COST-G

Combination Service for Time-variable Gravity Models

COST-G: towards a new GRACE and GRACE-FO combination

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G3P

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  - GRACE-FO
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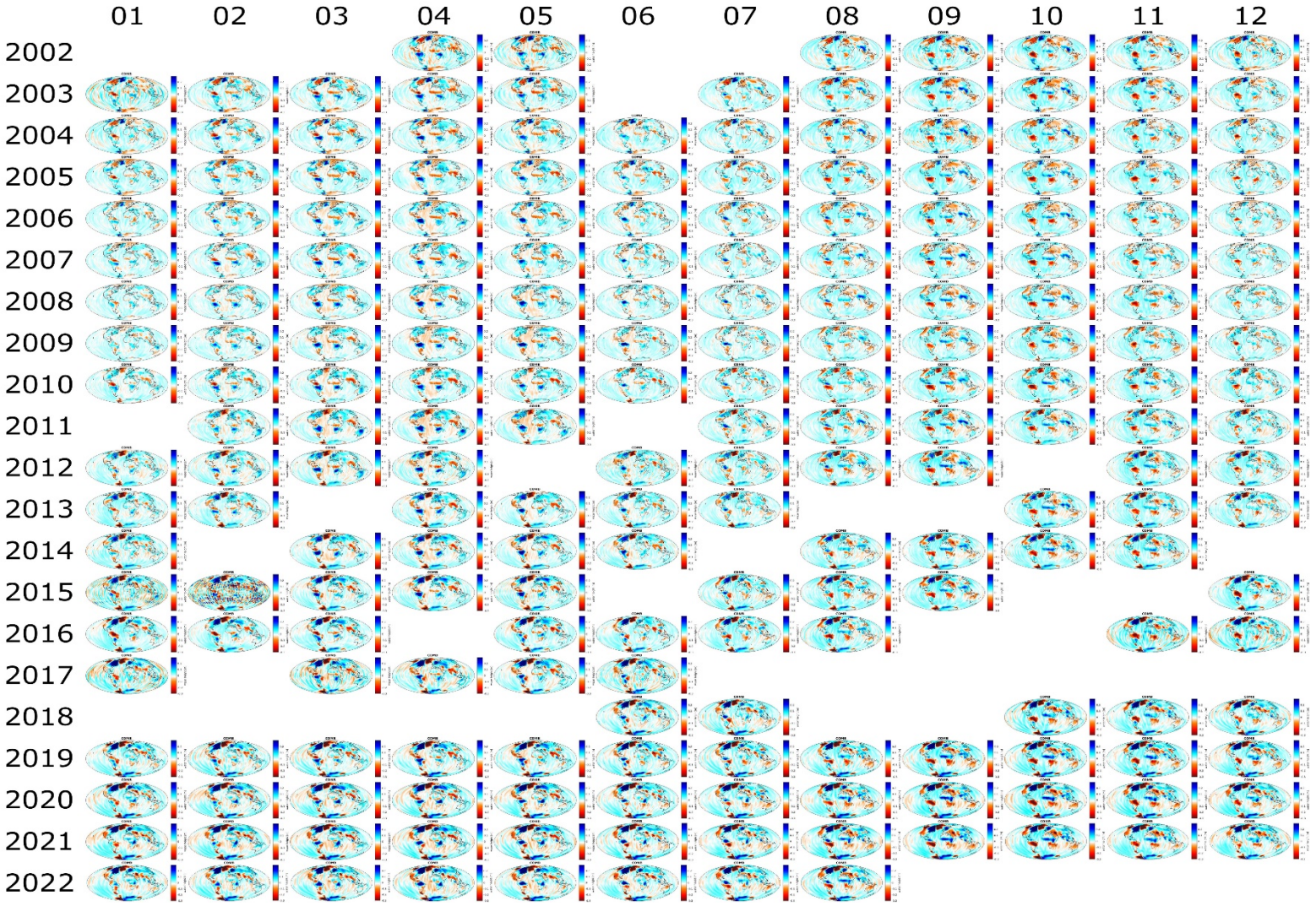
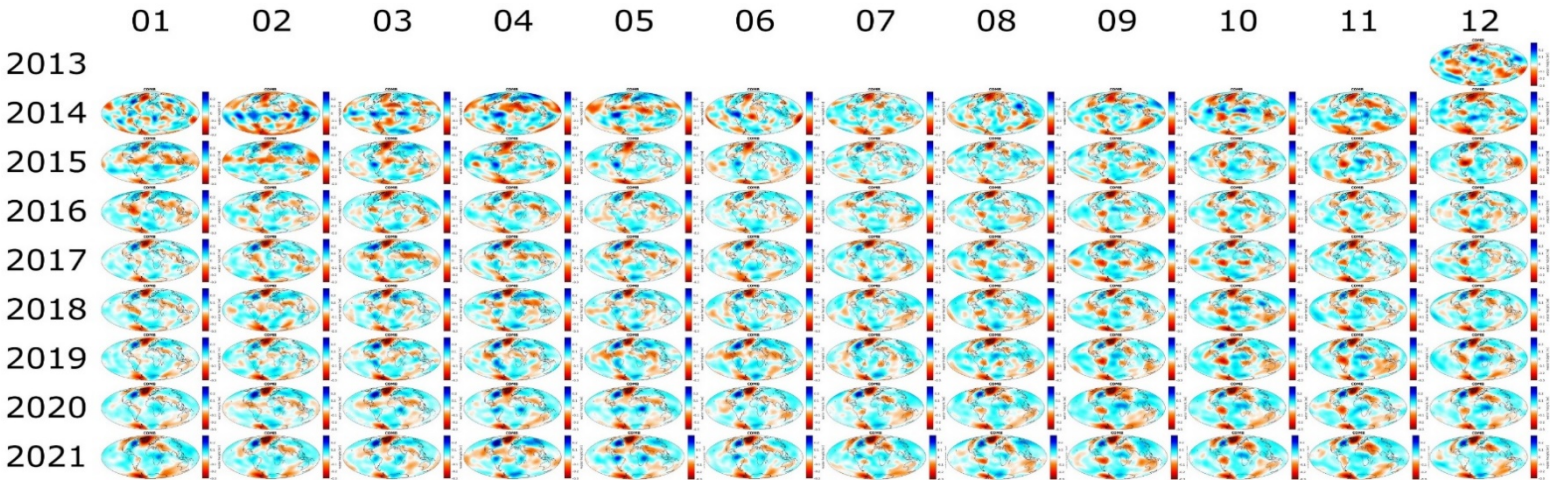
  - new input: AIUB GRACE-FO RL02
  - new weighting scheme
  - new accelerometer transplant products
- GRACE: extended combination
  - new Chinese time-series

COST-G: status

GRACE/GRACE-FO



Swarm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G3P: new GRACE-FO combination

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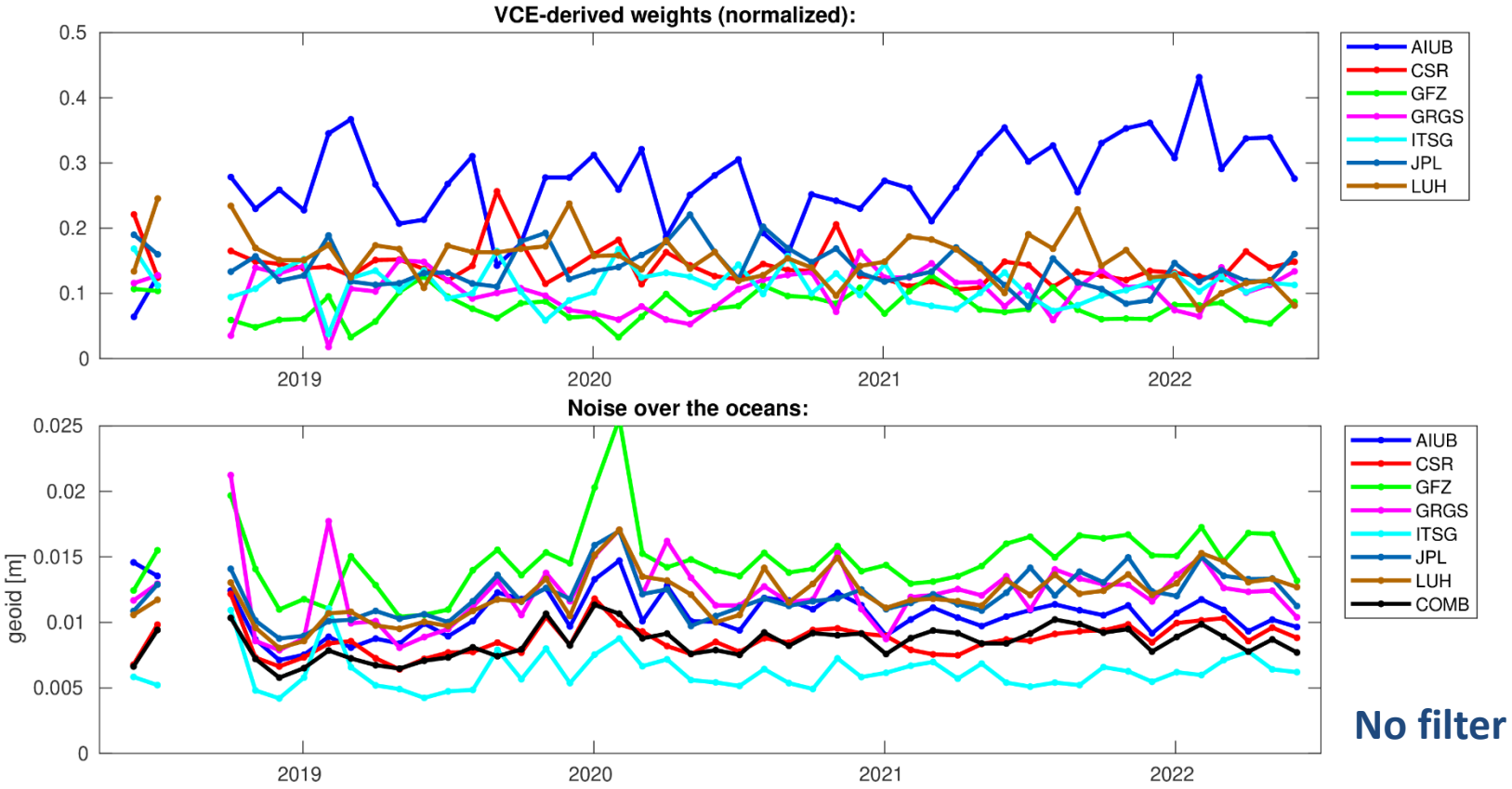
COST-G

GRACE-FO Operational Combination



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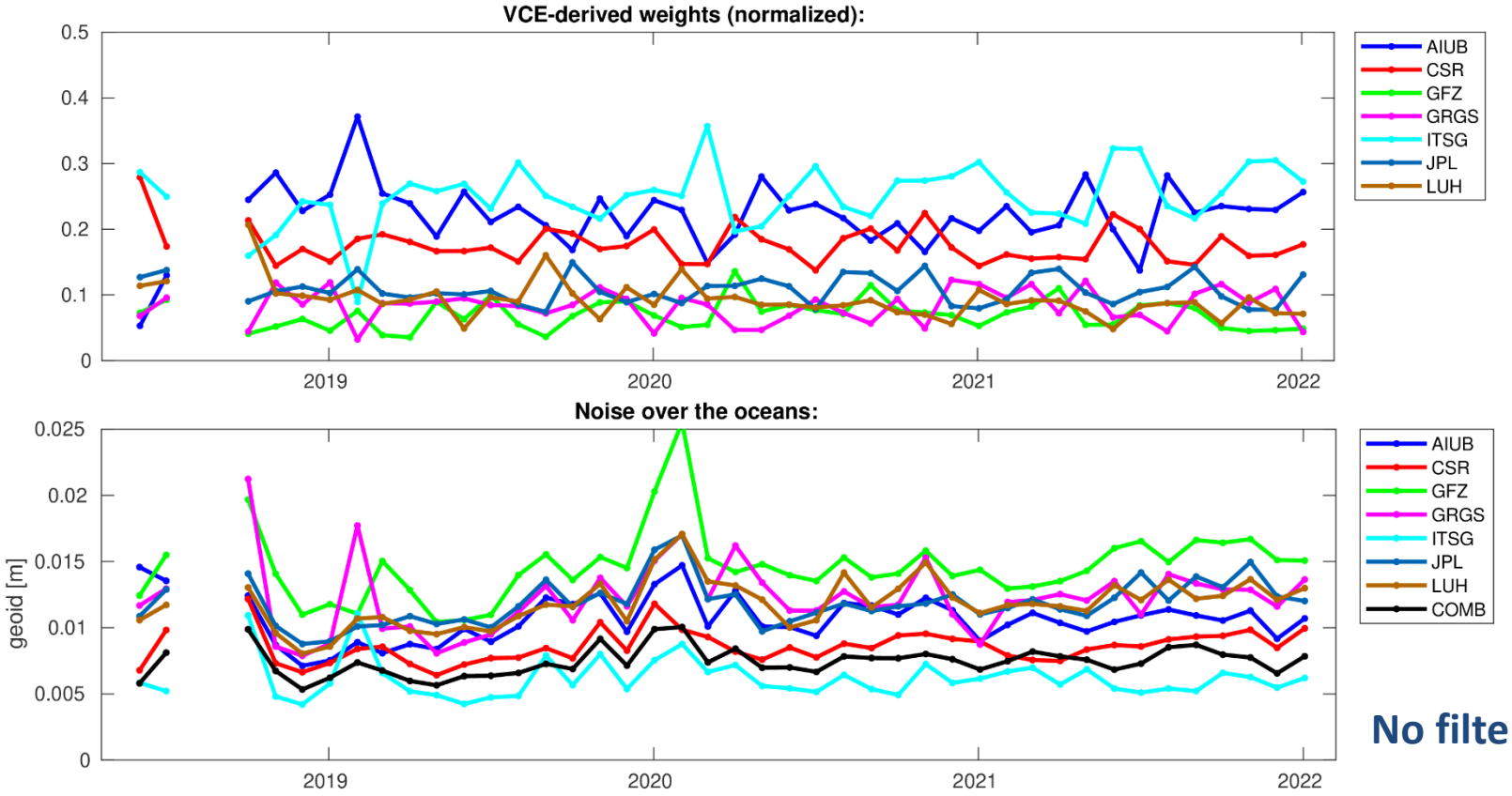
Weights do not reflect the noise over the oceans of AC solutions:

Highest weight: AIUB **Lowest noise: ITSG**

Adopting the Revised Weighting Scheme



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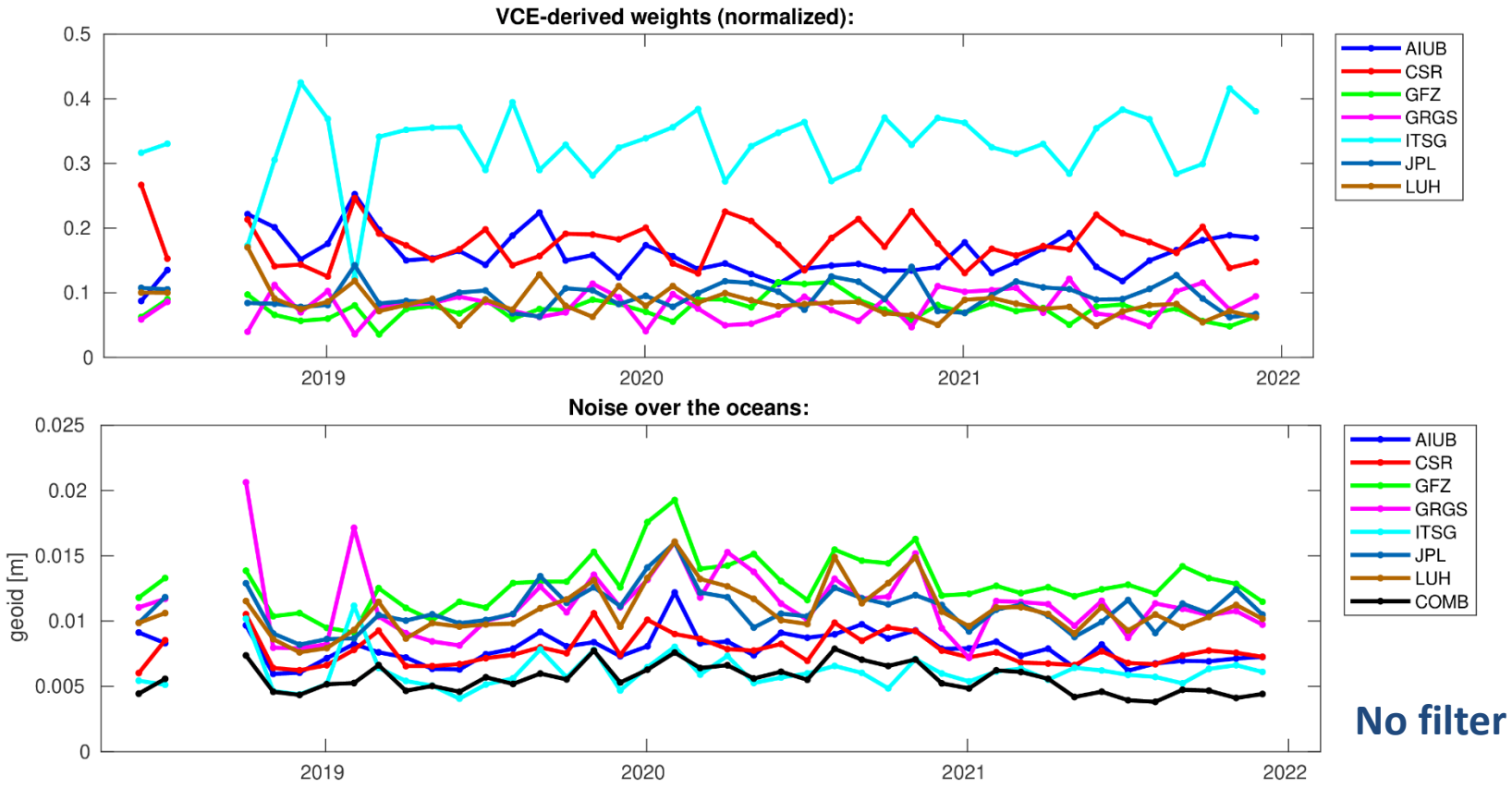
Weights better reflect the noise over the oceans of AC solutions:

Highest weight: ITSG **Lowest noise: ITSG**

Further Improvements of the Combined Solution



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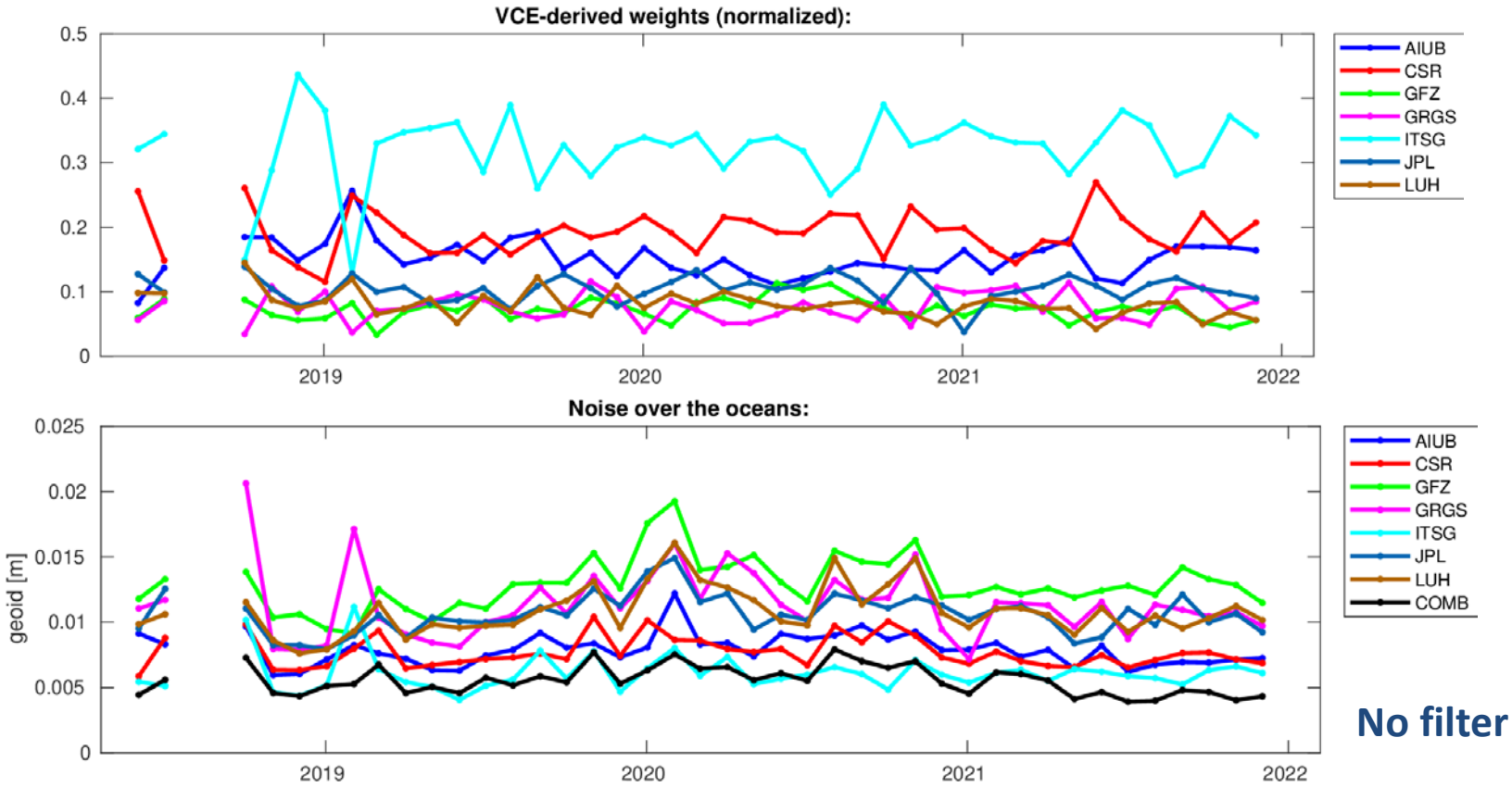
- Empirical Noise Modeling of **AIUB** AC solution (Ph.D. work of M. Lasser)
- **GFZ** time-series based on ACT product from G3P (as AIUB, GRGS, ITSG, LUH)

=> **Combination** outperforms all solutions in 2021

Further Improvements of the Combined Solution



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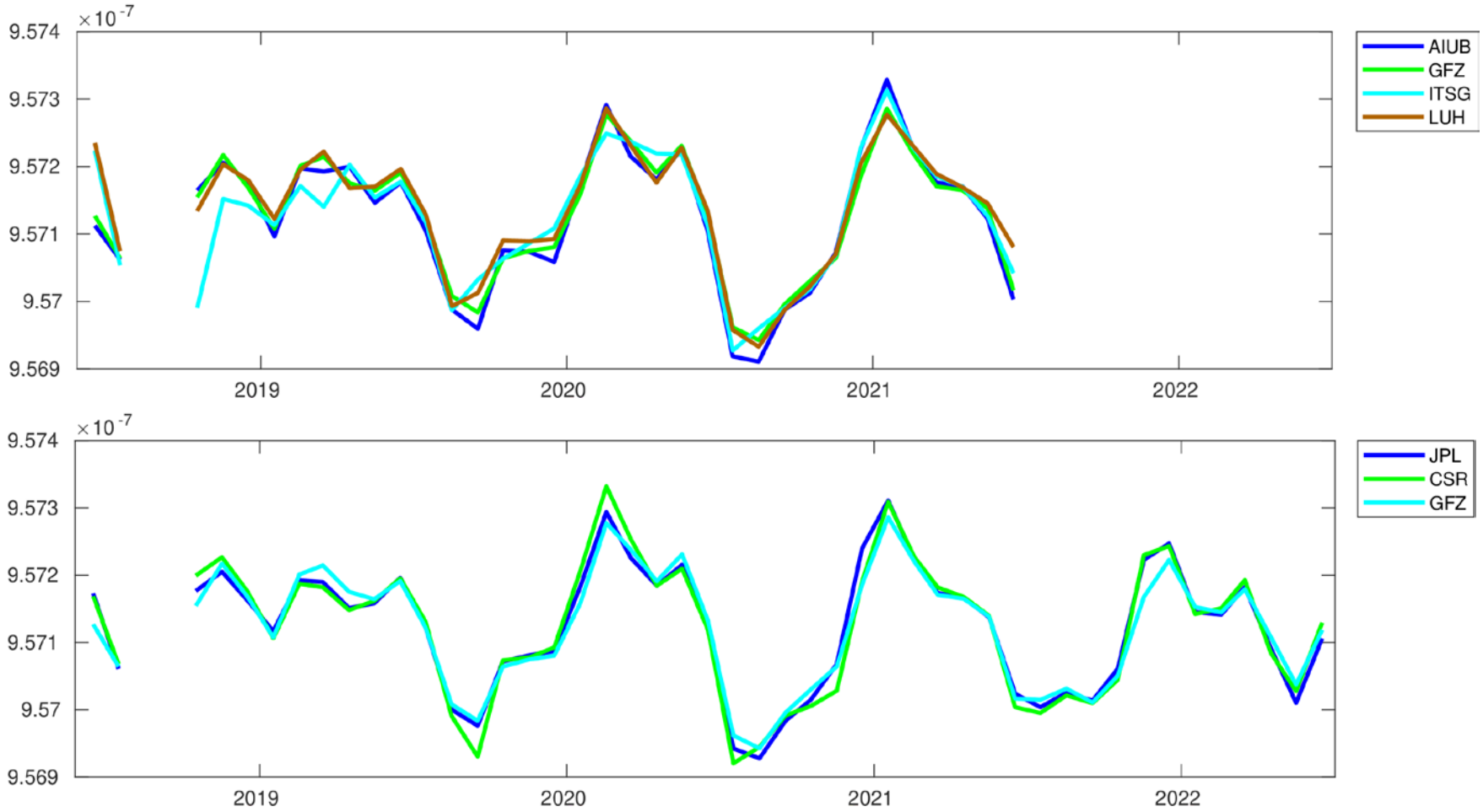
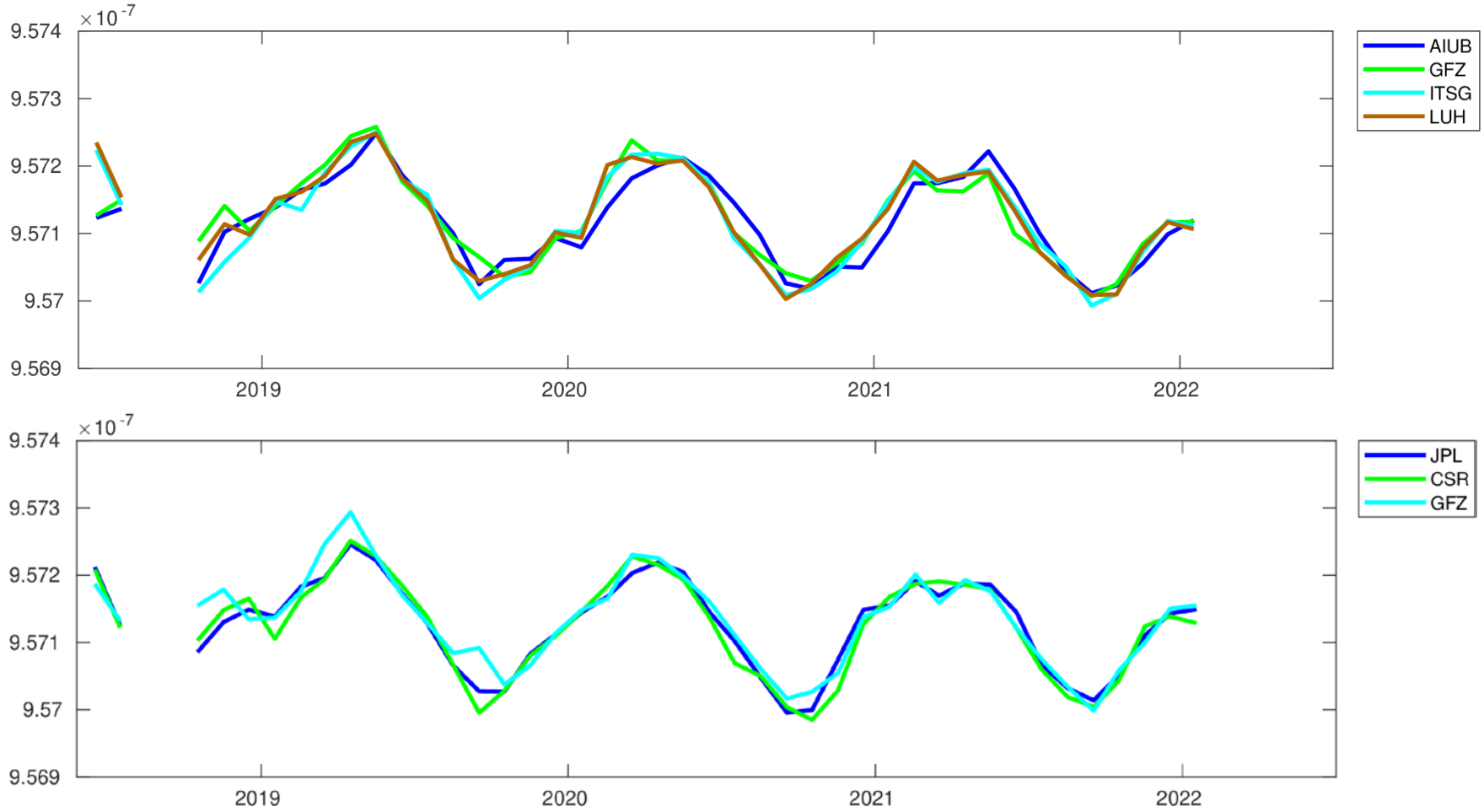
- **CSR and JPL RL06.1 time-series based on new JPL-ACT product; the main effect is on C30, which in case of using either the G3P-ACT or the new JPL-ACT has not to be replaced by SLR-derived values.**

Impact of G3P/new JPL-ACT on C_{30}



The accelerometer transplant product has a major impact on gravity field coefficient C_{30} (artefacts with 320d-period).

Impact of G3P/new-JPL ACT on C_{30}



The accelerometer transplant product has a major impact on gravity field coefficient C_{30}. The artefacts in C_{30} are remarkably reduced with the G3P/new JPL-ACT.

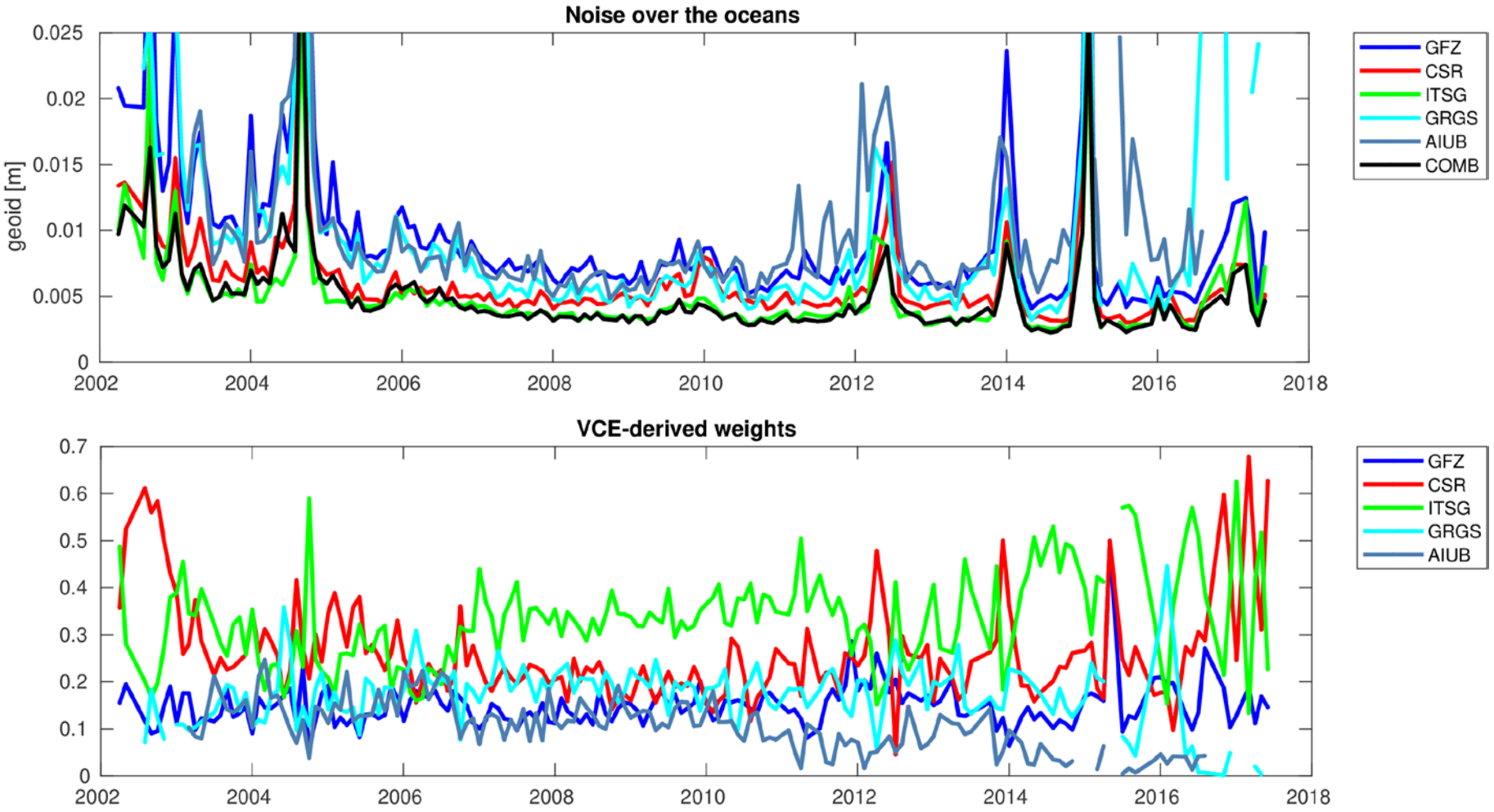
G3P-Summary

- G3P L2-combination offers:
  - reduced noise,
  - unchanged signal,
  - original GRACE-FO C_{30}

=> Improved signal-to-noise ratio, i.e. benefit for small scale/low amplitude signals.

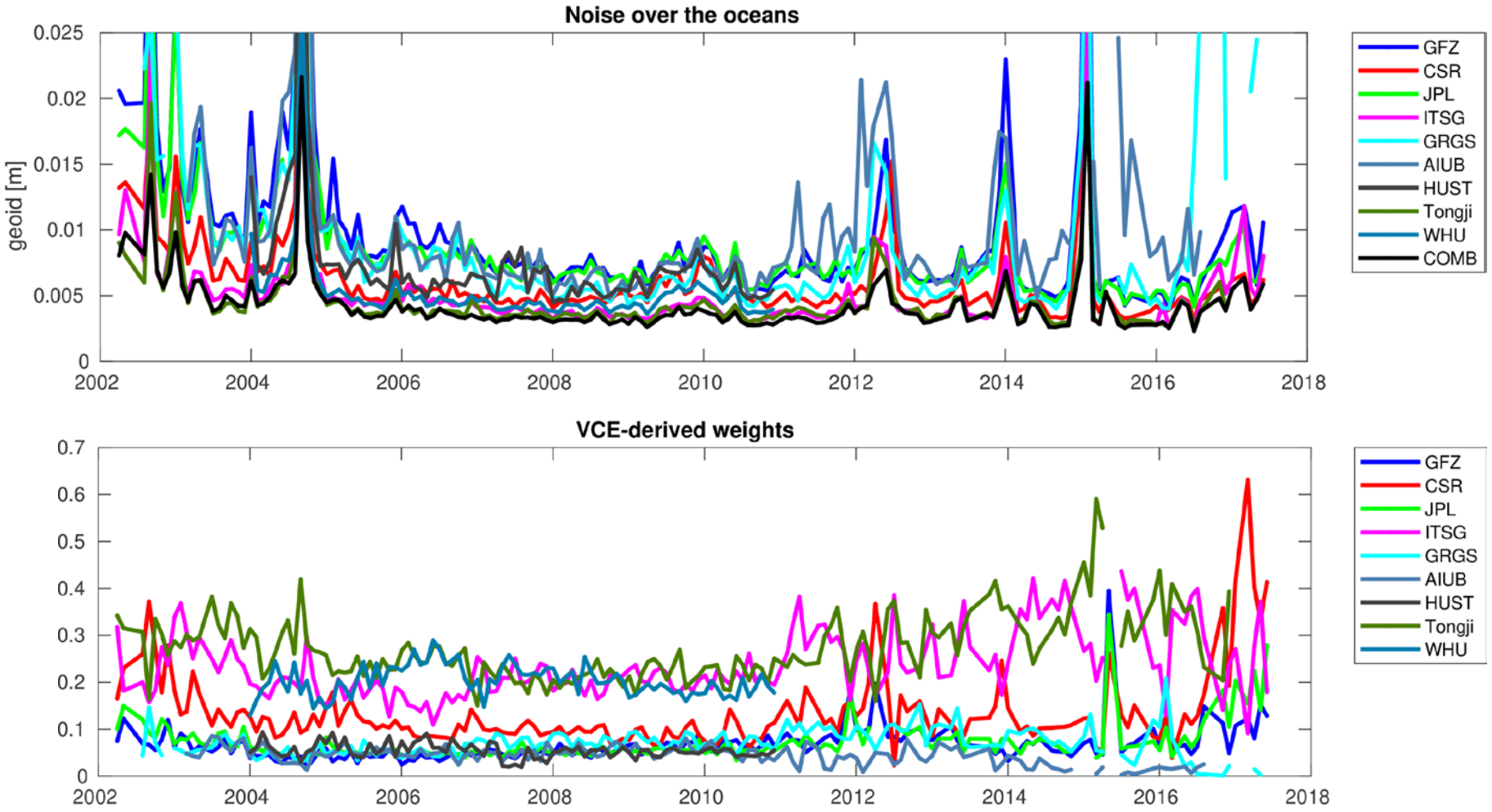
extended GRACE combination

Combination and noise asessment: RL01



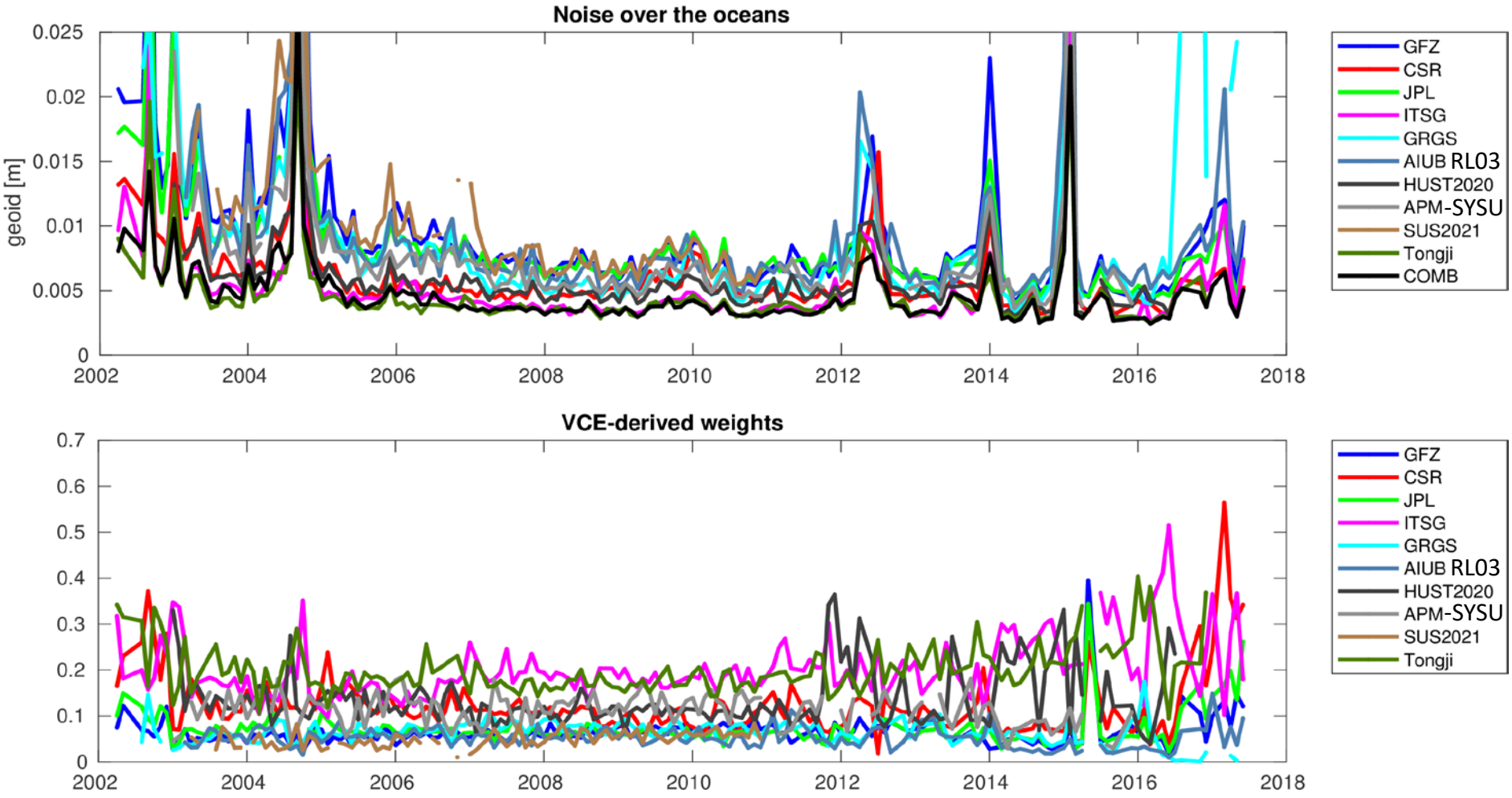
Operational GRACE combination: lowest noise ITSG – highest weights ITSG

Combination and noise asessment: extended (2020)



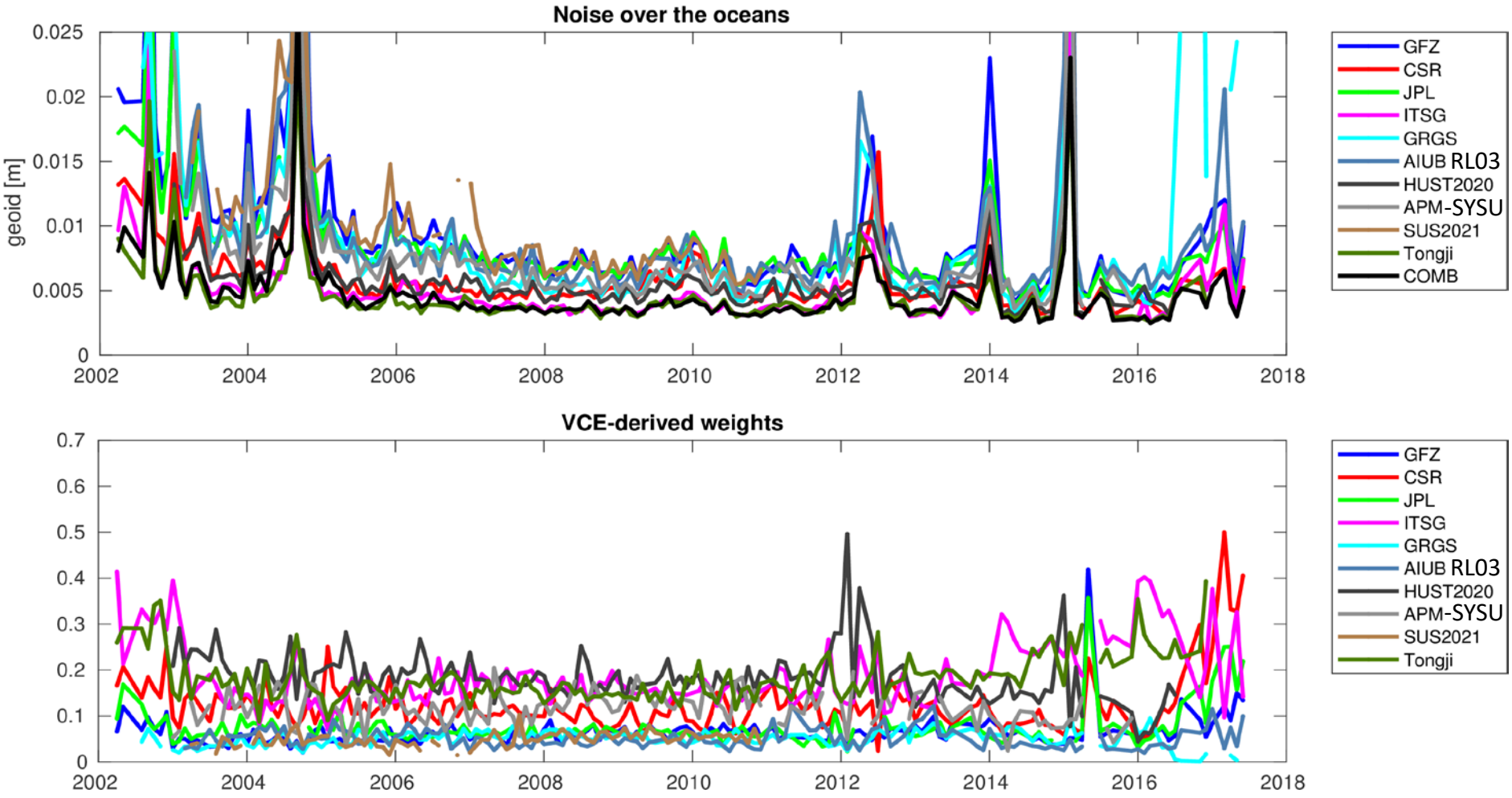
Extended GRACE combination (2020): strong contribution by Tongji and WHU-RL02

Combination and noise asessment: extended (2022)



Extended GRACE combination (2022): more homogeneous weights

Combination and noise asessment: extended 22.v2



G3P-weighting scheme: impact on HUST-weight, little impact on combination

GRACE-Summary

- Extended GRACE-combination:
  - is based on a larger set of time-series
  - does not profit from change in weighting scheme
  - may profit from alternative ACT-product (2016/17)
  - only moderate reduction of noise
  - more consistent use of background models