Modelling Breakout Group

October 4, 2019

Discussed points and decisions

- Available models during pre-campaign starting latest 01-12-2019: UM, IFS, ICON (global), UM, AROME, HARMONIE, ICON, WRF (regional). During the field campaign in addition sub-kilometre simulations of ICON-LEM will be added.

- Models will provide hourly output of daily forecasts that start at 0 UTC up to 48 hrs.

- Output of the simulations will be made available as quicklooks at the AERIS website

- The output fields of the models are described in Table 1 and 2

- Additional output to characterize the profiles in the HALO circle (and for larger domains) will be provided from the ICON simulations and, if possible, from other NWP models (see open points).

- If possible: save dedicated model data at time of satellite overpasses (GPM, AIRS, Calipso)

- Common simulation domains will be used for reruns of the mesoscale and LES models after the campaign. For the mesoscale models this will probably will be the domain also proposed for the Grey Zone project, i.e. 0-27N , 37-67W. Common domains for the LES models will depend on the final position of the HALO circle.

- Efforts will be made to design, in addition to Eulerian HALO-circle scale LES cases, a Lagrangian case for LES models from NTAS to Barbados is envisioned. Steef Boing has expressed interest to (help) coordinating this effort.

- George Geet will provide estimates for the large scale lateral forcings for the HALO circle LES runs, i.e. the divergence and the horizontal advection of moisture and heat and perhaps also momentum. In addition realistic estimates for SST are required. Sensitivity runs with realistic SST patterns are foreseen.

- For the identification of interesting periods, it is important to have a quick and easy characterization of days (instruments availability, model uncertainty, synoptic / cloud structures).

Action Points / Work in progress

- Backward-trajectory calculations from ECMWF ensemble forecasts (Pier Siebesma and Franziska Aemisegger)

- Which campaign measurements will be assimilated by ECMWF? (Pier Siebesma)

- Additional profile output and sampling of cloud structures / variability across the HALO circle (Vera Schemann)

- Profile information needed for Kite-Measurements (Wind 1x per day), MPI-DS will provide information / estimate of required regions

- Overview of model initiatives / simulations on website

Table 1: required 2D Output (60 min interval)for quicklooks.

Variable	Long Name	Units
$U_{10\mathrm{m}}$	Zonal wind at 10 m	$\mathrm{m\,s^{-1}}$
$V_{10\mathrm{m}}$	Meridional wind at 10 m	$\mathrm{m\,s^{-1}}$
P_{sfc}	Surface pressure	K
$\int q_{\mathrm{v}}\rho\,\mathrm{d}z$	Vertically integrated specific humidity	$\mathrm{kg\,m^{-2}}$
$\int q_{\mathrm{c}}\rho\,\mathrm{d}z$	Vertically integrated cloud water	$\mathrm{kg\,m^{-2}}$
$\int q_{\mathrm{i}}\rho\,\mathrm{d}z$	Vertically integrated cloud ice	$\mathrm{kg\,m^{-2}}$
C	Vertically projected cloud cover	–
R	Surface precipitation (accumulated)	$\mathrm{kg\,m^{-2}}$
CAPE	Convective available potential energy	$\mathrm{J\,m^{-2}}$
CIN	Convective inhibition	$\mathrm{J\,m^{-2}}$

Table 2: required fields (60 min interval) for quicklooks

Variable	Long Name	Units	level
U	Zonal wind at 10 m	$\mathrm{m\,s^{-1}}$	925, 850, 500, 200hPa
V	Meridional wind at 10 m	$\mathrm{m\,s^{-1}}$	925, 850, 500, 200hPa
θ	Potential temperature	K	925, 850, 500hPa
θ_e	Equivalent potential temperature	K	925, 850, 500, 200hPa
T	Temperature	K	925, 850, 500hPa
q_v	water vapor specific humidity	–	925, 850, 500hPa
RH	relative humidity	–	925, 850, 700, 500hPa
ω	vertical pressure velocity	Pa s^{-1}	850, 700, 500hPa

Open Issues

- Coordination of (high-resolution) ocean modelling.

- High-resolution SST products (Satellite and Aircraft) are important for modelling efforts (post-campaign). Point of contact? Sabrina Speich?

- Should the model output be saved at a central place? Suggestion: We will aim for 2D data and profiles at a central place (for an overview of simulations), 3D output should be saved by respective modelling groups.