SCO Portfolio • 2020-2022 Editions

THE SUSTAINABLE **DEVELOPMENT GOALS**

As an instrument of international cooperation, the SCO is in line with the Paris Agreement and the UN's Sustainable Development Goals.

THEMES OF **SCO PROJECTS**

The projects that received the SCO certification label cover a variety of themes across different types of territories.

THEMES

- Land Use
- Biodiversity
- Carbon
- Energy
- Extreme Meteo
- Agriculture
- Health
- Water Management
- Forest fires
- Education
- Natural disaster Response

ENVIRONMENTS

- Costoal
- Mountain
- Urban
- Rural
- Forest
- Atmosphere
- Ocean
- Tropical

- **Cover and above :**
  Meet Elyx, the digital ambassador for the United Nations, and now for the SCO, to address the Sustainable Development Goals. © ELYX/CNES 2022

SCO Portfolio

2020-2022 Editions

In 2017, during the first *One Planet Summit, the Space for Climate Observatory* (SCO) initiative was born to fully leverage the potential of Earth observation data in the adaptation and fight against climate change. Two years later, the French President officially announced its launch during the Paris Air Show, where twenty-three space agencies and international organizations met to sign the Joint Declaration of interest.

Today, with thirty-five partners and more than fifty projects around the world, the network is structured around an international charter and is recognized as a major player relying on increasingly available satellite data to contribute to the climate effort. Within this ecosystem, our country and the national space agency (CNES) have played a leading role, as demonstrated by the vitality of the SCO France. Thanks to the mobilization of numerous French scientific organizations alongside public institutions and private companies, the general public and local decision-makers are gradually gaining access to crucial tools to better understand and anticipate present and future climate challenges.

Whether it is a question of monitoring extreme weather events, water and forest management policies, biodiversity protection or prospects for adapting our cities and countryside, the services and platforms of the SCO provide essential decision-making tools for actors and stakeholders. These projects now allow many territories to move forward with resilient actions that are essential to the fight against global warming.

Following the COP27, which reaffirmed the need to step up international efforts to reduce anthropogenic emissions in the short term, and the need to mobilise for the adaptation of the most vulnerable territories to the inevitable consequences of climate change, the SCO International Alliance wishes to provide its expertise and full contribution.
This second congress of the SCO France is an opportunity to highlight the operational achievements in the field, the quality of cooperation within the French ecosystem as a whole, and the ambitions to deploy a tool for ecological planning within the territories.

Philippe BAPTISTE
President and CEO of CNES

- May 2022, phytoplankton bloom in Norway, an indicator of the health of the marine ecosystem.

Introduction

This updated version of the SCO Portfolio consolidates the dynamism and energy that have been invested towards the development of SCO France over the past three years. These three years have made it possible to provide the national community, the French public research and development institutions as well as stakeholders in a burgeoning private ecosystem with an instrument aimed at promoting the use of Earth observation data in the fight against climate change. It is also an opportunity to showcase, through operational applications, the power of these tools to decision-makers in charge of territorial management.

The SCO France is an inclusive initiative, with a robust accreditation mechanism. We cannot thank enough the members of the labeling committee who gave their time as well as the members of the Interagency Committee who worked together despite the difficulties caused by the health crisis.

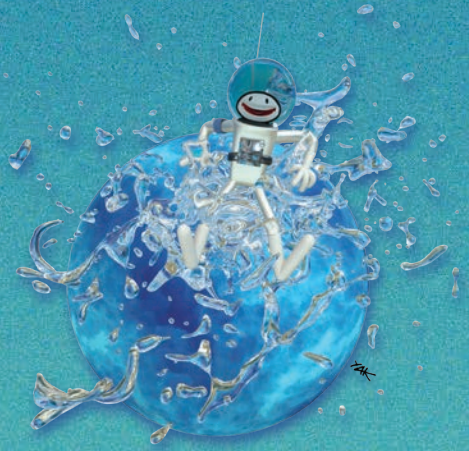
Today, the SCO France federates a portfolio of projects, as shown in this SCO Portfolio, which brings together a great diversity of themes, methodologies, data and actors. 260 institutions and 40 companies took part in the three years of the initiative. At CNES, around 20 engineers devote part of their time to SCO and ensure that the 51 French projects run smoothly.

The SCO France acts as a driver of the broader global initiative, and endeavors to gain visibility by promoting the projects on the international scene, in order to contribute to the objectives of adaptation of our societies to climate change.

Laurence Monnoyer-Smith and Frédéric Bretar,
Heads of SCO France at CNES

Summary

GATHER AND ACT FOR OUR PLANET



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SCO-ACCREDITED PROJECTS

INDEX OF PROJECTS IN ALPHABETICAL ORDER

DIRECTORY OF SCO PROJECTS

Gather and act for our planet

A GLOBAL INITIATIVE TO STUDY AND ADAPT TO THE IMPACTS OF CLIMATE CHANGE

- Sentinel-2 view of Sharm El-Sheikh, the Egyptian city on the Red Sea that hosted COP27 in 2022.

The SCO initiative

The Space for Climate Observatory (SCO) is an international initiative of the One Planet Summit, officially launched in June 2019 by French President Emmanuel Macron. The SCO aims to develop projects for local decision-makers to help them adapt to climate change. The projects monitor the impacts on the territories using satellite data, in situ data and local socio-economic data.

Co-drafted by the signatories of the Declaration of Interest in 2019, the Founding Charter opens SCO membership to any international, public or private entity committed to climate action. This Charter, which came into force on September 1st , 2022, has been ratified by 35 members, and more are to come.

SCO members

INTERNATIONAL FOCAL POINTS

OTHER SIGNATORIES

The SCObjectives

The primary objective of the SCO is to **develop a set of operational tools for observing, evaluating and anticipating the impacts of climate change**. Historical analysis of data, development of impact scenarios, warning systems: the SCO relies on science, space and digital technology to provide decision-making tools for public policies in the face of climate challenges. The tools, which are co-constructed with their users to meet local needs, must be easily transferable to other areas in the world once they are operational.

To achieve this, the SCO relies on **the pooling of existing international** (Copernicus, NOAA, Eumetsat, etc.) and national space data (DRIAS, etc.), whose interoperability with all types of local data, particularly environmental and socio-economic data, is promoted.

In the long term, the ultimate goal is to **provide policymakers in all countries with a common set of tools** to combat climate change or, failing that, to adapt to it.

(1)

SCOlutions

TO THE SUSTAINABLE DEVELOPMENT GOALS

In line with the international agreements of Paris, the SCO is aligned with the Sustainable Development Goals (SDGs) set by the UN and gathered in the 2030 Agenda. Indeed, through its philosophy, the projects it supports and the partnerships it implements, the SCO actively and directly responds to many of the 17 SDGs. It also pays great attention to vulnerable territories, developing demonstrators in situ, followed by training sessions so that the teams on the ground can appropriate the tool.

#1 SDG13, "Take urgent action to combat climate change and its impacts"

All SCO projects address SDG13. In so doing, they make it possible to operate and provide tools for public policies in this area. On average, one to two public institutions are directly involved in the consortia of the 50 SCO projects in France to, for example, aim for greater resilience to flooding, reduce urban heat islands, support the rural world in its transformation or improve the fight against forest fires.

#2 SDG15, "Preserve and restore terrestrial ecosystems"

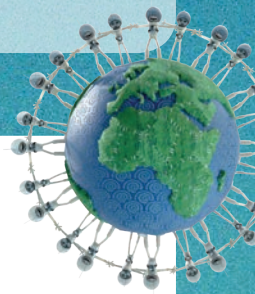
As the first ecosystem to be preserved urgently, forests are at the heart of the second target of SDG15, as well as the Mangroves and TropiSCO projects. The latter, an emblematic project of SCO, implements tropisco.org, the first platform in the world that allows tropical deforestation to be visualized in near-real time. Its indicators are relevant to several other targets of SDG15, including fight against poaching.

#3 SDG11, "Make cities inclusive, safe, resilient and sustainable"

Optical imagery, including 3D, radar imagery, thermal and atmospheric data, 10 SCO projects use a variety of satellite data to feature urban fabric and analyse its vulnerability to different factors. All of them respond to an overall objective of the SDG11 to implement integrated policies for resilient territories.

#4 SDG6, "Ensure access to water and sanitation for all and ensure sustainable management of water resources"

Earth observation data is a key tool for measuring and monitoring the state of watersheds, as in the case of OpHySE project, carried out on seven rivers in French Guiana, in partnership with the International Office for Water. On a larger scale, for the integrated management of resources, particularly transboundary resources, the fifth target of SDG6, AmSudSat project involves the Brazilian National Water Agency in developing a system for monitoring and forecasting the flows of the major South American watersheds.



(2)

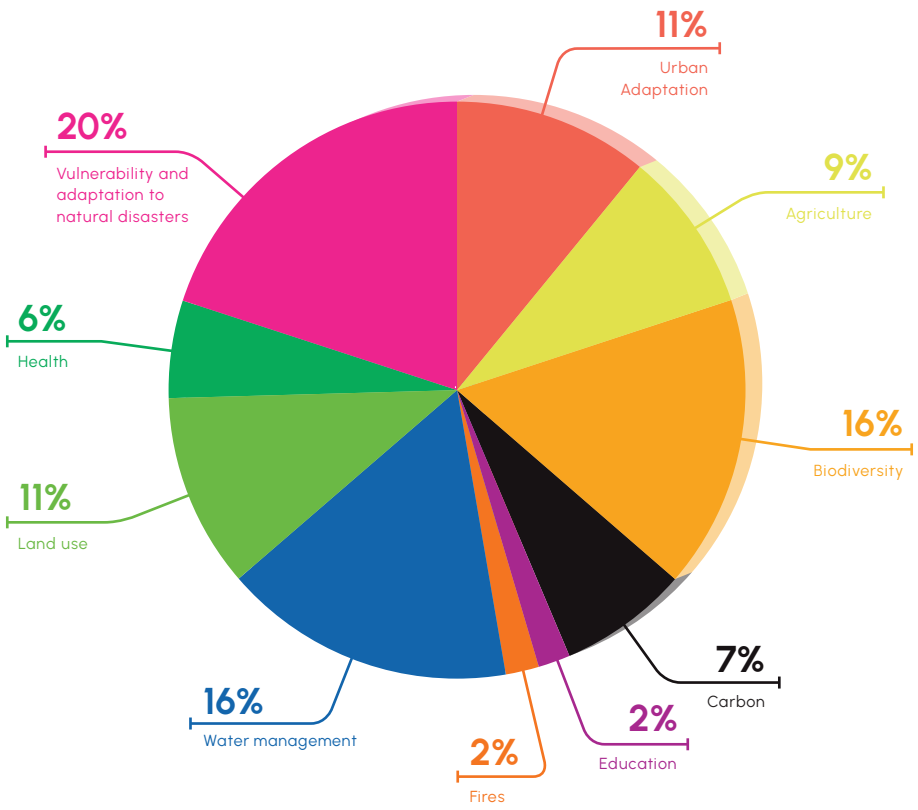
#5 SDG17, "Revitalize the global partnership for sustainable development"

Each SCO project is organised around a consortium of actors with complementary skills. Most bring together public and private entities, scientists and, in some cases, international organizations and associations. This multi-sectoral mobilization enables projects to propose decision-making tools that respond directly to local problems.

3 years of SCO

57

PROJECTS ACCREDITED



10

INTERNATIONAL STEERING COMMITTEES

PARTNERSHIP with UNEP's World Environment Situation Room : a page dedicated to the SCO and integration of TropiSCO tropical forest loss monitoring data into the Map-X interactive map.

A FOUNDING CHARTER, WHICH CAME INTO FORCE ON SEPTEMBRE 1st, 2022

Presentation of the Founding Charter and first signatures at the Cité de l'Espace (Toulouse, France) on 27 June 2022. © CNES / Frédéric Lancelot 2022

PARTICIPATION IN THE IAC 2022 IN PARIS (FRANCE), 19 SEPTEMBER 2022

SCO members present at the 10th International Steering Committee at IAC 2022 in Paris (France). © CNES

PARTICIPATION IN COP27 IN SHARM EL SHEIKH (EGYPT), FROM 15 TO 18 NOVEMBER 2022

The SCO intervened at the second ministerial meeting of the Tropical Forest Conservation Alliance. From left to right: Jose Gregorio Diaz Mirabal, leader of COICA (Coordination of Indigenous Organizations of the Amazon Basin), Pierre-Henri Guignard, French Ambassador and Special Envoy for the Alliance, Laurence Monnoyer-Smith, representative of SCO France, and Càndido Pastor Saavedra, from Conservation International. © CNES

During a round table discussion on the Mediterranean Pavilion. With, from left to right, Frédéric Bretar (CNES/SCO), Anya Waites (Dalhousie University/Ocean Frontier Institute), Mohamed Taher Al-Sharif (Mayor of Alexandria, Egypt), Hesham El-Askary (Egyptian Space Agency), Yana Gevorgyan (GEO) © CNES

The SCO in France

First Congress of the SCO France in Paris on December 7th, 2021. © CNES

As the national offshoot of the international initiative, the SCO France aims to bring together the scientific community, public authorities and the business world around solutions for mitigating and adapting to the impacts of climate change. Through its role as a driving force in France, SCO has become a major player among initiatives using satellite data to contribute to the climate effort.
Every year in September, it opens a call for projects through which it selects those to which it will award the SCO label.

Members of the SCO
IN FRANCE

Review of the SCO in France

PROJECTS

3 CALLS FOR PROJECTS • **51** ACCREDITED PROJECTS • **12** COMPLETED PROJECTS

7 OPEN ACCESS DEMONSTRATORS

- **TropiSCO**, for monitoring global tropical deforestation: https://www.tropisco.org
- **Band-SOS**, for monitoring cyclonic flooding in Bangladesh (prototype): https://bandsos.github.io
- **Vietsco**, maps of rice cultivation and flooding in the Mekong Delta: www.vietsco.org
- **Chove-Chuva**, to visualise the territorial dynamics observed in Mato Grosso (Brazil): https://www.sco.chove-chuva.org/
- **ClimHealth**, monitoring environmental data for disease surveillance: https://leptoyangon.geohealthresearch.org/ https://sat4health.geohealthresearch.org/
- **StockWater**, to find out how much water is in the dams: https://www.sco-stockwater.org/
- **OpHySE**, for real-time monitoring of French Guiana's rivers: https://sagui.hydro-matters.fr/sagui/

5 OPERATIONAL SERVICES DELIVERED

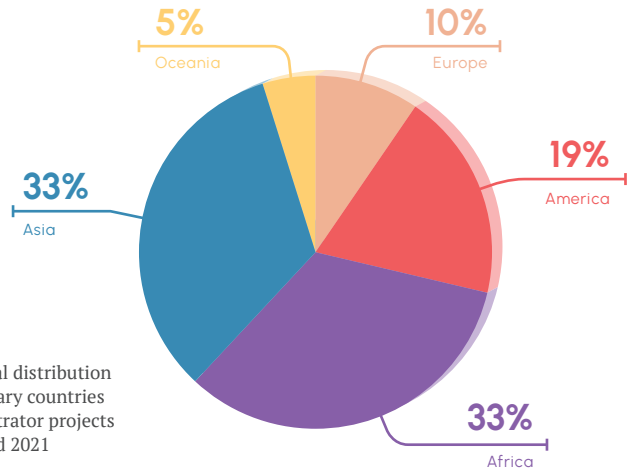
- **FORO** (**FLAude** project), for a better resilience to floods due to Mediterranean events: https://apps.tereval.fr/foro/#/
- **Arbocarto-V2**, to anticipate the risk of epidemics of mosquito-borne diseases: https://www.arbocarto.fr
- **EO4DroughtMonitoring** to anticipate droughts in New Caledonia ;
- **MEO-Climate** to accompany the rural world in its transformation: https://www.spaceclimateobservatory.org/meo-climate-gers
- **SCOLive**, an application for mapping and monitoring olive trees, already available on the stores : https://scolive.eu/

If you are interested in these services, contact the project team, the directory is at the end of the booklet (page 86) !

IMPACT OF THE PROJECTS

18 MILLION EUROS OF GLOBAL INVESTMENT

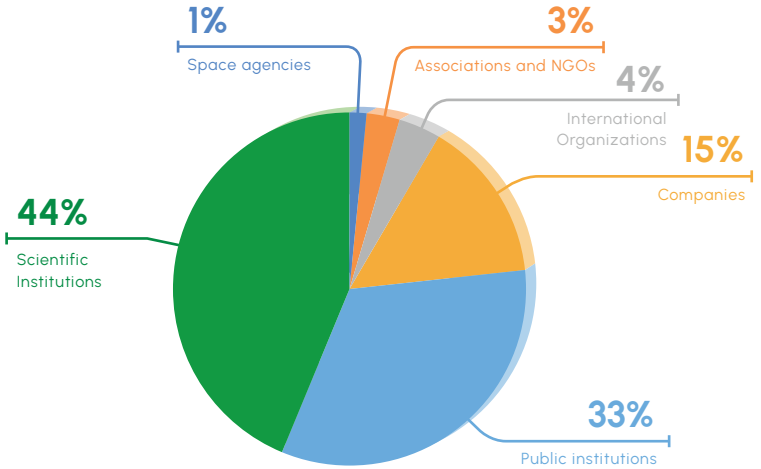
86 APPLICATION SITES IN 28 COUNTRIES
+420 MILLION INHABITANTS CONCERNED (ESTIMATE)



Continental distribution of beneficiary countries of demonstrator projects in 2020 and 2021

NETWORK

265 STRUCTURES GRAVITATE AROUND THE SCO FRANCE



Words from SCO

Almost every month, the SCO invites one of its members to a "One-to-One". In 2022, their testimonies reflect a pivotal year of structuring and expansion.

"The SCO is an exciting initiative focuses precisely on the main challenge that we will face over the coming decade: supporting the translation of global climate policy into regional and local information."
Susanne Mecklenburg,
Head of the Climate Office of the European Space Agency ESA

«The SCO breaks the benefits that space assets readily offer to national and local levels, helping authorities and communities on the ground to make informed decisions and adopt the right policies based on the data available.»
Simonetta Di Pippo,
Former Director of the United Nations Office for Outer Space Affairs UNOOSA

«An initiative like the SCO is essential to help people [...]. [...] It must continue to carry out projects at the most local level, right down to the end user, and to do so it must remain connected to research and science.»
Isabelle Bénézeth, Interministerial Copernicus and GEO Coordinator for the French Ministry of Higher Education, Research and Innovation

« This role as a bridging organization makes SCO and its network a leader in the adaptation, research and innovation for climate. That is the strength of the SCO: to be able to work in partnership and to bring together skills that no single organization has.»
Anna Rathsman, CEO of the Swedish Space Agency SNSA

«Satellites provide us with large amounts of data that are easily accessible to researchers and companies transforming them into useful applications.»
Michal Brichta,
Director of the industry branch of the Slovak Space Office SARIO

«When the SCO was presented to us, we were struck by the amount of data available from space and by the stated desire to make it available. We quickly identified a very strong interest in the service of construction and, conversely, that the CSTB possesses relevant information for several SCO projects.
Julien Hans,
Director of Energy and Environment, Centre Scientifique et Technique du Bâtiment CSTB (France)

«Satellite data can provide a fundamental dynamic approach to both the diagnostic phase and the implementation of an action plan at a lower cost, quickly and with a geographical scale that corresponds to [a] territory.
Johan Ransquin,
Head of the Climate Change Department at ADEME (France)

«Satellite imagery will lead us to define and qualify measurement indicators that do not exist today [and] the SCO can help us to standardize these indicators.
Bertrand Walckenaer,
Deputy Director General of the French Development Agency AFD

The SCO-accredited projects

URBAN ADAPTATION • AGRICULTURE
BIODIVERSITY • CARBON • EDUCATION
FOREST FIRES • WATER MANAGEMENT
LAND USE • HEALTH • VULNERABILITY
AND ADAPTATION TO NATURAL
DISASTERS

• The drought at Lake Valdecanas in Spain, seen by the Pleiades Neo satellite © Airbus DS 2022

SCO

RESPOND TO PROVEN NEEDS AND REPLICATE THE DEVELOPED SOLUTIONS

SCO projects are developed at the local level in partnership with local stakeholders to respond to their specific needs and problems. Once operational, the tools must be adaptable to fit other places in the world.

SPACE DATA

Optical, radar, thermal, altimetric, atmospheric and meteorological data… high and very high resolution space data time series are at the heart of each SCO project. Alone or, most of the time, combined with other data sets (field measurements, socio-economic data, citizen data…), they feed scientific models to transform them into operational decision support tools.

Charter for the functioning of the SCO in France, projects and valorization guides, FAQ… All resources are available online.

fundamentals

THE SCO FRANCE LABELLING PROCESS

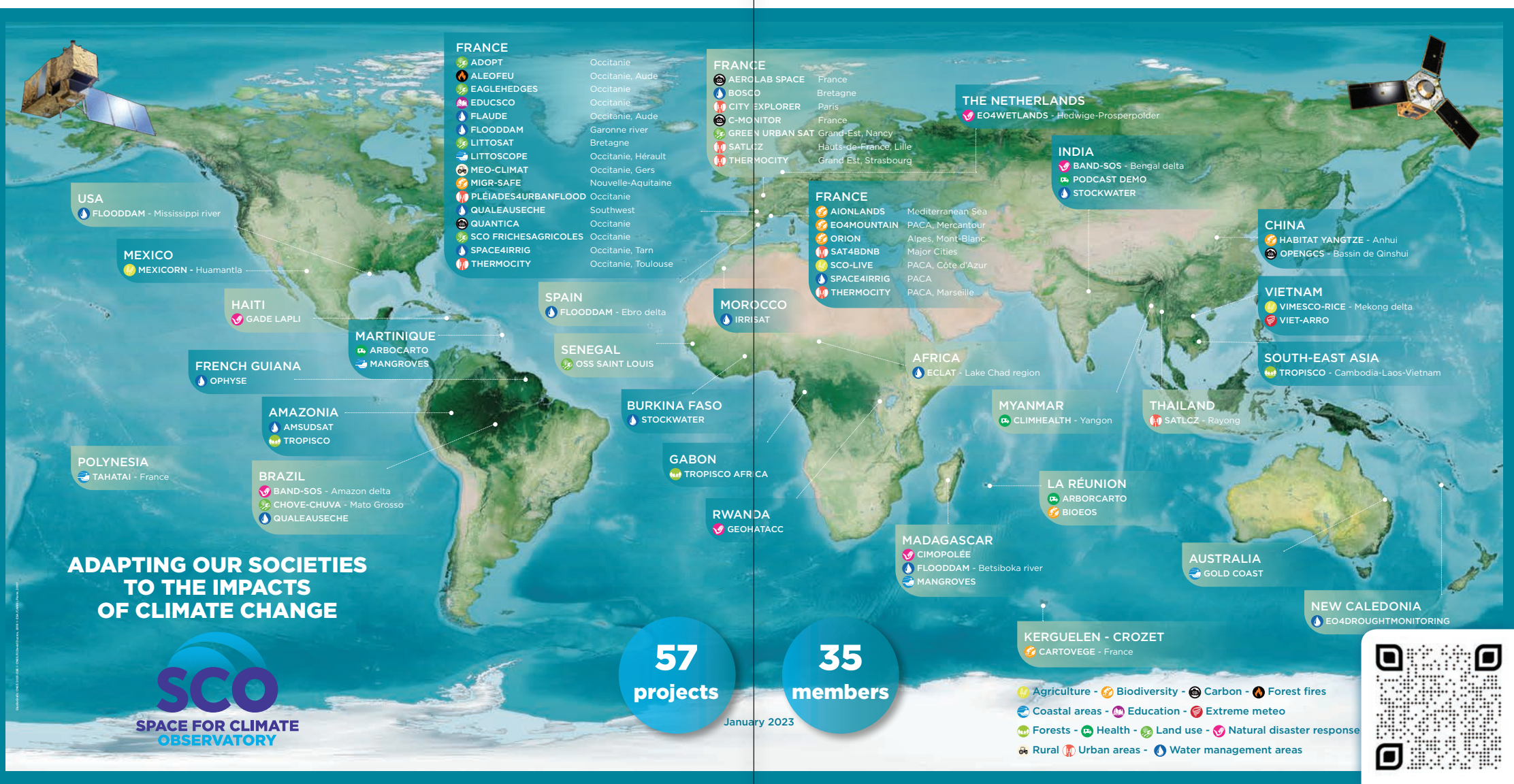
Every year in September, SCO France launches its call for projects. The proposals are studied by a labeling committee that verifies their feasibility and their adequacy to the SCO criteria. This process is detailed in the SCO France Charter and is shared with other national SCOs that wish to draw inspiration from it.

PROJECTS DEVELOPMENT

In order to ensure that the resulting outcomes are beneficial to everyone, the promoters of the labeled projects are committed to carrying out actions of valorization: reusing elements of the code in a new application, sharing expertise, etc. Available online, a Valorization Guide has been designed to help project leaders with this pooling effort.

Mapping projects

Obtaining the SCO certification label for a project means adhering to the SCO values and benefitting from international recognition. The label awarded by a local SCO is recognized by the International SCO.



City Explorer

OPTIMIZING THE BENEFITS OF URBAN GREEN AND BLUE SPACES

City Explorer addresses the need for better information to help guide urban planning for nature-based solutions. The tool maps the expected benefits of multiple ecosystem services associated with urban green and blue spaces. It allows users to add new green spaces to an urban environment to compare the relative benefits of different locations. They will be able to identify optimal spatial configurations that are adapted to the specific requirements of the city or region being assessed, taking into account the vulnerability or importance of the local population group.

City Explorer interface

SATELLITES
Sentinel-1 & 2, ESA CC Soil Moisture, LandSat-8

APPLICATION SITE
Paris (France)

PARTNERS
ESA, Future Earth, REGREEN, UK Centre for Ecology & Hydrology

WEBSITE
https://www.ceh.ac.uk/city-explorer

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

Green Urban Sat

MAINTAINING A HEALTHY LIVING ENVIRONMENT IN METROPOLISES

Example of vegetation extraction from a Pleiades image of Toulouse. © Terranis

Although highly urbanised areas have every interest in turning to solutions based on nature and vegetation, in particular to counter the heat island phenomenon, it is still difficult to understand precisely the effect and effectiveness of these solutions. Based on the use of satellite images, Green Urban Sat is developing methodologies for the quantitative and qualitative evaluation of ecosystem services provided by urban vegetation. The goal is to provide a fine-grained description of urban vegetation in order to see its effects, especially its benefits, with regard to climate change within the wider urban area.

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

SATELLITES
Pleiades and Pleiades Neo

APPLICATION SITE
Nancy, Strasbourg (France)

PARTNERS
Cerema, A2S, CNES, Live, Metropole Grand Nancy, Terranis

Pléiades4Urban Flood

CONTRIBUTION OF PLEIADES TO THE ADAPTATION OF THE URBAN FABRIC TO THE FLOOD HAZARD

The strength of Pléiade4UrbanFlood lies in the development of a service capable of evaluating the sensitivity to flooding of urban or highly anthropized territories. Using Pleiades satellite imagery, the project classifies land use and produces quantitative indicators related to urban morphology and its dynamics, soil sealing and the evolution of flood risk.

Pleiades satellite image of flooding north of Narbonne (Aude) on October 20th, 2018. © Airbus DS

SATELLITES
Pleiades and Pleiades Neo

APPLICATION SITE
Montpellier (France)

PARTNERS
Agenium 3D Lab, AIRBUS Defence & Space, Cerema, CNES, Terranis

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

Sat4BDNB

SATELLITE DATA FOR THE NATIONAL BUILDING DATABASE

Extract from the French National Buildings Database © CSTB

Dedicated to French urban territories, Sat4BDNB addresses the vulnerability of certain districts to the effects of climate change. Thanks to an innovative combination of several data sets, the project provides an overheating indicator identifying urban heat islands and morbidity for the whole of France. Integrated into the French National Building Database (BDNB), the combination of this environmental and socio-economic data will inform, assist and guide the construction industry to design the best renovation strategies.

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

SATELLITES
Pleiades, Sentinel-2

APPLICATION SITES
Major French cities: La Rochelle, Marseille, Montpellier, Nice, Paris, Strasbourg, Toulouse

PARTNERS
CSTB, CNES, CESBIO

SatLCZ

IDENTIFIYINGTHE VULNERABILITY OF URBAN ENVIRONMENTS DURING SUMMER HEAT WAVES

SatLCZ has developed a methodology to classify local climate zones derived exclusively from very high resolution satellite images. The identified issues are the vulnerability of urban environments during summer heat waves, as well as the adaptation and mitigation of local heat peaks. The tool can also provide indicators of imperviousness and vegetation levels, as well as a socio-economic vulnerability index.

Pleiades image of Lille (left) and associated LCZ mapping (buildings, vegetation, rocks, soil...). © SatLCZ

PROJECT COMPLETED

Are you interested in these services ? Contact the project team (directory on page 86 !)

AVAILABLE DATA
https://www.spaceclimateobservatory.org/satlcz-lille

SATELLITES
Pleiades

APPLICATION SITES
Lille (France), Rayong (Thailand)

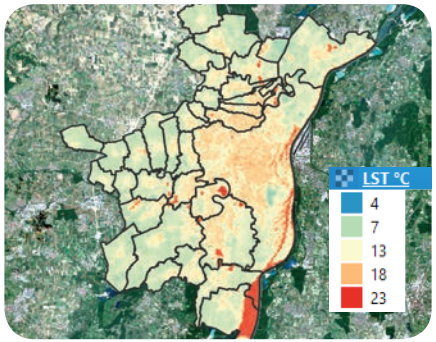
PARTNERS
Cerema, AIRBUS Defence & Space, CNES

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

Thermocity

ADAPTING CITIES TO HEAT WAVES



Température de surface à l'Eurométropole de Strasbourg le 22/06/2018 à 21h26 UTM. © ONERA

A pioneering project in the use of satellite thermal data in cities, Thermocity has developed a tool for analysing urban thermography to support planning policy on a metropolitan scale. It can thus identify and characterize urban heat islands with the associated health risk, the thermal performance of vegetation, or detect thermal anomalies from the hottest points measured in winter. The project also provides indicators of the evolution of land use in the city and thus makes it possible to monitor the implementation of adaptation policies.

Are you interested in these services ? Contact the project team (directory on page 86 !)

PROJECT COMPLETED

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

AVAILABLE DATA
On Theia

SATELLITES
Sentinel-2, SPOT 6/7, Pleiades, ECOSTRESS, Landsat-8

APPLICATION SITES
Marseille, Montpellier, Paris, Strasbourg, Toulouse (France)

PARTNERS
CNES, Météo-France, CSTB, ONERA

MEO-Climate Gers

THE RURAL AREAS ADAPT
TO CLIMATE CHANGE

MEO-Climate is a mapping platform for rural and semi-rural territories. The system offers local information, frequently updated and validated, to allow detailed monitoring of spatial and temporal evolutions as well as local management of actions. MEO-Climate offers three decision-making tools : AgriPractice for farming practices, WaterReserve for water reserve management, and GreenEnergy for the installation of renewable energy facilities.

PROJECT COMPLETED

Are you interested in these services ? Contact the project team (directory on page 86 !)

Demonstration of the AgriPractice service : annual summary of vegetation cover. © MEOSS

SATELLITES
Sentinel-1 & 2, SPOT 6/7, Pleiades

APPLICATION SITE
SCOT de Gascogne, Gers (France)

PARTNERS
MEOSS, SCOT de Gascogne

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

MexiCorn

ADAPTING MEXICAN
CORN TO DROUGHT

Faced with more frequent, longer and more intense droughts, local governments in Mexico are having to make short, medium and long term decisions in favor of corn production. To help them, MexiCorn is creating a tool that uses optical and microwave satellite data to monitor maize field parameters and reduce the impact of climate change on crop yield. Eventually, an online portal will show a monthly map of maize growing areas, a weekly map of soil moisture and water content of the vegetation, and the results of analyses of the climatic impact of observed changes.

Mexicorn's ultimate goal: to preserve native corn cultivars adapted to new local climates. © Getty Images

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

SATELLITES
Sentinel-1, Landsat, MODIS, SMAP, SMOS

APPLICATION SITE
Huamantla (Mexico)

PARTNERS
National Polytechnic Institute of Mexico, Mexican Space Agency AEM, Universidad Iberoamericana, CentroGeo

SCOLive

OLIVE TREE, A BIOINDICATOR OF CLIMATE CHANGE

SCOLive is a citizen's olive tree observatory to map diseases and pests that can affect crops and, in so doing, use the olive tree as a bioindicator of climate change. A mobile application is already operational and can be used to collect information such as the geographical location of olive trees and their state of maturity and phytosanitary status. By calling on all the players in the field, SCOLive strengthens the maintenance of olive-growing heritage and know-how, as well as scientific advances on the olive tree. Tools and methods are replicable to all regions of the world.

SCOLive relies on geo-located and time-stamped «citizen» feedback. © Getty Images

APPLICATION AVAILABLE
On stores and on the scolive.eu website

SATELLITES
Pleiades, Sentinel-2 & 3

APPLICATION SITE
Grasse region (France)

PARTNERS
ACRI-ST, ARGANS France, CNES, Community of agglomeration of the country of Grasse

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

Space4IRRIG

SUSTAINABLE AND EQUITABLE WATER MANAGEMENT FOR FIELD CROPS

Space4IRRIG aims to provide water managers with indicators to improve their knowledge of their territory and identify effective strategies for the future. To this end, an online platform will produce maps of soil moisture at very high spatial resolution (plot scale), of irrigated crops and of crop water requirements. Moisture maps will be provided for 15 to 20 dates per month, and maps of irrigated areas and water requirements will be updated monthly.

80% of the food needs expected in 2025 will be covered by irrigated agriculture. © Getty images

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

SATELLITES
Sentinel-1 & 2

APPLICATION SITES
Tarn-Aval and Val de la Durance catchment areas (France)

PARTNERS
BRGM, CESBIO, Chamber of Agriculture of Tarn, Regional Chambers of Agriculture Occitania and PACA, CNES, MEOSS, SCP, Smavd Durance

VIMESCO-Rice

MITIGATING CLIMATE EFFECTS ON RICE PRODUCTION

Using radar imagery and in situ data, VIMESCO-Rice has developed a tool for monitoring rice crops in the Mekong Delta and indicators of climate change on these crops. An open-access web portal provides monthly maps of rice area and growth stages, an annual map of crop density (number of crops per year), as well as the results of analysis of the climatic impact of the observed changes. While this project focuses on the effects of slow-onset climate change phenomena (droughts, floods, saltwater intrusion, etc.), the Viet-ARRO component (see page 84) focuses on the impacts of extreme events.

The online platform allows to visualize different maps such as here the intensity of rice cultivation, but also floods and affected crops or projections of land suitability for rice cultivation, according to different IPCC scenarios. © VietSCO

PROJECT COMPLETED

Are you interested in these services ? Contact the project team (directory on page 86 !)

ONLINE INTERFACE
https://www.vietsco.org

SATELLITES
Sentinel-1

APPLICATION SITE
Mekong Delta (Vietnam)

PARTNERS
CESBIO, CNES, GlobEO, IRD, Toulouse School of Economics, USTH, VAST, VNSC, UNDP

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

AIonWetlands

SATELLITES TO MAP AND MONITOR MEDITERRANEAN WETLANDS

Sansouires in Camargue (Tour du Valat). In the Mediterranean, wetlands are the richest ecosystems, but also the most threatened by human activities. © Marc Thibault

AIonWetland focuses on Mediterranean wetlands, known for their rich biodiversity and strategic dimension for human activities. To better characterize the state and evolution of these wetlands, the project promotes the joint use of time series of satellite observations with other relevant databases, notably from the Mediterranean Wetlands Observatory. An interactive and evolving geo-portal will offer a monitoring and alert service, as well as decision support to national and local authorities in charge of managing these fragile environments.

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

SATELLITES
Landsat, Sentinel-2

APPLICATION SITES
30 countries and territories of the Mediterranean basin

PARTNERS
Tour du Valat, CNES, Geomatys, ICUBE, OFB

BioEOS

PRESERVING COASTAL BIODIVERSITY

Between climate change and anthropogenic pressures, the biodiversity of coastal environments is declining rapidly and globally. In response to the need for simple and operational monitoring systems, BioEOS aims to provide adequate and replicable observation tools based on the analysis of the spatio-temporal dynamics of coastal biodiversity. The identification and precise monitoring of the state of coral reefs, the extension of seagrass beds and the geomorphological dynamics of the seabed are all relevant strategic areas for initiating climate resilience.

Trajectory indicators will be created to predict possible changes in these environments.

Biodiversity in the coral environment © W. Croizé-Fillon (illustration) & B. Brisset (Photo)

SATELLITES
Pleiades, Sentinel constellation, PRISMA

APPLICATION SITES
South West Indian Ocean Region: Reunion Island, Glorieuses, Mayotte, Bassas da India

PARTNERS
Ifremer, CNES, University Center of Mayotte, Gipsa-lab, IFRECOR, IMT Atlantique, INRAE, IRD, SHOM, Sorbonne University, Universities of La Réunion and Toulon

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

Cartovege

PROTECTING CROZET & KERGUELEN

The increase in temperature has significant consequences for biodiversity, particularly in the alpine and polar regions. Focusing on the French sub-Antarctic islands of Crozet and Kerguelen, Cartovege proposes to develop a decision-making tool for the conservation of flora and the preservation of habitats. By combining the mapping of existing vegetation and predictive modelling of changes that could affect it via satellite and field data, this tool will make it possible to better understand and anticipate the risks linked to climate change that weigh on the biodiversity of this territory.

Several invasive plants such as the dandelion are colonising the Southern Territories. © D. Renault

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

SATELLITES
Pléiades, Spot 6/7, WorldView, QuickBird, ALOS, Sentinel-1 (liste non exhaustive)

APPLICATION SITES
French Sub-Antarctic Islands

PARTNERS
Ecobio University of Rennes 1, CNES, CNRS including CIIL, INRAE, French Polar Institute, OFB, French Southern Territories National Nature Reserve, UMS PatriNat, University of Lyon 1

EO4Mountain-Pastoralism

SAVING HIGH ALTITUDE WETLANDS

Climate change has already modified highland wetlands, transforming agro-pastoral practices and habitats. Based on satellite images, EO4Mountain-Pastoralism is designed to provide a toolbox adapted to the needs of users to improve the monitoring and understanding of these areas, which provide important ecosystem services and contribute significantly to the reduction of greenhouse gases. The project aims to produce relevant data at short intervals (15 days) to detect and monitor the dynamics of high-altitude wetlands, but also to develop a methodology to statistically and physically link the variations of these data to indicators of the services provided by these environments.

Wetlands in the Mercantour National Park. © PNM

SATELLITES
Sentinel-1 & 2, SPOT 7, Pleiades

APPLICATION SITE
Mercantour National Park (France)

PARTNERS
A2S, CNES, EOST of the University of Strasbourg, iPGP, Mercantour National Park, Séolane

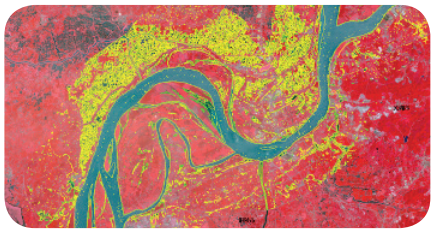
THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

HABITAT Yangtze

PROTECTING WETLAND HABITAT FOR MIGRATORY BIRDS

Taking advantage of the latest remote sensing sensors, AI algorithms and OpenGIS, HABITAT Yangtze aims to provide a high-resolution spatio-temporal database of wetlands in the middle and lower Yangtze River basin. Called Ecodata, the online platform for monitoring and mapping waterbird wintering habitats in monitored wetlands will be used by wetland managers, researchers and bird and climate change conservationists at local, national and international levels.



Artificial intelligence detection of large-scale water bodies. © Wu, Yan-lan

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

SATELLITES
Gaofen-2 & 6, Landsat-8, Sentinel-2

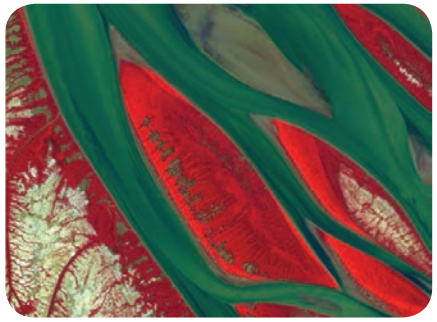
APPLICATION SITE
Anhui Province (China) : Shengjin Lake, Caizi Lake, Huayang Rivers & Lakes

PARTNERS
Anhui University and its laboratories, Shengjin Lake National Nature Reserve

Mangroves

PRESERVING AN ESSENTIAL NATURAL HERITAGE

Threatened, mangroves are nevertheless of great economic, heritage and environmental value. Understanding and monitoring these coastal environments is a constant priority to ensure their preservation, organize the management of their natural resources, and characterize the links between global changes and the state of the environment. Using satellite data and derived products available on the Data Terra research infrastructure, the Mangroves project is setting up an operational monitoring platform with spatial maps of the distribution of mangroves and their evolution, as well as indicators of natural or anthropogenic pressures.



Sentinel-2 image of Bombetoka Bay, Madagascar
© Copernicus Sentinel data 2019

SATELLITES
Pleiades, Sentinel-1 & 2, SPOT 6/7

APPLICATION SITE
French Guiana, Martinique, Guadeloupe, Mayotte, French Polynesia, New Caledonia, Madagascar and, by extension, any territory with mangroves.

PARTNERS
IRD, CNES, DINAMIS, GEODEV

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

Migr-Safe

TOWARDS AN OBSERVATORY FOR MIGRATORY SPECIES

The pilgrimage of migratory birds is strongly affected by landscapes, human activities and climate change. Since ensuring their journey and stopovers requires new collaborations between local authorities and scientists, Migr-Safe proposes new tools and data that can be used by both. The methodology developed now makes it possible to consider the creation of a spatial observatory for migratory fauna based on three main services: enhanced tracking (monitoring of trajectories, status and change indicators, characterization of habitats, alerts), regional service (correlation of behaviors with local geographical data) and enhancement (pooling of data and educational resources).

Tracking of the migration path on the Migr-Safe interface © CLS

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

SATELLITES
free data from numerous observation satellites and the ARGOS/KINEIS telemetry system

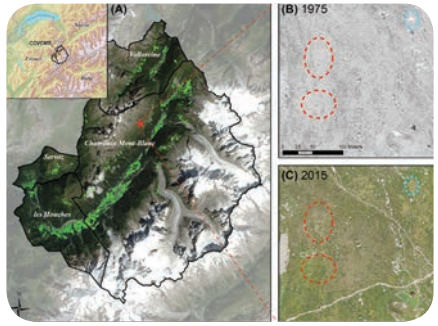
APPLICATION SITE
New Aquitaine (France)

PARTNERS
CLS, Aquitaine Regional Biodiversity Agency, New Aquitaine Chamber of Agriculture, CNES, GIFS, GIP ATGeRI, INRAE, UMR Tetis

ORION

MANAGING THE EXPANSION OF HEATHLANDS IN THE MOUNTAINS

Characterized by relatively low thickets, heathlands are very common in mountains and forests, but their distribution and expansion remains poorly understood, especially in the Alps. To overcome this lack of information, ORION uses advances in satellite imagery to develop a fine-grained map of the distribution of habitats, indicators of floristic diversity and the presence of large wild herbivores, as well as a map of areas at risk. The results are accompanied by photographic campaigns showing the change in the landscape over 30 years and place the heathland dynamics in a broader context of landscape modification induced by climate change.



Copernicus map 2018. In red, the areas of colonisation. In blue, a topographic refuge (snow combe). © CREA Mont-Blanc

SATELLITES
Sentinel-2

APPLICATION SITE
Community of Communes of the Chamonix-Mont-Blanc Valley (France)

PARTNERS
CREA Mont-Blanc, Asters CEN-74, CCVCMB, LECA

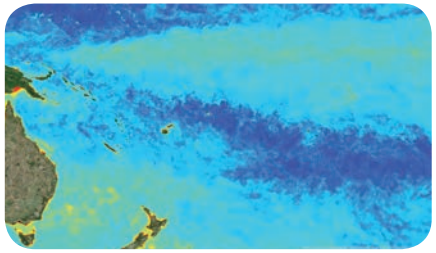
THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

TAHATAI

IMPROVING THE GOVERNANCE OF THE POLYNESIAN COASTLINE

The Polynesian coastal zone, where sustained exchanges between land and sea are accompanied by a wide variety of uses, from fishing to habitat, is also very vulnerable to climatic hazards. TAHATAI aims to develop and automate the collection and calculation of useful indicators for the governance of the coastal zone, based on space and in-situ data. The resulting reliable information will allow a better understanding of the changes brought about by global warming, but also to protect biodiversity and identify areas of vulnerability on the coast in order to anticipate possible risks.



Daily chlorophyll visualization. © Contains data from the Copernicus programme, Geospatial Platform Qëhnelö™

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

SATELLITES
Sentinel-1-2-3, Aqua, Terra MODIS, SPOT World Heritage, Pleiades, Pleiades Neo, WorldView, Future Co3D, ECMWF satellite weather data

APPLICATION SITES
French Polynesia and New Caledonia (Pacific Ocean)

PARTNERS
BLBLUECHAM, CNES, Copernicus Relays, CSIRO, DRM, Government of French Polynesia, IRD, QuintesensPty.Ltd

AEROLAB SPACE

MONITORING GHGs AT THE REGIONAL LEVEL AND MAKING DECARBONIZATION EFFORTS CREDIBLE

AEROLAB SPACE represents the space component of the initial AEROLAB project in order to create a synergy between AEROLAB's in situ measurements (ground, aircraft, balloon, etc.) and satellite measurements. In support of decarbonation policies, the project is developing a decision-making tool via greenhouse gas monitoring indicators and evidence of the impact of environmental policies. These results will benefit public authorities to give credibility to their decarbonisation efforts, and the scientific community, which will have access to a set of quality measurement data that will also help validate the satellite data.

Extract of a Sentinel 2 image over the Eastern region. © 2022, Copernicus Sentinel Imagery, processed by SnapPlanet

SATELLITES
Sentinel-2 & 5, OCO2

APPLICATION SITE
Great East Region (France)

PARTNERS
GSMA/CNRS, Capgemini, CNES

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

C-Monitor France

ESTIMATING DAILY EMISSIONS OF ANTHROPOGENIC CO2 AND FOSSIL POLLUTANTS

The ability to monitor greenhouse gas emissions is crucially important from both an environmental and health standpoint. C-MONITOR France is a tool which provides a daily and localised estimate of CO2 emissions of anthropic origin and of pollutants associated with the use of fossil energy sources, thanks to the joint utilisation of socio-economic and spaceborne remote-sensing data. Monitoring is set to cover the whole of France, with a focus on two specific regions, and will be made available to a wide range of stakeholders; regional and local authorities and their operators, industrial emitters of greenhouse gases, as well as citizens and opinion influencers (NGOs and others) in the form of easy-to-understand indicators.

© Getty Images

THEMES

LES OBJECTIFS DE DÉVELOPPEMENT DURABLE

SATELLITES
Sentinel-1 & 2

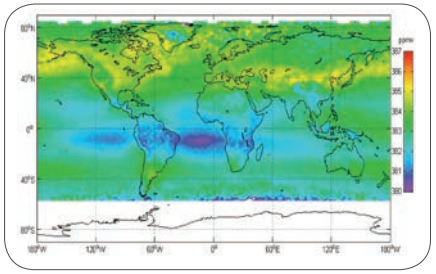
APPLICATION SITES
Centre Val de Loire, New Aquitaine, Occitania, Paris (France)

PARTNERS
LSCE, Atos, CITEPA, KAYRROS

Open-GCS

MONITORING GEOLOGICAL CARBON SEQUESTRATION

OpenGCS provides dynamic monitoring of CO2 leakage from geological carbon sequestration sites. Combining real-time monitoring of wireless sensor networks and regional satellite observations, OpenGCS is designed to provide safety, environmental impact and risk assessment studies of geological carbon sequestration. In particular, it will produce maps of the spatial distribution of CO2 and CH4 (methane) with monthly and annual variability, as well as an impact analysis of the observed changes on the environment.



Global distribution map of the annual average XCO2 AIRS (from 6 to 8 km) between 2003 and 2011© AIRS

SATELLITES
NASA AIRS, OCO-2, TROPOMI

APPLICATION SITES
Qinshui Basin, Shanxi Province (China)

PARTNERS
Chinese University of Mining and Technology (School of Resources and Geosciences, Artificial Intelligence Research Institute), China United Coalbed Methane Co.

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

Quantica

SUPPORTING CARBON STORAGE IN INTERMEDIATE CROPS

Many species, such as mustard here, are suitable for intercropping. © Getty Images

Capturing CO2 in soil would reduce global warming. To this end, the Quantica project proposes a tool for evaluating, on the scale of agricultural plots of land, the carbon storage potential offered by the intermediate vegetation cover. The stakeholders in the agricultural chain, including cooperatives and environmental certification bodies, will be able to use the tool to fairly remunerate farmers who commit to applying these carbon storage practice.

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

SATELLITES
Sentinel-2, Landsat-8, SPOT 6/7

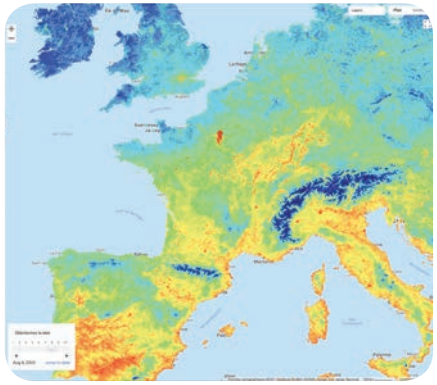
APPLICATION SITE
Occitania Region (France)

PARTNERS
AIRBUS, ARVALIS Vegetal Institute, ASP, CESBIO, Chambers of Agriculture of Occitania, CNES, E2L, Occitanum

EducSCO

EDUCATING THE CITIZENS OF TOMORROW

EducSCO is a cross-cutting action supported by the Interagency Committee of SCO France. Intended for teachers, this project aims to disseminate knowledge about the mechanisms, causes and consequences of climate change in order to accelerate awareness of the issues at stake. To this end, EducSCO organizes an annual customised training course for secondary school teachers and produces online tools.



Simple and intuitive, the EducSCO web tool allows to visualise the temporal evolution of the surface temperature on several time scales. ©SCO

ONLINE APPLICATION
EducSCO-temperature, an application dedicated to the study of temperature evolution from space

SATELLITES
Optical and radar imaging, atmospheric sounding, oceanography, meteorology, this project uses all families of Earth observation satellites.

PARTNERS
CNES, Maisons pour la science, Académie de Toulouse, Esero, Esa

APPLICATION SITE
Academy of Toulouse (France)

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

Aleofeu

MODELLING THE DYNAMIC FOREST FIRE HAZARD

Preventing and fighting forest fires are key areas for adaptation to climate change. Aleofeu is building operational tools that integrate the observed and modelled evolution of climatic and territorial conditions. The first objective is to produce dynamic and up-to-date maps of the Aude department in order to construct forecasts of fire behavior on the scale of the forest areas studied, thus allowing to decide on the adequate course of action. The second objective is to provide analyses of the vegetation based on the various scenarios established by the IPCC in order to refine the fire risk levels.

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

SATELLITES
Pleiades, Sentinel-1 & 2, Spot (including Spot World Heritage), Landsat, Modis

APPLICATION SITE
Aude (France)

PARTNERS
DDTM Aude, CNES, INRAE, Météo-France, ONF, SDIS Aude

AMSudSAT

SOUTH AMERICAN WATERSHEDS AND THEIR IMPACT ON GLOBAL CLIMATE CHANGE

The AMSudSAT project aims to monitor water flows in Amazonian watersheds and provide both quantitative and qualitative forecasts of flows in the Paraná River. In collaboration with the Brazilian National Water Agency and the Paraguayan Ministry of the Environment, the aim is to provide relevant information and create strategic indicators through the joint use of satellite and in situ data. The final objective is to promote integrated water resource management and to improve the anticipation and monitoring of extreme events in the area.

In Brazil, the Rio Negro and Solimões rivers join to form the Amazon River. © contains modified Copernicus Sentinel data (2018), processed by ESA, CC BY-SA 3.0 IGO

SATELLITES
Sentinel-1-2-3, MODIS, GPM, Hydroweb/ Theia data, Copernicus products

APPLICATION SITES
Amazon Basin, Brazil, Bolivia, Colombia, Ecuador, France, Guyana, Peru, Suriname, Venezuela, Paraguay

PARTNERS
CLS, BRL, CESBIO, CNRS, Ensat, GET-IRD, Functional Ecology and Environment Laboratory, University of Toulouse III

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

BOSCO Brittany

MONITOR THE EVOLUTION OF THE WATER CONTENT OF SOILS

The ambition of the BOSCO project is twofold. Firstly, to monitor changes in soil water content and the persistence of dry conditions on the scale of the Brittany region, consistent with the scale of water management and runoff. Secondly, to co-construct diagnostic, analysis and service tools with stakeholders and managers to assist in decision-making, in support of public policies (water resources, agriculture, preservation of ecosystems).

Soil moisture map of the Meu-Canut basin (2019) © Geosciences Rennes/CES THEIA

SATELLITES
Sentinel-1 & 2

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

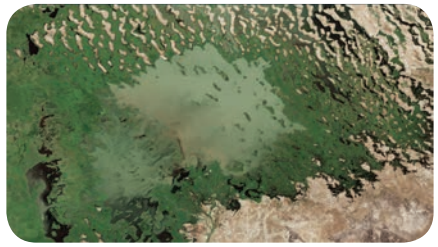
APPLICATION SITE
Brittany Region (France)

PARTNERS
Géosciences Rennes/CNRS, BRETEL, Chamber of Agriculture Brittany, CNES, DREAL Brittany, Eau du bassin Rennais, Ecobio Rennes, GéoBretagne, INRAE, IUEM, KERMAP, Météo-France, Observatory of Sciences of the Universe of Rennes, OEB, Rennes Metropolis, TerraScience, UMR LETG, UMR SAS, UMR Tetis

ECLAT

CLIMATE CHANGE IN THE LAKE CHAD REGION

Using satellite images, the ECLAT project has developed a replicable methodology for mapping land use in extreme and complex environments. Developed in three areas of Africa, the indicators cover natural and urban environments, linked to the dynamics of water resources. As a further step from operational remote sensing to users, it has demonstrated the possibility of producing sustainable development indicators from free data and indices derived from space remote sensing.



Lake Chad, seen here by Sentinel-2 in 2018, has shrunk by about 90% since the 1960s. © contains modified Copernicus Sentinel data, processed by ESA

PROJECT COMPLETED

Are you interested in these services ? Contact the project team (directory on page 86 !)

SATELLITES
Sentinel-2

APPLICATION SITES
Africa: Lake Chad Basin (Cameroon, Niger, Nigeria, Chad), Tocc Tocc Community Nature Reserve (Senegal), W National Park (Niger)

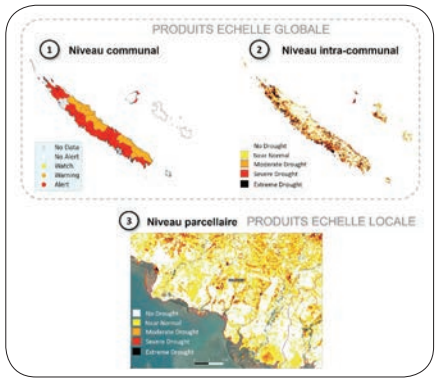
PARTNERS
CLS/SIRS, Dakar Ecological Monitoring Center, World Customs Organization, African Union, UNDP

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

EO4Drought Monitoring

CHARACTERIZING, MONITORING AND FORECASTING DROUGHT IN NEW CALEDONIA



© EO4DroughtMonitoring

EO4DroughtMonitoring is a tool for characterizing and monitoring drought on a territorial scale. It is designed as a tool aiming to assist in the rational management of farms and as a decision-making aid for institutions. The system is capable of assessing the intensity of drought episodes, estimating their severity by analogy with a historical reference state and, coupled with current data, providing an indication of the plausible future trajectory of a hydrological season.

Are you interested in these services ? Contact the project team (directory on page 86 !)

PROJECT COMPLETED

SATELLITES
Sentinel-2, Landsat-7/8, MODIS, ASCAT

APPLICATION SITES
New Caledonia
Targeted extension territories: French Polynesia, Wallis & Futuna and Vanuatu

PARTNERS
iNSiGHT, New Caledonia Rural Agency, CNES, IRD, Météo-France, Theia, UMR Espace Dev

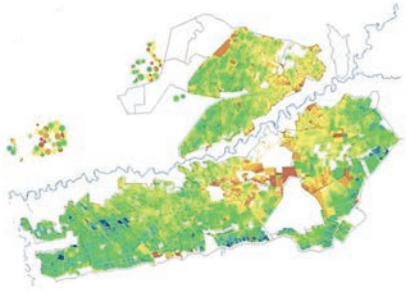
THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

IRRISAT-Morocco

MANAGERING WATER RESOURCES

IRRISAT-Morocco aims to set up an irrigation water optimisation system using satellite data. It is based on two complementary approaches to estimating plant water consumption and requirements, which are combined to provide results at the agricultural plot, irrigated sector and watershed scales. Annual crop maps, daily indicators (evapotranspiration, biomass production, soil moisture, irrigation needs), an online platform disseminates information and advisory products to farmers and water stakeholders.



Example of a daily evapotranspiration map.
© IRRISAT

SATELLITES
VIIRS, Landsat, Sentinel-2, Mohammed VI-A & B

APPLICATION SITES
Tadla irrigated area, Berrechid plain, Sebou hydraulic basin (Morocco)

PARTNERS
Royal Centre for Spatial Remote Sensing, CESBIO, Regional Office of Agricultural Development of Tadla, ORMVAG, Mohammed V University, Hassan 2 Agronomic and Veterinary Institute

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

OpHySE

FOLLOW THE STATE OF THE RIVERS IN REAL TIME

Climate change risks causing substantial changes to the hydrological cycle, affecting rivers and their navigability in particular. In this respect, the OpHySE (Operational Hydrology from Space and modEls) project aims to propose a platform for real-time monitoring of the condition of rivers and provide a navigability aid which will ultimately enable the way they evolve to be planned and predicted. This tool will be put into application for demonstration purposes on all the river basins of French Guiana, where the rivers are of major environmental and economic importance.

In French Guiana, the flow of rivers, and therefore their navigability, varies intensely between dry and rainy seasons. © Jonathan CALMANT

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

ONLINE INTERFACE
https://sagui.hydro-matters.fr/sagui/

SATELLITES
Jason-3, Sentinel-3 & 6, GPM (Global Precipitation Measurement) constellation

APPLICATION SITE
French Guiana (South America)

PARTNERS
HydroMatters, CNES, DGTM French Guiana, French Guiana Water Office, International Water Office

SeSAM

MONITORING SARGASSUM SEAWEED BLOOMS

Massive arrivals of Sargassum seaweed have multiple consequences (environmental, economic and health) in the tropical Atlantic. In this context, SeSAM (Seasonal Sargassum Alert and Monitoring) aims to propose a tool for operational monitoring and seasonal forecasting of Sargassum seaweed, by exploiting the capacities of satellite data and digital twins of the ocean. The project thus aims to support the decision-making chain of each territory affected by the phenomenon and provides a coherent response to the need to strengthen regional and international cooperation (GeoBluePlanet, IOCARIBE, UNESCO, etc.) for coordinated management.

Sargassum strandings. © iStock

SATELLITES
Sentinel-2 & 3, Aqua, GOES 16

APPLICATION SITES
Caribbean Region, West Africa, Gulf of Mexico

PARTNERS
CLS, CNES, IRD, Mercator Ocean

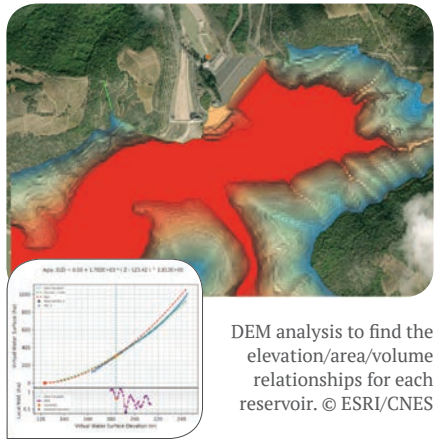
THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

Stock Water

GLOBAL MONITORING OF THE LOAD OF HYDRAULIC DAMS

Dams are strategic tools for countries and their management of water resources, the availability of which is an increasingly essential issue. Stock Water aims to set up a system for monitoring the load of dams based on satellite data, and a specific processing chain, thus facilitating the action of the public authority in this area. The project, which is open to any country wishing to join, is being developed with a method that will be tested for replicability in several countries where the necessary data is available before going to a global scale.



DEM analysis to find the elevation/area/volume relationships for each reservoir. © ESRI/CNES

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

OLINE INTERFACE
https://www.sco-stockwater.org/

SATELLITES
Sentinel-1 & 2, TandemX

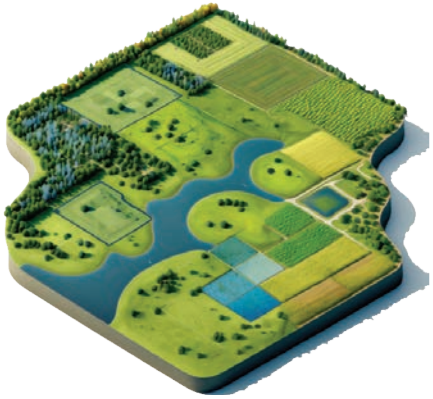
APPLICATION SITES
India, Tunisia, Laos, Burkina Faso

PARTNERS
CNES, CESBIO, GET, INAT, INGREF Tunisia, IRD, LISAH, MONRE Laos, National Geophysical Research institute India, NTPC Laos

XtremQuality

MONITOR THE WATER QUALITY
OF SMALL ARTIFICIAL RESERVOIRS

The XtremQuality project addresses the issue of the evolution of the quality of water stored in small artificial water reservoirs, which have been seldom studied in France until now. With the implementation of indicators on the trajectory of these surfaces by aggregating multi-source data, it aims to improve our knowledge and raise awareness of the impacts of climate change on these water reservoirs, which are essential for a number of uses.



SATELLITES
Sentinel-2

APPLICATION SITES
Southwest France and the Parana sub-basin in Brazil

PARTNERS
IRD/GET, ANA, CNES, eAU, ECLA, INRAE, Magellium

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

ADOPT

HELPING NATURE PARKS TO ADAPT

Example of a soil map generated on the Theia platform. © Theia

The aim of the Regional Nature Parks is to allow the sustainable development and conservation of region's heritage, which implies anticipating and countering the effects of climate change. The aim of the ADOPT project is therefore to use Earth observation data to define, prototype and test a service for producing and disseminating indicators of the impacts of climate change for the Regional Nature Parks of the Occitan region. They will thus be able to monitor the evolution of environments and develop adaptation scenarios.

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

SATELLITES
Data and products distributed by Theia, Dinamis, Copernicus Climate Change Service (C3S), USGS and NASA

APPLICATION SITES
Regional nature parks of Occitania (France)

PARTNERS
E2L Space & Living Labs, CNES, IDGEO, La Telescop, Regional Nature Parks of Occitania

Chove-Chuva

ACCOMPANYING AMAZONIAN SOCIO-ENVIRONMENTAL TRANSFORMATIONS

Chove-Chuva aims to develop a tool for monitoring and disseminating territorial dynamics in the Brazilian state of Mato Grosso. Intended to be easy to use to facilitate access for many people as possible, especially citizens, the tool will provide a series of synthetic indicators on the change in the climatic variables and the dynamics of land occupation (forest, agriculture, water resources) and land use (low-carbon agricultural practices advocated under the ABC plan), and a regional vulnerability indicator.

Reforestation of riparian forest in Mato Grosso. © ICV

ONLINE INTERFACE
https://www.sco.chove-chuva.org/

SATELLITES
Sentinel-2, Landsat, MODIS

APPLICATION SITE
Mato Grosso (Brazil)

PARTNERS
UMR LETG, Alkante, CAT, CIRAD, CNES, CNRS, Embrapa, FEC, GEODEV, ICV, SEMA-MT, UERJ, UMR Tetis, UNEMAT, University of Rennes 2

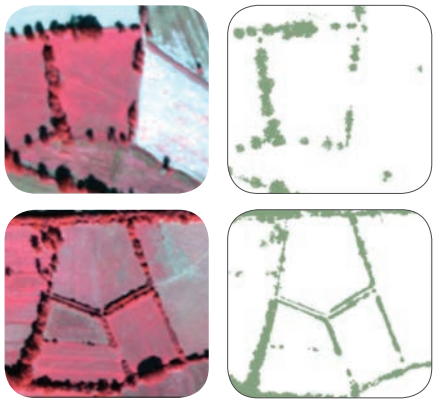
THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

Eagle Hedges

FOLLOW HEDGEROWS

Hedges act as a refuge for biodiversity and provide many ecosystem services. It nevertheless remains difficult to assess their exact effect. Eagle Hedges responds to this challenge to support the implementation of national agro-ecological transition policies. It consists firstly in setting up an operational service for extracting the surface areas and linear coverage of hedges in a given region in order to monitor how they evolve, and secondly of developing a robust tool for characterizing the network of hedgerows and its functions in various regions.



Hedge extraction layer (©UMR Dynafor) from satellite images (© DigitalGlobe).

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

SATELLITES
Pleiades, Spot 6/7

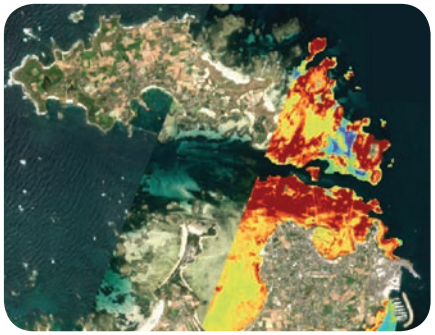
APPLICATION SITES
Pyrenees-Gascony workshop area, Aude and Haute-Garonne departments (France)

PARTNERS
TerraNis, AFAC, CNES, DYNAFOR, IGN, OFB

LITTOSAT

THE COASTLINE MONITORED BY SATELLITE

LITTOSAT offers an innovative dashboard including new data for the analysis of coastal territories and marine protected areas. These environments are both weakened by the effects of climate change and strong anthropic pressures. By making it possible to monitor the spatial evolution of coastal vegetation and the effects of climate change over a short period, LITTOSAT also aims to assess the impact of current policies for preserving these areas. In particular, the project will provide up-to-date and strategic satellite data for monitoring sensitive areas in shallow waters and intertidal zones.



Overview of LITTOSAT satellite products: high tide, low tide and vegetation index mosaics over a portion of the Breton coastline © Hytech imaging, contains modified Copernicus Sentinel 2 (2020) data

SATELLITES
Sentinel-2, Pleiades, Planet

APPLICATION SITES
Brittany and Normandy, including the Iroise Marine Natural Park and the Armorique Regional Natural Park (France)

PARTNERS
Hytech imaging, CNES, GIS BRETEL, IUEM, OFB, PNRA

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

SCOFriches Agricoles

ENHANCING THE VALUE OF AGRICULTURAL WASTELAND

SCO FrichesAgricoles aims to facilitate the identification of agricultural wastelands and to promote better management in order to limit fire and health risks. To this end, the project aims to deploy multiple strategic tools: an algorithm for identifying the areas under consideration through satellite observation, a collaborative data entry application and a consultative decision support application for users. These freely available tools will provide operational support to local authorities and to those involved in planning, environmental conservation and agricultural development.

Low shrubby wasteland - Commune of Mèze in the Hérault © Safer Occitanie

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

SATELLITES
Sentinel-1 & 2, Spot 6/7, Pleiades

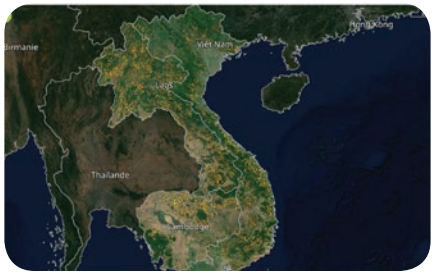
APPLICATION SITES
Several municipalities in the Occitania region (France)

PARTNERS
Safer Occitania, CNES including Lab'OT, National Federation of Safer

TropiSCO

TRACKING GLOBAL TROPICAL FOREST LOSS

Despite their essential role, forests are shrinking drastically, especially in the tropics. TropiSCO is developing a platform for weekly monitoring of global tropical forest loss by means of Sentinel-1 radar images. The first results are online thanks to close collaboration with certain partner countries of programmes conducted by France in the Amazon, Africa and Southeast Asia. Reliable and easy to use, TropiSCO data can help combat illegal logging and mining, illegal farming and wildlife trafficking.



Visualisation of deforestation in Southeast Asia on tropisco.org.

ONLINE INTERFACE
https://www.tropisco.org

SATELLITES
Sentinel-1

APPLICATION SITES
Africa, Amazonia, South East Asia

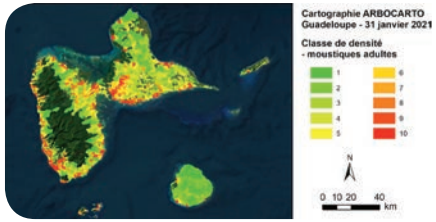
PARTNERS
GlobEO, CESBIO, CNES

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

Arbocarto-V2

ANTICIPATING MOSQUITO ABUNDANCE



Arbocarto simulation of Aedes albopictus adult mosquito densities in Guadeloupe. © Arbocarto

Mosquitoes are vectors of human arboviruses such as dengue and chikungunya. Designed for Regional Health Agencies and mosquito control operators, the Abocarto-V2 application can be used to guide vector control actions and to adjust field actions in high-risk areas. To this end, the tool generates predictive maps of the abundance of *Aedes albopictus* or *aegypti* mosquitoes in a given territory, depending on the user's choice, and allows the simulation of different prevention or control scenarios.

Are you interested in these services ? Contact the project team (directory on page 86 !)

PROJECT COMPLETED

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

APPLICATION AVAILABLE
On request https://www.arbocarto.fr

SATELLITES
SPOT 6/7, Sentinel-2

APPLICATION SITES
Montpellier, Grenoble, Bordeaux, Reunion, Mayotte, Antilles (France)

PARTNERS
CIRAD, Marie Demarchi, CNES, French Ministry of Health and Prevention

ClimHealth

PREVENTING EPIDEMIOLOGICAL RISKS BY MONITORING THE ENVIRONMENT

ClimHealth proposes to improve a portal for accessing space-derived climate data with the aim of facilitating their cross-referencing with local epidemiological sources and thus better understanding the influence of climate on the development of certain infectious diseases such as malaria. Ultimately, ClimHealth will be an operational module of meteorological and environmental data integrated into the DHIS2 global epidemiological monitoring tool.

Developed in Thailand, the Sat4Health interface provides disease-specific graphs of rainfall, temperature, vegetation and humidity data. © ClimHealth

PROJECT COMPLETED

Are you interested in these services ? Contact the project team (directory on page 86 !)

OLINE DEMONSTRATORS

Satellites for Health Surveillance :
https://sat4health.geohealthresearch.org/
LeptoYangoon :
https://leptoyangon.geohealthresearch.org/

APPLICATION SITES

Yangon (Myanmar)
Thailande

PARTENAIRES

IRD, CNES, AFD, Pasteur Institute of Cambodia, Seas-OI (Indian Ocean), University of La Reunion

SATELLITES

Sentinel-1 & 2

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

PODCAST-Demo

STEMMING THE SPREAD OF CHOLERA

Cholera, a waterborne disease, affects 1.3 to 4 million people worldwide each year. New cases of *Vibrio cholerae* pathogen emergence and associated epidemics have been reported in relation to global warming and increased extreme weather events. PODCAST-Demo aims to validate a web-based demonstrator for the visualization and analysis of cholera risks according to climate-related *Vibrio cholerae* hot spots. Intended for public health authorities and open to local populations, the tool will thus provide decision support for implementing preventive measures.

Vibrio cholerae, hosted by planktonic and detrital hosts, survives transport by ocean currents. © Getty Images

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

SATELLITES

Essential climate variables of the ESA-Climate Change Initiative

APPLICATION SITE

India

PARTNERS

Plymouth Marine Laboratory, ESA, Japan Agency for Marine-Earth Science and Technology, National Center for Earth Observation

BanD-SOS

IMPROVING THE RESILIENCE OF DELTAS TO CYCLONIC FLOODING

Every three years on average the Bengal Delta is struck by a major tropical cyclone resulting in serious consequences. In response, BanD-SOS is developing a pre-operational system for forecasting (between 36 and 48 hours) cyclonic flooding and the associated societal risk to society. The platform provides the real-time information needed to implement evacuation and population protection operations when a cyclonic event occurs. It thus helps in the development of public policies for adaptation to the submergence hazard to ensure the resilience of the population in the medium-to-long term.

Coastal defences installed along the Kuakata coastline (South Bangladesh) ©Jamal Uddin Khan (LIENSs, La Rochelle).

ONLINE INTERFACE
https://bandsos.github.io (prototype)

SATELLITES
Sentinel-2

APPLICATION SITES
Bengal (Bangladesh, India) and Amazon (Brazil) deltas

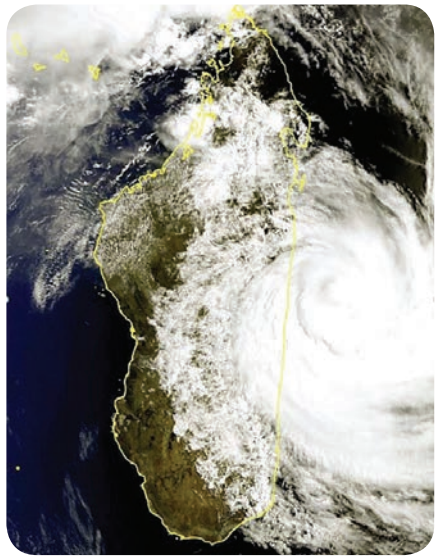
PARTNERS
LEGOS, Arizona State University, BWDB/ FFWC, CNES, LIENSs, Ohio State University

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

Cimopolée

MAPPING THE IMPACT OF CYCLONES FOR ADAPTATION AND RESILIENCE



Cyclone Emnati, February 2022 © ESA, Sentinel-3

The consequences of climate change can already be measured in terms of tropical cyclones, whose power and area of influence are increasing as ocean temperatures rise. The Cimopolée project aims to develop an operational tool capable of processing strategic data for risk management related to extreme weather events in the south-west Indian Ocean. Based on optical and radar satellite images, a web interface will provide users with indicators of natural disasters a posteriori, in order to quantify the damage and better manage the consequences of their occurrences.

THEMES

SATELLITES
Sentinel-1 & 2

APPLICATION SITES
Madagascar and Reunion Island (Indian Ocean)

PARTNERS
University of La Réunion, BNGRD, CNES, IOGA, IRD, IST, UMR EspaceDEV

THE SUSTAINABLE DEVELOPMENT GOALS

EO4Wetlands

MULTI-SCALE MONITORING OF WETLAND RESTORATION

Monitoring wetlands has become a major strategic issue given their key role in biodiversity, climate change and hydrology. In this perspective, EO4Wetlands aims to provide a wetlands monitoring tool for French, Belgian and Dutch users. Through the joint use of in situ data, UAV overflights and high-resolution satellite data, the tool will allow the analysis of surface conditions and their spatio-temporal changes in order to support decision-makers concerned about the potential occurrence of extreme climatic events such as floods.

Satellite view and drone orthoimage overlay of the LLHPP application site

SATELLITES
Sentinel-1-2-3, Landsat, Ecostress, Pléiades

APPLICATION SITE
LLHPP Living Lab Hedwige-Prosperpolder (Belgium/Netherlands)

PARTNERS
Cerema, CNES, Geomatys

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

FLAude

BE MORE RESILIENT TO FLOODING

Thanks to FORO, the location of the hedges with respect to the hydrological network and the slope of the land makes it possible to identify the areas at stake. © FLAude

Are you interested in these services ? Contact the project team (directory on page 86 !)

PROJECT COMPLETED

Developed in a department particularly affected by extreme hydro-meteorological events, FLAude has delivered its FORO platform, Flood Observatory for Resilient Occitanie. Based on satellite imagery, the tool enables local stakeholders to visualize and gain a better understanding of the risks linked to flooding by runoff, and to implement resilience plans. Already in use in the Aude region, FORO will be deployed from 2023 in several territories of the Mediterranean Arc. It will rapidly offer the detection of ice jams and damaged vines.

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

ONLINE INTERFACE
Results for the Aude :
https://apps.tereval.fr/foro/#/

SATELLITES
Pléiades, Sentinel-1 & 2, SPOT, Landsat

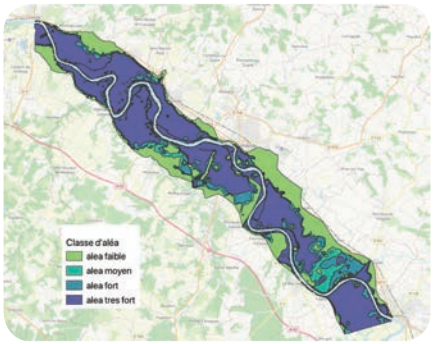
APPLICATION SITE
Aude department and Occitania region (France)

PARTNERS
DDTM Aude, CNES, Copernicus C3S, Météo-France, SGEvT, University of Toulouse 2/LISST

FloodDAM

FLOOD ALERT

The FloodDAM project aims to develop a near-real-time flood warning and mapping system based on analysis of optical and radar satellite imagery, in situ data and virtual stations via machine learning methods. Mapping of flood risk areas along rivers will also be produced, based on flood history and current measured weather conditions.



Modelling of possible flood risks along the Garonne River taking into account both the maximum water level (PHE) and the flow. © FloodDAM

SATELLITES
Sentinel-1-2-3, Pléiades, TerraSarX

APPLICATION SITES
Rivers Garonne and Seine (France), Mississippi (USA), Ebro (Spain), Betsiboka (Madagascar)

PARTNERS
CERFACS, Predict Services, AIRBUS Defense & Space, CNES, JPL, VIGICRUES, Vortex.IO

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

Gade Lapli

MANAGING HYDRO-METEOROLOGICAL CRISES IN REAL TIME

Gade Lapli takes advantage of COSPARIN (space contribution to flood risk) data to quantify the risks associated with extreme precipitation events in regions that are extremely vulnerable to climate change and often poorly equipped with forecasting means, such as Haiti. The tool will propose the creation of an index to monitor changes in rainfalls caused by climate change, particularly during the hurricane season, but also to support civil security authorities in monitoring hydro-meteorological hazards in real time, including an alert service.

Estimation of rainfall and potential flood zone in Haiti in the PREDICT Observer tools - result from COSPARIN. © Predict

THEMES

SATELLITES
GOES, MSG, METEOSAT, FY, HIMAWARI, MetOp, TerraSAR-X, TanDEM-X

APPLICATION SITE
Haiti (Caribbean)

PARTNERS
Predict Services, CEREMA, CNES, CNIGS, DGPC, LMI Caribact, Météo-France, Ministry of Agriculture, Natural Resources and Rural Development of Haiti, ONQEV Haiti, UHM HAITI

THE SUSTAINABLE DEVELOPMENT GOALS

GeoHaTACC

DOCUMENTING THE EFFECTS OF CLIMATE CHANGE IN TROPICS

The GeoHaTACC project focuses on geo-hydrological hazards such as mass movements and flash floods, more specifically on the territory of Rwanda. Combined with other sources of information, satellite data can make a real contribution to the detection and analysis of the spatio-temporal evolution of such events. In a context of data scarcity, the objective is to provide tools to assess the effects of climate change on meteorological hazards on the wider scale of Central Africa.

Example of a typical landslide in Rwanda
© O. Dewitte & B. Smets, RMCA, Tervuren

SATELLITES
Sentinel-1 & 2, Landsat-8/9, PlanetScope

APPLICATION SITE
Rwanda (East Africa)

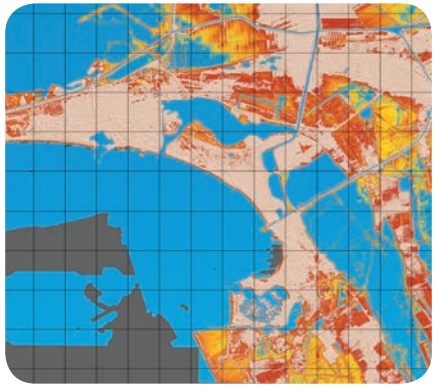
PARTNERS
Earth and Environment Institute of the University of Strasbourg, A2S, CNES, CRED, Royal Museum for Central Africa

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

Littoscope

MODELLING MARINE SUBMERSIONS



Mapping of submerged areas around Palavas-les-Flots. © CNES-CLS2016 study

The Littoscope project has developed an operational solution using satellite data to model the vulnerability of a coastline to flooding hazards and to assess the associated risks by combining socio-economic and space data. The tool can thus generate maps of permanent (due to the global rise in water level) and temporary (during an extreme event involving exceptional waves) marine submersion risks.

Are you interested in these services ? Contact the project team (directory on page 86 !)

PROJECT COMPLETED

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

https://datastore.cls.fr/products/littoscope-coastal-resilience/

SATELLITES
Pléiades, Copernicus Marine et Climate Change Services

APPLICATION SITES
Palavas-les-Flots and Montpellier Metropole, Gâvres (France)

PARTNERS
CLS, BRGM, CNES, GCF, LEGOS, SIRS

Monitoring the Gold Coast

RECOVERING BEACHES AFTER A STORM

Australia's Gold Coast is seeing increasing damage to its beaches from the onslaught of stronger and more frequent storms. To support research advances in post-storm breach recovery, Monitoring the Gold Coast is developing an automated and repeatable methodology that uses radar satellite imagery to extract the waterline and tidal data from tide gauges. The tool can then study net accretion or erosion, depending on whether the waterline is moving offshore or inshore.

The coastline of the Australian Gold Coast. © Pixabay

SATELLITES
Sentinel-1, données ESA Sea State CCI (L3 & L4 products)

APPLICATION SITE
Gold Coast (Australia)

PARTNERS
Telespazio UK, CMRC of Griffith University, ESA, Future Earth

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

OSS Saint Louis

ACCESSING THE VULNERABILITY OF COASTAL POPULATIONS AND ECONOMIC ACTIVITIES

Pleiades view of Saint Louis, at the mouth of the Senegal River. © CNES 2012, Distribution Airbus DS

OSS Saint Louis is proposing a detailed study of Senegal's coastal environment and indicators of climate change in the face of rising sea and river levels, as well as the number and intensity of storms. The aim is to gain a better understanding of the flooding hazard and the associated risks (statistical analysis of events), to identify current and future risk areas, and to propose new vulnerability indicators, all with a multi-risk vision of the territories.

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

SATELLITES
Sentinel-1-2-3, SPOT 6/7, Pléiades

APPLICATION SITE
Coastline of Saint Louis, Senegal (Africa)

PARTNERS
M2C, CNES, CNRS, Idees, LEGOS, Resallience, UNDP, University of Rouen

Viet-ARRO

AN OBSERVATORY FOR AGRICULTURAL RESILIENCE IN THE MEKONG DELTA

Conducted as part of the Vimesco-Rice project (see page 40) devoted to the adaptation of rice growing in Vietnam, the Viet-ARRO component focuses on managing the impacts of typhoons on Vietnamese agriculture. In collaboration with the Vietnamese Ministry of Agriculture, the system produces relevant decision-support information for authorities to rapidly assess impacts in the post-event period, and proposes resilient options for territorial recovery. This rapid mapping is based on free Sentinel-1 imagery analysis.

In mid-June 2022, the Vietnamese teams received training in radar processing in order to become fully familiar with the tool. © Linda Tomasini

PROJECT COMPLETED

Are you interested in these services ? Contact the project team (directory on page 86 !)

ONLINE INTERFACE
https://www.vietsco.org

SATELLITES
Sentinel-1

APPLICATION SITES
Central Vietnam (Southeast Asia) and typhoon affected areas

PARTNERS
GlobEO, Vietnam Space Agency VAST, CESBIO, CNES, IRD, TSE, USTH

THEMES

THE SUSTAINABLE DEVELOPMENT GOALS

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Cimopolée

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City Explorer

SCO ESA - 2021 Edition

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