

## Status of the seamless coupled modelling system ICON-ART

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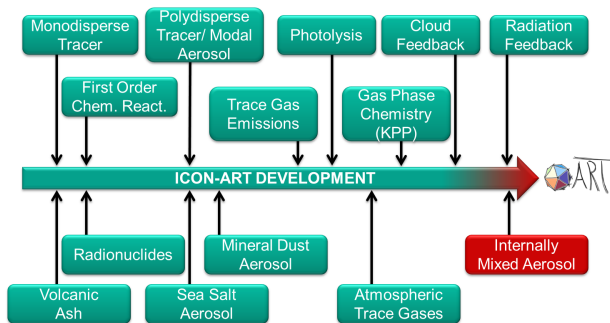
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### The model ICON-ART

The nonhydrostatic global modelling system ICON (Zängl et al., 2014) is a joint development of German Weather Service (DWD) and Max Planck Institute for Meteorology (MPI-M) with local grid refinement down to grid spacing in the sub-kilometer range. It will be used for numerical weather prediction, climate projections and for research purposes. Since January 2016 ICON runs operationally at DWD for weather forecast on the global scale with a grid spacing of 13 km. The integrated modelling framework ICON-ART (*ICOsahedral Nonhydrostatic – Aerosols and Reactive Trace gases*) extends ICON by modules for gas phase chemistry and aerosol dynamics, and related processes (Rieger et al., 2015). ICON-ART is designed to account for feedback processes between meteorological variables and atmospheric trace substances.



Example of global and nested model domain



### Features

- Biogenic emissions: MEGAN (Günther et al., 2012)
- Dust emissions: new parametrization based on Vogel et al., 2006
- Volcanic ash emissions: new parametrization
- Photolysis frequencies: CloudJ (Prather, 2015)
- Full gas phase chemistry based on MECCA (Sander et al. 2005)  
RADMKa – mechanism was included  
→ see poster Schröter et al., X3.66, Session AS1.22
- Aerosol-Radiation feedback: new parametrization  
→ see oral presentation Walter et al., Session AS3.7
- Aerosol-Cloud feedback: based on Bangert et al., 2012
- Implementing the ISOtopologues based on Pfahl (2012)  
→ see poster Eckstein et al., X3.202, Session AS4.14

### ICON-ART infrastructure highlights

- Minimally invasive coupling between ICON and ART
- XML based tracer definition and metadata initialization
- Flexible extension of the ICON tracer metadata structure
- Optional hybrid parallelization
- Flexible and easily extendable aerosol module framework

### References

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