Summary

Model-data comparisons

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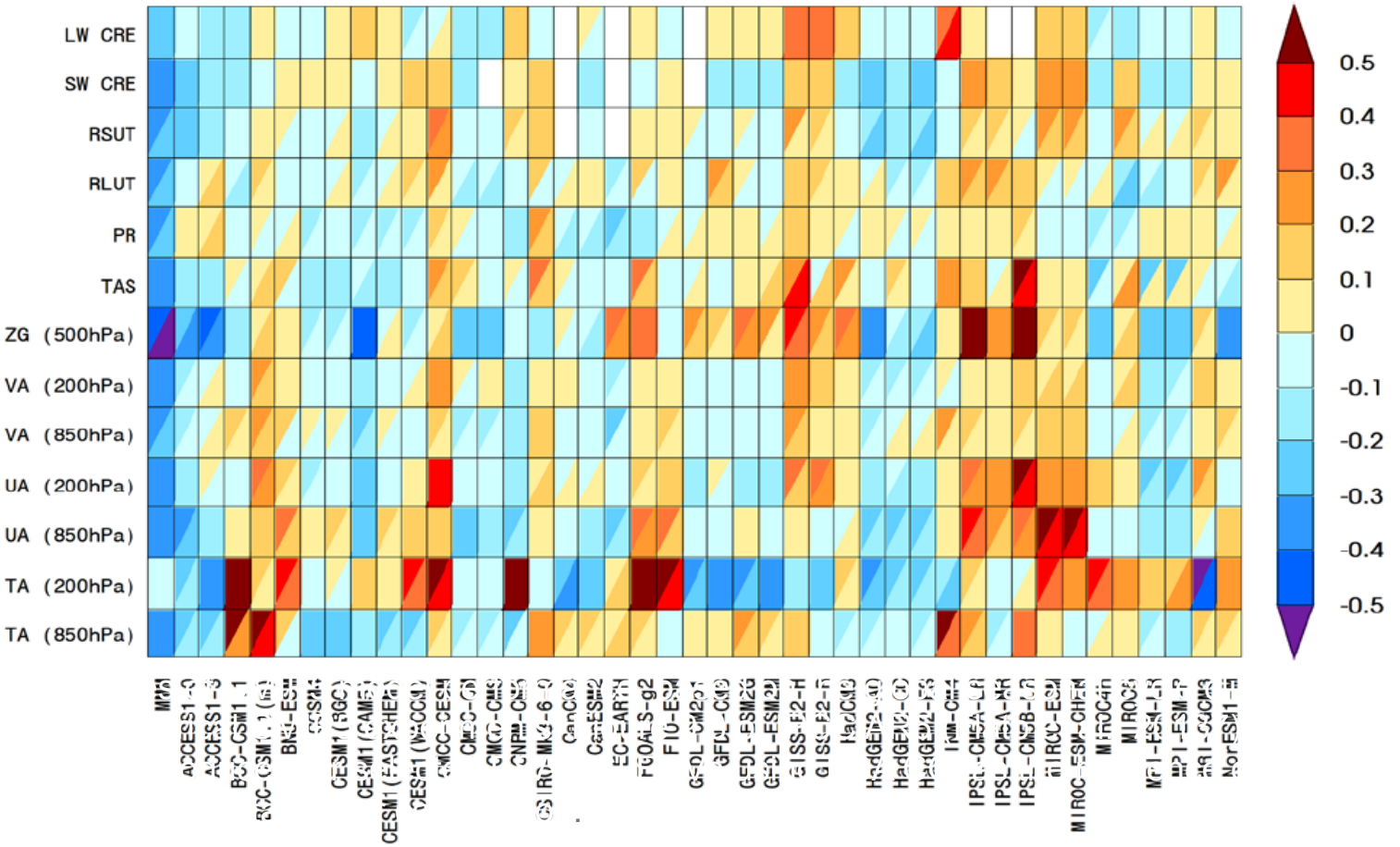
- **3 presentations**
- **General ways of model data comparisons**: model fields vs. Observations, reanalysis vs. Observations, assimilation in models, model assessments and benchmarking
- Tools
  - ESMValTool → CMIP6
  - CMF@ECMWF → Reanalysis
  - Reanalysis systems → allows impact assessment („is it worth using?“)

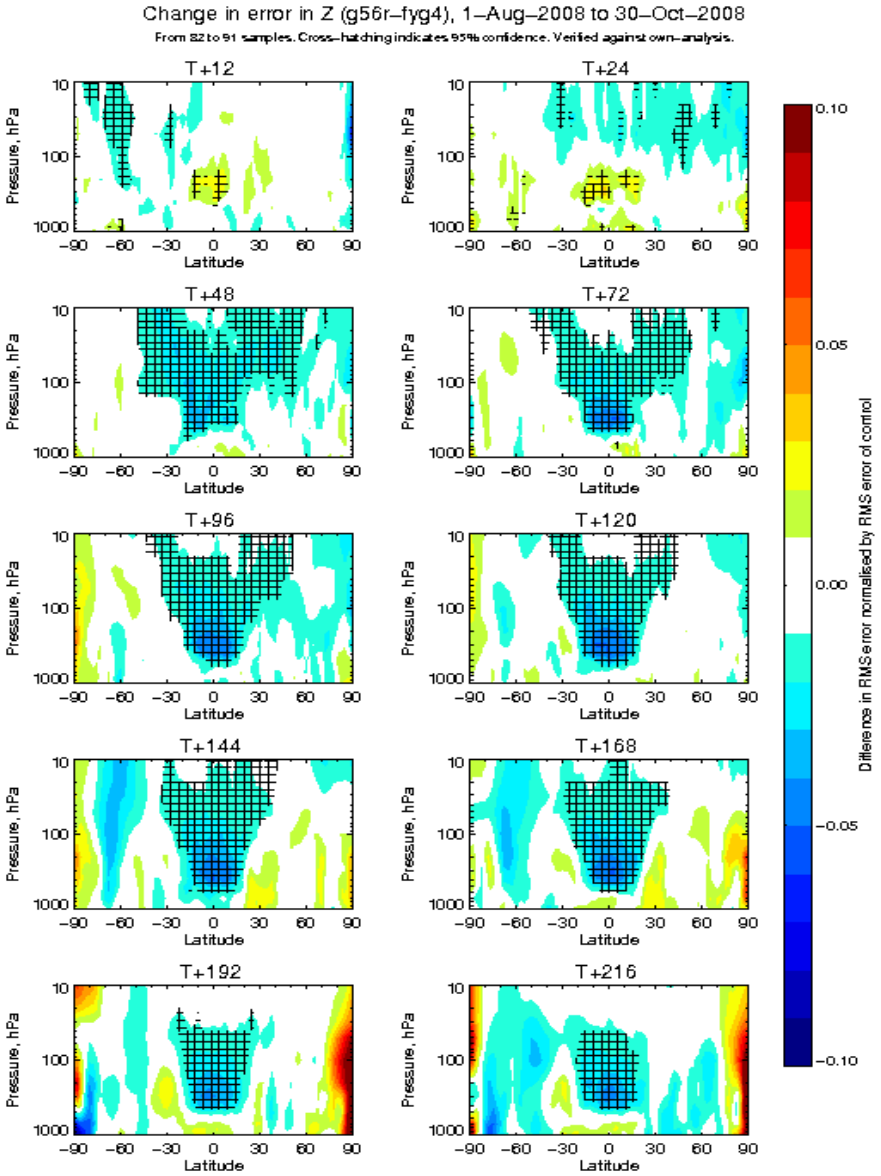
Model-data comparisons

- **Do we use models to understand caveats in our CCI records?** Some examples existing, but at early stage → potential to further improve this feedback?
- **Reanalysis vs. Observations / Assimilation**: how could bias be estimated?
- **Assessment/benchmarking of models**: sampling biases are an issue for model benchmarking; do we have a solution.
- **Model data & processing**: model data is large; infrastructures like CEMS or DKRZ offering capabilites to perform computing on place are essential (should be probably also more used by CRG‘s in CCI teams)

Performance Metrics calculated with ESA CCI Data



GOME-2 NPO3 impact on forecasts: an example of consistency



GOME-2 NPO3 degrades RMS Fc error

GOME-2 NPO3 Improves RMS Fc error

- **Vertical cross-section of the change in the RMS forecast error of the geopotential height computed at various forecast times.**
- **Hatched areas show where the changes are statistically significant with a 95% confidence level.**

Model-data comparisons

- **Vertical distribution of variables:** use of averaging kernels, jacobians,
- **Usage of uncertainties**: initial usage of uncertainty information is ongoing; however, usage of the novel uncertainty information seems to be underexploited → strategy in the CRG‘s?
- **Delivery of ensemble products to represent uncertainties?** Might be a good way to represent uncertainties e.g. For obs4MIP and CMIP comparison.
- How do we avoid that our good datasets get „bad marks“. Must look at several aspects of assessment as models can be „tuned“ to old system.