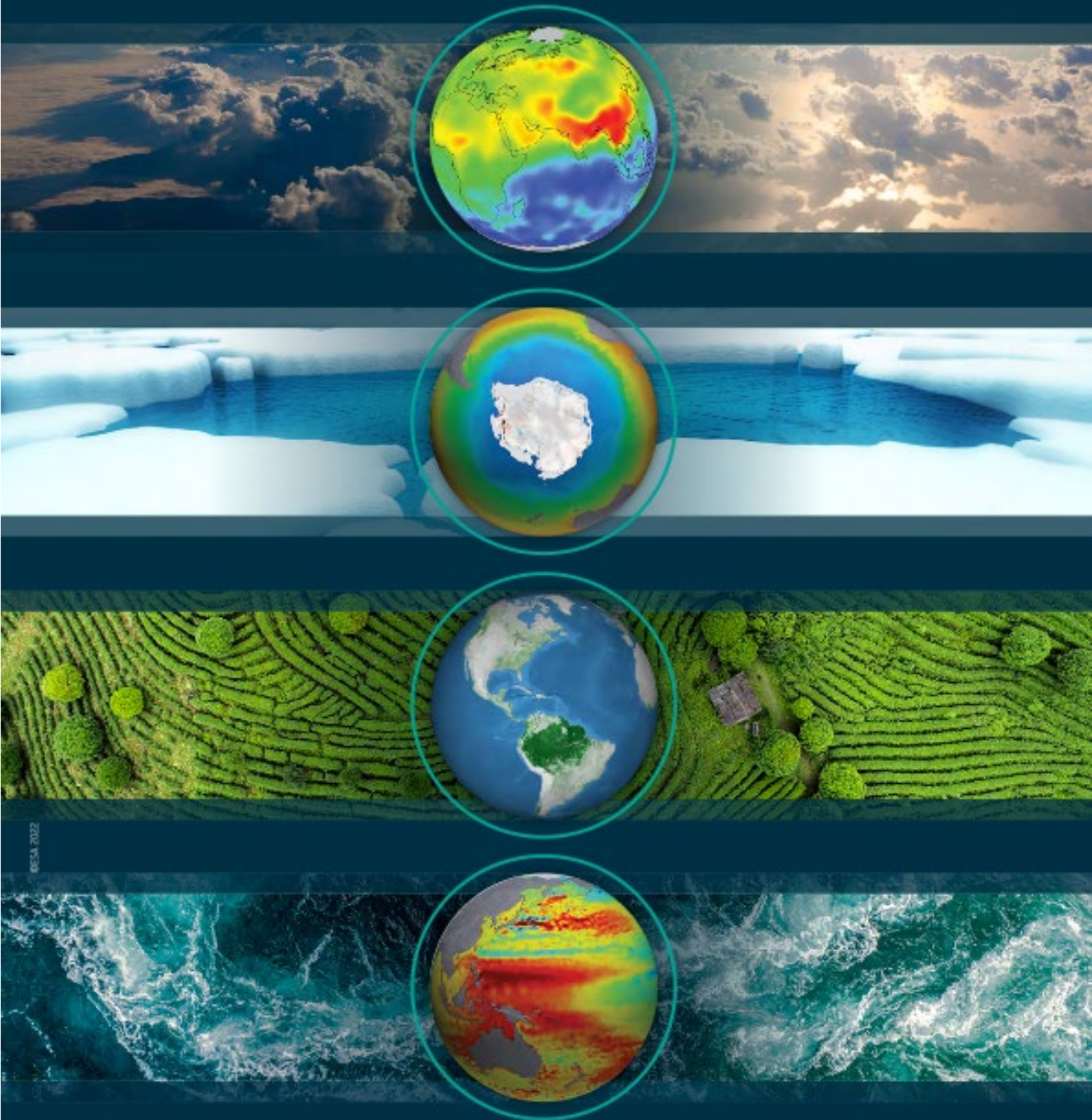


climate change initiative

THE CLIMATE CHANGE INITIATIVE FELLOWSHIP

Call for post-doctoral research proposals for 2022



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1. The Research Fellowship Call in Brief

The European Space Agency's (ESA) Climate Change Initiative (CCI) Research Fellowship programme is a co-funding scheme for talented early-career climate scientists, interested in undertaking promising research on satellite-derived climate data records.

This call will support a number of post-doctoral research projects, proposed by early-career climate scientists, funded by ESA with a Firm Fixed Price of €110.000 for a 2-years project with a minimum of 30% contribution from their Host Organisation.

- Call opens on 21st November 2022;
- Submission deadline on 31st January 2023;
- Notification to applicants by mid-March 2023;
- Intended start of successful candidates in April - June 2023.

2. Introduction

The European Space Agency (ESA)¹ leads on observing the Earth's changing climate from space. The ESA Climate Office's flagship programme, the Climate Change Initiative (CCI)^{2,3,4}, draws together over 40 years of data from ESA's own satellite missions and those from other space agencies - from past as well as currently active in-orbit instrumentation. The CCI science teams focus on R&D activities to generate long-term, global climate data records that describe the evolution of key components of the Earth's climate system, as defined by the Global Climate Observing System (GCOS)^{5,6}. Currently more than 20 Essential Climate Variables (ECV) of the 54 GCOS defined ECVs have been addressed by science teams involved in the CCI. Furthermore, a climate modelling user group lies at the core of the programme, bringing together Earth observation, climate modelling and reanalysis communities. Drawing on multiple ECVs, the CCI includes budget closure projects that address complex science questions.

All ECV datasets are fully validated and have high levels of traceability and consistency, including quantitative estimates of uncertainty required by both climate science and modelling communities⁷. In its contribution to climate and Earth system science, this programme has published over 600 peer-reviewed articles and supported the Intergovernmental Panel on Climate Change's (IPCC) headline statements on climate in both its Fifth and Sixth Assessment Reports^{8,9} and further special reports, such as the 'Special Report on Oceans and Cryosphere in a Changing Climate'¹⁰.

Since March 2022, ESA's Climate Office has hosted the International Project Office of the World Climate Research Programme's Coupled Model Intercomparison Project (CMIP). The Office's aims include promoting CMIP's research and contributions to the wider science community and works closely with the ESA Climate Office to promote systemic research at the interface of climate modelling and Earth Observations to support CMIP activities.

As a research agency, ESA aims to support early-career scientists in the field of Earth Observation for Climate Research, and to date the Climate Change Initiative has funded twenty-four research fellowships¹¹ to further improve and exploit ECV products. To continue this research-excellence, ESA is calling for new proposals under the umbrella of the CCI Fellowship scheme.

¹ www.esa.int

² www.climate.esa.int

³ "Climate Change Initiative", *Remote Sensing of Environment* Special Issue, 162, 239-426, June 2015

⁴ "Earth Observation of Essential Climate Variables", *Remote Sensing of Environment* Special Issue, 203, 1-322, Dec 2017

⁵ See Global Observing System for Climate: Implementation Needs. 2016, GCOS-200:
<https://gcos.wmo.int/en/gcos-implementation-plan>

⁶ The GCOS 2022 Implementation Plan, see
<https://gcos.wmo.int/en/publications/gcos-implementation-plan2022>

⁷ Merchant *et al.*, 2017, doi:10.5194/essd-9-511-2017

⁸ IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change,
<https://www.ipcc.ch/report/ar5/syr/>

⁹ IPCC, 2021: *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*[Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, In press, doi:10.1017/9781009157896.

¹⁰ IPCC, 2019: IPCC Special Report on the Ocean and Cryosphere in a Changing Climate, <https://www.ipcc.ch/srocc/>

¹¹ For more information, see archived CCI fellowship website, <http://cci.esa.int/content/cci-fellowships>

3. The CCI Research Fellowship Programme

The CCI Research Fellowship scheme will support early-career scientists (recent graduates seeking their first post-doctoral position, and those interested in a second post-doc), to undertake cutting edge research with the long-term data records generated under the CCI. This call specifically targets research into the fundamental understanding and long-term response of our climate system, and improving our knowledge of the carbon, water and energy cycles.

In this context, the CCI Research Fellowship scheme aims to:

- Engage the next generation of Earth observation, climate change and climate science researchers in exploitation of CCI climate data records.
- Contribute to the scientific excellence and innovation in ESA Member States by increasing the scientific impact of the CCI.
- Maximise the scientific return of ESA's Earth observation missions, datasets and the generation of long-term data records in terms of new scientific results and publications.
- Develop, via engagement with the CMIP community through the CMIP IPO, research into the interface between climate models and ESA ECVs tailored to CMIP requirements
- Enhance interactions and knowledge exchange between ESA and other laboratories/universities involved in climate research activities.

3.1 Implementation

The CCI Research Fellowship scheme 2022 offers several dedicated post-doctoral research projects, co-funded by ESA and national scientific and technical centres in ESA Member States contributing to the CCI programme.

Eligibility:

- Candidates must have received a Ph.D. research degree (or shall receive it before the start of the research fellowship contract in March 2021) in Earth science, physics, engineering, Earth observation, climate research or a related discipline.
- Candidates shall have completed their PhD degree in not more than 4 years full time equivalent.
- Candidates must have a nationality from an ESA Member State.

Host Organisation:

- Each Research Fellowship will be implemented through a two-year contract, which will be placed with the selected Host Organisation (e.g., university, technical centre, laboratory, company). The Host Organisation will be located in an ESA Member State that contributes to the CCI: Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Romania, Spain, Sweden, Switzerland and the United Kingdom.
(Note: the CCI is not a mandatory ESA programme and only Member States that have subscribed to the programme may participate as Host Organisations. Please, see Cover Letter for Host Organisation country eligibility).
- The Host Organisations shall co-fund the research position of the Candidate (as a post-doctoral research contract) for the entire duration of the project (see Conditions below).
- The Host Organisations shall contribute towards the cost of publications.
- ESA will aim to maximise the geographical distribution and avoid a concentration of candidates in the same centre.



- The selected Candidate will be the Principal Investigator of the research project, while a representative of the Host Organisation (e.g. a full professor, faculty member or a member of the scientific staff of the Host Organisation) shall serve as the principal ESA contact for administrative and contractual matters.
- The selected Candidate will preferably work full-time on the research projects proposed in their application and will be based at the proposed Host Organisation during the entire period of the research contract. Options for part time work are available and can be discussed.
- The Host Organisation shall confirm (via the required letter of support) the availability of the Candidate and the ability of the Host Organisation administration to initiate the project during April - June 2023.

Programmatic Areas:

Candidates shall propose a two-year research plan, in the following programmatic areas:

- Exploitation of the Climate Change Initiative Essential Climate Variables to improve our understanding of carbon, water and energy cycles and investigate the long-term response of our climate system.
- Cross-ECV research topics ranging from (but not exclusive to) teleconnections, tipping points, ice-ocean-atmosphere interactions, ocean surface currents, sea level budget closure, atmospheric trace gases, land-atmosphere exchange, terrestrial hydrology, and climate and human health.
- Topics related to the exploitation of CCI ECVs in the context of CMIP, for example systematic observations based forcing datasets, model evaluation for process understanding, parameterization development, constraints on water and energy cycles, model benchmarking, or any aspect of the interface between climate models and observations.
- Projects should also aim to improve interactions between CCI community members and other laboratories/universities involved in climate research activities.

Scientific proposal:

- Proposals shall be submitted to ESA using the template provided in ANNEX B. Each proposal shall include a CV of the Candidate, a list of publications and letters of support (see section 2.2 for details);
- Proposals shall include a plan for publication of results in international peer review journals and presentation of results at key international conferences (with an accompanying travel plan);
- Candidates are encouraged to outline their complementarity to existing research.

Selected candidates:

- Selected candidates are expected to submit at least one scientific peer-reviewed paper that was conceived during their CCI Research Fellowship.
- Any results obtained through the project published shall explicitly acknowledge the ESA CCI Research Fellowship funding scheme, and if applicable the CMIP IPO.
- The project's final report, scientific results (including algorithm and geoinformation products, etc.) shall be made publicly available through the ESA Climate website¹².

¹² www.climate.esa.int



- Fellows will be expected to contribute to the CCI Knowledge Exchange activities as ambassadors for the CCI.

Data access:

- Selected candidates will be granted free access to the required ESA data. Product quotas will be set up by ESA mission managers, if necessary, for those products having processing constraints.
- Candidates shall detail
 - the complete list of ESA data (including ESA third-party missions) that will be required to carry out the project in their proposal,
 - additional data sources, especially auxiliary and in-situ collected data. The Candidate or the Host Organisation shall demonstrate the availability of all the required data sets, to accomplish the proposed work, in the proposal.

Conditions and contract with the Host Organisation:

- For selected project proposals, ESA will place a contract with the Host Organisation for a maximum budget of €110,000 per 2-year project, as a co-funding contribution to a standard post-doctoral position (see Appendix 2 of this call for proposals). ESA funding will contribute to cover costs associated to the salary, travel support and (part of the costs for) publications of the Candidate.
- The Host Organisation shall co-finance and provide a post-doctoral contract to the Candidate to undertake the research activity proposed. The Host Organisation shall contribute to the overall cost for the two years. This contribution must be equal or greater than 30% of the ESA contribution. This contribution may cover: e.g., overheads, travel support, cost of publications, material, contributions in kind and/or part of the candidate salary and emoluments.
- A preliminary travel and cost plan shall be provided in the proposal. Additional funding may be available from the CMIP IPO for CMIP related Fellows.

Options for part time work are available and can be discussed.

Managing and reporting:

- The Candidate shall include in the travel plan (and associated costing) the mandatory participation to the following review meetings:
 - **1st Kick-off Meeting** to be organised online at T0;
 - **CCI Colocation and CMUG meetings** (one physical meeting per year each) ;
 - **If relevant, CMIP meetings** (one physical meeting per year)
 - **Mid Term Review** to be organised online at the end of the first year of activity;
 - **Final Review** to be organised online at the end of the activity.
- The selected Candidates will be assigned an ESA scientific mentor, and shall participate in regular remote meetings and online seminar series with the ESA Climate Office.
- The minimum reporting requirements are outlined as follows:
 - **Bi-monthly Progress Report:** Management document describing the main progress and status of the project, problem areas and proposed solutions;
 - **Technical Notes 1 and 2** (to be delivered at T0+6 and T0+18, respectively): Scientific and technical documents detailing the main technical developments and scientific results achieved.
 - **Mid-term review report:** Meeting report to be made publicly available on the fellowship website describing in detail the work carried out and scientific results obtained during the first year of activity.
 - **Final report:** Scientific document to be publicly available on the fellowship website describing in detail the overall activity, problems faced, methods developed and final scientific results obtained



- throughout the project. This should include a list of publications produced.
- **Executive final paper:** Scientific summary of the project in the form of a scientific publication.

3.2 Proposal Submission

- Proposals shall be submitted by **31 January 2023 (at 24:00 CEST)** via e-mail to climate.office@esa.int, including:
 - The research proposal (using the template in ANNEX B); A letter of support from the Host Organisation supporting the Candidate and their project proposal, including a statement **accepting without reservation the conditions of the draft partnership agreement** (please, see Appendix 2 of the present call). *Offers without such a statement or with reservations to the Partnership Agreement will not be considered for evaluation;* An additional letter of support from a key scientist leading the group with which the Candidate will be working, supporting the Candidate and the scientific proposal;
 - A CV of the Candidate including a list of publications;
 - The financial information in the PSS form (ANNEX C).
- Submissions shall include in the e-mail subject: “CCI Fellowship – Candidate name and surname”

3.3 Selection process

- Proposals will be selected on the basis of the following criteria:
 1. Scientific background and experience of the Candidate and the Host Organisation, including the adequacy of the proposed computing facilities, feasibility of data access requirements;
 2. Relevance of the proposed work to Programmatic Areas (identified in Section 2.1);
 3. Excellence of the scientific proposal demonstrating the expected contribution to science beyond the state of the art;
 4. Adequacy of the proposed methodology, work plan, scientific approach;
 5. Financial capacity to perform the project.
- After the selection process, ESA will send an e-mail to all candidates informing them about the outcome of their application.

3.4 Application Requirements, Summary and Checklist

Requirement	Description
Budget per study	ESA will support the selected projects under a co-funding scheme with a maximum budget of €110k per 2-year project.
Candidate	The Candidate must have received a Ph.D. research degree before starting the project. They must have a nationality from an ESA Member State or Canada have received their PhD degree in the last four years (FTE equivalent).
Host Organisations	Host Organisations from the Member States participating in the CCI (see cover letter) are eligible to submit an offer in answer to this Call for Research Proposal. Required co-funding contribution from the Host Organisation shall be, at least, 30% of the overall cost of the ESA contribution.
Duration	Projects shall start before the end of June 2023 covering two years of activity.



Project objectives	Project objectives shall clearly contribute to the Programmatic Area identified in this call.
Use of ESA data	Projects shall maximise the use of ESA data. To this end, a detailed data requirement plan shall be included in the proposal.
Conference Participation	ESA will support through its €110k contribution participation of the Candidate in ESA CCI and CMIP meetings, international conferences and symposiums to present their research work.
Outputs and results	Proposals shall clearly specify the project outputs in terms of scientific results, data sets required, products, models and targeted publications.
Proposal documentation	Proposals shall include: <ul style="list-style-type: none"> <input type="checkbox"/> <i>The research proposal (see template in ANNEX B);</i> <input type="checkbox"/> <i>A letter of support from the Host Organisation supporting the Candidate and their project proposal;</i> <input type="checkbox"/> <i>A statement from the Host Organisation accepting the conditions of the draft partnership agreement without reservations (see Appendix 2). Offers without such a statement or with reservations to the Partnership Agreement will not be considered for evaluation;</i> <input type="checkbox"/> <i>An additional letter from a key scientist leading the group with which the Candidate will be working, supporting the Candidate and the scientific proposal;</i> <input type="checkbox"/> <i>A CV of the Candidate including a list of publications.</i> <input type="checkbox"/> <i>The financial information in the PSS form (ANNEX C).</i>
Reporting	Reporting shall include as a minimum: <ul style="list-style-type: none"> <input type="checkbox"/> <i>Bi-monthly progress report;</i> <input type="checkbox"/> <i>Technical notes 1 and 2;</i> <input type="checkbox"/> <i>Mid-term meeting report;</i> <input type="checkbox"/> <i>Final report (extended version and executive summary).</i>
Review meetings	<ul style="list-style-type: none"> <input type="checkbox"/> Participation at the review meetings (at T0+4, at the end of the first year and at the end of the project) is mandatory and shall take place online. <input type="checkbox"/> Regular remote online meetings with an assigned ESA mentor, and a seminar series will be organised by the ESA Climate Office.

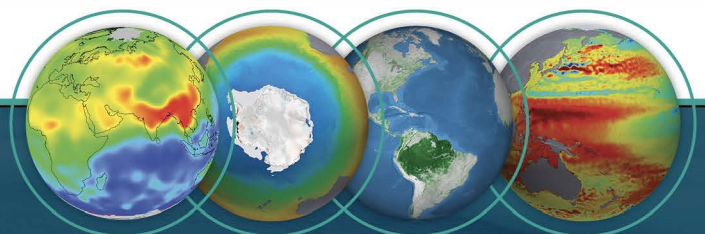
Annex A: Climate Change Initiative Fellowship Project Proposal

ANNEX A – ESA CLIMATE CHANGE INITIATIVE PROJECTS, POINTS OF CONTACT, DATA SOURCES, ADDITIONAL ELEMENTS

Projects

ECV	Lead Organisation	Science Leader
Aerosol_cci	Deutschen Zentrums für Luft- und Raumfahrt (DLR) Finnish Meteorological Institute (FMI)	Thomas Popp Gerrit de Leeuw
Biomass_cci	University of Wales Aberystwyth	Richard Lucas
Cloud_cci	Deutsche Wetterdienst (DWD)	Rainer Hollmann
Fire_cci	Universidad de Alcalá	Emilio Chuvieco
GHG_cci	Universität Bremen	Hartmut Bösch
Glaciers_cci	University of Zurich	Frank Paul
HR Land Cover_cci	Università di Trento	Lorenzo Bruzzone
Antarctica_cci	University of Leeds	Andy Shepherd
Greenland_cci	Danish Technical University (DTU)	René Forsberg
Lakes_cci	Laboratoire d'Études en Géophysique et Océanographie Spatiales (LEGOS) Plymouth Marine Laboratory (PML)	Jean-François Crétaux Stefan Simis
LandCover_cci	Université Catholique de Louvain (UCL)	Pierre Defourny
LST_cci	University of Leicester	Darren Ghent
OceanColour_cci	Plymouth Marine Laboratory (PML)	Shubha Sathyendranath
Ozone_cci	Koninklijk Belgisch Instituut voor Ruimte-Aeronomie (BIRA)	Dr.Folkert Boersma
Precursors for ocean and aerosol_cci	Koninklijk Belgisch Instituut voor Ruimte-Aeronomie (BIRA)	Michel van Roozendaal
Permafrost_cci	B.GEOS	Annett Bartsch
Salinity_cci	Université Pierre et Marie Curie (UPMC)	Jacqueline Boutin
Seaice_cci	Norwegian Meteorological Institute (MET NO)	Thomas Lavergne
Sea Level_cci	Collecte Localisation Satellites (CLS)	Anny Cazenave
Sea State_cci	Institut français de recherche pour l'exploitation de la mer (IFREMER)	Fabrice Ardhuin
Snow_cci	ENVEO	Thomas Nagler
Soil Moisture_cci	Technische Universität Wien (TUW)	Wouter Dorigo
SST_cci	University of Reading	Chris Merchant
Vegetation_cci	University of Trente (UT)	Christiaan van der Tol
Water Vapour_cci	University of Reading Deutsche Wetterdienst (DWD)	Michaela Hegglin Marc Schroder
CMUG	UK Meteorological Office (UKMO)	Paul van der Linden
Sea Level Budget Closure	Technische Universität Dresden (TUD)	Martin Horwath
IMBIE	University of Leeds	Andrew Shepherd
RECCAP	Laboratoire des Sciences du Climat et l'Environnement (LSCE)	Philippe Ciais

Table 1: ESA CCI projects, lead organisations and lead scientists.



Annex A: Climate Change Initiative Fellowship Project Proposal

Points of Contact

While proposals do not have to be based at institutions with CCI projects, collaboration and discussion with the lead organisations is strongly encouraged. Table 1 above provides details of the lead organisation and lead scientist for each of the CCI projects.

The CCI Research Fellowships will be coordinated by the ESA Climate Office. To contact the ESA Climate Office for further questions, please e-mail Climate.Office@esa.int quoting the subject line 'FAO CCI Research Fellowship panel/team'.

Data Sources

All the data generated by the CCI are available through the ESA Climate website (climate.esa.int) or from the individual projects. While use of these data is strongly encouraged the proposals can also include data (including from ESA) not from the CCI if they contribute to assessment of consistency or aid exploitation of the CCI data.

ANNEX B – Proposal Template (see APPENDIX_1_2022_ANNEX B.docx)

ANNEX C – PSS Form (see APPENDIX_1_2022_ANNEX C.xlsx)

If there are any queries regarding the PSS form, please contact the Climate Office for support.

APPENDIX 2 – Draft Partnership Agreement (see APPENDIX_2_2022_DPA.docx)

