

**Centre for Regional Change in the Earth System (CRES)**

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To adapt to climate change requires a precise understanding and quantification of how human activities, interacting with natural processes, affects human and natural systems. The Centre for Regional Change in the Earth System (CRES) is a novel multidisciplinary climate research platform, which brings together leading scientists with excellent and long track records of quality research in climate change and key Danish stakeholders and practitioners with a need for improved climate information. CRES is the result of a grant of 4 MEuro from the Danish Council of Strategic Research in October 2009 over a period of 5 years and co-funded by the participating institutions. The mission of CRES is to establish a coordinated research effort of high relevance to societal preparedness for climate change and to enhance Denmark's contribution to international climate change research. Moreover, CRES aims to reach out beyond its core group and create new national and international synergies between current and planned research activities in climate research and adjacent fields. From the CRES platform, new scientists will be trained to cope with uncertainties in regional climate change and its impact by invoking model tools of i) ocean - atmosphere coupling; ii) atmosphere - hydrology coupling; iii) ice sheets coupled in earth system models; iv) coupling between terrestrial and aquatic biosphere, v) their mutual interaction; vi) remote change such as the Greenland and/or Antarctic ice sheets; and vii) integration of climate change information in a risk management framework. Goals: In taking an interdisciplinary approach, the overall objective of CRES is to extend knowledge of and reduce the uncertainties surrounding regional climate change and its impacts and thereby support future climate change adaptation and mitigation policies. Specific objectives are to: a) reduce uncertainty surrounding regional climate change and its impacts for the period 2020-2050 by improving model formulation and process understanding; b) identify key changes and tipping points in the regional hydrological system, agriculture, freshwater and estuarine ecosystems caused by changes in seasonality, dynamics and extreme events of precipitation, droughts, heat waves and sea level rise; c) quantify confidence and uncertainties in predictions of future regional climate and its impacts, by improving the statistical methodology and substance and by integrating interdisciplinary risk analyses; d) interpret these results in relation to Danish, European, and global risk management approaches for climate change adaptation and mitigation; As a multi-institutional research centre, CRES aims at enhancing the quality of Danish climate research and Denmark's contribution to international climate change research. Expected outcome: The expected outcome of CRES will be innovative in providing operational solutions for quantifying climate change and more accurate depictions of its impacts on hydrological, biological and social systems at regional and local scales, based on coupled climatehydrological-ecosystem-risk analyses models. The centre aims provide new information on the effects of extreme events and on tipping points (climate, hydrology, nutrient dynamics, ecosystem responses and risks) and their interactions. In collaboration with key stakeholders, this will impact climate change adaptation strategies in Denmark and possibly beyond. CRES has a number of national stakeholders and international collaborators, including Uni Bergen; Uni Lund; SMHI; Imp. Col. London; BC3. Participation in international projects such as AgMIP and CMIP5 is another way of bringing the world to CRES.