

Overview of H2020 CRiceS project

Risto Makkonen, FMI
On behalf of the CRiceS project team

Project website: <https://www.crices-h2020.eu/>



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Climate Relevant interactions and feedbacks: the key role of sea ice and Snow in the polar and global climate system (CRices)

Coordinator:

Risto Makkonen, FMI (Finland)

Scientific coordinator:

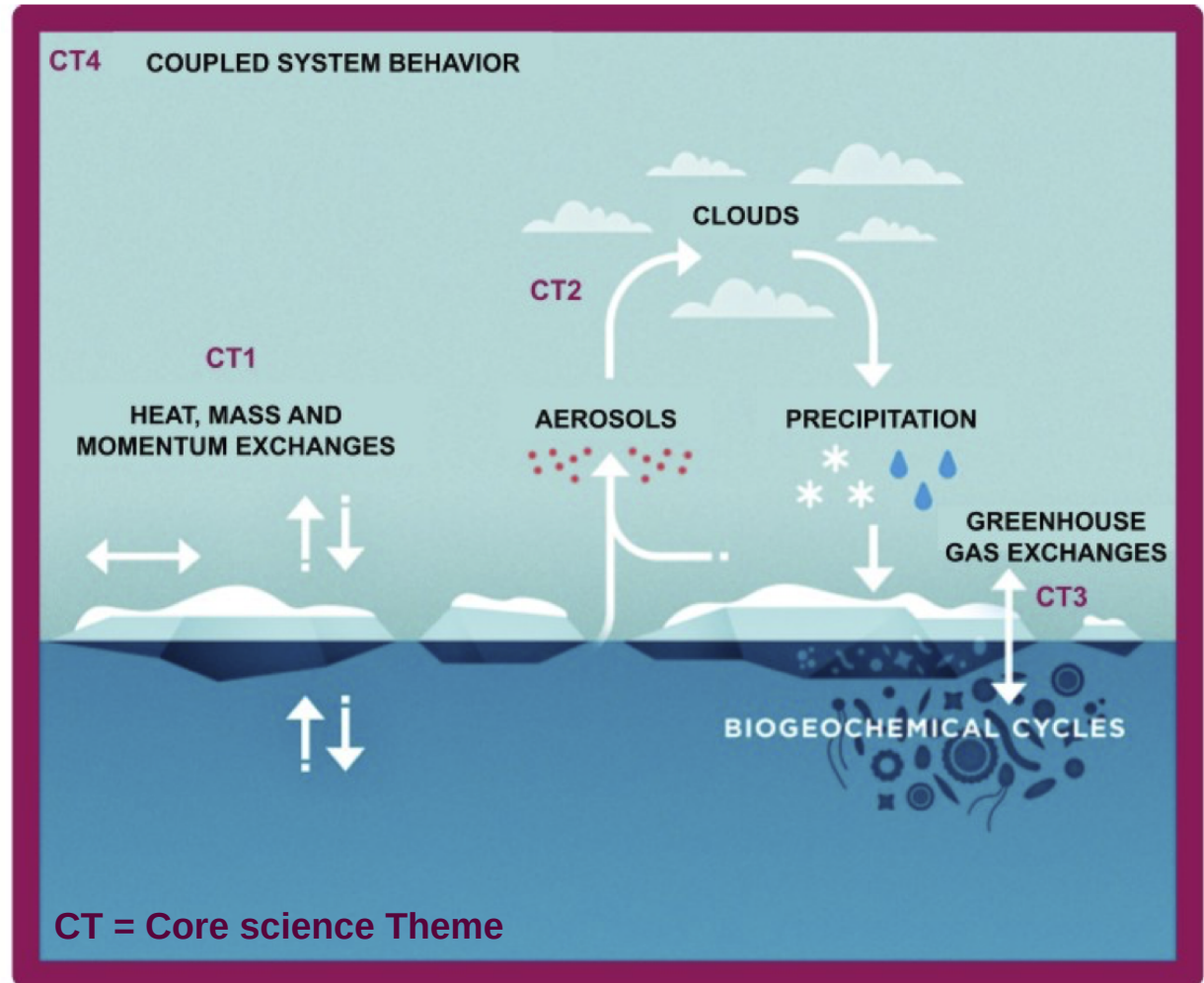
Jennie Thomas, IGE/CNRS (France)

EU Budget: 8 Million EUR

Start date: 1 Sept. 2021

H2020 Call:

LC-CLA-17-2020 - Polar climate: understanding the polar processes in a global context in the Arctic and Antarctic Regions

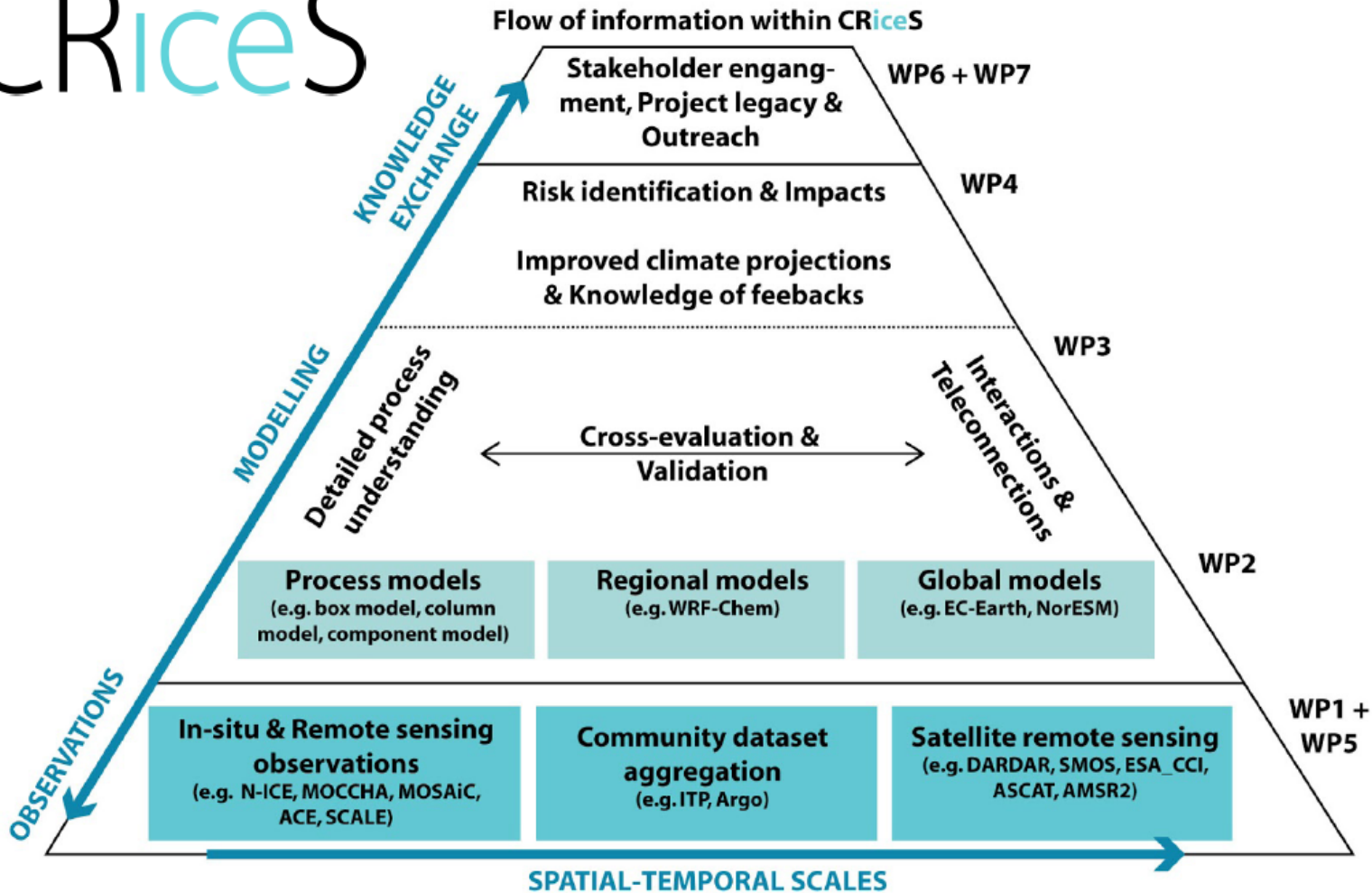


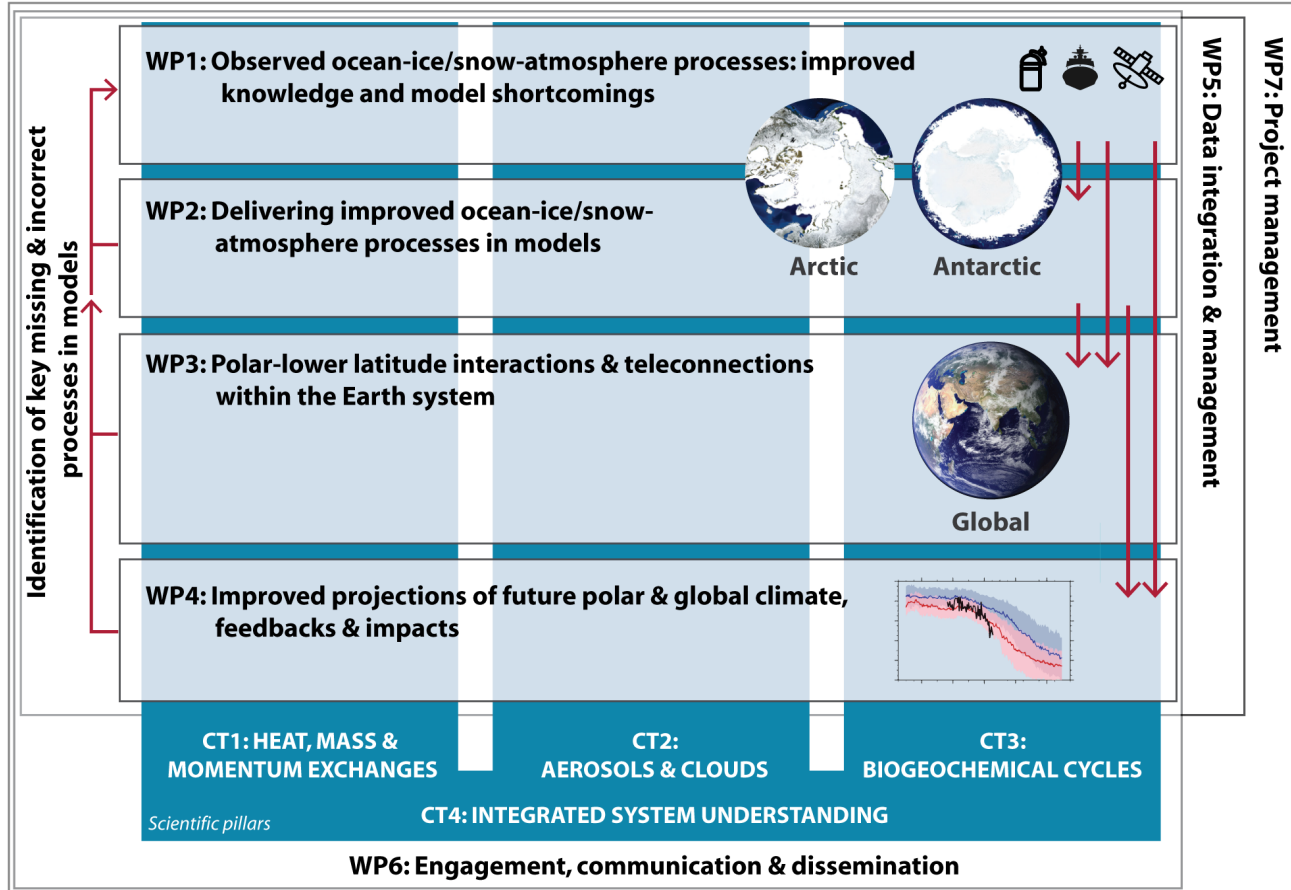
Participant organization name	Country
FMI - Finnish Meteorological Institute (coordinator)	Finland
CNRS - Centre National de la Recherche Scientifique - 3 CNRS Research Labs: CNRS-IGE - L'Institut des Géosciences de l'Environnement CNRS-CNRM - Centre National de Recherches Météorologiques CNRS-LATMOS - Lab. Atmos., Milieux, Observations Spatiales	France
CICERO - Center for International Climate Research	Norway
SU - Stockholm University	Sweden
NPI - Norwegian Polar Institute	Norway
CMCC - Foundation Euro-Mediterranean Center on Climate Change	Italy
SYKE - The Finnish Environment Institute (Suomen ympäristökeskus)	Finland
UCT - University of Cape Town	S. Africa
UHEL - University of Helsinki	Finland
UiB - University of Bergen	Norway
UBremen - University of Bremen	Germany
CSIC-ICM - Spanish National Research Council - Institut de Ciències del Mar	Spain
UCL - University College London	UK
AWI - Alfred Wegener institute	Germany
BAS - British Antarctic Survey	UK
EPFL - École Polytechnique Fédérale de Lausanne	Switzerland
RUG - University of Groningen	Netherlands
UVIC - University of Victoria	Canada
UCalg - University of Calgary	Canada
NCPOR - National Centre for Polar and Ocean Research	India
ICM&MG - Institute of Computational Mathematics and Mathematical Geophysics, Siberian Branch of Russ. Acad. of Sciences	Russia



The **overarching objective** of CRiceS is to **deliver improved understanding of the physical, chemical, and biogeochemical interactions within the Ocean-Ice-Atmosphere system, new knowledge of polar and global climate, and enhanced ability of society to respond to climate change.**

The unique and broad interdisciplinary expertise within CRiceS allows us to quantify the characteristics and functioning of the OIA system in the past, present and future (across diverse timescales) and its role from regional to global spatial scales. Knowledge at these scales is essential for developing improved understanding of how OIA physical and chemical processes control polar and global climate.







Climate Relevant interactions and feedbacks: the key role of sea ice and Snow in the polar and global climate system (CRiceS)

Project objectives

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- O2: Advance descriptions of the OIA system in numerical models (WP2) in order to produce more robust projections and to quantify teleconnections, polar - non-polar interactions, feedbacks and impacts (WP3-4)



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- O3: Deliver open data and models that service the scientific community, stakeholders, and beyond (WP5)



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- O4: Develop proactive communication pathways, building on existing research initiatives, aimed at engaging in regional/global climate assessment processes and with stakeholders (WP6-7)

Models and model datasets used and/or developed within the project

Existing model datasets including large ensembles				
CMIP6	Coupled Model Intercomparison Project Phase 6	CT1-4	Global	Days-years
Multi-Model Large Ensembles	Initial-condition Large Ensembles conducted with up to 7 global climate models, archived by the US CLIVAR Working Group on Large Ensembles	CT4	Global	Days-years
CORDEX	WCRP project for coordinated downscaling experiments and regional climate projections	CT1, CT4	Regional	Days-years
AMAP multi-model data	Simulations performed for the upcoming (2021) assessment by the AMAP Expert Group on Short-lived Climate Forcers.	CT2, CT4	Regional	Days-years
AEROCOM	Open, international multi-model initiative for advancing the understanding of global aerosols	CT2, CT4	Global	Days -years
C3S and Copernicus reanalysis	ERA5, CAMS, and CMEMS including: climate/weather, ocean, sea ice, and atmospheric composition	CT-CT4	Global	Hours-years

Models and model datasets used and/or developed within the project

Component models				
NEMO	NEMO is a state-of-the-art modelling framework for oceanographic, forecasting and climate studies which is developed by the NEMO European Consortium	CT1, CT4	Global, Regional	Days-years
SI3	State of the art community sea ice model that is part of NEMO	CT1, CT4	Global, regional	Days-years
BFM	Ocean Biogeochemical Flux Model including a sea-ice biogeochemistry component and can be used standalone or within CMCC-ESM2	CT3, CT4	Global, regional, polar	Days-years
BLOM/iHAMOCC	Physical-biogeochemical ocean components with interactive carbon cycle within NorESM2	CT1, CT3, CT4	Global	Days-years
CanOE-CSIBv1	Canadian Ocean Ecosystem Model/Canadian Sea-ice Biogeochemistry model for the NEMO community ocean modelling framework	CT2, CT3, CT4	Polar	Days-years
SURFEX	Surface modelling platform developed by Météo-France including surface snow	CT1, CT4	Global, regional	Days-years

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Regional models				
WRF and Polar-WRF	Regional 3D meteorological model	CT1, CT4	Regional	Weeks-years
WRF-Chem	Regional 3D chemical transport model for aerosols and clouds	CT2, CT4	Regional	Hours-year
metROMS-EcoDynamo	Ocean-ice-ecosystem coupled model with sea ice (C-ICE) including biogeochemistry	CT1, CT3, CT4	Arctic	Days-years
MAR-SI3- NEMO	Ocean-ice-atmosphere interactions, with Antarctic specific atmospheric dynamics	CT1, CT4	Antarctic	Days-years
FVCOM-CICE	Unstructured grid multi-scale ocean-sea ice-ice sheet interaction	CT1, CT4	Antarctic	Days-years
NEMO-CanOE-CSIB	Regional ocean-ice-ecosystem model with sea ice and ocean biogeochemistry North Atlantic Arctic and an updated version to cover Canada Three Oceans	CT1, CT3, CT4	Arctic	Days-years
NEMO-BFM-SI3	Regional version of Ocean-Sea-Ice model including dynamics and biogeochemistry	CT1, CT3, CT4	Antarctic	Weeks-years
Process and single column models				
OpenFOAM	Realistic small-scale continuum modelling of unconsolidated sea ice and wave dynamics coupling	CT1	Antarctic	Days-weeks
ESIM-BFM	Zero-dimensional thermodynamics/biogeochemistry model implementing the sea ice component of BFM (BFM-SI)	CT1, CT3	Antarctic	Days-months

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Global Climate / ESMs / Global weather prediction				
EC-Earth	European community ESM based on ECMWFs seasonal forecasting system aimed at climate information/services	CT1-CT4	Global	Weeks-years
NorESM2	Norwegian Earth System Model, v2	CT1-CT4	Global	Weeks-years
CNRM-CM	Global climate model developed by Meteo France/CNRM	CT1, CT4	Global	Weeks-years
UKCA	UK community atmospheric chemistry-aerosol global model	CT2, CT4	Global	Weeks-years
CanESM5	Canadian Earth System Model, v5 With ocean ecosystem models CMOC and CanOE	CT3, CT4	Global	Weeks-years
CMCC- ESM2	CMCC Earth System Model	CT1, CT3, CT4	Global	Weeks-years
CESM2	NCAR lead, community developed global climate/ESM	CT1, CT2, CT4	Global	Weeks-years
PlaSim- ICMMG-1.0	Intermediate complexity climate model including atmosphere, land, ocean, and ice	CT1, CT4	Global	Weeks-years
OpenIFS	Weather forecast model based on ECMWF global IFS	CT1, CT4	Global	Days-years
NEMO-BFM-SI3	Coupled Global Ocean-Sea-Ice System including physical dynamics and biogeochem.	CT3, CT4	Global	Weeks-years