esa

support to science element | scientific exploitation of operational missions | climate change initiative

The Living Planet Fellowship

Call for research proposals 2014

Reference: XXXXXXXXX

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of operational missions

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1. Introduction

Since observing the Earth from space first became possible more than fifty years ago, satellite missions have become central to monitoring and learning about how the Earth system works. ESA has been involved in Earth observation science and applications from space ever since the launch of its first meteorological mission, Meteosat, back in 1977. Following the success of this first mission, the subsequent series of Meteosat satellites, together with ERS-1, ERS-2 and Envisat have been providing us with a wealth of invaluable data about the Earth, its climate and its changing environment [R1]-[R2].

Today, a new age in ESA's Earth Observation (EO) programmes is becoming a reality with the launch of the first components (GOCE, SMOS, Cryosat-2, Swarm) of a suite of scientific satellites, the Earth Explorers, the continuity of well-established meteorological missions and the advent of the Sentinels with the launch of the first (Sentinel-1) of a series of new operational missions serving a wide range of European environmental information priorities [R2]-[R3]. In addition, the Climate Change Initiative (CCI) [URL5] is dedicating significant effort to the development of long-term climate data records addressing major Essential Climate Variables (ECVs) [R4] responding to the needs of the climate community.

This increasing multi-mission observational capacity provided by the Earth Explorers and the Sentinel series, the CCI climate data records, together with the long-term ESA archives and the 3rd party missions offer unique opportunities for science and innovation in the areas of earth observation, earth system science and climate research.

The full scientific exploitation of this capacity requires significant dedicated research efforts as well as the involvement of the new generation of scientists starting their careers in the different fields of Earth Observation, Earth System Science and Climate Research.

As a direct response to this need, and following the success of the Changing Earth Science Network [URL6], ESA launches the Living Planet Fellowship, which expands the scope of the initiative to cover all different areas of ESA EO scientific exploitation.

This document is a call for proposals addressed to the new generation of Scientists in ESA Member States to undertake innovative and leading edge research activities that may provide a significant advances in the scientific exploitation of ESA EO missions and datasets.

This call is for a number of research projects (supported by ESA with a ceiling price of 40KEuro per year under a co-funding scheme) proposed and implemented by young researchers at post-doctoral level.

1.1 Reference documents

[R1] "The Science and Research Elements of ESA's Living Planet Programme", ESA-SP series, ESA SP-1227, 1998.
[R2] "Introducing the Living Planet Programme: the ESA's strategy for EO", ESA-SP series, ESA/SP-1234, 1999.
[R3] "The Changing Earth – New Scientific Challenges for ESA's Living Planet Programme", ESA-SP series, ESA/SP-1304, 2006.
[R4] Systematic Observation Requirements for Satellite-Based Data Products for Climate - 2011 Update, GCOS-154, December 2011. Available online at: http://www.wmo.int/pages/prog/gcos/Publications/gcos-154.pdf.

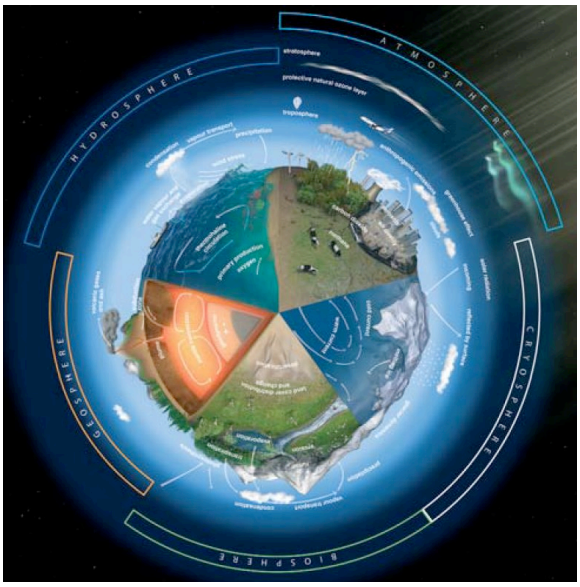
1.2 Reference web site

[URL1]	www.esa.int	ESA Web portal
[URL2]	www.esa.int/stse	Support To Science Element Portal
[URL3]	www.esa.int/eopi	Principal Investigator Portal
[URL4]	www.esa.int/seom	Scientific Exploitation of Operational Missions
[URL5]	www.esa-cci.org	Climate Change Initiative
[URL6]	http://www.esa.int/stse/cesn/cesn.php	Changing Earth SciNet

2 THE LIVING PLANET FELLOWSHIP

The main objective of the Living Planet Fellowship is to engage young scientists in ESA Member States pursuing a scientific career in Earth Observation, Earth System or Climate Science into all areas of ESA scientific exploitation activities.

The initiative will support young scientist, at post-doctoral level, to undertake leading edge research maximising the scientific return of ESA EO missions and datasets through the development of novel methods, new products and fostering new scientific results. This includes the scientific exploitation of the Earth Explorer missions, the long-term ESA archives, the new Sentinel missions and the long-term data records generated under the Climate Change Initiative.



In this context, the Fellowship Scheme aims at:

- Engaging the young generation of Earth observation, Earth system science and climate scientists in all different areas of ESA scientific exploitation activities;

- Contributing to the scientific excellence and innovation in Member States by addressing the main scientific priorities of ESA exploitation programmes.

- Maximizing the scientific return of ESA EO missions, datasets and investments in generating long-term data records in terms of new scientific results and publications;

- Preparing for the future by fostering the development of a dynamic research network of excellence and innovation involving young scientists in ESA Member States addressing key areas of research relevant for ESA missions and the ESA science strategy;

- Enhancing interactions, exchanging know-how and allowing cross fertilisation between ESA and Earth science laboratories, research centres and universities.

2.1 Implementation

The initiative will be implemented through a number of dedicated research projects proposed and carried out by young scientists, at post-doctoral level, hosted by universities, laboratories and technical centres in ESA Member States.

With this call for proposals, ESA will select and **co-finance a number of projects** (See details in **Conditions and contract with the Host Organisation** below) proposed by scientists at post-doctoral level through their Host Organisation responding to the following principles:

Eligibility:

- Candidates must have received a Ph.D. research degree (or shall receive it before the start of the fellowship contract within 2014) in Earth science, physics, engineering, Earth observation, climate research or a related discipline.

- Candidates must in general be no older than 35 years at the time of the application. Candidates may only exceed the above age limit of 35 years old provided that they have completed their PhD degree in the last 2 years (after the 1st May 2012).

- Candidates must have a nationality from an ESA Member State (including Canada).

Host Organisation:

- The initiative will be implemented through 2-year contracts placed with selected Host Organisations (e.g., university, technical centre, laboratory, company) from ESA Member States participating to EOEP-4 or CCI (**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).

- **Only one Candidate** will be selected for any single organisation (understood as a Faculty or Institute inside large research institutions or universities) to maximise the geographical distribution and avoid a concentration of candidates in the same centre.

- Selected candidates will be the Principal Investigators 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.

- Selected candidates will work full-time on the research projects proposed in their applications and will be based at the proposed Host Organisation during the entire period of the research contract, except for the **OPTIONAL** research periods in an ESA centre or at other ESA Member State research laboratory (e.g., one of the organisations of the CCI projects).

- The Host Organisation shall confirm (via the required letter of support) the availability of the Candidate and the possibility of the Host Organisation administration to initiate the project within 2014.

Programmatic Areas:

Candidates shall propose a 2-year research plan, in one of the following three programmatic areas:

A) Support To Science:
- Scientific exploitation of the Earth Explorers missions (i.e., SMOS, CryoSat, GOCE and Swarm), developing and validating innovative methods, novel products and promoting new scientific results.
- Earth System Science research maximising the exploitation of ESA missions and long-term ESA archives (e.g., ERS-1, ERS-2, Envisat), also in synergy with other ESA and non-ESA data sets, specifically addressing the new scientific challenges of the Living Planet Programme (see Annex A).

B) Scientific Exploitation of the Sentinels:
- Development and validation of advanced EO methods and products for scientific exploitation of the continued observations and innovative features of the Sentinel missions (Sentinel 1, Sentinel 2, Sentinel 3 or Sentinel 5P);
- Developing novel scientific methods and tools for enhancing the synergetic exploitation of the Sentinel missions (Sentinel 1, Sentinel 2, Sentinel 3 and Sentinel 5P);

C) Climate Change Initiative (see [URL5] and Annex B for more details):
- Exploiting Essential Climate Variable (ECV) products generated by the ESA's CCI for improved understanding of the climate system.
- Examining Cross-ECV consistency and multiple ECV use (those under the CCI Programme in particular).

Scientific proposal:

- Proposals shall be submitted to ESA using the template provided in ANNEX C. Each proposal shall include a CV of the candidate, a list of publications and 3 letters of support;

- The project results in terms of final reports, scientific results, algorithm, geo-information products, etc., shall be publicly available through the relevant ESA web sites. In addition, proposals shall include a plan for publications in international peer review journals as well as a travel plan to key international conferences;

- The projects shall explicitly acknowledge ESA's Living Planet Fellowship funding scheme in any single journal paper and conference proceedings containing results obtained in this framework.

Data access:

- Selected candidates will be granted free access to the required ESA data. Product quotas will be set up by mission managers, if necessary, for those products having processing constraints, following the same approach as for regular Category-1 projects [URL3].

- Candidates shall detail in their proposals the complete list of ESA data (including ESA 3rd party missions) that will be required to carry out the project.

- Candidates are encouraged to make use of additional data sources, especially auxiliary and in-situ collected data. The Candidate or the Host Organisation shall demonstrate in the proposal the availability of all the required data sets to accomplish the proposed work.

Conditions and contract with the Host Organisation:

- For selected project proposals, ESA will place a contract (see Appendix 2 of this call for proposals) with the Host Organisation for a maximum budget of 40KEuro per year, as a co-funding contribution to a standard post-doctoral position. ESA funding shall contribute to cover costs associated to the salary 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 with, as a minimum, 30% of the overall cost for the two years (e.g., covering overheads, contribution in kind).

- In addition to the maximum amount of 40KEuro per year, as part of the contract with the Host Institution, ESA will also provide an additional maximum amount of 3.000 Euro to cover both the potential costs of related publications and also participation of the selected Candidate to international conferences and ESA review workshops to present the research work. A preliminary travel and cost plan shall be provided in the proposal (see requirements related to meetings and workshops participation in the Section below).

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 by teleconference at T0;
  - **A First Collocation Meeting** at T0+4;
  - **Mid Term Review** at the end of the first year of activity;
  - **Final Review** at the end of the activity.

  When possible, meetings will be organised in the format of workshops involving all participants to the initiative. In principle the workshops will be organised in an ESA establishment. Specific details on the venue will be communicated in due time to the selected candidates.

- Reporting shall be done following the minimum requirements below:

  - **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 report:** Scientific document to be publicly available 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 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, to be used by ESA in a monographic series collecting the results of the initiative.

2.2 Research periods in centres other than the Host [OPTIONAL]

The initiative incorporates as an option the possibility to carry out a research period (of duration from 3 to 6 months) in ESA establishments or other key scientific organisations as visiting scientists. During this period, selected candidates will work in close collaboration with the relevant nominated staff to complete part of the proposed work.

Candidates shall point out in their proposals the preference (or not) for this option as well as tentative dates for the visiting period. A short description of the proposed work to be carried out in this visit shall also be included in the proposal.

ESA will provide additional economic support to the selected candidates during the visiting scientist period to be negotiated with ESA in a case by case basis as a Change Contract Notice.

Proposal evaluations will be independent of this option. In addition ESA reserves the right to consider or not this option depending on ESA priorities.

2.3 Proposal Submission:

- Proposals shall be submitted **before June the 30th (at 24:00 CET) 2014** via e-mail to **EOScience@esa.int,** including:
    - The research proposal (using the template in ANNEX C);
    - A letter of support from the Host Organisation supporting the candidate, his/her project proposal
    - A statement from the Host Organisation **accepting without reservations 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;***
    - Two additional letters of support from key scientists in the relevant field, supporting the candidate and the scientific proposal;
    - A CV of the candidate including a list of publications;
    - The PSS form provided in ANNEX D including the financial information.

- Submissions shall include in the e-mail subject: "Living Planet Fellowship – Candidate name and surname"

- Any additional questions shall be submitted to EOScience@esa.int.

2.4 Selection process

Proposals will be selected on the basis of a peer review process by a Scientific Committee including members of Scientific Advisory Bodies to ESA and ESA senior staff. The selection process will be carried out on the basis of the following criteria:

1. Scientific background and experience of the candidate as well as the Host Organisation, including the adequacy of the proposed laboratory facilities, data sets availability and required EO data.

2. Relevance of the proposed work with respect to the specific programmatic areas of interest (See Section 2.1);

3. Excellence of scientific proposal demonstrating a contribution to science beyond the state of the art and providing a significant advancement with respect to the specific objectives of the programmatic areas of interest (See Section 2.1);

4. Adequacy of the proposed methodology, work plan, scientific approach, proposed EO data procurement and available data sets;

5. Impacts of concrete project outputs in terms of scientific results, data sets, products, models and target publications and potential further developments;

After the selection process, ESA will send an e-mail to all candidates informing them about the outcome of their application.

2.5 Planned Scheduling

Description	Date
Open call	May 2014
Submission of Proposals	30th June 2014
Communication of Results (tentative)	October 2014
Beginning of Activities (tentative)	4rd Quarter 2014

2.6 Planned Contracts per Programmatic Area

In the context of this call for proposals the following contracts are expected to be placed per programmatic area:

Programmatic Area	Expected contracts
A) Support To Science	Up to 6
B) Scientific Exploitation of Operational Missions	Up to 6
C) Climate Change Initiative	Up to 10

2.7 Application Requirements, Summary and Checklist

Requirement	Description
Budget per study	ESA will support the selected projects under a co-funding scheme for a maximum budget of 40KEuro per year plus a maximum of 3000 Euros to cover travel and publication costs.
Candidate	Candidate must have received a Ph.D. research degree before starting the project (within 2014). They must have, as a maximum, 35 year old at the time of the application and must have a nationality from an ESA Member State or Canada. Candidates over the above age limits are eligible provided that they have received the PhD degree in the last two years.
Host Organisations	Host Organisations from the Member States participating to EOEP-4 or 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, the 30% of the overall cost of a standard post-doctoral position.
Duration	Projects shall start within 2014 covering 2 years of activity.
Project objectives	Project objectives shall clearly contribute to one of the three Programmatic Areas 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.
Participation to Conferences	ESA will also support with an additional amount (up to 3.000 Euros) both cost of publications and the participation of the Candidate to review meetings, international conferences and symposiums to present the research work.
Outputs and results	Proposals shall clearly specify the project outputs in terms of assets: scientific results, data sets, products, models and targeted publications.
Visiting Scientist periods	The candidate can include as an option in the proposal the possibility to carry out a research period in an ESA centre or another institution (as a visiting scientist) for a continuous and maximum period from 3 to 6 months during the entire duration of the project.
Proposal documentation	*Proposals shall include:* • *The research proposal (see template in ANNEX C);* • *A letter of support from the Host Organisation supporting the candidate, his/her project proposal* • *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****;* • *Two additional letters of support from key scientists in the relevant field, 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 D).*
Reporting	Reporting shall include as a minimum: • *Bi-monthly progress report;* • *Technical notes 1 and 2;* • *Mid-term report;* • *Final report (extended version and executive summary).*
Review meetings	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 be included in the travel plan.

ANNEX A – SUPPORT TO SCIENCE PRIORITIES: THE NEW CHALLENGES OF THE LIVING PLANET

The Challenges of the Oceans:

Improve understanding and quantification of:

- evolution of coastal ocean systems including the interactions with land in response to natural and human-induced environmental perturbations;
- mesoscale and submesoscale circulation and the role of the vertical ocean pump and its impact on energy transport and biogeochemical cycles;
- response of the marine ecosystem and associated ecosystem services to natural and anthropogenic changes;
- physical and biogeochemical air/sea interaction processes on different spatio-temporal scales and their fundamental role in weather and climate;
- sea level changes from global to coastal scales and from days (e.g. storm surges) to centuries (e.g. climate change);

The Challenges of the Atmosphere:

Improve understanding and quantification of:

- water vapour, cloud, aerosol and radiation processes and the consequences of their effects on the radiation budget and the hydrological cycle;
- interactions between the atmosphere and the surface involving natural and anthropogenic feedback processes for water, energy and atmospheric
- composition;
- changes in atmospheric composition and air quality, including interactions with climate;
- interactions between changes in large scale atmospheric circulation and regional weather and climate;
- impact of transient solar events on the Earth's atmosphere;

The Challenges of the Solid Earth

Improve understanding and quantification of:

- physical processes associated with volcanoes, earthquakes, tsunamis and landslides in order to better assess the natural hazards;
- individual sources of mass transport in the Earth system at various spatio-temporal scales;
- physical properties of the Earth crust and its relation with natural resources;
- the physical properties in the deep interior, and their relationship to deep and shallow geodynamic processes;
- different components of the Earth magnetic field and their relation to the dynamics of the charged particles in the outer atmosphere and ionosphere for Space Weather research;

The Challenges of the Cryosphere

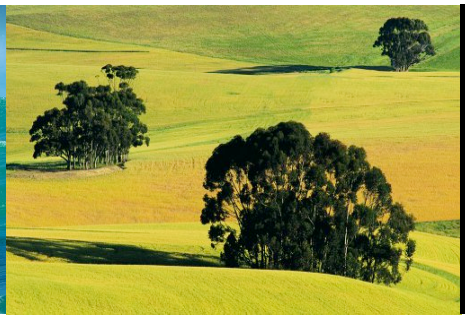
Improve understanding and quantification of:

- regional and seasonal distribution of sea-ice mass and the coupling between sea ice, climate, marine ecosystems, and biogeochemical cycling in the ocean;
- mass balance of grounded ice sheets, ice caps and glaciers, their relative contributions to global sea-level change, their current stability and their sensitivity to climate change;
- seasonal snow, lake/river ice and land ice, their effects on the climate system, water resources, energy and carbon cycles; the representation of the terrestrial cryosphere in land surface, atmosphere and climate models;
- effects of changes in the cryosphere on the global oceanic and atmospheric circulation;
- changes taking place in permafrost and frozen-ground regimes, their feedback to climate system and terrestrial ecosystems (e.g. carbon dioxide and methane fluxes);

The Challenges of Land

Improve understanding and quantification of:

- natural processes and human activities and their interactions on the land surface;
- interactions and feedbacks between global change drivers and biogeochemical cycles, water cycles, including rivers and lakes, biodiversity, and productivity;
- structural and functional characteristics of land use systems to manage sustainably food, water and energy supplies;
- land resource utilisation and resource conflicts between urbanization, food and energy production and ecosystem services;
- how limiting factors (e.g. freshwater availability) affect processes on the land surface and how this can adequately be represented in prediction models;

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

Introduction
The ESA Climate Change Initiative is a 6 year programme dedicated to realising the full potential of the long-term global Earth Observation archives that ESA together with its Member states have established over the last thirty years, as a significant and timely contribution to the Essential Climate Variable (ECV) databases required by United Nations Framework Convention on Climate Change (UNFCCC) [R-4]. It is dedicated to implementing all steps necessary for the systematic generation and regular updating of the relevant ECVs while at the same being fully coordinated with on-going international efforts to bring together the Earth observation, climate modelling and climate science communities to exchange knowledge and hence better quantify climate change. The CCI comprises 14 projects covering 13 ECVs plus a specific project on climate modelling (CMUG) (see Table 1).

Data Sources
All the data generated by the CCI are available through the ESA CCI website (www.esa-cci.org) under Data Access. 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.

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 provides details of the lead organisation and lead scientist for each of the CCI projects.

Additional elements under CCI
For the exploitation of the CCI data, the proposed project shall be original and shall not overlap with work already being undertaken as part of individual CCI projects. This will be part of the evaluation.

Enhancing interactions between the CCI and other science laboratories, research centres and universities is an important part of this scheme. Thus, visiting scientist exchanges with one or more organisations (including those involved in the CCI) can be considered and shall be presented as part of the proposal (see 2.2) complete with an appropriate letter of agreement.

ECV	Lead organisation	Science Leader
cloud_cci	*Deutsche Wetterdienst (DWD)*	*Dr. Rainer Hollmann*
ozone_cci	*Belgisch Instituut voor Ruimte-Aeronomie (BIRA)*	*Prof Michael van Roozendahl*
aerosol_cci	*German Aerospace Centre (DLR)/Finnish Meteorological Institute (FMI)*	*Dr Thomas Holzer-Popp Prof Gerrit de Leeuw*
ghg_cci	*University of Bremen*	*Prof Michael Buchwitz*
sst_cci	*University of Reading*	*Prof Chris Merchant*
seaice_cci	*Nansen Environmental and Remote Sensing Centre (NERSC)*	*Prof Stein Sandven*
sealevel_cci	*Collecte Localisation Satellites (CLS)*	*Dr Anny Cazenave*
oceancolour_cci	*Plymouth Marine Laboratory (PML)*	*Dr Shubha Sathyendranath*
glaciers_cci	*University of Zurich*	*Dr Frank Paul*
landcover_cci	*Université Catholique de Louvain (UCL)*	*Prof. Pierre Defourney*
fire_cci	*Universidad de Alcalá*	*Prof Emilio Chuvieco*
icesheet_greenland	*Danish Technical University (DTU)*	*Dr René Fosberg*
icesheet_antarctica	*University of Leeds*	*Prof Andrew Shepherd*
soilmoisture_cci	*Technical University of Vienna (TUW)*	*Prof Wolfgang Wagner*
Climate Model User Group	*UK Meteorological Office (UKMO)*	*Dr Roger Saunders*

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

ANNEX C – Proposal Template (see ANNEX C.doc)

ANNEX D – PSS Form (see ANNEX D.xls)

For Additional Information:

For additional information, please, contact us through the following e-mail: **EOScience@esa.int**