

Joint BECC/MERGE Short Project Call

Introduction

The complementary expertise and methodologies used by MERGE and BECC scientists has the potential to make significant contributions to our understanding of climate change and its links to biodiversity and ecosystem services, and to inform national and international policy and assessments based on the best available science.

A series of stimulating discussions among our members at our 2020 joint BECC-MERGE Spring Meeting identified a number of knowledge gaps at the intersection of our Strategic Research Areas (SRAs), the filling of which will require joint activities and a commitment to facilitate these on the part of the SRA Boards. A summary of these topics and knowledge gaps can be found in Appendix 1 (below). In addition, new method development to address these gaps are encouraged, such as machine learning methods.

To stimulate the creation of such joint activities, BECC and MERGE announce this short project call. Budget: 1.25 mSEK (50% each from BECC and MERGE) to fund up to 4 projects with a maximum budget of 310 tkr.

Funding for the projects will be made available from Lund University (500kr from MERGE and 400 from BECC), and the University of Gothenburg (100kr from MERGE and 250 from BECC). Funding from LU and UGOT can only be spent at LU and UGOT, respectively.

Money to be transferred before the end of 2025, with a final project date of Dec 31, 2026. Reporting by May 2026 in the form of a seminar open to BECC & MERGE members.

Timeline:

Call opens: 10 April

Deadline: 18 June

September: Evaluation will be completed, and decision will be made

What can be applied for?

- Short, self-contained projects
- Pilot projects
- Workshops

Examples of expected outcomes

- Review paper
- Research paper
- Scientific report from a pilot project that can lead to a larger grant application.

Evaluation criteria:

A funded project should fill a knowledge gap at the intersection of BECC and MERGE research areas, a filling which require joint activities of BECC and MERGE researchers. Such knowledge gaps were identified at the 2020 BECC-MERGE Spring Meeting (Appendix

1), but also other well motivated research gaps may be funded. The application should bring together participants active in BECC and MERGE. To provide an added value, we particularly encourage applications that bring together researchers that do not already work together in already well-established research collaborations.

The main applicant must be an employee at LU or UGOT, hold a PhD degree (obtained before the application deadline) and have been active within the BECC or MERGE research environments.

Application format:

3 pages, including budget but excluding reference list and maximum 2-page CVs from the main applicants.

The project description should clearly describe how it addresses the identified knowledge gaps in Appendix 1 (or other well motivated research gaps) and state the relevance for both BECC and MERGE. The budget should include overhead at the departments where resources are intended to be spent and include a sum of the amount to be spent at Lund University and University of Gothenburg, respectively.

The CV should include information on

- Education
- Major employments
- Merits & awards (incl. docent, supervision, major grants and awards, board responsibilities, outreach, review assignments, etc)
- Bibliometric summary + 10 most relevant publications + link to full publication list/LUCRIS

An evaluation group consisting of two members from MERGE and two from BECC will be appointed by the MERGE and BECC boards, respectively. The application will be evaluated based on scientific quality, relevance to the identified knowledge gaps and the development of BECC and MERGE, feasibility and the qualifications of the applicants.

Appendix 1 - Identified Topics & Knowledge Gaps

At the 2020 BECC-MERGE Spring Meeting our members identified the following knowledge gaps at the intersection of our two Strategic Research Areas (SRAs), the filling of which will require joint activities and a commitment to facilitate these on the part of the SRA Boards. Some gaps were also raised as crucial policy requirements by our joint BECC-MERGE Reference Group. New method development to address these gaps are encouraged, such as machine learning methods.

Wetlands and their management: How will climate change (CC) and air quality (AQ) affect and be affected by CO₂, CH₄ & N₂O emissions from wetlands? How will rewetting or restoration of agricultural land and/or forested land affect biodiversity (BD), CC, AQ and ecosystem services (ES)? What impacts will climate change have on wetlands, including their BD and ES?

Scenario building: How can we jointly develop integrated modelling/assessment approaches that account for the full range of climate/biodiversity/land use interactions relevant to a Swedish context? What impact do local land-use scenarios developed using social-ecological modelling have on BD, CC, AQ and ES? Can indicators for analysis of scenarios be developed? Can benefits and trade-offs be assessed in a combined framework? Can such a framework be applied to study the interactions in different ecosystems, including agricultural land, forests, arctic-alpine ecosystems and wetlands? How do we scale this up to the national level? What is the best way to engage our scientific reference groups (SRGs) in this effort?

Humans and society in the climate system: Social Climate Models (SCMs) could eventually replace IAMs. It's important to have a coupling to society and some kind of human boundary. It is claimed that SCMs, by superseding the SSP framework, could eventually reduce the uncertainties in future climate projections – but do we believe this? Based on existing studies - what are the parameters that lead to the greatest uncertainty in SCMs? What real-world processes do they represent?

Agriculture: How will climate change affect agricultural production in Sweden? How can we maintain BD in traditional agricultural landscapes, maintain or increase quantity/quality of yields, and simultaneously decrease the net climate forcing resulting from CO₂, CH₄ and N₂O emissions and biophysical impacts? Can we reduce NH₃ emissions and leaching, both for AQ (PM_{2.5}) and eutrophication, respectively? How can we systematically use observations made near agricultural land to constrain and calibrate our models? (Related to “Kväveklivet” identified by our joint BECC-MERGE Reference Group. See: <https://www.regeringen.se/pressmeddelanden/2024/09/satsning-pa-260-miljoner-kronor-for-miljoatgarder-som-ska-starka-biologiska-mangfalden-pa-land-och-i-hav-och-vattendrag/>)

Forestry practices: What alternative afforestation and forest management measures and strategies (e.g. mixing deciduous with evergreen species, reforestation of abandoned agricultural land, intensification, optimized thinning practices) are best for BD and ES provision, and still useful for climate mitigation, considering both biogeochemical and biogeophysical effects? How will AQ be affected by such choices? How might consideration of future disturbances influence decisions in this area? How do we integrate ICOS/ACTRIS observations to constrain and calibrate our models? How can BECC and MERGE devise a

modelling and assessment framework across scales that can be used to inform policy and decision making based on this science?

Extreme events: How will the projected occurrence of extreme events (type, intensity, frequency and duration) impact the BD and ES provided by Sweden's ecosystems, including arctic-alpine environments? How do we integrate ICOS/ACTRIS observations associated with such events to constrain and calibrate our models? How should we account for the risk of extreme events in conservation strategies or efforts to benefit ecosystem services (which are often supported by models)?

Integrated Sustainability Assessment: Can an integrated sustainability assessment of Sweden's climate and biodiversity policies identify with confidence synergies and trade-offs between biodiversity conservation and climate change mitigation/adaption?

Biofuels: What consequences will the increased cultivation and use of biofuels (crops and forests) have for CC, AQ, BD and ES? Can we identify how and where best to cultivate these crops in order to maximize any benefits and to minimize negative effects, considering multiple time horizons?

Ex. Earlier funded BECC-MERGE SP

MERGE&BECC: POLLENOMICS: decoding the farming history of Europe using advanced statistics to combine ancient DNA with pollen data - Lund University

Forecasting fuel, fire and carbon fluxes in Swedish Forests - Lund University

Investigating the Role of Satellite-Derived Fire Energetics in Improving Modeling of Emissions from the Smoldering Combustion Phase of Boreal Wildfire - Lund University

VOCsBox - assessing plant stress effects on atmospheric chemistry with a new fumigation chamber system - Lund University

Land-use and forest management feedbacks with climate in the regional Earth System

Learning from a fire prone past for a fire prone future: Assessing the effect of forest fires (pilot project) - Lund University