

Driver files for DALES



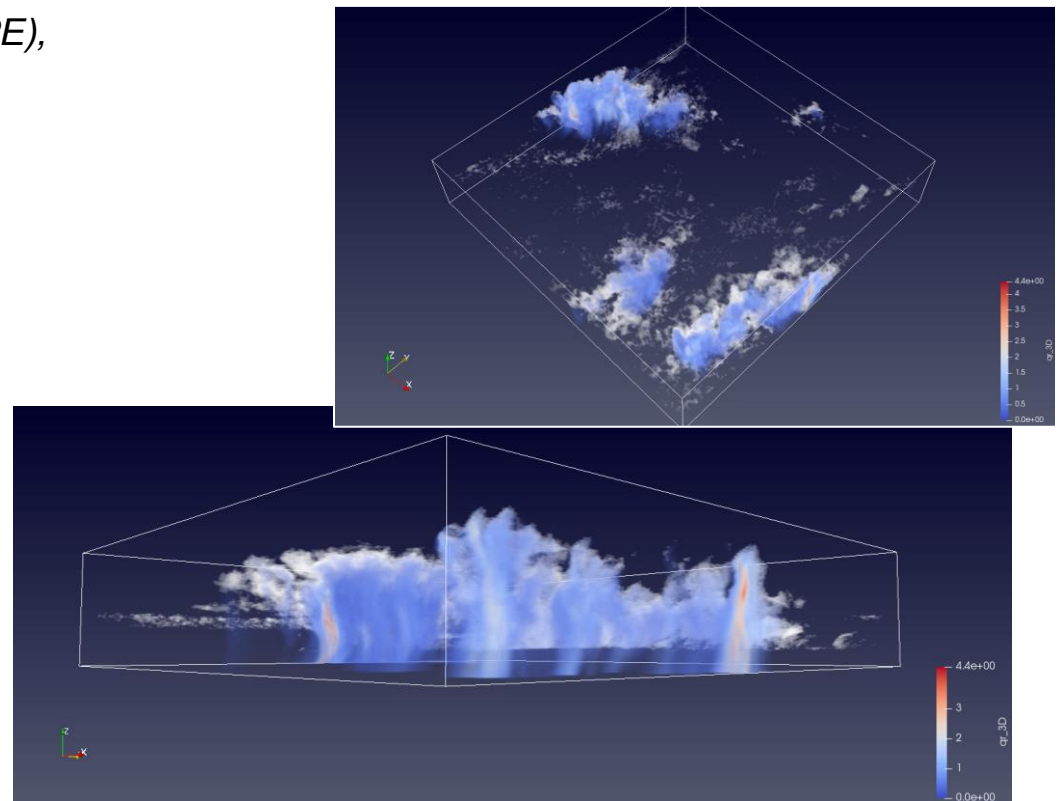
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- Input file format
- Library of cases

First DALES results for a Lagrangian EUREC4A case



How we use DALES

github.com/dalesteam/dales

1. As a high-resolution idealized LES model

Periodic boundaries, horizontally homogeneous but time-dependent forcing, interactive surface/soil model, mixed-phase microphysics, 3D radiation, ...

Used to supplement field campaign data with virtual high-res 4D fields

2. As a simplified circulation model for grey zone research

ED(MF)ⁿ implemented as a unified scale-aware & stochastic subgrid scheme

Benefits:

- i) DALES can be run at much larger grid-spacings (10m-100km)
- ii) Applicable across the convective grey zone
- iii) Multi-column model (MCM): allows interactions between subgrid convection and the resolved circulation

Input file format

The KNMI Parameterization Testbed *(KPT; Neggers et al, 2012, 2013)*

Some characteristics:

- NetCDF
- Same format as the RACMO SCM
- All input data in one file
- Time-height arrays
- Prescribed advective tendencies and subsidence
- Geostrophic wind profiles (large-scale pressure gradients)
- Surface boundary: all kind of properties (DALES user can choose which ones to use, through the namelist)
- Tracer fields for initialization

We use Python scripts (Jupyter notebook) to read ECMWF MARS data and convert into KPT format.

*More info: Van Laar et al. (2019, doi:10.1175/JAS-D-18-0084.1)
Neggers et al (2019, doi:10.1029/2019MS001671)
Reilly et al. (2020, doi:10.1175/JAMC-D-19-0013.1)*

Library of cases

In total: close to 4000!

Multi-year (permanent sites)

Cabauw (5 years)	JOYCE (5 years)	ARM SGP (1 year)
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Multi-day (permanent and mobile sites)

LASSO SGP	Go Amazon			
MOSAiC	PASCAL			
EUREC4A	NARVAL	BCO		

Single day

BOMEX	RICO	ATEX	ASTEX	DYCOMS
FIRE	CGILS	ARM97	EUCLIPSE	MPACE
CONSTRAIN	COMBLE	ACLOUD	SCMS	SANDU
GABLS	VOCALS	GPCI	ASCOS	