Regional Cooperation for
Limited Area Modeling in Central Europe

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Info on CAMS aerosols in radiation

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Introduction

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- ACCORD cloud-aerosol-radiation (CAR) project, initiated by Laura Rontu, aims at the **use of CAMS near real time aerosols** in AROME/HARMONIE-AROME/ALARO physics:
  - in **microphysics,** aerosols play the role of CCN and IFN
  - prognostic aerosols are subject to **creation/destruction** (sea spray, burning, deposition) and **transport** (advection, turbulence)
  - in **radiation,** aerosols have direct effect on absorption, emission and scattering
- CAR is transversal effort, delivering (not only :-) necessary **aerosol logistics** shared by all physical packages.
- This talk is a 5' overview of what is beeing done **on the radiation side.**

Passing aerosols to radiation

- **An old way** is to pass layer aerosol optical depths (AODs) at 550 nm for 6 Tegen aerosol types:
  - total AODs of Tegen aerosol types from init file (climatology)
  - AOD split to model layers (predefined vertical profiles)
  - layer optical properties of Tegen aerosol types and of aerosol mixture in target spectral division **(done by radiation scheme)**
- **A new way** is to pass directly layer optical properties of aerosol mixture in the target spectral division:
  - CAMS aerosol mass mixing ratios (MMRs) from init/cpl files
  - inherent optical properties of CAMS aerosol types in target spectral division (pre-computed in setup)
  - layer optical properties of aerosol mixture (every timestep)

What was done

- On radiation side, work started with ACRANEB2 scheme.
- Aerosol optical properties were externalized, ACRANEB2 now gets **layer optical properties of aerosol mixture.**
- For **ascending compatibility,** routine diagnosing them from AODs of Tegen aerosol types was created and validated.
- Dataflow of CAMS aerosol optical properties was designed:
  - inherent optical properties of CAMS aerosols from NetCDF file
  - averaging to target spectral division in setup
  - layer optical properties of aerosol mixture in every timestep (evolving MMRs, influence of relative humidity)

What needs to be finished

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- **Code** for the dataflow of CAMS aerosol optical properties **has to be finalized,** debugged and validated.
- It has to be merged with the modset of Yann Seity, bringing CAMS aerosol MMRs from init/cpl files to physics driver.
- When ready, **scientific testing** of the near real time aerosols in ACRANEB2 can start.
- Interfacing with other radiation schemes can be done.
- Possibility to use **climatological aerosol MMRs** in radiation should be worked out.

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Thank you for your attention.

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