Linkage from Research to Operational activity

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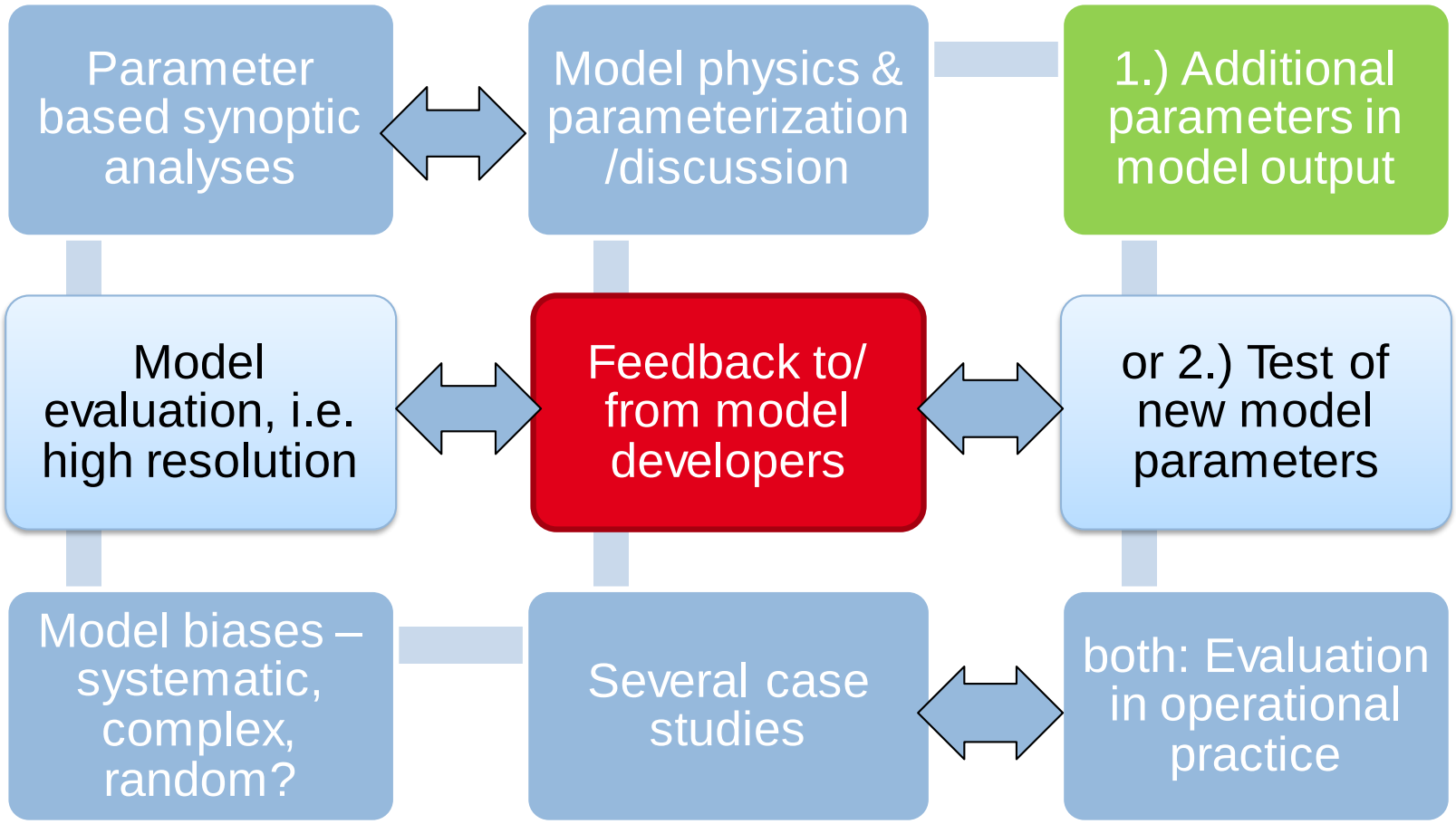
Introductory comments

- The topic and aim is how can work the improved know how transfer from research in theoretical meteorology to apply in operational practice (synoptic approach).
- And the opposite case - providing of case studies with meaningful results from behalf of synoptic, meso- and subgrade scale and their interpretation with different conceptional models as well as current model physics and parameterizations in global and high resolution models.
- In short this means double feedback from theoretical and practical meteorology and use of synergies between conceptional models on the one hand and applying the state of art on behalf of model physics on the other hand.

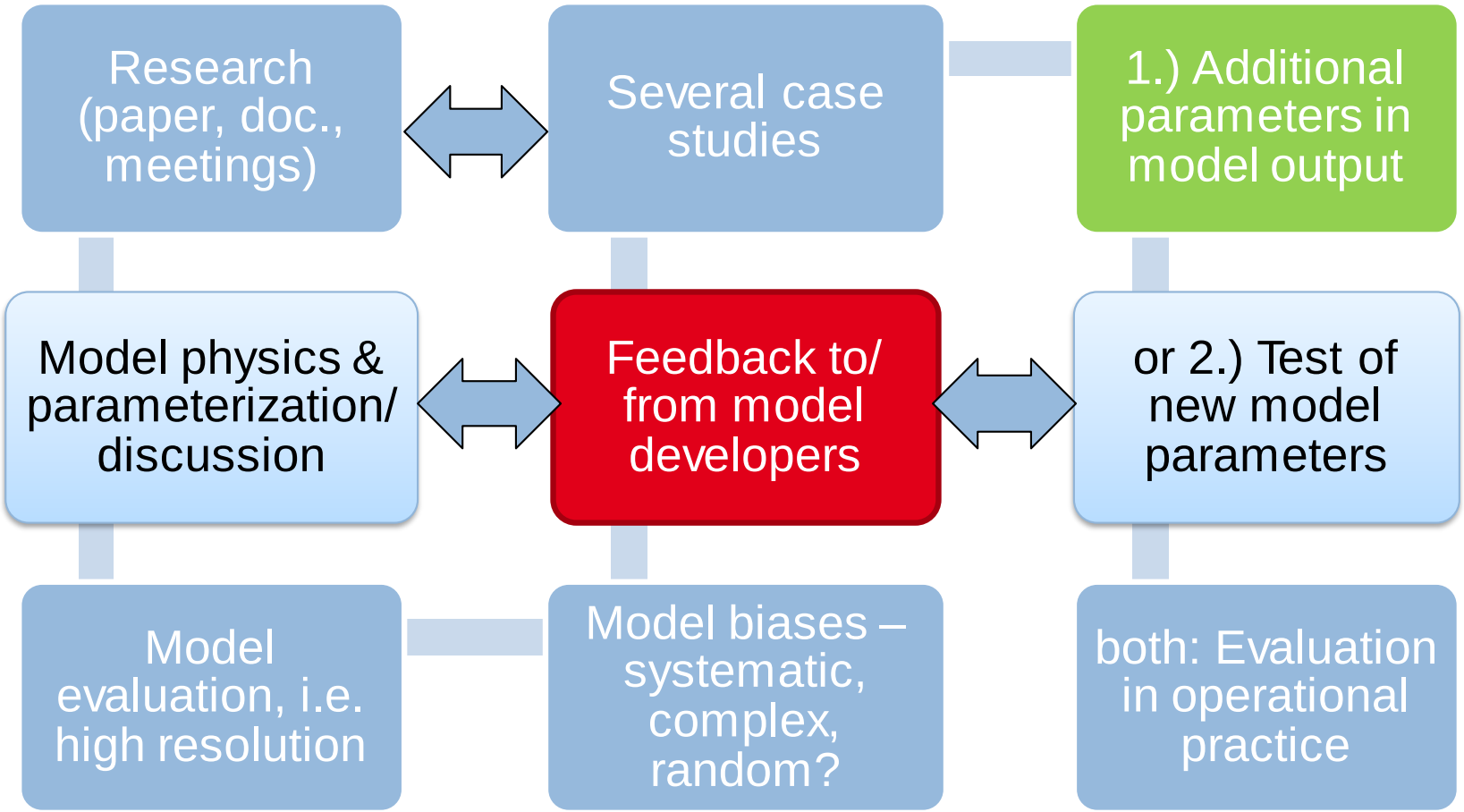
Introductory comments

- Such approach can lead to discover of new (external) or adaptation of existing parameters, related to enhancement of operational forecast through differential analyses and interpretation of synoptic deviations and non-homogeneities (discovered and approved with case studies) with the support of physics and mathematics.
- Results can be e.g. enhanced parameterization or new explicit model calculations (i.e. different or adapted forcing) and so improved weather forecasting (for short and medium range-wide weather forecast) and also better understanding of physical and chemical processes in the atmosphere and ocean as well as the complex interactions between it and within it.

Flowchart Diagram – operational practice vs. research



Flowchart Diagram – research vs. operational practice



The process and structure at the DWD

- Weather forecasting department (WV 12, VBZ); tasks, among others:
  - ✓ Operational weather forecasting;
  - ✓ Definition of technical and operational user requirements (national and international) of the VBZ. Implementation of these requirements in the service provision of the forecasting and consulting center;
  - ✓ Scientific exchange (Weather forecast services/centers, Institutes, conferences).

The process and structure at the DWD

- ➔ Weather forecasting department (WV 12, VBZ):
  - ✓ Evaluation of new model versions, radar, now - casting and MOS-products (several working groups):
    - ✓ i.e. evaluation of model resp. product consistence, compatibility and synoptic evidence;
  - ✓ Providing of evaluation sessions, i.e. with model developers:
    - ✓ i.e. model and parameterization discussion;
    - ✓ Recommendations from synoptic approach (approved with case studies and/or papers);

The process and structure at the DWD

- ➔ Research department (FE 1 Meteorological analysis and modeling); tasks, among others:
  - ✓ Model physics and parameterization:
    - ✓ i.e. new development, model outputs, maintenance, technical support, complementation, testing, scientific exchange;
  - ✓ (Numerical) evaluation, adaptation, integration of new model versions;
  - ✓ Application-oriented research in the field of numerical simulation of the atmosphere;

The process and structure at the DWD

- ➔ Research and development department (FE 1):
  - ✓ Providing of evaluation sessions, i.e. with Forecasters (VBZ), including:
    - ✓ model and parameterization discussion, which can lead to:
      - ✓ Integration of new components, conceptional favorites or parameters in model outputs, i.e. cross-sections with certain parameters as support for Forecasters;
      - ✓ Adaptation of parameterization schemes.

Examples DWD/ ECMWF

- 1.) Evaluation working group between VBZ and FE, related to model discussion:
  - ✓ Regular evaluation sessions with interesting synoptic cases, related to model forecasting quality and consistency;
  - ✓ Current: working on wind gust parameterization (after presentation of meaningful case studies), including external parameters with synoptic approach (also in cooperation with ECMWF Reading).

- 2.) Internal project group founded:
  - ✓ Proposals for enhanced (extended) medium range-wide weather forecast (to fill the gap to sub-seasonal forecast), including stratospheric parameters.

Thanks for your attention!