

## DEEMPACT

A grant request from **INSTITUT DE RECHERCHE POUR LE DÉVELOPPEMENT (IRD)**  
For the Climate Initiative programme of the BNP Paribas Foundation

[Print PDF](#)

### Description of the project

**The overarching aim of DEEMPACT is to reduce the large uncertainty in future model predictions of rainfall extremes in Atlantic semi arid and monsoonal regions.**

Tropical hydroclimate is extremely sensitive to climate change, with severe impacts on natural resources and society (fresh water, rain-fed agriculture, *etc.*) in drought and flood prone regions, such as Northeast Brazil, Sub-Saharan countries or Morocco on which DEEMPACT will build pilot studies. The wide internal variability range complicates the understanding and recognition of climate change due to human activities. Impacts on eco- and anthropo-systems depend on changes in long-term trend, decadal frequency and the magnitude of rainfall. On these timescales, the global warming influence depends on the phase of the relevant modes of internal variability. As a result, the respective role of anthropogenic forcing and natural variability has not yet been disentangled in many vulnerable regions. Given improvements in climate models, data availability and techniques to merge both, it is now nevertheless possible to better anticipate the next decades relying on decadal climate prediction system, that can also help attributing the role of external forcings (natural and anthropogenic) and internal source of predictability. The highest skill in terms of unforced decadal predictability comes mostly from the large inertia and predictability of the Atlantic Meridional Overturning Circulation and of the Atlantic Multidecadal Oscillation. Volcanic eruptions have also been identified as a key source of forced predictability on multi-years timescale. Key questions arising from decadal predictions performed up to now are (i) what are the key sources of predictability for Atlantic Ocean tropical vulnerable regions? (ii) What are the underlying mechanisms? (iii) Do identified processes improve predictions skills of the climate impact?

DEEMPACT relies on newly developed capabilities of the Institut Pierre Simon Laplace (IPSL) and U. Louvain la Neuve climate models, to develop physically more realistic climate reconstructions over the last 150 years and large parts of the last 2000 years (2K) by constraining internal variability from direct and proxy-based observations, and evaluating uncertainties related to external forcings. Constraining the last 2K Atlantic decadal climate variability will allow increasing the short instrumental observations, identifying new sources of predictability, understanding of climate model responses to forcings and developing more accurate future decadal projections. This is compulsory for meeting the needs to prepare developing countries for the impacts of future major drought and floods. DEEMPACT objectives are to:

- (1) Reconstruct and understand Atlantic decadal variability since 1850 in two fully coupled models driven by known external forcings using particle filtering, ocean nudging and wind restoring.
- (2) Identify climate modes and attribute the ranges of past extremes events (*e.g.* mega-droughts) back to 650 CE, by compiling highly-resolved and high-quality climate proxy records (*e.g.* tree-ring, lake-level, speleothems, corals *etc.*) along with new records in tropical S. America, N. Africa and Sahel.
- (3) Build a reference catalogue documenting the resilience of eco- and anthropo-systems (*e.g.*, shifts, breakpoints) for key periods of the last 2K based on new multi-scale and multi-parameter data (pollen, fires, historical documents, *etc.*) in Northeast Brazil and Sub-Saharan countries.
- (4) Extend the climate model reconstruction to key periods of the last 2K using two methods for proxy data assimilation in IPSL and LOVECLIM models.
- (5) Assess the realism of climate models decadal variability in the North Atlantic as compared to the new reconstructions and identify the mechanisms linking Atlantic SST variability and hydro-climate extremes.
- (6) Evaluate skills of newly-identified sources of decadal predictability and design climate projections of rainfall extremes in DEEMPACT study area for the next decades.

### Project attributes

[Localisation](#)

DEEMPACT focuses on climate variations at the decadal timescales over South America and Africa monsoonal regions as well as North Africa semi-arid regions (Brazil, Morocco, Senegal, Mali, Niger, Mauritania, Burkina, Congo). There, unprecedented proxy database made available for DEEMPACT by partners' IRD-funded projects will extend the short instrumental records. Further, known historical archives of climate extremes (e.g., drought/flood events, cyclones, daily records of Temperature, Precipitation, etc.) in sahel/sub-sahel regions and in the Tropical Atlantic (Antilles and Jamaica) will be retrieved. Tasks on climate reconstructions and modelling will be carried out in France, Belgium and Norway.

#### Sources of informations

DEEMPACT links on-going national and international projects regarding climate change and variability at various timescales, impacts on ecosystems and decadal predictions. This unprecedented configuration at international level for both climate reconstruction and modelling is timely to deliver a mature understanding of the mechanisms at play and allow addressing challenges regarding the impact of climate change on vulnerable countries. See: <http://deempact.locean-ipsl.upmc.fr>.

(1) <http://blue-action.mpimet.mpg.de/index.php?id=3498>;

(2) <https://www.ird.fr/la-recherche/laboratoires-mixtes-internationaux-lmi/lmi-paleotracés-paleoclimatologie-tropi>

;

(3) <http://labex.ipsl.fr/recherche/actionsscientifiques>;

(4) [https://www.belspo.be/belspo/brain-be/projects/PAMEXEA\\_en.pdf](https://www.belspo.be/belspo/brain-be/projects/PAMEXEA_en.pdf);

(5) <https://chrono-environnement.univ-fcomte.fr/spip.php?article2335>;

(6) <http://www.agence-nationale-recherche.fr/?Project=ANR-13-SENV-0007>.

#### Major milestones 2017

WP1 (Project management): January 2017 Project kick-off meeting with invited international speakers (All PIs and Partners); D.1.1 M6. Project leaflet (MK&IRD communication department); WP2 (Reconstruct and understand Atlantic decadal variability from 1850 to present): D. 2.1 M12. Assess the role of surface nudging and 3D ocean nudging in the oceanic response over the 20th century (PDRA&JM). WP3 (Reconstruct and evaluate decadal variability over the last 2K): D. 3.1 M12. Reconstruct climate modes and attribute ranges of past extremes rainfall events (e.g. mega-droughts) back to 650 CE, from proxy records in S. America and Africa (Cofunded PhD, cofunded PDRA&MK&ST&AS&MAS&IB). D. 3.2 M12. Offline pseudo proxy analyses in extra tropical North Atlantic regions for key periods of the last 2K (PDRA&AB&JM). D. 3.3 M12. Compile historical documents and pollen records from sub-Saharan countries (PDRA&EG&BS&AML).

#### Major milestones 2018

WP1: D.1.2 M18. Summer school for early career scientists focused on interactive model-data comparisons and impacts. Co-organised with a partner and LMI Paleotracés co-funding (MK&AS). D.1.3 M20. Web-series and photograph press release (website&IRD com. department). D.1.4 M24. Joint public conference with Brazil-Africa-Europe Tripartite cooperation projects in Marrakech (all PIs&PDRAs). D.1.5 M24. Project meeting in Agadir (All PIs and PDRAs). WP2: D. 2.2 M24. Papers on the model response to Nudging proposal particle filter respectively to the simple surface nudging and other 20th century Reanalyses (PDRAs&HG&JM&DS&MK). D. 2.3 M24. Papers on decadal variability large-scale modes and AMOC variations links with tropical precipitations over the 20th century (PDRAs&cofunded-Phd&JM&GG&MK). WP3: D.3.4 M18. Catalogue and papers on the resilience of eco- and anthropo-systems for key periods of the last 2K based on new multi-scale and multi-parameter data (PDRA&EG&BS&AML&AS&IB).

#### Major milestones 2019

WP1: D.1.6 M36. Public conference in Dakar (All PIs), Science event in Paris (IRD support). D.1.7 M36. Results dissemination (website, press release). D.1.8 M36. Final workshop with invited international experts and local stockholders (Dakar, all PIs&PDRAs). WP3: D.3.5 M25. Identification of target periods for the past 2K simulations based on proxy and historical information and relevance for future risks (PDRA&EG&BS&AS). D.3.6 M36. Papers on the uncertainty ranges of reconstructed 2K Atlantic internal variability (PDRAs&DS&HG&JM&MK&GG&AB&&AS&MAS). D.3.8 M36. Papers on the D-A of external forcing on Atlantic variability and teleconnections with rainfall extremes (PDRAs&MK&JM&GG&AB&MM). WP4 (Prediction of extremes and impacts): D. 4.1 M25. Papers on Atlantic Ocean, volcanic forcing and rainfall hindcast prediction skills (co-funded

PDRA&DS&JM&GG&MM). D. 4.2 M36. Papers on climate hazards associated with length, geographical extent, severity of extremes in future scenarios (PDRA&SJ&BS).

### Scientific interest

DEEMPACT is an ambitious project that aligns to WCRP Extremes Grand Challenge. With the unprecedented knowledge resulting from the participation of historians, experts in palynology, climate variability and prediction the project will be in a unique position to build a database including resilience of eco- and anthropo-systems (e.g., breakpoints, etc.) and address one of the key limits of current prediction systems: the statistical and dynamical robustness of the links between decadal variability and extremes. This is critical for a better planning and management of energetic use, water availability for human and agriculture, urban occupation, etc. Therefore, DEEMPACT results will be relevant to Climate Services, local institutions in many tropical countries, which are constantly subject to extreme climatic conditions. Other public and private institutions (insurance companies, etc.) will certainly also benefit from results produced here.

### International scope

DEEMPACT brings together an historian (LENSs, France), experts in palynology, statistics, analyses of proxy- and instrumental records of climate changes, monsoons, climate modelling and prediction from France (IPSL, EPOC) and Norway (U. Bergen), in paleoclimate data assimilation from Belgium (U. Louvain La Neuve) and in decadal prediction from Spain (BSC). Project Partners include UFF, USP and INPE-CPTEC from Brazil, U. Ibn Zohr from Morocco and UCAD from Senegal. We expect that the outcomes will be of interest for society and stakeholder in tropical South America and Africa and beyond. It is relevant to international initiatives such as CLIVAR, Future Earth, WCRP Grand Challenge of Extremes, CMIP6 (PMIP, DCCP, VOLMIP) and PAGES2K.

### Organisation of the team and profiles involved

Myriam Khodri is the PI with responsibility for project management, the timely delivery of results and the necessary integration to meet objectives. Khodri has a solid experience in coordinating national and international projects, and endorsing international responsibilities. Khodri will also be involved in setting up and analysing model simulations and proxy records. She will lead WP1, and J. Mignot, H. Goosse and D. Swingedouw will lead the other ones. These young and more experienced researchers have all shown their capability in leading projects and coordinating WP in national and international projects and have very complementary expertise in terms of model development, proxy analysis and physical interpretation of climate variability. The Monthly Skype meetings, one face-to-face meetings per year with all investigators and at least one international conference is budgeted for each PDRA and PIs, which will ensure the project meets strategic goals.

### Outreach

Several PIs of DEEMPACT are strongly involved in education and training of S. American and African students. DEEMPACT will encourage multi and regional supervision of PDRA combining partners from several countries. A summer school for PhDs and students is planned in a partner tropical country. Public conferences will be organised allowing students and teachers from developing country to meet and exchange on their perspectives. Seminars for stakeholders from local communities and the private sector are also planned. DEEMPACT website will be used to disseminate the activities and results of the project, and resources for environmental education and awareness will be developed such as web series that we will send to newspapers. Finally, workshops during the project will include special sessions with decision-makers from the environmental and productive sectors. Mid-term and final executive reports will be delivered to national agencies in charge of climate-change issues.

### Project timeframe

DEEMPACT overarches on-going projects which deliverables will feed our scientific goals ensuring strong PIs dedication. During year 1, the retrieval of numerous trans-Atlantic historical archives and production of proxy-based climate reconstructions will provide hitherto unseen direct extreme events chronology. In parallel, technical issues related to data assimilation in climate models will be addressed for the historical period. Outcomes at the end of year 1 will lead to several high profile publications and feed the modelling assimilation tasks of the last 2K during the first 24 months. Newly identified processes and sources of predictability for rainfall extremes in vulnerable regions obtained by merging observations and model reconstructions will be delivered as soon as month 18. During the last 18 months we will quantify the

predictions skill in hindcast framework and provide to climate service and the public sector with improved decadal predictions systems for climate hazards.

### [Impact of the fundings](#)

The funding request corresponds to 60% of the total co-funded relevant projects. DEEMPACT funding request concerns: Postdoctoral Research Award (PDRA) to attract and promote the direct involvement of recent PhD holders; field trips to seek historical documents; laptops and desk screens for the PDRA; one face-to-face meeting per year with all investigators and at least one annual international conference for each PIs and PDRA are budgeted. This will ensure the project meets strategic goals. About 30k€ are allocated to outreach activities such as multimedia releases (e.g. <http://youtu.be/xcaQNIgF3R4>), a summer school, public conferences and festivals. To that aim it will strongly rely on the longstanding expertise of IRD communication department that is implanted in many Southern countries ( <http://en.ird.fr/ird.fr/the-media-centre>) which will free of charge help organise science events, multimedia releases, etc. to promote research related to the benefit to developing countries.

### [Synthesis](#)

Droughts and floods are projected to increase in the coming decades in vulnerable tropical regions. Yet the detection of human-activities impact on recent events is complicated by the lack of understanding on the role of natural variability. DEEMPACT fills the need for identifying the natural ranges of rainfall extremes and the resilience of Atlantic sector socio-ecosystems from long series found in historical and natural archives. Furthermore, DEEMPACT exploits the IPSL and LOVECLIM climate models capabilities to derive physically consistent reconstructions for the last 2000 years where internal variability is constrained to observations, and uncertainties related to external forcings are evaluated. With the unprecedented knowledge resulting from the participation of historians, experts in climate variability and impacts the project will be in a unique position to identify the processes that shape decadal climate variations and developing countries vulnerabilities to climate changes.

## **Project team**

### [Sultan, Benjamin](#)

researcher

IRD

contribution to the creation of a catalogue on the resilience of eco- and anthropo-systems for key periods of the last 2K and co-coordination with S. Janicot of "Predictions of climate extremes and impacts for the next decades"

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### [Janicot, Serge](#)

Senior researcher

IRD

contribution to the project: coordination with B. Sultan of "Predictions of climate extremes and impacts for the next decades"

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**Mignot, Juliette**

**Researcher**

**IRD**

WP2 leader; expertise on climate variability at decadal timescales, role of the ocean, teleconnections to the Tropics and climate predictability.

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**Sicre, Marie-Alexandrine**

**Senior researcher**

**CNRS**

Production of high-resolution proxy reconstructions in North Atlantic sector- comparison with model simulations

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**Bouloubassi, Ioanna**

**Researcher**

**CNRS**

Production of high-resolution proxy reconstructions over Northeast Brazil and tropical Atlantic- comparison with model simulations

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[Sifeddine, Abdel](#)

**Senior researcher**

**IRD**

Reconstruction of Past Climate variability in the Tropics from Speleothemes, lakes and marine sediments.

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[Lézine, Anne Marie](#)

**Senior researcher, LOCEAN Director**

**CNRS**

Production of high-resolution vegetation reconstructions over equatorial Africa - comparison with model simulations

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[Gastineau, Guillaume](#)

**Lecture**

**Sorbonne Universités, Université Pierre et Marie Curie, Paris 6**

expertise on climate variability at decadal timescales, Atlantic Multidecadal Oscillation and role of the ocean in forcing atmospheric responses.

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[Thiria, Sylvie](#)

**Professor**

**University Versailles Saint-Quentin-en-Yvelines**

Contribution to climate modes reconstructions using proxy records and statistical methods.

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[Khodri, Myriam](#)

**Climate research scientist**

**IRD**

Project coordinator

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[Swingedouw, Didier](#)

**Researcher**

**CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE (CNRS)**

Leader of WP4, expertise on climate variability at decadal timescales, role of the ocean and climate predictability.

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[Goosse, Hugues](#)

**Directeur de Recherches et Professeur Extraordinaire**

**ELIC/TECLIM Université catholique de Louvain**

Leader of WP3; Development and test of data assimilation methods

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Belgium

[Ménégoz, Martin](#)

**Associate researcher**

**Barcelona Supercomputing Center-Centro Nacional de Supercomputación (BSC)**

Contribution to WP4 on hindmost and forecast; expert on the role of volcanic eruption on climate prediction

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[Born, Andreas](#)

**Rechercher**

**University of Bergen, Department of Earth Science**



contribution to data assimilation, supervision

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[Garnier, Emmanuel](#)

Senior researcher

CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE (CNRS)

Retrieval of historical document in historical archives

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## Budget of the project

- [Budget entered](#)
- [Budget group by account](#)
- [Budget group by year](#)

### Spendings

Wages IRD Research Position J. Mignot <i>110 Human ressources : Permanent staff</i>	2017	19,579.00€
H. Goose Professor Position (U. Louvain La Neuve Staff)	2017	18,000.00€
<i>110 Human ressources : Permanent staff</i>		
Wages Versailles U. Professor S. Thiria <i>110 Human ressources : Permanent staff</i>	2017	18,589.70€
Wages Sorbonne U. Lecturer Research Position G. Gastineau	2017	6,842.65€
<i>110 Human ressources : Permanent staff</i>		
Wages CNRS Research Position E.		

### Fundings

U. Bergen Staff <i>100 Self financing</i>	2017	27,083.33€
BCS Staff <i>100 Self financing</i>	2018	19,542.00€
U. Bergen Staff <i>100 Self financing</i>	2018	10,833.33€
BCS Staff <i>100 Self financing</i>	2019	19,542.00€
LABEX cofunding * <i>300 Public financing</i>	2017	165,000.00€
LABEX cofunding *		

Garnier	2017	18,589.70€	300 Public financing	2018	110,000.00€
<i>110 Human resources : Permanent staff</i>					
Wages CNRS Research Position I.			IT "Nudging proposal particle filter in IPSL model"		
Bouloubassi	2017	7,831.60€	proposal particle filter in IPSL model" *	2017	37,554.00€
<i>110 Human resources : Permanent staff</i>					
Wages CNRS Research Position A.M.			500 Grant requested from the BNP Paribas Foundation		
Lézine	2017	22,487.99€	Postdoctoral fellow coaching (programing, foreign language training, etc) *	2017	1,000.00€
<i>110 Human resources : Permanent staff</i>					
Wages CNRS Research Position M.A.			500 Grant requested from the BNP Paribas Foundation		
Sicre	2017	18,589.70€	support for hosting, support for conference attendances and publication fees *	2017	15,000.00€
<i>110 Human resources : Permanent staff</i>					
Wages CNRS Research Position D.			500 Grant requested from the BNP Paribas Foundation		
Swingedouw	2017	14,096.88€	equipments *	2017	15,000.00€
<i>110 Human resources : Permanent staff</i>					
Wages IRD Research Position A.			500 Grant requested from the BNP Paribas Foundation		
Sifeddine	2017	22,487.99€	Project meetings *	2017	12,000.00€
<i>110 Human resources : Permanent staff</i>					
Wages IRD Research Position S. Janicot			500 Grant requested from the BNP Paribas Foundation		
Janicot	2017	26,985.59€	Utility costs for proxy analyses *	2017	10,000.00€
<i>110 Human resources : Permanent staff</i>					
Wages IRD Research Position B. Sultan			500 Grant requested from the BNP Paribas Foundation		
Sultan	2017	15,287.59€	Retrieval of historical document in historical archives *	2017	10,000.00€
<i>110 Human resources : Permanent staff</i>					
Wages IRD Research Position M.			500 Grant requested from the BNP Paribas Foundation		
Khodri	2017	27,410.60€	Post-doc "Treatment of historical archives and climate reconstructions" (UCAD, Senegal pricing) *	2017	14,400.00€
<i>110 Human resources : Permanent staff</i>					
Wages IRD Research Position J. Mignot			500 Grant requested from the BNP Paribas Foundation		
Mignot	2018	19,579.00€	Post-doc "Detection-attribution of extremes: the role of external forcing in the IPSL model" *	2017	45,334.00€
<i>110 Human resources : Permanent staff</i>					
H. Goose Professor Position (U. Louvain La Neuve Staff)			500 Grant requested from the BNP Paribas Foundation		
Goose	2018	18,000.00€	Post-doc "Links between Atlantic decadal variability and extreme events for monsoon in the IPSL model" *	2017	45,334.00€
<i>110 Human resources : Permanent staff</i>					
Wages Versailles U. Professor S. Thiria			500 Grant requested from the BNP Paribas Foundation		
Thiria	2018	18,589.70€	Post-doc "Simple nudging and nudging proposal particle filter in LOVECLIM model" *	2017	45,334.00€
<i>110 Human resources : Permanent staff</i>					
Wages Sorbonne U. Lecturer Research Position G. Gastineau			500 Grant requested from the BNP Paribas Foundation		
Gastineau	2018	6,842.65€			
<i>110 Human resources : Permanent staff</i>					
Wages CNRS Research Position E.					
Garnier	2018	18,589.70€			
<i>110 Human resources : Permanent staff</i>					
Wages CNRS Research Position I.					
Bouloubassi	2018	7,831.60€			
<i>110 Human resources : Permanent staff</i>					
Wages CNRS Research Position A.M.					
Lézine	2018	22,487.99€			
<i>110 Human resources : Permanent staff</i>					
Wages CNRS Research Position M.A.					
Sicre	2018	18,589.70€			
<i>110 Human resources : Permanent staff</i>					
Wages CNRS Research Position D.					
Swingedouw	2018	14,096.88€			
<i>110 Human resources : Permanent staff</i>					

Wages IRD Research Position A. Sifeddine <i>110 Human resources : Permanent staff</i>	2018	22,487.99€	Post-doc "Simple nudging in the IPSL model" IRD Pricing * <i>500 Grant requested from the BNP Paribas Foundation</i>	2017	45,334.00€
Wages IRD Research Position S. Janicot <i>110 Human resources : Permanent staff</i>	2018	26,985.59€	IT "Nudging proposal particle filter in IPSL model" IT "Nudging proposal particle filter in IPSL model" *	2018	37,554.00€
Wages IRD Research Position B. Sultan <i>110 Human resources : Permanent staff</i>	2018	15,287.59€	500 Grant requested from the BNP Paribas Foundation		
Wages IRD Research Position M. Khodri <i>110 Human resources : Permanent staff</i>	2018	27,410.60€	Postdoctoral fellow coaching (programing, foreign language training, etc) *	2018	800.00€
Wages IRD Research Position J. Mignot <i>110 Human resources : Permanent staff</i>	2019	19,579.00€	500 Grant requested from the BNP Paribas Foundation		
H. Goose Professor Position (U. Louvain La Neuve Staff) <i>110 Human resources : Permanent staff</i>	2019	18,000.00€	support for hosting, support for conference attendances and publication fees *	2018	10,000.00€
Wages IRD Research Position M. Khodri <i>110 Human resources : Permanent staff</i>	2019	27,410.60€	500 Grant requested from the BNP Paribas Foundation		
Wages IRD Research Position B. Sultan <i>110 Human resources : Permanent staff</i>	2019	15,287.59€	equipments *		
Wages IRD Research Position S. Janicot <i>110 Human resources : Permanent staff</i>	2019	26,985.59€	500 Grant requested from the BNP Paribas Foundation	2018	1,000.00€
Wages IRD Research Position A. Sifeddine <i>110 Human resources : Permanent staff</i>	2019	10,487.99€	equipments * 500 Grant requested from the BNP Paribas Foundation	2018	4,000.00€
Wages CNRS Research Position D. Swingedouw <i>110 Human resources : Permanent staff</i>	2019	14,096.88€	Webseries&Science events * 500 Grant requested from the BNP Paribas Foundation	2018	14,365.61€
Wages CNRS Research Position M.A. Sicre <i>110 Human resources : Permanent staff</i>	2019	18,589.70€	Summer school * 500 Grant requested from the BNP Paribas Foundation	2018	15,000.00€
Wages CNRS Research Position A.M. Lézine <i>110 Human resources : Permanent staff</i>	2019	22,487.99€	Project meetings * 500 Grant requested from the BNP Paribas Foundation	2018	12,000.00€
Wages CNRS Research Position I. Bouloubassi <i>110 Human resources : Permanent staff</i>	2019	7,831.60€	Utility costs for proxy analyses * 500 Grant requested from the BNP Paribas Foundation	2018	4,500.00€
Wages CNRS Research Position E. Garnier <i>110 Human resources : Permanent staff</i>	2019	18,589.70€	Retrieval of historical document in historical archives * 500 Grant requested from the BNP Paribas Foundation	2018	10,000.00€
Wages Sorbonne U. Lecturer Research Position G. Gastineau <i>110 Human resources : Permanent staff</i>	2019	6,842.65€	Post-doc "Simple nudging in the IPSL model" IRD Pricing * 500 Grant requested from the BNP Paribas Foundation	2018	45,334.00€
VOLCADEC Project cofundig <i>120 Human resources : Non-permanent staff</i>	2017	48,000.00€	Post-doc "Simple nudging and nudging proposal particle filter in LOVECLIM model" *	2018	45,334.00€
PAMEXEA Balespo Project cofunding <i>120 Human resources : Non-permanent staff</i>	2017	18,000.00€	500 Grant requested from the BNP Paribas Foundation		

H2020 BAC Projet <i>120 Human ressources : Non-permanent staff</i>	2017	65,000.00€	Post-doc "Links between Atlantic decadal variability and extreme events for monsoon in the IPSL model " *	2018	45,334.00€
VOLCADEC Project cofundig <i>120 Human ressources : Non-permanent staff</i>	2018	24,000.00€	500 Grant requested from the BNP Paribas Foundation		
PAMEXEA Balespo Project cofunding <i>120 Human ressources : Non-permanent staff</i>	2018	18,000.00€	Post-doc "Detection-attribution of extremes: the role of external forcing in the IPSL model" *	2018	45,334.00€
H2020 BAC Projet <i>120 Human ressources : Non-permanent staff</i>	2018	49,000.00€	500 Grant requested from the BNP Paribas Foundation		
PAMEXEA Balespo Project cofunding <i>120 Human ressources : Non-permanent staff</i>	2019	18,000.00€	Post-doc "Treatment of historical archives and climate reconstructions" (UCAD, Senegal pricing) *	2018	14,400.00€
LMI Paleotracas cofunding <i>220 Purchases : Consumables</i>	2017	10,000.00€	500 Grant requested from the BNP Paribas Foundation		
Paleomex project cofunding <i>220 Purchases : Consumables</i>	2017	3,000.00€	Post-doc "Predictions of climate extremes and impacts for the next decades" *	2018	45,334.00€
LMI Paleotracas cofunding <i>220 Purchases : Consumables</i>	2018	10,000.00€	500 Grant requested from the BNP Paribas Foundation		
Paleomex project cofunding <i>220 Purchases : Consumables</i>	2018	3,000.00€	Post-doc "Predictions of climate extremes and impacts for the next decades" *	2019	22,667.00€
support for conference attendances LMI Paleotracas cofunding <i>300 Travels and related expenses</i>	2017	2,500.00€	500 Grant requested from the BNP Paribas Foundation		
support for conference attendances LMI Paleotracas cofunding <i>300 Travels and related expenses</i>	2018	2,500.00€	Post-doc "Volcanic eruption impact on predictability" BSC pricing *	2019	28,000.00€
support for conference attendances LMI Paleotracas cofunding <i>300 Travels and related expenses</i>	2019	2,500.00€	500 Grant requested from the BNP Paribas Foundation	2019	13,000.00€
LMI Paleotracas cofunding <i>410 Communication : Receptions and events</i>	2017	3,000.00€	Project meetings *		
LMI Paleotracas cofunding <i>410 Communication : Receptions and events</i>	2018	3,000.00€	Final project meeting - International experts and stakeholders *	2019	15,000.00€
LMI Paleotracas cofunding <i>410 Communication : Receptions and events</i>	2018	3,000.00€	500 Grant requested from the BNP Paribas Foundation		
LMI Paleotracas cofunding <i>410 Communication : Receptions and events</i>	2019	3,000.00€	Science events *	2019	15,000.00€
LMI Paleotracas cofunding <i>410 Communication : Receptions and events</i>	2019	3,000.00€	500 Grant requested from the BNP Paribas Foundation		
Sorbonne U. Phd Grant "Proxy reconstruction of climate modes and attribute ranges of past extremes rainfall events"	2017	30,000.00€	support for hosting, support for conference attendances and publication fees *	2019	10,000.00€
500 Educational action			500 Grant requested from the BNP Paribas Foundation		
ANR Projet ACASIS co funding <i>500 Educational action</i>	2017	40,000.00€			
Sorbonne U. Phd Grant "Proxy			<b>Total Fundings</b>		<b>1,102,247.27€</b>

reconstruction of climate modes and attribute ranges of past extremes rainfall events" <i>500 Educational action</i>	2018	30,000.00€
Summer School LMI Paleotracas cofunding <i>500 Educational action</i>	2018	5,000.00€
Sorbonne U. Phd Grant "Proxy reconstruction of climate modes and attribute ranges of past extremes rainfall events" <i>500 Educational action</i>	2019	30,000.00€
Final project meeting LMI Paleotracas cofunding <i>600 Management fees</i>	2019	5,000.00€
<b>Total Spendings</b>		<b>1,102,247.27€</b>

\* Non confirmed funding

### Spendings

<i>110 Human ressources : Permanent staff</i>	679,747.27€
<i>120 Human ressources : Non-permanent staff</i>	240,000.00€
<i>220 Purchases : Consumables</i>	26,000.00€
<i>300 Travels and related expenses</i>	7,500.00€
<i>410 Communication : Receptions and events</i>	9,000.00€
<i>500 Educational action</i>	135,000.00€
<i>600 Management fees</i>	5,000.00€
<b>Total Spendings</b>	<b>1,102,247.27€</b>

### Fundings

<i>100 Self financing</i>	77,000.66€
<i>300 Public financing</i>	275,000.00€
<i>500 Grant requested from the BNP Paribas Foundation</i>	750,246.61€
<b>Total Fundings</b>	<b>1,102,247.27€</b>

### Spendings

2017	456,278.99€
2018	381,278.99€
2019	264,689.29€
<b>Total Spendings</b>	<b>1,102,247.27€</b>

### Fundings

2017	488,373.33€
2018	490,664.94€
2019	123,209.00€
<b>Total Fundings</b>	<b>1,102,247.27€</b>

### Our organisation

#### INSTITUT DE RECHERCHE POUR LE DÉVELOPPEMENT (IRD)

Creation year :1945

The IRD (Institut de recherche pour le développement) is a French research organism, original and unique on the European development research scene.

Emphasizing interdisciplinarity, the IRD has focused its research for over 65 years on the relationship between man and its environment, in Africa, Mediterranean, Latin America, Asia and the French tropical overseas territories.

Its research, training and innovation activities are intended to contribute to the social, economic and cultural development of southern countries.

**Web site :**

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**Project leader**

Khodri Myriam

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IRD - LOCEAN / IPSL

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Boite 100, 4 Place Jussieu

75252 Paris cedex 05

France

**Contribution to the project :**

Project coordinator

[Main publications](#)

Zanchettin, Khodri et al. (2016) The Model Intercomparison Project on the climatic response to Volcanic forcing (VolMIP), Special Issue: Coupled Model Intercomparison Project Phase 6 (CMIP6) Experimental Design and Organization. gmd-2016-68.

Troin, Vrac, Khodri et al. (2016) A complete hydro-climate model chain to investigate the influence of sea surface temperature on recent hydroclimatic variability in subtropical South America. Clim. Dyn.doi:10.1007/s00382-015-2676-0.

Stoffel, Khodri et al., (2015) Reconciling reconstructions and simulations of volcanic cooling, Nature Geoscience, doi: 10.1038/NCEO2526.

Wainer, Prado, Khodri and Otto-Bliesner. Reconstruction of the South Atlantic Subtropical Dipole index for the past 12,000 years from surface temperature proxy (2014) Nature Scientific Rep.

Sicre, Khodri et al. (2013) Sea surface temperature and sea ice variability in the subpolar North Atlantic from explosive volcanism of the late thirteenth century. *Geophys. Res. Lett.*

#### [Main area of research](#)

Khodri is a IRD researcher based in LOCEAN and heads a team of 19 researchers dedicated on the processes of tropical climate variability and impacts over vulnerable regions. She is an expert in climate and oceanic variability over the last 2000 years (2K) using climate models, proxy records and statistical tools. She is also a specialist in natural external forcings (impact and modelling of solar and volcanoes) and is responsible for their modelling in the IPSL climate model. She is the Lead PI for the LABEX-IPSL-Volcano project and is currently co-chair of the new internationally coordinated modelling assessment of the climate response to volcanic forcing, CMIP6-VOLMIP. She has been the WP leader of several projects the past 7 years, most of them in close collaboration with South American countries and thereby contributed to the training of PhD students. She serves now as a coordinator for a PAGES-2K WG aiming at reconstructing South America hydro-climate variations over the last 2K.

#### [Awards](#)

- NOAA Fellowship Award: Atmospheric and Oceanic Science Program (AOSP) Fellow jointly sponsored by Princeton University and the Geophysical Fluid Dynamics Laboratory of the Nation Oceanic and Atmospheric Administration (GFDL/NOAA).
- French Science Academy Award (l'Académie des Sciences) for best Post-Doc Proposal,.