

# Project EVA

## Earth system modelling of climate Variations in the Anthropocene

Nationally coordinated collaborative research project funded by The Research Council of Norway under programme KLIMAFORSK Grant no. 229771

Duration: 01.01.2014 - 31.12.2017 (4 years)



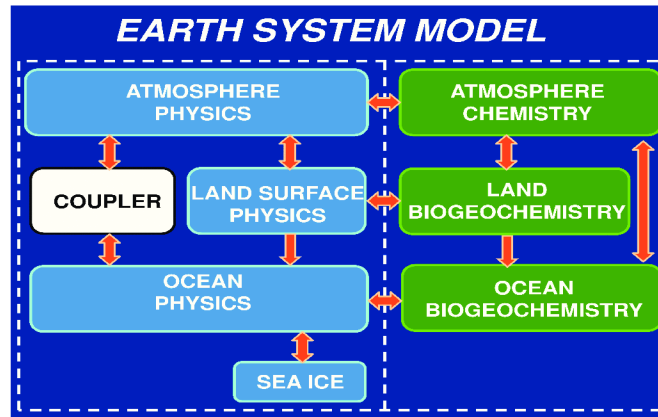
[www.uib.no/eva](http://www.uib.no/eva)

- leaflet version 1.0, 2014 -

The term **Anthropocene** denotes the on-going time period since the beginning of the industrialisation (as marked by the implementation of the steam engine in 1784). Human actions have changed the Earth's climate and environment during this short period in the history of Earth.

**How can the changes up to now be quantified? And how to prepare for the future?**

**Earth system models (ESMs)** are key tools to answer these questions. They are climate models which next to physics also take into account chemical, biological, and ecosystem processes.



Following: European Network for Earth System modelling (ENES), 2012, Infrastructure Strategy for the European Earth System Modelling Community 2012-2022, 33 p., <http://enes.org>.

### Primary objective of EVA

To provide a cutting-edge version of the Norwegian Earth system model NorESM for global climate assessments, including prognostic climate experiments and their analysis for use by the national as well as international community.

### The EVA consortium:

Coordinator:

1. University of Bergen, Geophysical Institute and Bjerknes Centre for Climate Research, UiB.



2. Uni Klima, UNI Research AS, Bergen (UniKlima).



3. Nansen Environmental and Remote Sensing Centre (NERSC).



4. Norwegian Meteorological Institute, Oslo (MET.NO).



5. University of Oslo, Department of Geosciences (UiO).



6. Norwegian Institute for Air Research, Kjeller (NILU).



7. Center for International Climate and Environmental Research, Oslo (CICERO).



### Budget:

50 million NOK from the Research Council of Norway.  
21 million NOK from in-kind contributions.

### Contact:

**Website:** <http://www.uib.no/eva>

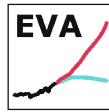
### Project lead:

Prof. Dr. Christoph Heinze, University of Bergen, Geophysical Institute, Postboks 7803, 5020 Bergen, Norway, phone: +47 55589844, email: [christoph.heinze@gfi.uib.no](mailto:christoph.heinze@gfi.uib.no)

### Co-lead:

Prof. Dr. Trond Iversen, Norwegian Meteorological Institute, Oslo, email: [trond.iversen@met.no](mailto:trond.iversen@met.no)

**Simulation of the integrated Earth system for meeting societal challenges and solving fundamental science questions.**



Atmosphere



Illustration: www.colourbox.no

Land



Illustration: www.colourbox.no

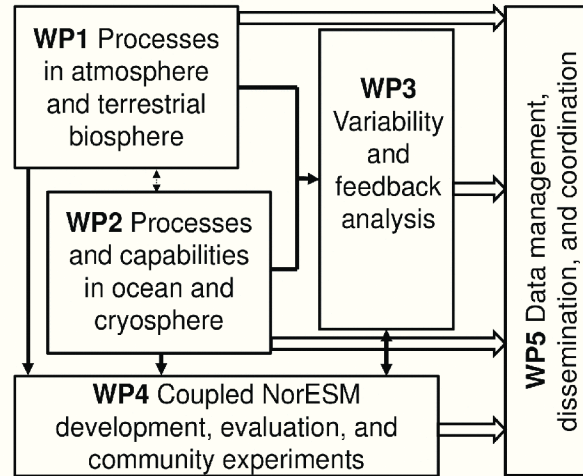
Ocean



Illustration: www.colourbox.no

**Work packages:**

EVA is structured into 5 work packages:



**Delivery:**

**WP1:** New and improved aerosol and cloud treatments. Interactive scheme for domestic combustion emissions. Uncertainty assessment of GHG and climate change on high latitude terrestrial biogeochemistry.

**WP2:** Upgraded ocean dynamical core and improved ocean processes (physical and biogeochemical). Improved sea-ice, snow, and sea-level modelling capabilities. Addition of new marine tracers to model.

**WP3:** Separation of natural and anthropogenic climate responses. Results on storm tracks, precipitation, and (biogeo-)chemical mechanisms contributing to climate feedback and projection uncertainties.

**WP4:** Provide new cycle of NorESM (NorESM2). Make available a complete evaluation package for all model components. Intercomparison studies with different resolutions. Assessment of marine and terrestrial biogeochemistry performance.

**WP5:** Dissemination, outreach, and management.

**Project plan:**

In EVA, the Norwegian Earth system model (NorESM) as the main national facility for global climate studies will be further developed, extended, quality checked, and applied to key research questions in the field of climate science.

In particular, NorESM2 will be established also for participation in key international assessments. NorESM experiments on drivers for climate variability will be carried out, and related feedbacks will be quantified addressing key uncertainties.

Complex spatio-temporal structures of the climate system will be analysed including interactions between physical processes and biogeochemical cycles. The planned pre-industrial, historical, and future NorESM simulations together with observational evidence provide the foundation for discriminating between natural and human-induced climate variability.

More complete process representations in NorESM on the basis of observational evidence and a detailed model evaluation against observations will enable more realistic quantifications of uncertainties in state-of-the-art climate simulations.

Relevant Arctic climate processes will be addressed: cold clouds, Arctic haze, sea ice and thawing of permafrost.

EVA is firmly embedded within the international scientific research field. NorESM is provided as a major national infrastructure for large-scale predictive climate studies.

Results and data sets will be open to all end-users (scientists, policy makers, and the public). For adaptation and mitigation purposes, data will be made available through the National Climate Service Centre (<https://wiki.met.no/kss/start>).