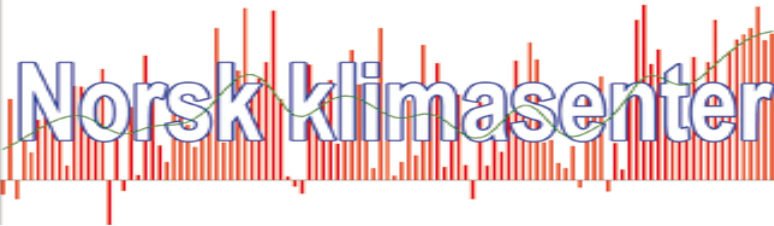


Module 1

NorESM Development and Validation



Objective: Module 1

To firmly establish NorESM as a state-of-the-art computer model for the simulation of the global climate and associated Earth System processes through sustained development, validation and analysis.

- To **validate NorESM** as belonging to the family of state-of-the-art climate and earth system models;
- To further develop the NorESM with a good balance between the **need for increased model resolution** and code upgrades, and the need for **improved parameterizations and more complex on-line processes** (cross-cutting: M3);
- To use NorESM experiments to study basic properties of the earth system's **natural climate variability** and its **response to forcing** mechanisms (cross-cutting: M2 and M4).

Work Packages

- ***WP1.1–Validation of NorESM based on CMIP5 runs for IPCC AR5 (Iversen, Heinze).***
 - regional flow regimes and storm tracks, blocking, sea-ice extent and thickness, aerosol concentrations and optical depths, cloud and precipitation climatology, the NA ocean circulation, and ocean and land carbon and nitrogen cycles.
- ***WP1.2–Further upgrading and developments of NorESM (Bentsen).***
 - ***WP1.2.1–Upgrading the NCAR-based code***
 - ***WP1.2.2: Improved atmospheric parameterizations.***
 - ***WP1.2.3: Parameterization of ocean mixing, and interactions with sea-ice, snow, and ice sheets.***
 - ***WP1.2.4–Biogeochemistry***
- ***WP1.3 – Further analysis and validation of NorESM based on diagnostics experiments (Iversen).***
 - ***WP1.3.1: Diagnosis of circulation modes, regional flow regimes, and feedbacks.***
 - ***WP1.3.2: Diagnosis of transport properties using FLEXPART.***

Deliverables

- *D1.1: CMIP5: NorESM synthesized paper sent for publication, **Mar 2012. (OK, July 2012)***
- *D1.2: CMIP5: 1-5 topic papers sent for publication, **Jun2012. (OK, July 2012)***
- *D1.3: Implementation and impact studies of Zilitinkevich/Esau scheme, **Dec 2012. (?)***
- *D1.4: Explicit description of aerosols in cloud water implemented and investigated, **Mar 2013.***
- *D1.5: NorESM-version to be (partly or fully) based on CESM1 (i.e. CAM5). **Jun 2013.***
- *D1.6: Ocean cryosphere interactions (sea-ice and ice-sheets). **Dec 2012.***
- *D1.7: Biogeochemistry upgrades. **Dec 2013.***
- *D1.8: Flow regimes and feedback analysis. **Jun 2014.***
- *D1.9: Implementation of FLEXPART and transport analysis. **Dec 2013.***