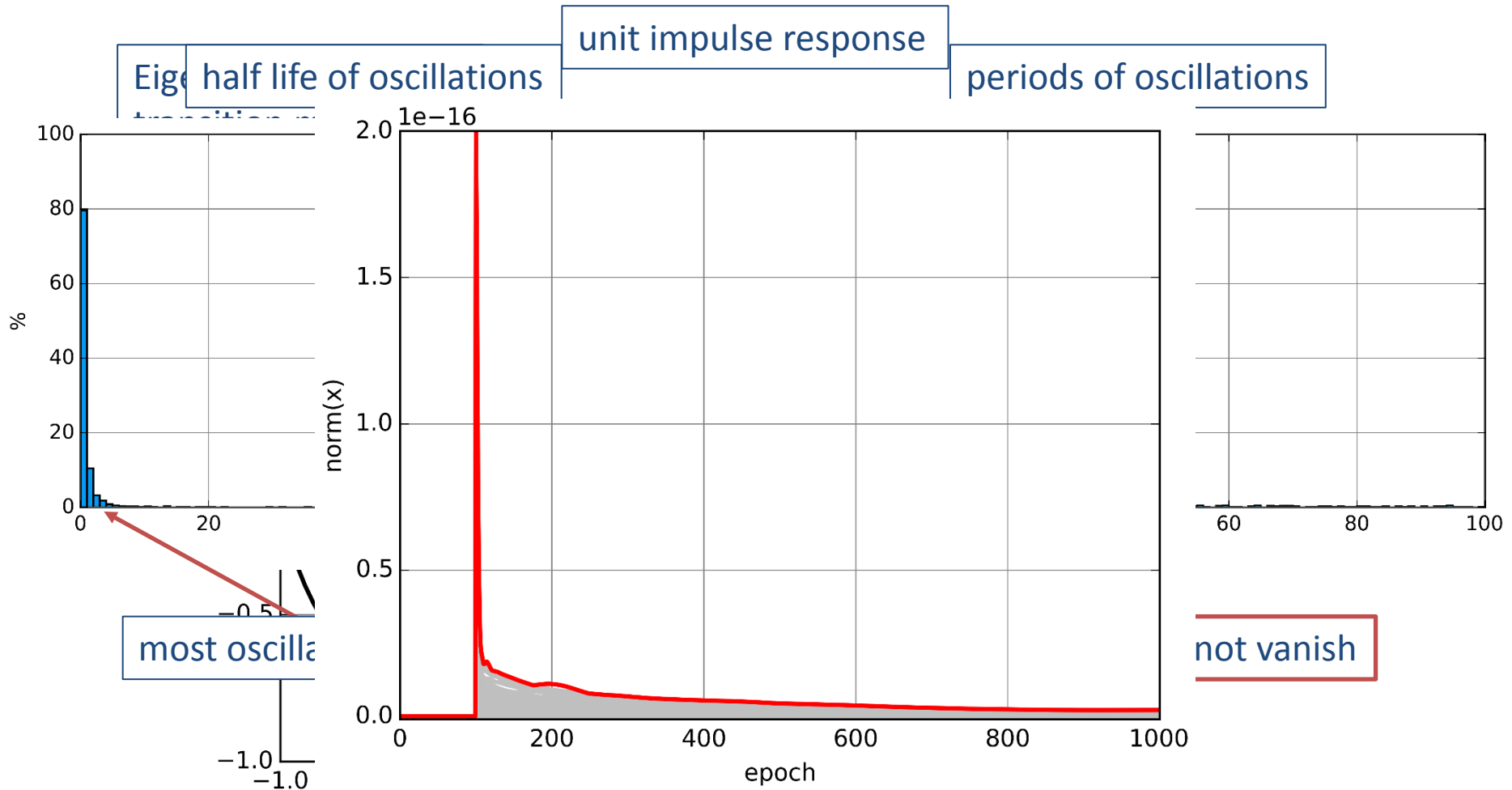
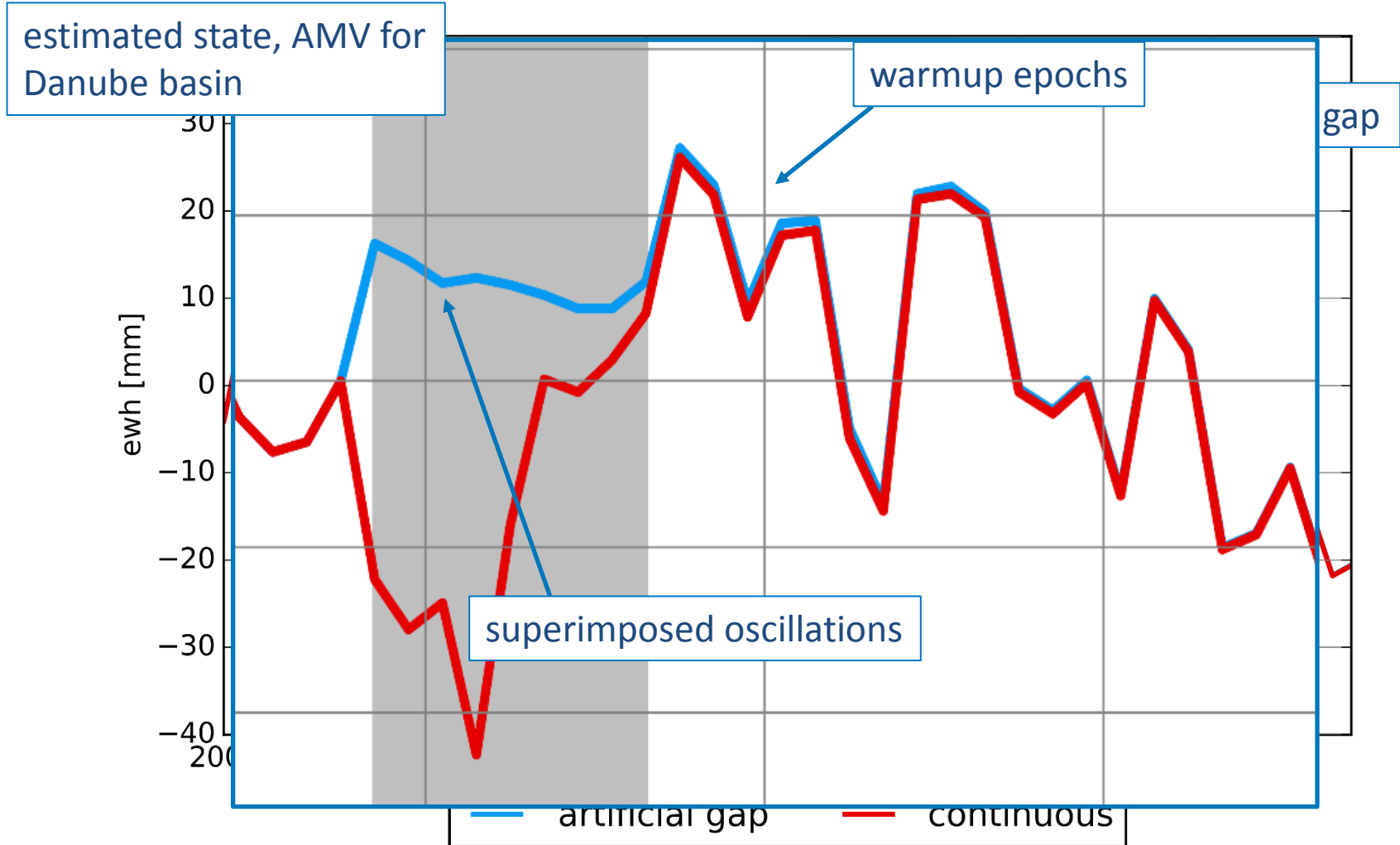# Process Model Derivation (1)
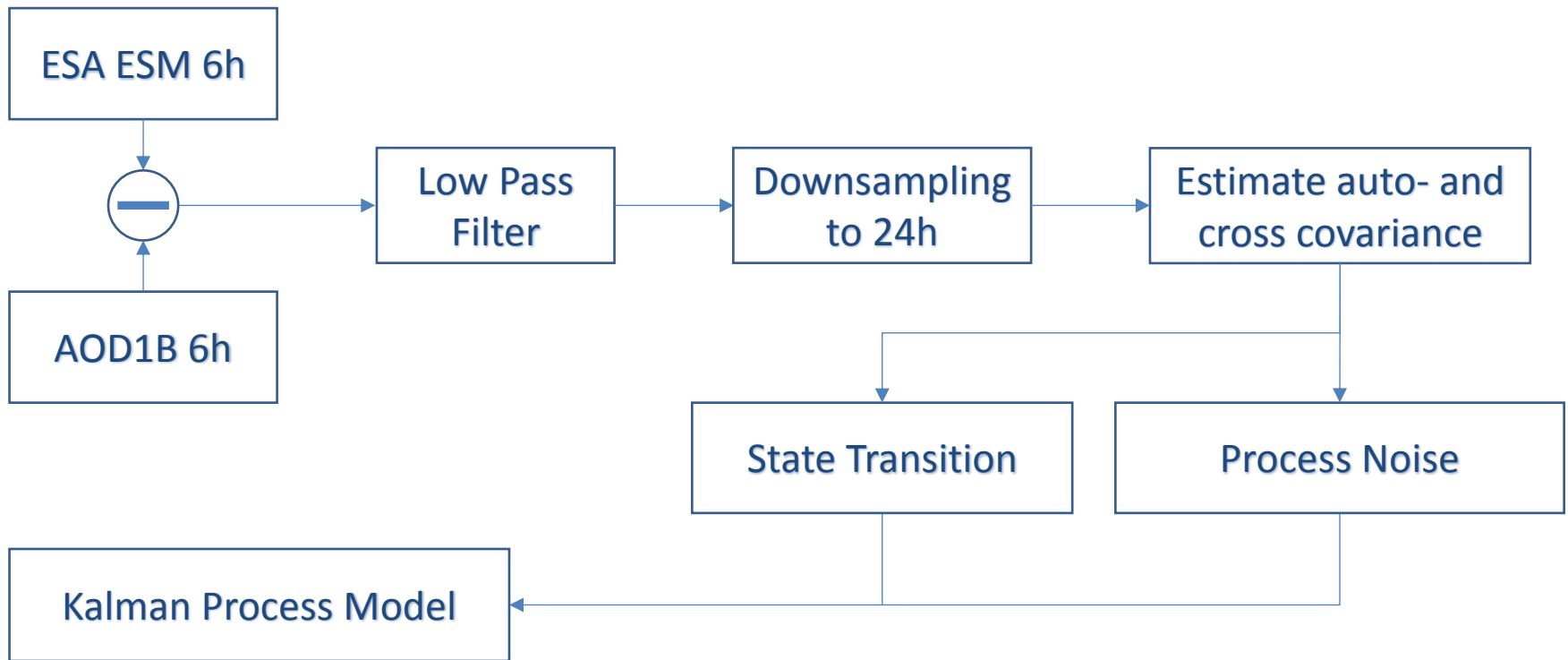
Process Model Derivation (2)

autocovariance propagated
to spatial domain

equivalent water height [cm]

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Process Model Properties (1)

Process Model Properties (2)

estimated state, AMV for Danube basin

warmup epochs

gap

superimposed oscillations

ewh [mm]

30
20
10
0
−10
−20
−30
−40
200

artificial gap — continuous

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Contribution of GRACE to Updated State

propagated to spatial domain

contribution limited

regions with high expected variability

ground tracks

higher orders are not controlled by GRACE → process model

contribution [%]
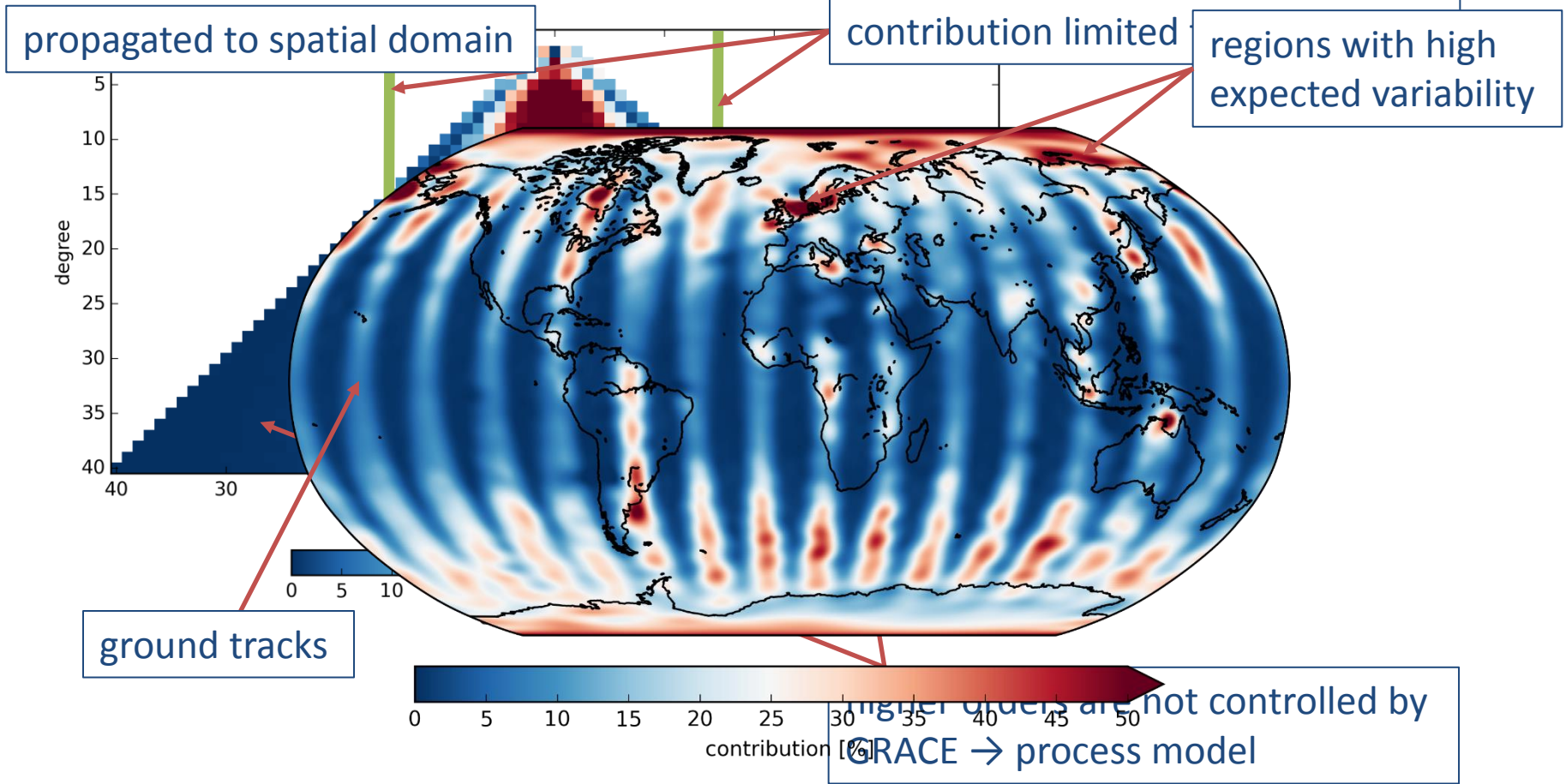
Plans and Outlook

- Finalizing software framework

- Process model tuning
    - Handling of long term correlations in data gaps
    - Introducing new WGHM daily time series (maybe?)

- M7- : Reprocessing of time series using rapid GPS products
    - Improvement of kinematic orbit processing
    - T5.2: data basis for hydrological service (T6.1 & T6.2)

- M7- : Working towards (provisional) service operations resulting in D5.2

Items of Discussion

- During the development of the NRT Draft Concept (D5.1) some interesting points came up:
  - Dependence of the daily solutions of the models used to derive state transition and process noise matrix
  - Impact of constraint on the daily solutions