ID de Contribution: **24** Type: **Talk (Long)**

Using machine learning to parameterize unresolved processes in climate models: a few thoughts on the example of gravity waves

jeudi 11 juillet 2024 09:30 (45 minutes)

Climate models and Numerical Weather Prediction (NWP) Models describe the atmospheric circulation with a
limited resolution. There unavoidably remains processes that involve spatial scales shorter than the grid scales, ie processes that are unresolved. Cloud processes, turbulence near the surface and internal gravity waves propagating from lower to upper layers are among the main dynamical processes that are unresolved and need to be parameterized, ie represented by sub-models designed in part heuristically.

Machine Learning has been proposed as a major tool to advance in the parameterization of subgrid-scale processes for climate and NWP models. Numerous investigations and developments have been carried out, and are ongoing. Within this context, we have chosen to use Machine Learning to probe the relationship between the large-scale (resolved) flow and internal gravity waves, as observed by long-duration balloon campaigns. Tree-based methods (Random Forests, Extremely Rnadomized Trees, Adaptive Boosting) have been used to predict observed gravity waves from variables describing the large-scale flow. Comparisons to existing parameterizations will be described briefly. Pesperctives and challenges of different approaches for the parametrization problem will be discussed.

The presentation will give an overview of this general context, of the physics and observations of atmospheric gravity waves, and of the investigations carried out and results obtained within our team.

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