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## Parametrization and data assimilation

*Friday, 3 April 2020 09:15 (1 hour)*

This two-hour lecture will start by explaining the role and main ingredients of data assimilation in general. The widely used framework of variational data assimilation will then be gradually introduced. The challenges associated with the necessary inclusion of physical parametrizations in the data assimilation process will be highlighted. The concept of adjoint model as well as the techniques to derive it will be introduced. The importance of the linearity constraint in 4D-Var and the methods to address it will be detailed. The set of linearized physical parametrizations used at ECMWF will then be briefly presented. Finally, various examples of the use of physical parametrizations in variational data assimilation and its impact on weather forecast quality will be given.

By the end of the session, the students should be able:

- to name the main ingredients of a data assimilation system.
- to tell why physical parametrizations are needed in data assimilation.
- to identify the role of the adjoint code in 4D-Var.
- to recognize the importance of the regularization of the linearized code.

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