WP5: Regional gravity field solutions in near real time

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Task

T5.4: Regional Solutions: Concept and Processing TUG, GFZ M04-M27

Input: *D2.1, NRT reference frame data from T3.3, List of historical flooding situations and 2-D flood masks from T3.7*

GFZ and TUG will improve current methods based on alternative representations of the gravity field (e.g. radial base functions) to derive **regional mass transport solutions** and will process these alternative and experimental models **for the complete mission period** and **for all areas of interest**.

Output: *D5.4 (Regional Solution Product Report, M27)*

HORIZON 2020

RBF Regional
Status (in short)

- Development delayed due to intensive work load with NRT development (before 1.4.2017) and NRT operational test run (after 1.4.2017)
- Concept and proto-type has been developed
- Takes full advantage of the infrastructure from the NRT service
- Work shall be finished by Sep. 2017 (comments see last slide)

Linear Equation Systems

- Nominal integration over geographic 1x1 deg surface tiles (2x2 deg based on equal area)
- Data reduction (residual observations) using global 2x2 solution, beforehand
- newly radial basis functions assembly for the regular 1x1 degree surface grid
- Stacking of 5-15 sequential days
- covariance – estimates for
  - Instrument noise de-correlation (similar to 2x2 degree global solutions)
  - no stochastic prediction but *Tikhonov* regularization towards background models (hydrological modeling, exclusively)
- Least Squares Adjustment after each 5-15 days of accumulation
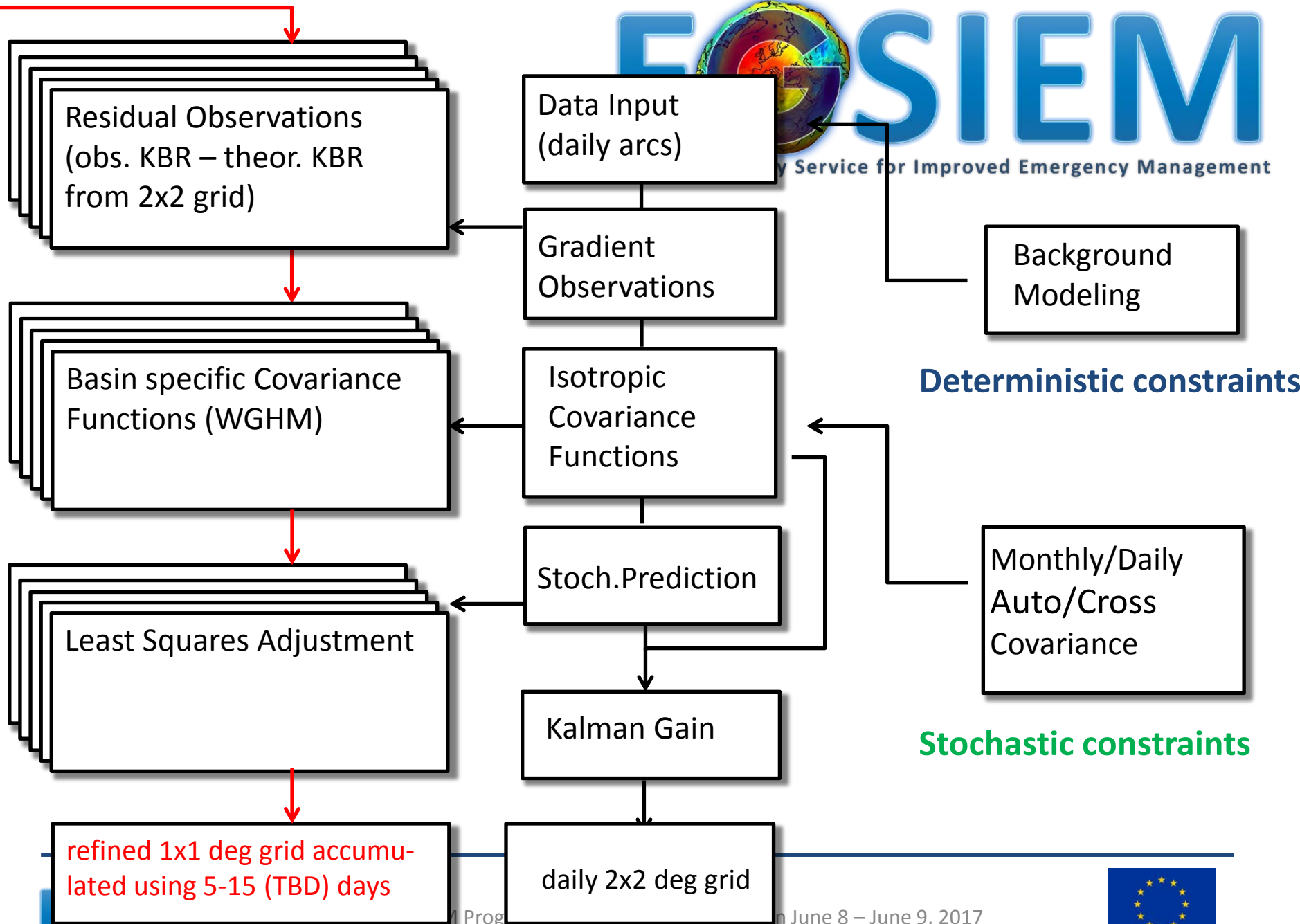
Output products

- Global daily solutions on 2x2 deg grid (water equivalent, center of figure added)
- Global daily 2x2 deg operational average background model
- Global daily averaged AOD1B 2x2 deg de-aliasing
- Global daily 1x1 deg L3 grid (GIA correction, center of figure added)
- SHC deg/ord 50 (center of figure added, static field EIGEN6C restored)
- 1x1 deg regional product for defined areas of interest (*under construction*)
- error estimates for the grid values

Outlook/
Open Issues

- Until end of operational service phase (M33) we will
  - Derive for dedicated (large) basins with historical flood events (e.g. Danube) 1x1 degree regional refined solutions.
  - Finalize Deliverable 5.4 (Regional Solution Product Report) which is understood as a concept paper (draft already available)
- Validation of regional solution has to be performed by the Hydrological Service and summarized at M36 within D6.2 (Operational Hydrological Service Product Report)
- Deliverable D5.5 (NRT Validation Report) due for M36
- Write papers till M36!
  - Gruber et al. : Short latency monitoring of continental, oceanic and atmospheric mass variations using GRACE inter-satellite accelerations, submitted to GJI
  - Gruber et al.: Validation of GRACE time-variable gravity fields by GPS, ICESat, hydrological modeling and altimetry satellite orbits, planned for open access journal