European Commission | Education, Audiovisual & Culture Executive Agency

Capacity Building

Building sustainable partnerships to support modernisation, inclusiveness and internationalisation of higher education in the Partner Countries

Erasmus+ Capacity Building in Higher Education

Online Grantholders´Meeting
25-29 January 2021

Erasmus+ South Med, Iraq, Iran, Yemen

Wednesday 27/01
14h00 - 14h45
Meeting number:
175 126 0334
Password:
EBOOTH2021
(32668420 from phones and video systems)
Join the web meeting

Thursday 28/01
14h00 - 14h45
Meeting number:
175 417 3451
Password:
EBOOTH2021
(32668420 from phones and video systems)
Join the web meeting

Friday 29/01
14h00 - 14h45
Meeting number:
175 457 8235
Password:
EBOOTH2021
(32668420 from phones and video systems)
Join the web meeting

Western Balkan universities towards European integration

Friday 29/01
14h00 - 14h45
Meeting number:
175 983 0085
Password:
EBOOTH2021
(32668420 from phones and video systems)
Join the web meeting

Capacity Building for a Greener world

Thursday 28/01
14h00 - 14h45
Meeting number:
175 957 5677
Password:
EBOOTH2021
(32668420 from phones and video systems)
Join the web meeting

Project number	Beneficiary	Title	Years of activities	Implementing Regions	contact person
561755-EPP-1-2015-1-NO-EPPKA2-CBHE-JP	NORGES MILJO-OG BIOVITENSKAPLIGE UNIVERSITET	Water Harmony: Harmonise teaching and pedagogical approaches in water related graduate education	2015-2019	Sri lanka	Harsha C. Ratnaweera
561797-EPP-1-2015-1-FR-EPPKA2-CBHE-JP	UNIVERSITE TOULOUSE II-JEAN JAURES	MONTUS – Master On New Technologies Using Services	2018 - 2021	South East Asian partners	Dominique Laffly
573764-EPP-1-2016-1-FR-EPPKA2-CBHE-JP	UNIVERSITE PAUL SABATIER TOULOUSE III	MADEEHI: Coopération et innovation pédagogique : Eau-Énergie-Habitat à Madagascar	2016-2019	Madagascar	Angela MOCA LICCIARDI and Manitra Razafinimanana
573806-EPP-1-2016-1-RS-EPPKA2-CBHE-JP	NIVERZITET U NISU	Development of master curricula for natural disasters risk management in Western Balkan countries	2016-2020	Western Balkan countries	Milan GOCIC
573897-EPP-1-2016-1-BG-EPPKA2-CBHE-JP	SOUTH-WEST UNIVERSITY NEOFIT RILSKI	Licence, Master professionnels en formation ouverte et à distance pour le développement du tourisme durable en Chine, au Vietnam et au Kirghizstan	2016-2019	China, Vietnam and Kyrgyzstan	Preslav Dimitrov
586317-EPP-1-2017-1-BE-EPPKA2-CBHE-JP	UNIVERSITEIT ANTWERPEN	CITYLAB CAR : Engaging students in sustainable Caribbean Cities	2017-2021	Caribbean	Tom Coppens
609553-EPP-1-2019-1-FR-EPPKA2-CBHE-JP	UNIVERSITE DE NANTES	GREENCAP	2020-2022	Cambodia	Lionel LEMIALE

Dear All,
We are approaching the end of the week before our Grant Holder Meeting.
As agreed I'm coming back to you to see if you kindly send some **bullet points** on the project implementation you find useful to share and discuss with the new coordinators. I will use this points for addressing questions.
Just think about what it has been the **PLUS** and as well the **Challenges** you faced during the implementation phase. Relevant points might be **on project team, the cooperation arrangements and sharing a vision, outcomes and outputs, Impact and sustainability.**
Also, if you have a PPT to share during our meeting **only on results**(as I already uploaded your overall material on the website), feel free to send it to me.
To conclude, just some **technical remark**:

1. The meeting is on next **THU, 28/01/2021 at 14**.
2. Here you find the link: https://cbhegrantholders2021.eu/ebooths
3. As 7 projects will be presented in 60 minutes (eventually we could stay for more time..) so it's crucial a mutual respect for the time (I'll be your time keeper) to let everybody share their experience and **enjoy it!**
4. To conclude, I'm sharing with you some information on the project we are going to talk about.
5. I suggest to will follow a chronological order, first the achieved projects, then the ongoing initiatives.

Kind regards,

Eugenio DELFINO

European Commission
Education, Audiovisual and Culture Executive Agency (EACEA)
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UNIVERSITÉ TOULOUSE Jean Jaurès

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“Capacity Building for a Greener World”

Looking for your experience to share as best practice at our Annual Grant Holder meeting 2021

TORUS - Toward an Open Resources Upon Services (2015-2018)
&
MONTUS – Master On New Technologies Using Services (2018-2021)

Dominique LAFFLY, coordinator

Co-funded by the Erasmus+ Programme of the European Union

BIG (environmental) DATA and SUSTAINABILITY

STATE OF THE ART IN THE 2000s

The fundamentals of TORUS and MONTUS

Pr. Dominique LAFFLY
Head of TORUS & MONTUS

MAIN IDEA: Big (environnemental) Data for a Greener Word? YES… BUT

Johannes Jütting and Ida Mc Donnell in a report* produced for the Paris COP21 (Synthesis: How to ensure that data promotes development?) they recall in the preamble:

"Data are essential to ensure the achievement of the Sustainable Development Agenda on the horizon. 2030, in particular to ensure that no one is left behind. But producing more will not be enough: for it to be useful for policy development, monitoring and accountability, this data must be transformed, analyzed and harnessed. If the 2017 Development Co-operation report focuses on the role of data for development, it is because the quality, up-to-date and disaggregated data is essential to achieve the ultimate development goal of improving well-being. people and fight poverty are not available. Investment in statistical systems must become a strategic priority for both developing countries and providers of development cooperation."

BIG (environmental) Data, the methods and techniques that go with it, offer a real opportunity to support policies to ensure a tomorrow for humanity, which is now threatened. We bet that a Greener World will also be a viable World.

It is with this in mind that we have promoted the TORUS and MONTUS programs with ERAMSUS +.
The idea is to promote common knowledge between environmentalism and information disciplines to allow the former to access the latter and vice versa. Because it is through transdisciplinarity that we will find the solution which cannot be left entirely in the hands of GAFAM.

* https://www.oecd-ilibrary.org/docserver/dcr-2017-6-fr.pdf?expires=1569921745&id=id&accname=guest&checksum=39D2CD9A8462882048BD0CDE2347C91E

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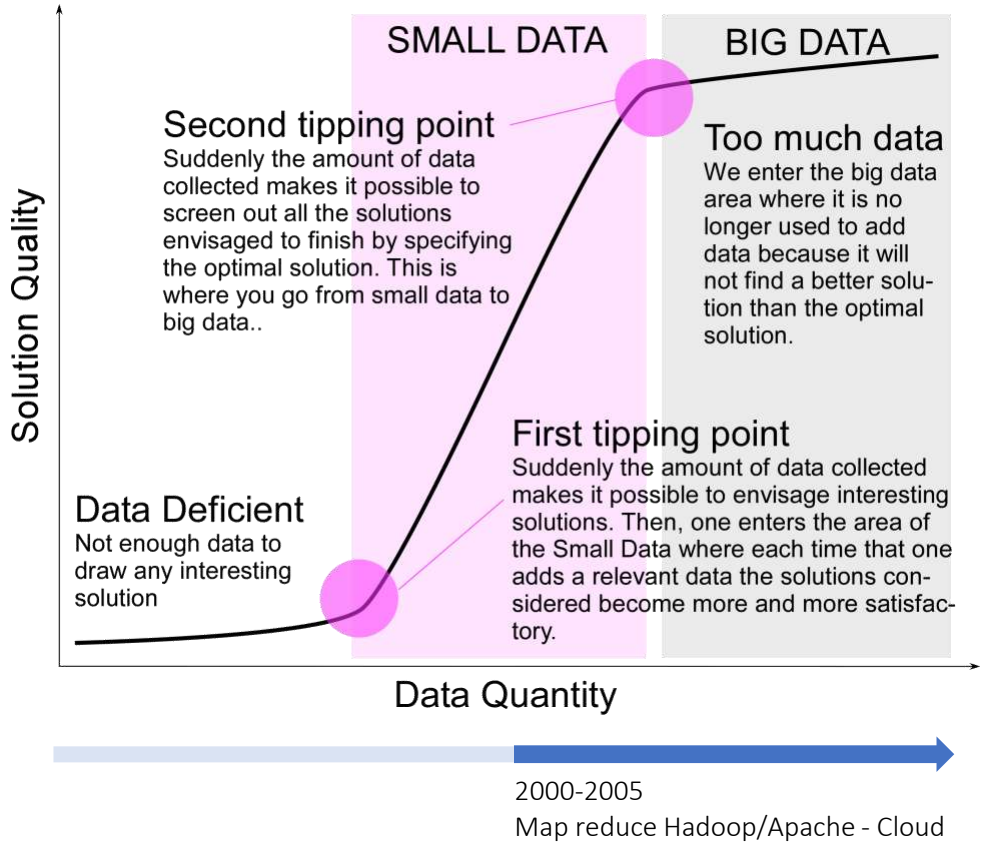
STATE OF THE ART → BIG DATA → New Oil Gold

The **Big Data** is the **new oil gold**, the amounts of information now generated are astronomical: "*the digital data created in the world would have gone from 1.2 zettabytes per year in 2010 to 1.8 zettabyte in 2011, then 2.8 zettabytes in 2012 and will rise to 40 zettabytes in 2020*" (Wikipedia). A true universe with these black holes that absorb most of the information without even being processed – it is estimated that **less than 3 % of the data actually marked and analyzed**. The numbers are beyond the comprehension of most of us:

– "In 2011, 5 exabytes of data were generated every two days. This is now done in just 10 minutes.
– Only 0.5 % of these data are analyzed.
– There were only 130 exabytes of data in the digital universe in 2005. There should be more than 40,000 by 2020.
– In 2020, the data will represent the equivalent of more than 5,000 Gb per person.
– In 2012, 35 % of this information would require protection, but this is the case only for 20 % of them".



Technically, how to consider the exploitation of these data? Peter Norvig, Director of Research at Google, offers an **S-curve** to illustrate the link between the evolution of the amount of data and the quality of possible processing solutions.

The **switch** between Small Data and Big Data is **far behind us** and its dating depends on the disciplines and sectors of activity.

Google's Big Data (24 Petabytes a day) is not CERN's or that of NASA and even less that of the geographer.

Anyway, **let us agree that from the moment the data accumulates faster than we have the time to analyze them, they require storage volumes that involve servers and that the information is not systematically structured we are indeed in a big data problem**: we find the initial **3V – Volume, Speed and Variability**.

All the environmental disciplines are confronted with this reality of massive data, with the rule of the 3+2Vs: Volume, Speed, Variety, Veracity, Value.

Pr. Dominique LAFFLY
Head of TORUS & MONTUS

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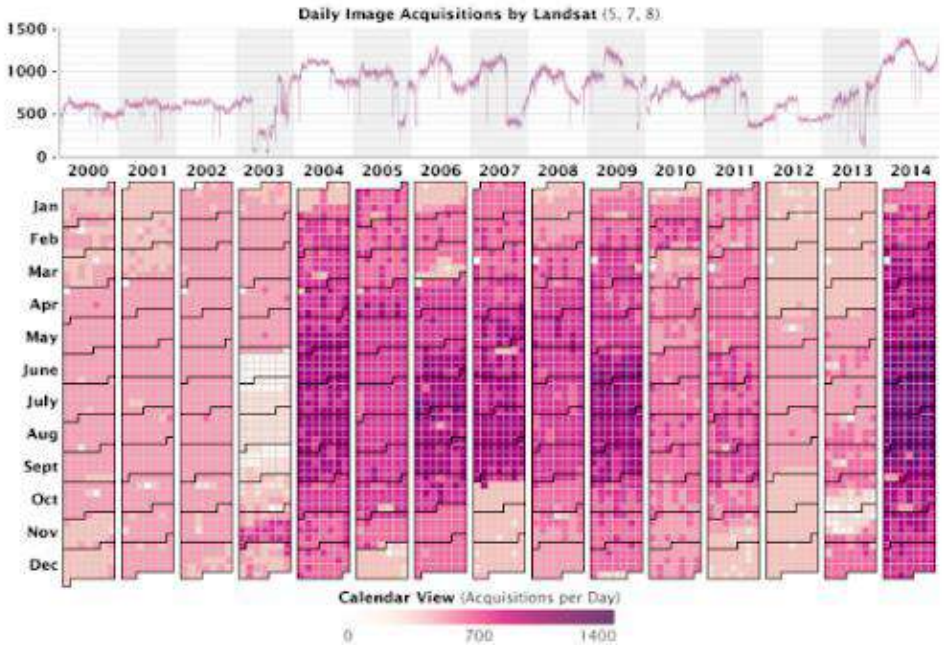
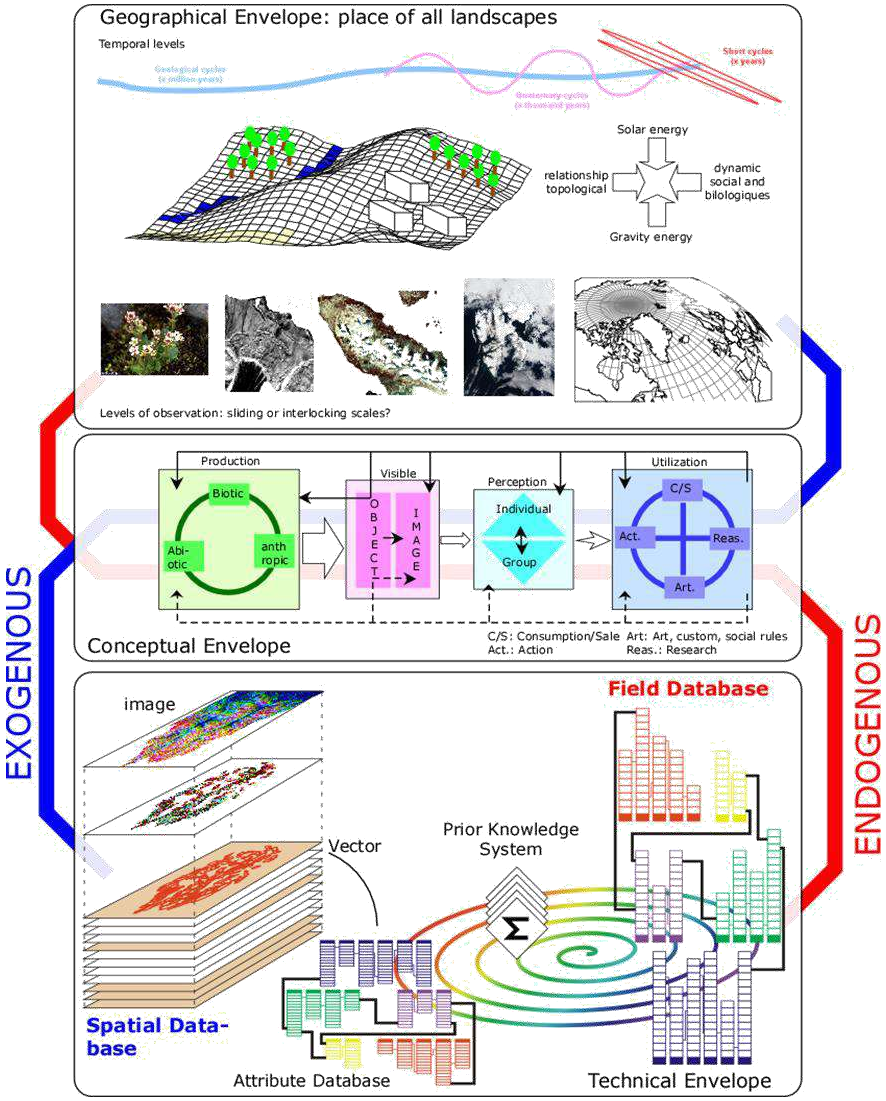
STATE OF THE ART: Integrated Analysis → the way to the Big Data for Geoscience

https://earthobservatory.nasa.gov/images/85703/a-lot-of-data-a-lot-of-possibilities



NASA enables scientists around the world to understand how the universe works by collecting data of events or objects and making those data accessible. In fact, NASA has over 26 petabytes of Earth data sets that are available to scientists–that's **26 million gigabytes, or enough data to need 52,000 computers each with 500 gigabytes of storage space**. Earth scientists use these data to understand how the Earth system works and how the spheres within the Earth system interact with one another.



The "*signs*" that the landscape returns – information – allow a quantitative approach based on the use of statistical and machine learning tools in search of fundamental structures for – in a way to paraphrase J. Perrin in Atomes, 1913 – "replace the "*visible complicated*" of perceived geographical space by "*the simple invisible*" of spatial structures".

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Head of TORUS & MONTUS

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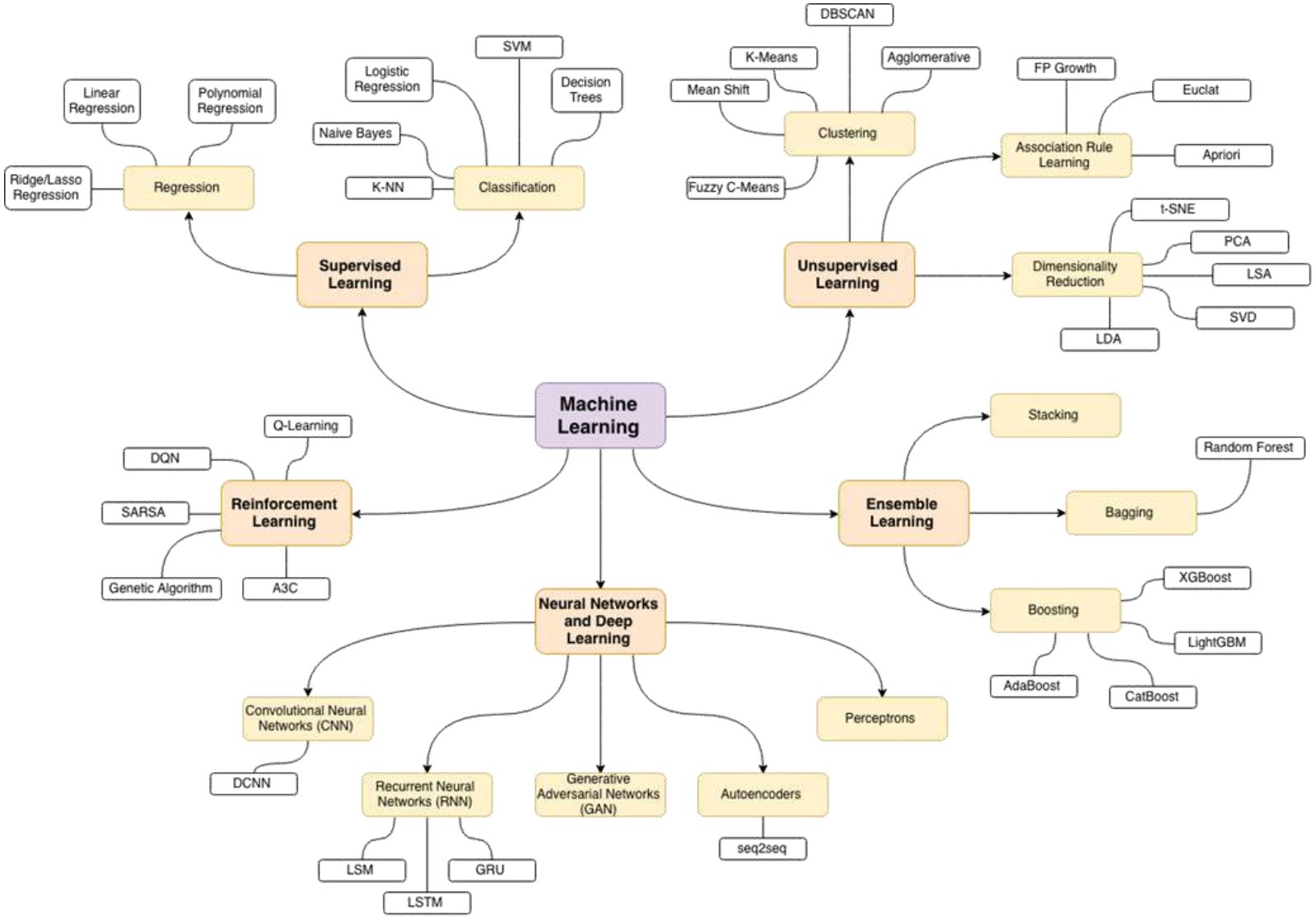
STATE OF THE ART: Integrated Analysis → Big Data → Artificial Intelligence (Machine Learning)



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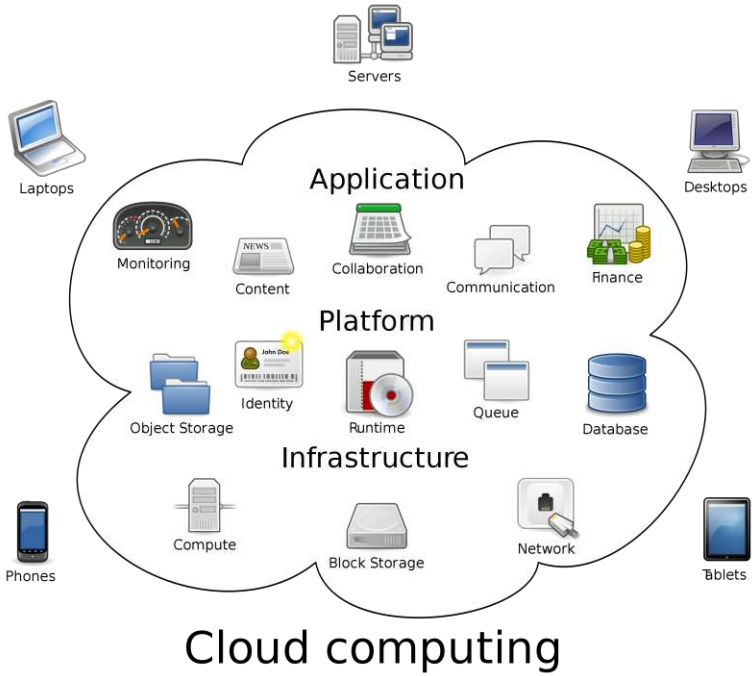
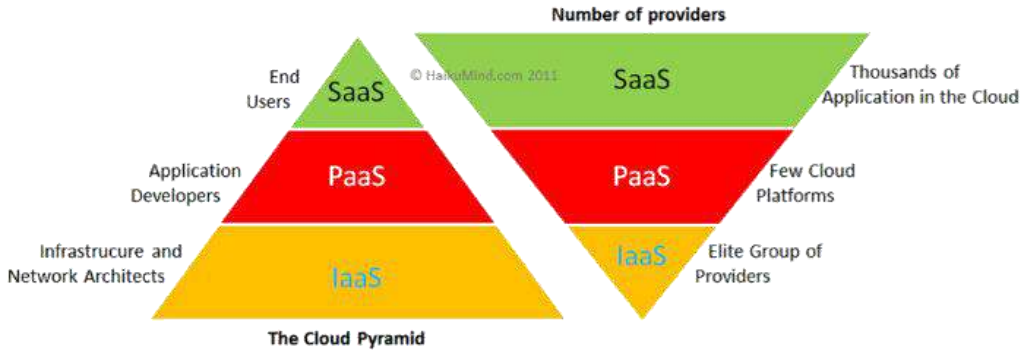
STATE OF THE ART: Integrated Analysis → Big Data → Artificail Intelligence → Cloud Computing

Cloud computing is the on-demand availability of computer system resources, especially data storage (cloud storage) and computing power, without direct active management by the user. The term is generally used to describe data centers available to many users over the Internet. Large clouds, predominant today, often have functions distributed over multiple locations from central servers.
(Wikipedia)



Cloud computing

Saas (Software as a Service): Access to software application often referred to as software on demand. You don't have to worry about installing, configuring and running the application. You just have to use the service through your client interface (desktop or laptop, tablet, etc.).



PaaS (Platform as a Service) provides computing platforms that generally include the operating system, programming the language runtime environment, database, web server, etc.

PaaS is a highly scalable solution, and users don't have to worry about platform upgrades or downtime issues during maintenance.

IaaS (Infrastructure as a Service) provides you with the IT infrastructure, virtual or physical machines (quite often) and other resources such as file servers, data storage, firewalls, load balancers, IP addresses, virtual local networks, etc ...

Compared to SaaS and PaaS, IaaS users are responsible for managing more things: applications, data, middleware, and OS. Users are responsible for updating these if new versions are released.

STATE OF THE ART: Cloud Computing & environment → 2009: *Google Earth Engine* and *Global Forest Change*

Google Earth Engine | image collection

Scripts | Docs | Assets

Filter scripts... NEW

- Owner (1)
  - users/dominiquelaffly/default
    - COPERNICUS_Landcover_100m_Proba-V-C3_Global
    - Filtered Composite
- Writer
  - No accessible repositories. Click Refresh to check again.
- Reader
  - No accessible repositories. Click Refresh to check again.
- Examples
  - Image
    - From Name
    - Normalized Difference
    - Expression
    - Hillshade
    - Landcover Cleanup
    - Reduce Region
    - Canny Edge Detector
    - Center Pivot Irrigation Detector
    - Clamp
    - Connected Pixel Count
    - HSV Pan Sharpening
    - Hough Transform
    - Modis Qa Bands
    - Pixel Area
    - Pixel Lon Lat
    - Polynomial

Filtered Composite * | Get Link | Save | Run | Reset | Apps

Imports (1 entry)
var France: Feature 0 (MultiPoint, 0 properties)

```
// Filter an image collection by date and region to make a
// median pixel composite.
//
// See also: ClippedComposite, which crops the output image
// instead of filtering the input collection.

// Filter to only include images intersecting Colorado or Utah.
var polygon = ee.Geometry.Polygon({
  coords: [[[-1.107467, 45.570649], [-1.769339, 43.363063], [-0.364568, 42.810137], // Colorado
            [-0.200148, 43.892895], [0.790812, 44.061352], [1.417619, 44.975257], // Utah
            [0.616154, 45.665000], [-0.124307, 45.130519], [-1.107467, 45.570649]]],
  geodesic: false
});

// Create a Landsat 7 composite for Spring of 2000, and filter by
// the bounds of the FeatureCollection.
var collection = ee.ImageCollection("LANDSAT/LC08/C01/T1_TOA")
    .filterDate('2018-07-01', '2018-08-01')
    .filterBounds(polygon);

// Compute the median in each band, in each pixel.
var median = collection.median();

// Select the red, green and blue bands.
var result = median.select('B3', 'B2', 'B1');
// Map.addLayer(result, {gain: [1.4, 1.4, 1.1]});
Map.addLayer(result, {min: 0, max: 0.3});
Map.setCenter(1.417619, 44.975257, 5);
```

Rebecca Moore found the solution by creating Google Earth Engine. This prototype was able to use data, storage resources and Google technologies to analyze datasets on a global scale, including images from NASA that had long been inaccessible.

Geometry Imports

To create the global forest map, Google Earth Engine used a network of cloud-based servers to process 650,000 images on 10,000 computers working in parallel. It would have taken 15 years for a single computer to do this job.

On the cloud It made it possible to visualize the extent of deforestation in a fraction of a second…

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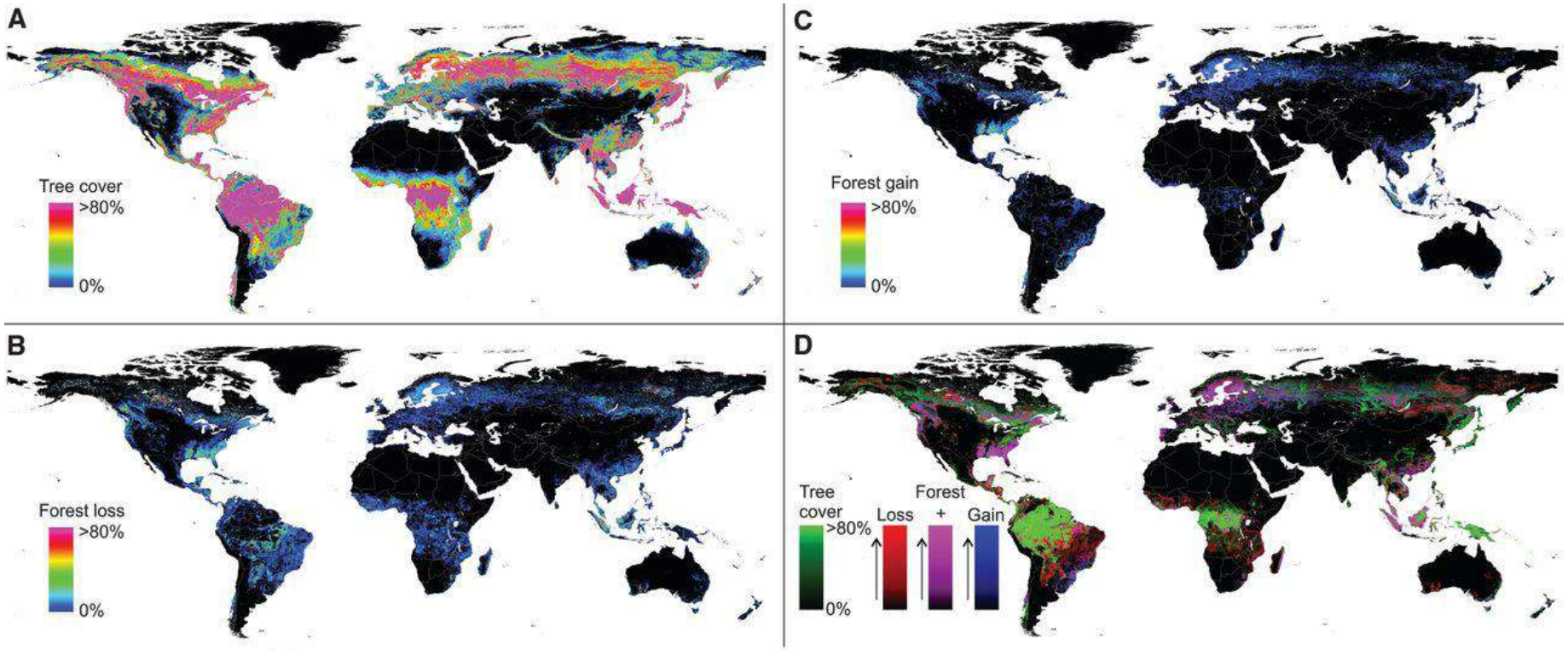
STATE OF THE ART: IT scientists, data scientists and “geo”scientists together → the way

High-Resolution Global Maps of 21st-Century Forest Cover Change, M. C. Hansen1, P. V. Potapov, R. Moore, M. Hancher, S. A. Turubanova, A. Tyukavina, D. Thau, S. V. Stehman, S. J. Goetz, T. R. Loveland, A. Kommareddy, A. Egorov, L. Chini, C. O. Justice, J. R. G. Townshend,15 Nov 2013:Vol. 342, Issue 6160, pp. 850-853
DOI: 10.1126/science.

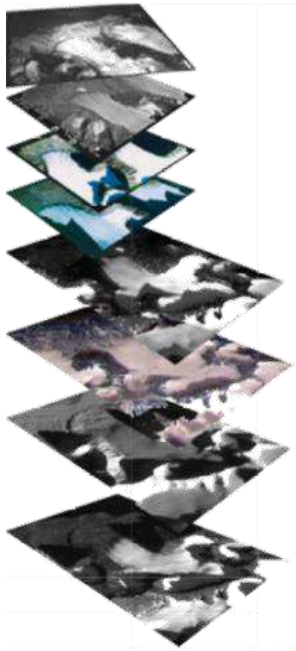


Even at Google, an **IT** engineer and her team, R. Moore in this case, **partnered** with "**thematicists**" to develop the Global Forest Change project:
Department of Geographical Sciences, University of Maryland; Department of Forest and Natural Resources Management, State University of New York; Woods Hole Research Center; Earth Resources Observation and Science, USGS; Geographic Information Science Center of Excellence, South Dakota State University.

It would be a mistake to think that a geographer, a hydrologist or a geologist - even very technically invested - can alone develop efficient services at the level of the infrastructure of the CC (Infrastructure as a Service - IaaS) or even develop and manage a platform (Platform as a Service - SaaS). Conversely, a network and systems "IT specialist" will be able to ensure the logistics and the proper functioning of IaaS and PaaS but will not have geo-environmental thematic skills.

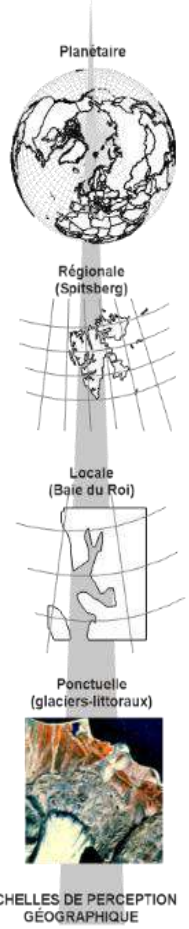
STATE OF THE ART: Cloud Computing & Big (environmental) Data → ideal solution

To know the avalable data in « real time » (Landsat, Sentinel, Spot, Terra…)



Automatically apply their calibrated preprocessing(for example, followed the melting snow, new DEM…) without having to download the data

Generalize the model to large areas.



Integrating archives and / or find on the web of data that could be interesting but not semantically indicated.

Test different models (neural networks, Monte Carlo, hidden trees, SVM …) and verify the contribution of different environmental variables.

Web Front End simplissime!.

Pr. Dominique LAFFLY
Head of TORUS & MONTUS

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STATE OF THE ART: → ideal solution… BUT (VERY) DIFFICULT (and expensive)

IT technologies & Hardware

R

python™

hadoop MapReduce

jupyterhub

Scala APACHE Spark

{ REST:API }

mongoDB

NoSQL

GDAL

Earth-observing Data Processing and Machine Learning

RasterFrames®

LocationTech Stack

GeoTrellis — Rasters & Map Algebra

JTS — Geometry Encoding

geomesa — Geospatial Queries

SFCurve — Geospatial Indexing

Main environmental challenges

A world tomorrow?

Smart city

Education

Disaster

Research

Air pollution

Planification

Smart agriculture

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BIG (environmental) DATA and SUSTAINABILITY

STATE OF THE ART IN THE 2000s

The fundamentals of TORUS and MONTUS

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Head of TORUS & MONTUS

1. The Geographer

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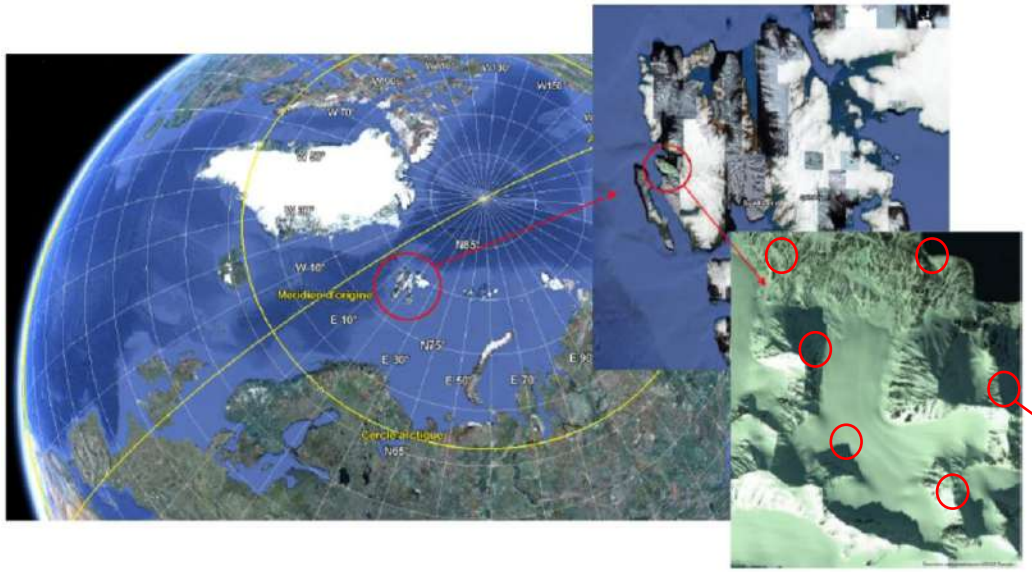
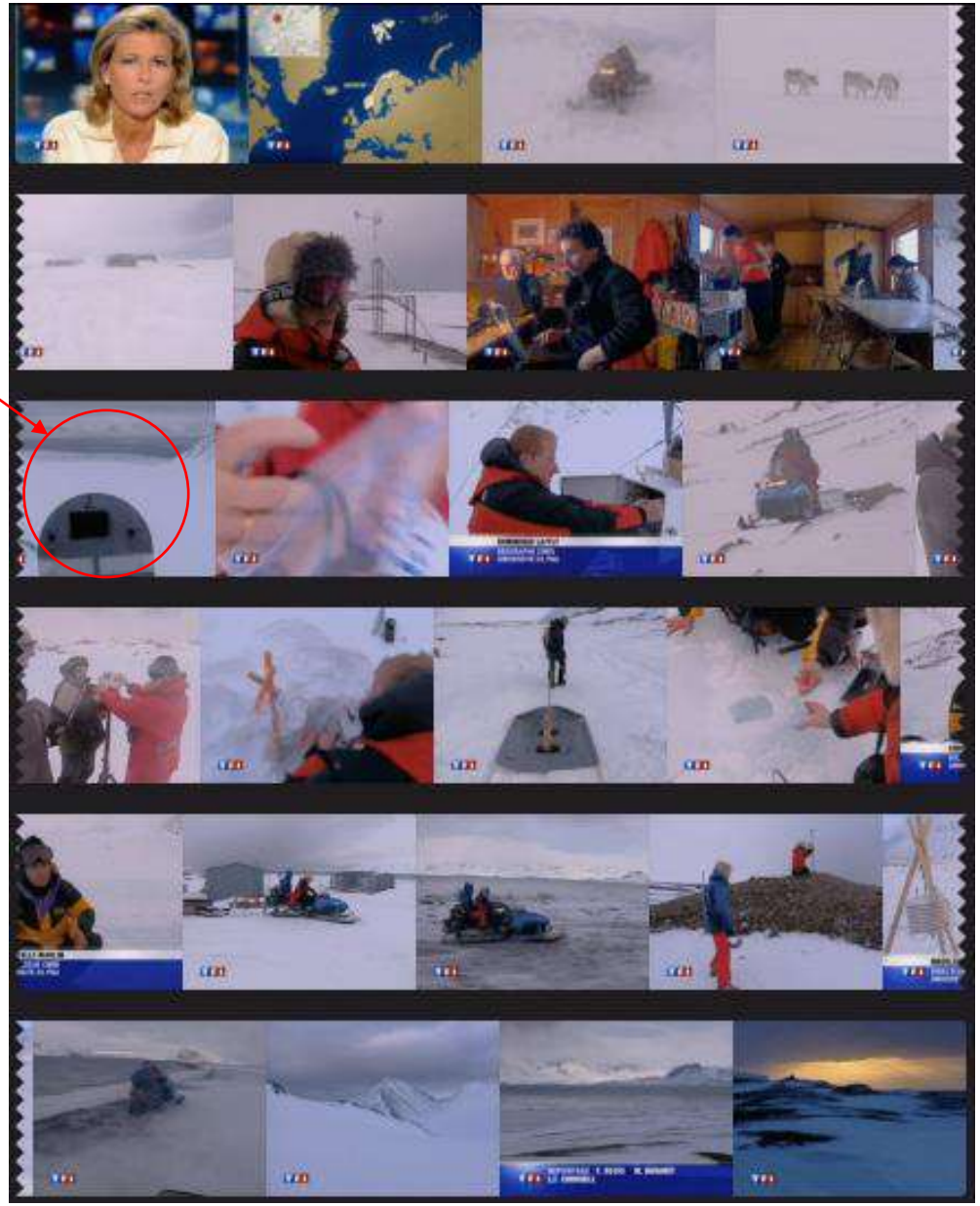


It all started at Spitsbergen in 2007



Hydro-sensor Flow (2007-2011) supported by the ANR (french agency for research)
&
IPY (International Polar Year)

In 2007 6 timelaps cameras are installed around a small arctic glacier to follow in “real time” the snow melt rhythm and understand impact on the glacier mass balance and hydrological budget

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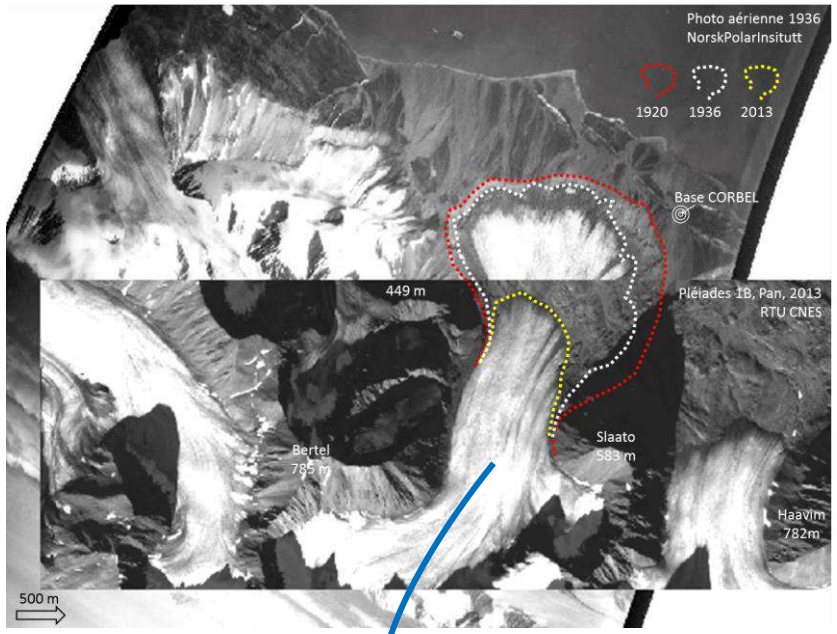
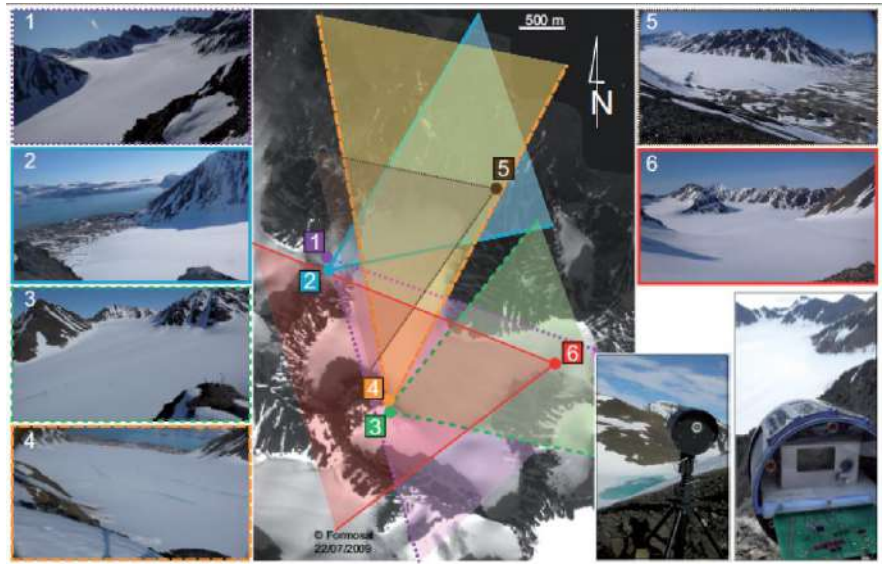
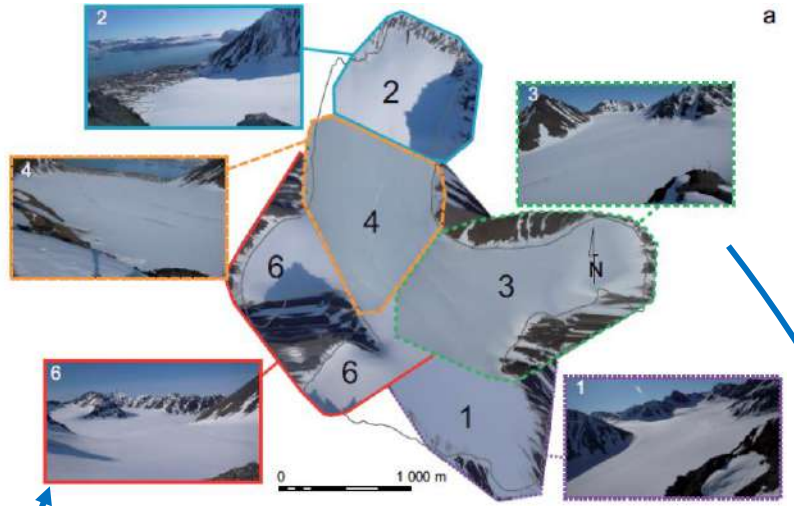
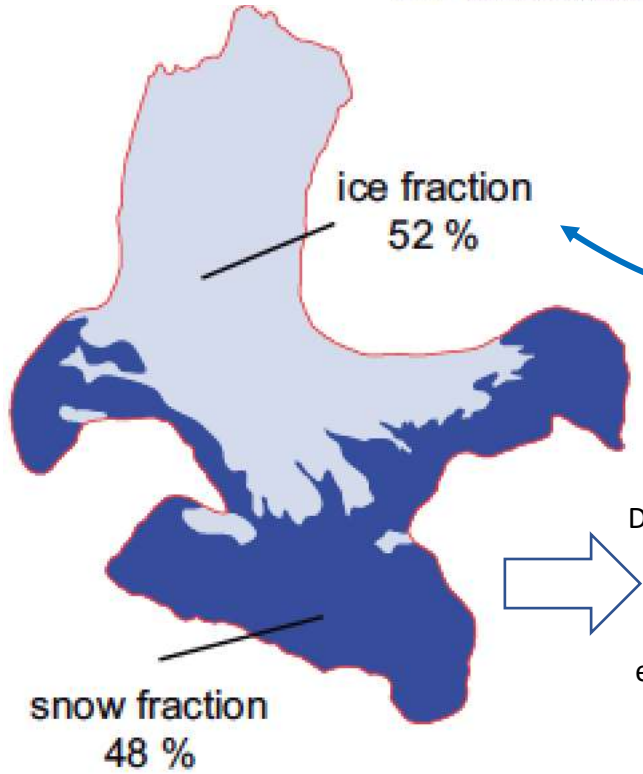




In situ acquisition, timelaps high resolution camera

Manage database, clean imagery, georeferencing, mosaïc and classification





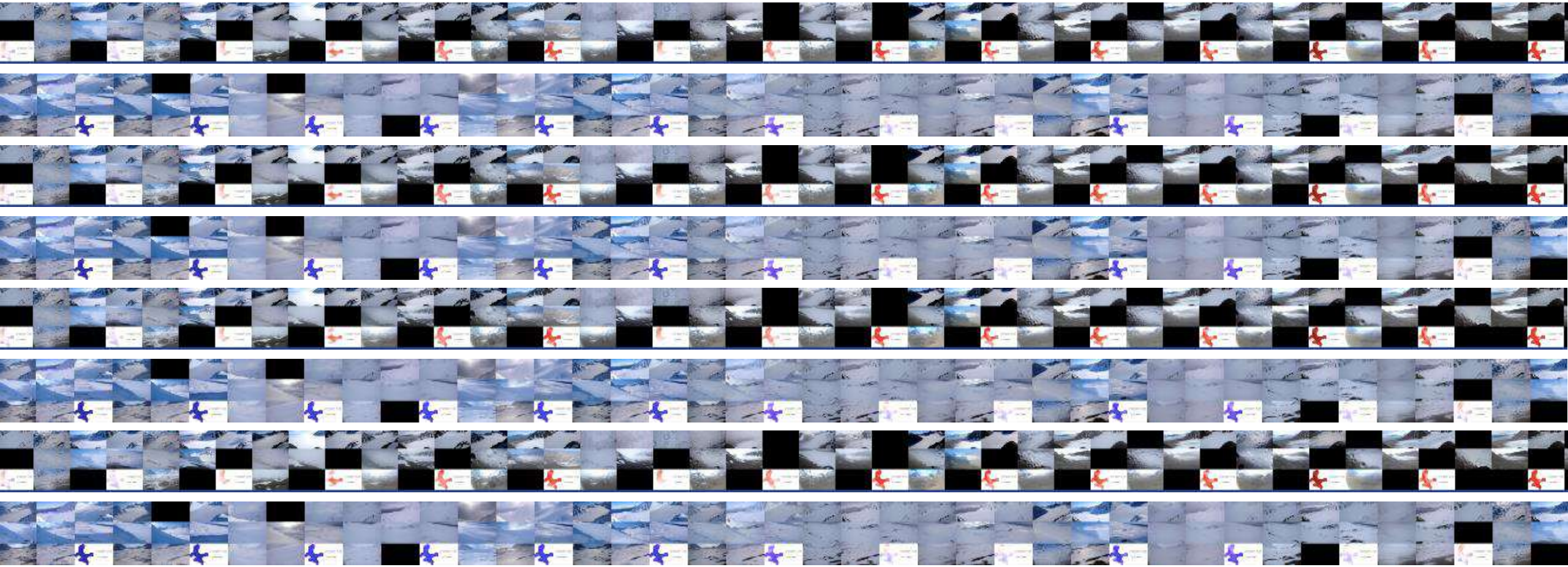
Daily fusion model

Water equivalent

Glacier mass balance

Global warm impact

6,570 Images per year, 317 Gb per year.
Today approximately 100,000 images – 25 Pb



Big Data – how to manage?

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2. Hazard, PROLOG, Geographer and Data Scientist… 2008

SWI Prolog

Cloud Computing & Geoscience

The Data Scientist

Invited on the field (Spitsberg)

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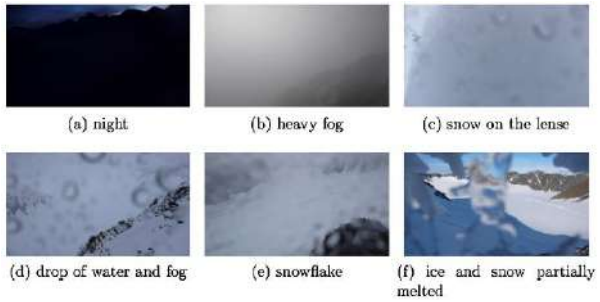
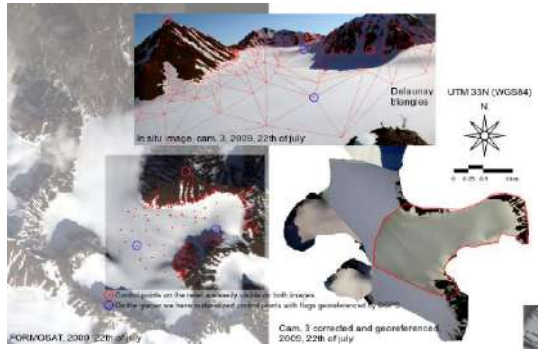
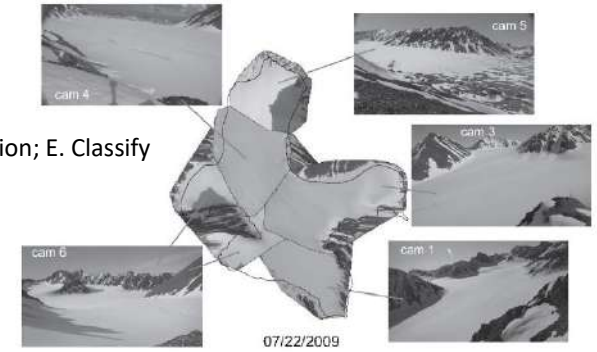
SaaS – Software as a Service or Service as a Solution?





Each image must be A. tested; B. Crop; C. Project; D. Mosaicization; E. Classify

So many cloud services to orchestrate



2011-2016, É. RANISAVLJEVIC, **PhD**, « Traitement multimodal d'images in situ pour l'analyse des dynamiques environnementales utilisant le cloud computing » direction D. LAFFLY et Y. Le NIR (EISTI). É. RANISAVLJEVIC est ingénieur en informatique et maître de conférences à CY Tech Paris-Cergy.

É. RANISAVLJEVIC, Y. LE NIR, F. DEVIN, D. LAFFLY, 2014, "A dynamic and generic cloud computing model for environmental analysis using in-situ data applied to glacier mass balance", **International Journal of Applied Earth Observation and Geoinformation**, vol. 27, part. A, pp.109-115.

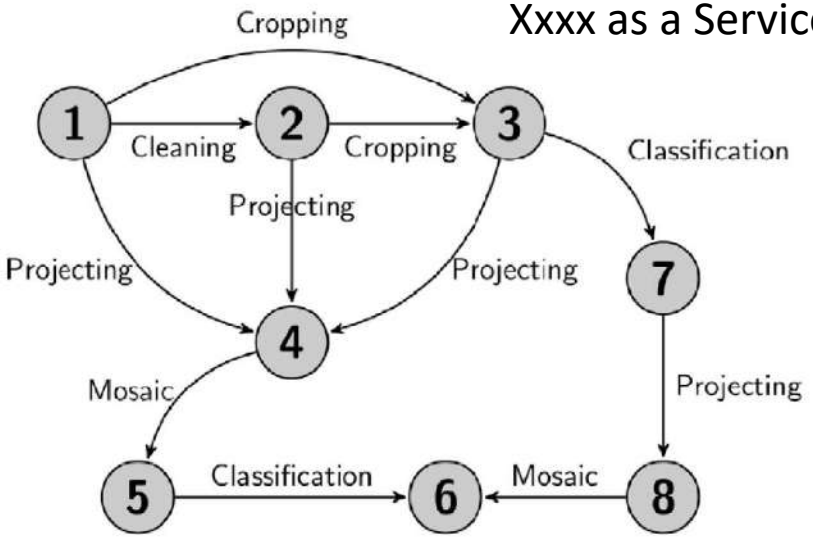
É. RANISAVLJEVIC, Y. LE NIR, F. DEVIN, D. LAFFLY, 2013, "Semantic orchestration of image processing services for environmental analysis", **ISPRS Journal of Photogrammetry and Remote Sensing**, vol. 83, pp. 184-192.

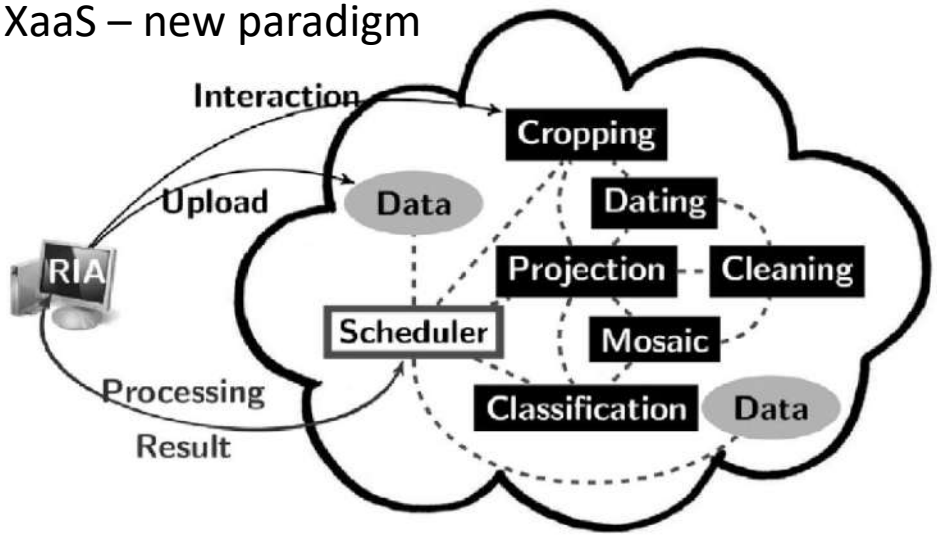
É. RANISAVLJEVIC, N. FORTIN CAMDAVANT, A. MOHAMMAD-DJAFARI, A.JOURDAN, Y. LE NIR, F. DEVIN, D. LAFFLY, 2016, " Dimensionality reduction methods for analysing in-situ sensing images database in arctic environment (Austre Lovénbreen, Svalbard)", **14th International Circumpolar Remote Sensing Symposium**, Sept. 12-16, Homer, Alaska.

É. RANISAVLJEVIC, F. DEVIN, Y. LE NIR, D. LAFFLY, 2014, "Architecture comparison of an in-situ data processing application applied to glacier mass balance analysis", **13th International Circumpolar Remote Sensing Symposium**, Sept 8-12, 2014, Reykjavik, Iceland.

É. RANISAVLJEVIC, F. DEVIN, Y. LE NIR, J.-M. FRIEDT, C. MARLIN, M. GRISELIN, D. LAFFLY, 2012, "A dynamic and generic cloud computing model for environmental analysis using in-situ sensing data applied to glacier mass balance analyze", **12th International Circumpolar Remote Sensing Symposium, May 14-18, 2012, Levi, Finland.**

Xxxx as a Service – XaaS – new paradigm





3. IT scientists and Geographers and FIMO and and Vietnam… our historical bases

Florent Devin &Yannick Le Nir

EISTI

Traitement multimodal d'images *in situ* pour l'analyse des dynamiques environnementales utilisant le *cloud computing*

PhD Computer Science – Elisabeth Ranisavljevic (defense 2016)

Quang Hung Bui & Thi Nhat Thanh Nguyen

FIMO

December, 2014

TOTAL

May, 2014

December, 2014

TORUS

TowardanOpenResourcesUsingServices

How?

2010

Dominique LAFFLY UT2J

Daniel WEISSBERG UT2J

PhD Geography, Aménagements hydro-électriques et conséquences environnementales dans le nord ouest du Vietnam

Phan van CU VNU

Didier ORANGE IRD

PhD Geography – Thiet Van Nguyen (defense 2015)

PhD Geography, Conséquences environnementales de l'urbanisation et de l'industrialisation en baie d'Ha Long, Vietnam

PhD Geography – Truong Van Tran (defense 2016)

Erasmus+

Key Action 2

Capacity building in the field of **higher education**

Pr. Dominique LAFFLY
Head of TORUS & MONTUS

Cloud Computing for environmental data

The encounter between two worlds for a greener world

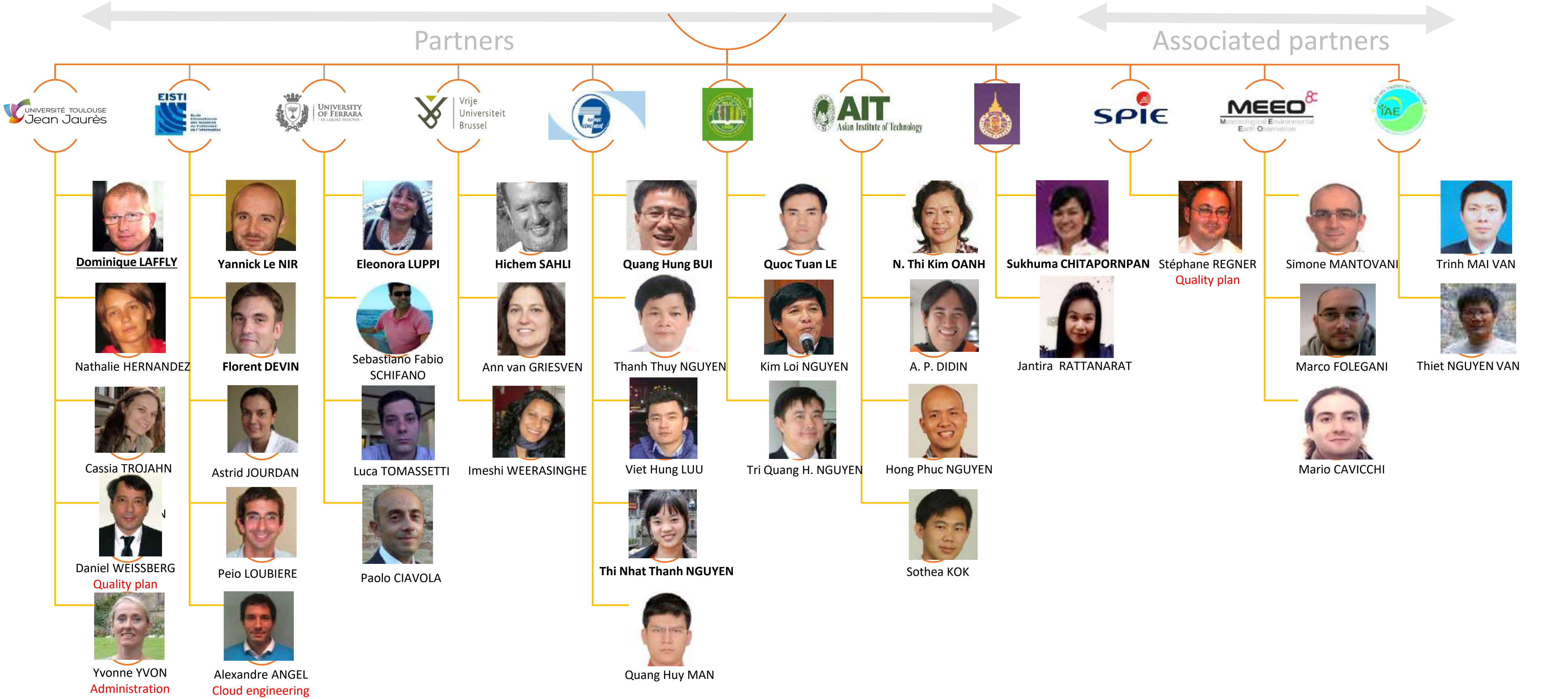
Pr. Dominique LAFFLY
Head of TORUS & MONTUS

UNIVERSITÉ TOULOUSE Jean Jaurès

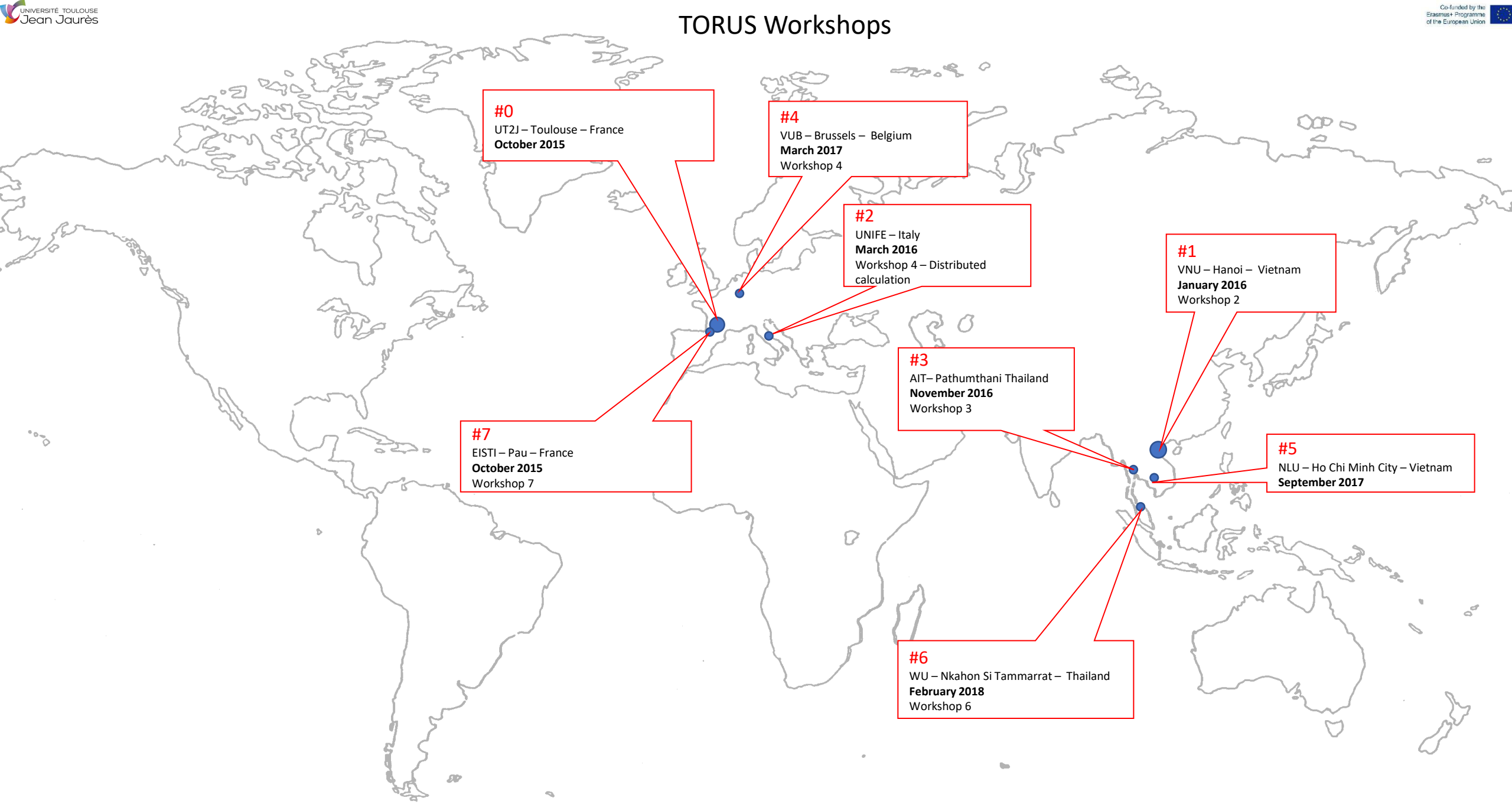
Co-funded by the Erasmus+ Programme of the European Union

TORUS

TowardanOpenResourcesUsingServices



TORUS Workshops



Pr. Dominique LAFFLY
Head of TORUS & MONTUS

TORUS
TowardanOpenResourceUsingServices

Co-funded by the Erasmus+ Programme of the European Union

Home | Team | News | Project | Workshop | Contact | connexion

Homepage > Workshop

Workshop

How speedmymac.com To Eliminate Mac Cleanser

The Best Way to Remove Out Of Your Mac? People are having trouble. It may cause your computer to perform slower and more with mistakes. Listed here is the way you free yourself out of the clutches and can do away with it.

Cloud computing of environmental data

Make communication between the world of geosciences with the one of information processing and cloud computing... and vice versa.

Capacity building of all stakeholders so that they can be autonoimous with cloud computing technologies.

Eight workshops with one day of geoscience presentation and to days teaching on cloud computing.

WS0: Official launch – first steering committee: all about TORUS

UT2J (2015, 11)
Toulouse

See the Workshop

WS1: The encounter between two worlds: the cloud and Geosciences

The first international workshop on **The encounter between two worlds: the cloud and Geosciences** will include the below scientific sessions:

- The TORUS Project
- Introduction of Cloud Comp
- Interdisciplinary research to
- Training on Cloud Computi

WS2: Computer architecture a

UNIF (2016, 06) – Ferrara

WS3: Cloud computing for air

AIT (2016, 11)
Pathumthani

Steering Commitee


Dominique Laffly
France
Read more


Florent Devin
France


Le Quoc Tuan
Viet Nam


Hichem Sahli
Belgium


Thanh T N NGUYEN
Viet Nam


Yvonne YVON
France

WS1 : The encounter between two worlds: the cloud and Geosciences

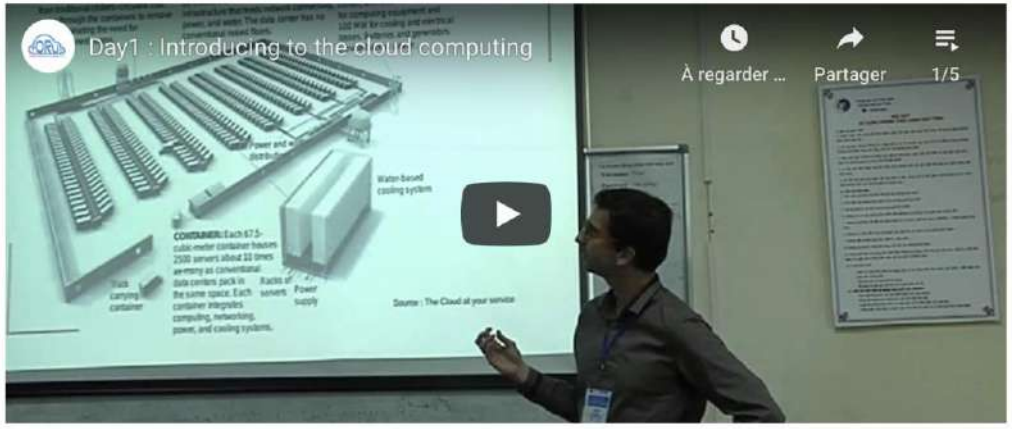
The first international workshop on **The encounter between two worlds: the cloud and Geosciences** will include the below scientific sessions:

- The TORUS Project
- Introduction of Cloud Computing
- Interdisciplinary research topics of Geosciences
- Training on Cloud Computing

Program

Videos : WS1 Playlist

WS1: The encounter between two worlds: the cloud and Geosciences



Plenary

- The global warming in monsoon area
- Air Pollution Mapping from Space
- Developing DSS and PIS in Vietnam
- Emission inventory (EI) Air pollutions and greenhouse gases
- Field Informatics Applications of ICT to Environment Management and Monitoring
- Vietnam Environmental Priority
- IT Application for environment
- Observing and understanding the atmosph aerosol by remote sensing
- Principles of distributed computing
- Air Pollution Modeling Application

Lecture

- Web oriented architecture
- Learning Scala 2
- Learning Scala 1
- Introduction to Cloud Computing
- Big Spatial Data
- NoSQL : mongodb
- Spark Introduction Solution

Video

- WS1 Playlist

Lecture : Learning Scala 2

WS1: The encounter between two worlds: the cloud and Geosciences

map : apply a function on all element of the collection and return the result in a collection

```
{
  // map : apply a function on all element of the collection and re
  println("map")
  println(v10.map(_*2)) // Apply a function (here *2) to all elemen
  println(v10 map {_*2}) // Note that here we are using {} instead
  println(v10 map f)
  println(v10 map {x => f(x)})

}
```

1 second 139 milliseconds

foreach : same as map, but no result is return (typically use with println)

```
{
  // foreach : same as map, but no result is return (typically use
  println("foreach")
  println(v10 foreach f)
  v10 foreach {x => print(x + " ")}
}
```

667 milliseconds

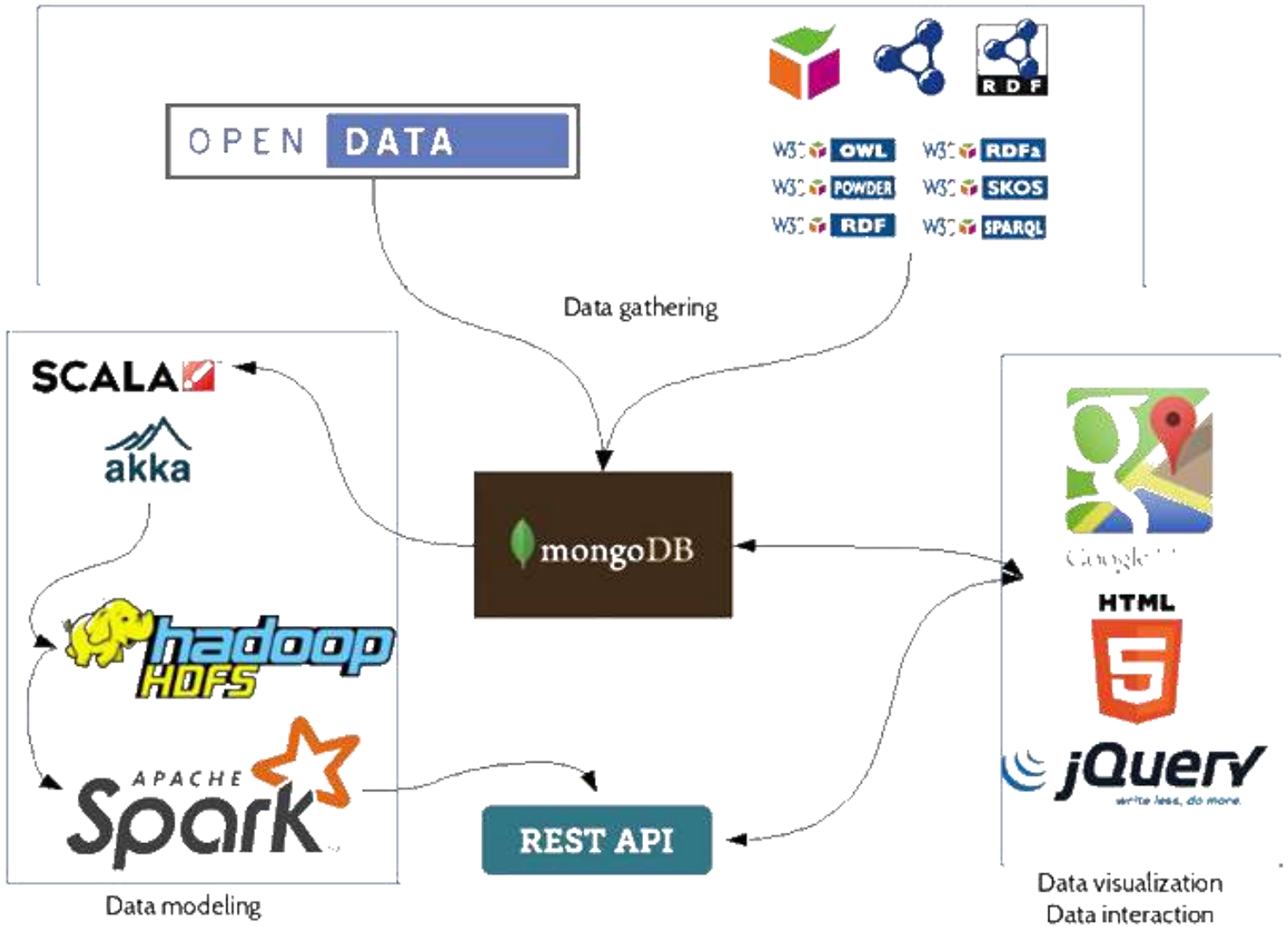
Page 5 / 8

filter : keep only values that satisfy a condition (filterNot exists)

Télécharger (PDF, 768KB)

Co-funded by the Erasmus+ Programme of the European Union

2015-2016 – Spatial Data Infrastructure Solution on the cloud
What is teaching at the begining of TORUS



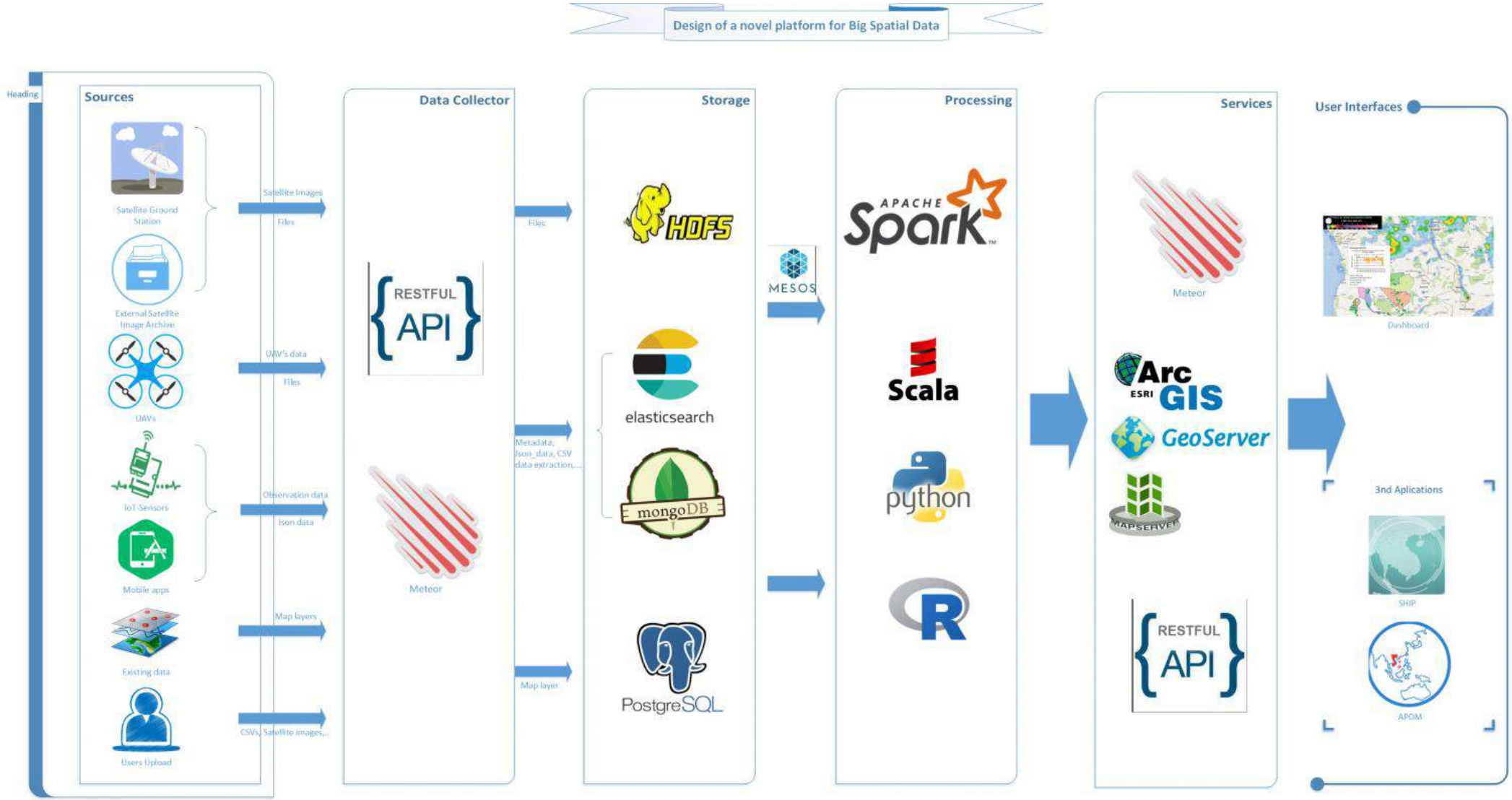
Pr. Dominique LAFFLY
Head of TORUS & MONTUS

F. Devin, A. Jourdan, D. Laffly, Y. Le Nir, "*Cloud data architecture applied to urban management*", October 2016, DOI:10.1109/KSE.2016.7758075

Co-funded by the Erasmus+ Programme of the European Union

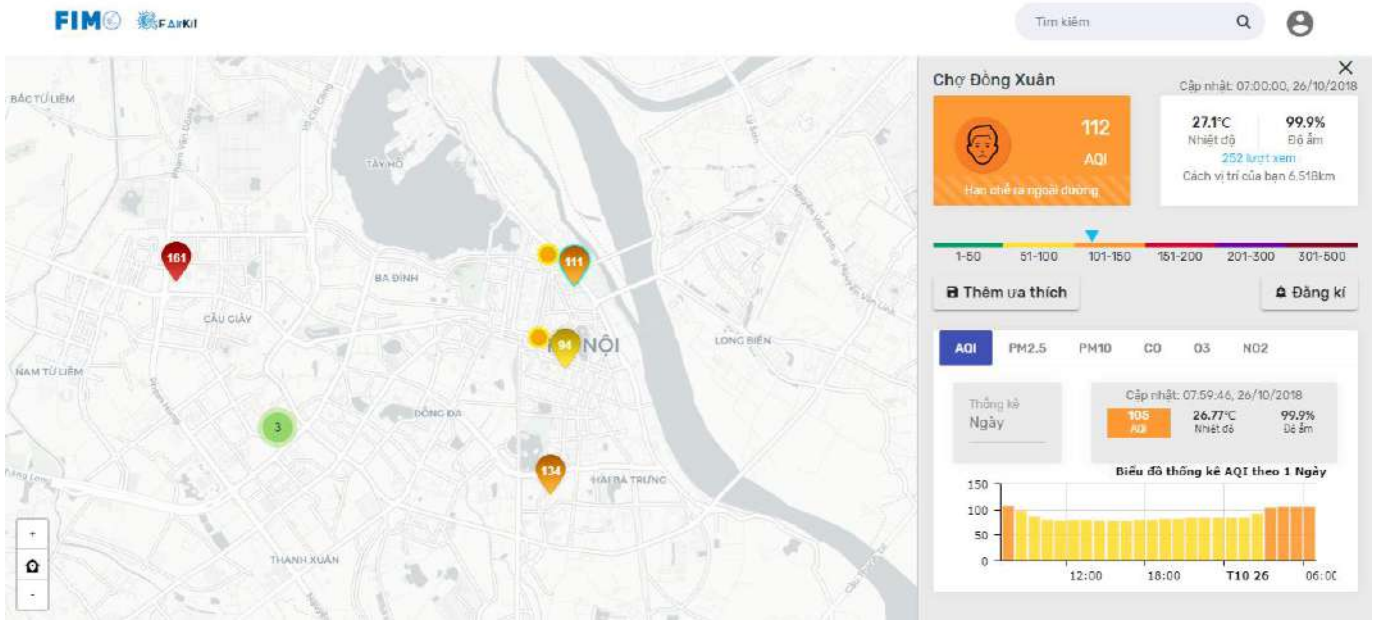
2018 TORUS – Spatial Data Infrastructure Solution on the cloud
What is done by Asian team at the end of TORUS

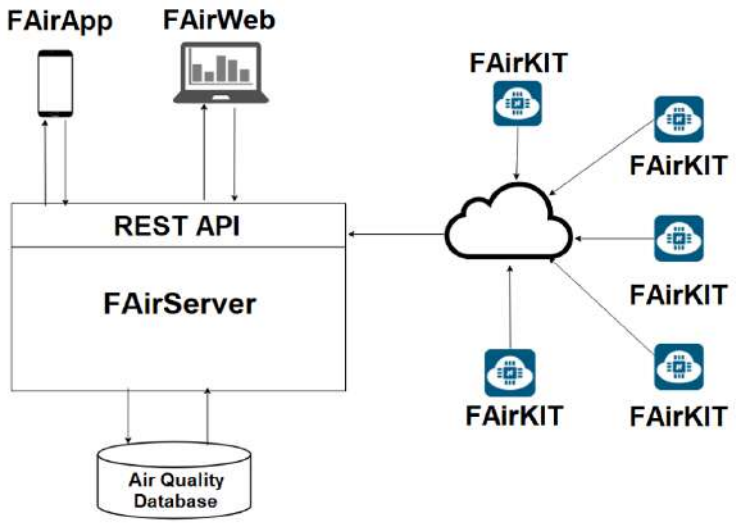
(http://fimo.edu.vn/research-and-development-teams/spatial-data-infrastructure/)



TORUS – New smart systems solution on the cloud...

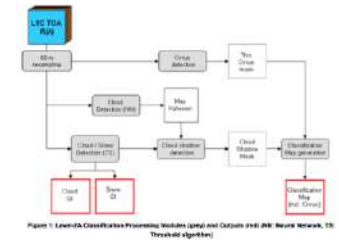
(http://fimo.edu.vn/research-and-development-teams/iot/)





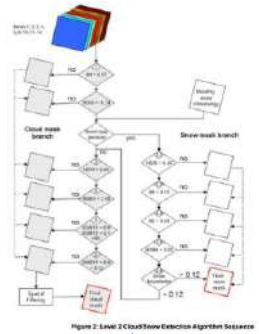
2016 TORUS – Spatial Data Infrastructure Solution on the cloud
What is done by Asian team at the end of TORUS (student internship)

Semantic request



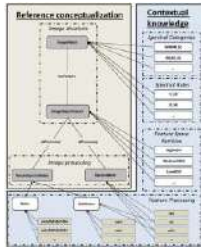
ESA – level 2a algo.

Multicriteria request



SPARK services

New Algo. as a Service



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TORUS – Spatial Data Infrastructure Solution on the cloud
Cloud servers at the end of TORUS (Vietnam & Thailand)



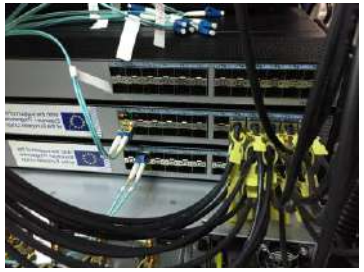






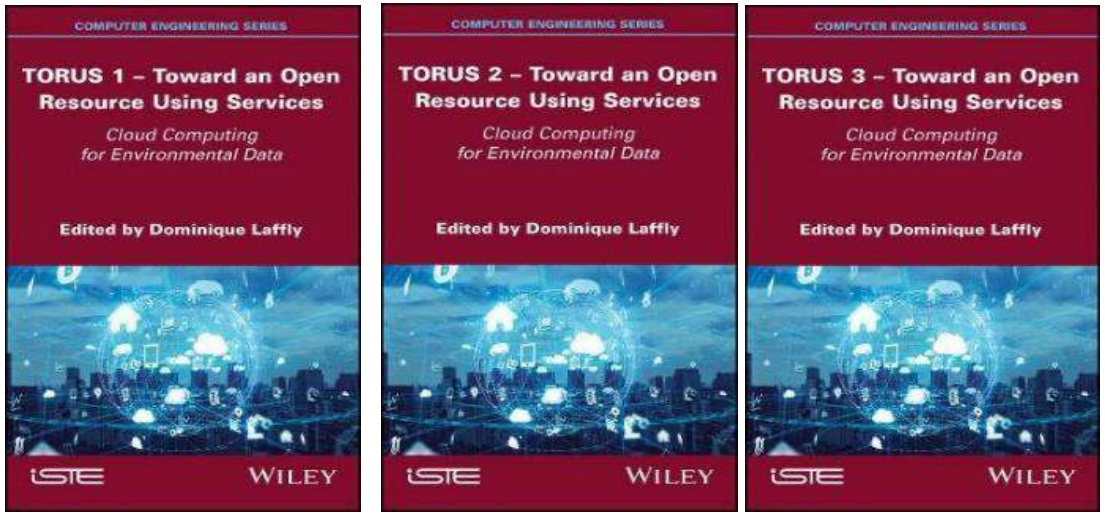






Pr. Dominique LAFFLY
Head of TORUS & MONTUS

TORUS – Spatial Data Infrastructure Solution on the cloud
The book, 3 volumes, 918 pages.



- **Volume 1**, ISBN10 1786305992, 340 p. *This book raises the problem of voluminous data in geosciences before presenting the main methods of analysis and computer solutions mobilized to meet them.*
- **Volume 2**, ISBN10 178630600X, 318 p. *This book presents remote sensing, geographic information system and spatial data infrastructure that are central to all disciplines that deal with geographic space.*
- **Volume 3**, ISBN10 1786306018, 260 p. *This book is a collection of thematic application cases representative of the specificities of the teams involved in TORUS and which motivated their needs in term of cloud computing.*

This book, presented in three volumes, examines "environmental" disciplines in relation to major players in contemporary science: Big Data, artificial intelligence and cloud computing. Today, there is a real sense of urgency regarding the evolution of computer technology, the ever-increasing volume of data, threats to our climate and the sustainable development of our planet. As such, we need to reduce technology just as much as we need to bridge the global socio-economic gap between the North and South; between universal free access to data (open data) and free software (open source). In this book, we pay particular attention to certain environmental subjects, in order to enrich our understanding of cloud computing. These subjects are: erosion; urban air pollution and atmospheric pollution in Southeast Asia; melting permafrost (causing the accelerated release of soil organic carbon in the atmosphere); alert systems of environmental hazards (such as forest fires, prospective modeling of socio-spatial practices and land use); and web fountains of geographical data. Finally, this book asks the question: in order to find a pattern in the data, how do we move from a traditional computing model-based world to pure mathematical research? After thorough examination of this topic, we conclude that this goal is both transdisciplinary and achievable.

Chapter 12

Introduction to Distributed Computing

Eleonora Luppi

Book Editor(s): Dominique Laffly

First published: 15 April 2020 | https://doi.org/10.1002/9781119720492.ch12

PDF TOOLS SHARE

Summary

This chapter provides a brief overview of distributed systems and their evolutions. It distinguishes two different families of distributed systems: network operating systems

Co-funded by the Erasmus+ Programme of the European Union

MasterOfNewTechnologiesUsingServices

… from *TORUS* to *MONTUS*!

Pr. Dominique LAFFLY
Head of TORUS & MONTUS

MONTUS is:

Creation of a Master
→ capacity building

Vietnam National University
Faculty of engineering and Technology
Hanoi – Vietnam

« BIG DATA/CLOUD COMPUTING in ENVIRONMENTAL SCIENCE »

Open first year of the master last year of MONTUS 2

3 main axis:
a. Geoscience -> the major environmental issues of the contemporary world – sustainable development – Remote Sensing – Water runoff – Fire –Air pollution – Biodiversity – Urban/city
b. IT -> DataBase infrastructure – Statistical Analysis – Remote Sensing/GIS – Computer programming and Cloud Computing
c. Education -> English – Research methodology – communication and personal valorization – Law/ethic

To do:
Adminstrative official accreditation, Lecture offcial accreditation, Details of lectures, Selection and minimum level, Cost of the formation (total and per student), International accreditation (ECTS) and co-accreditation, Places of lecture, Place of digital education, Who teach?, Equipment…

New partnership
→ capacity building

Extend Asian collaboration to Cambodia → **Institute of Technology of Cambodia & Royal University of Fine Arts**
Extend Asian collaboration to Vietnam → **Hanoi University of Architecture and Da Nang University**

-

Open new thematic in Geoscience/IT (Biodiversity, Agriculture, Urban microclimate, Urban management&policy, Heritage…)

-

Installation of a new cloud server in Cambodia

3 mains cloud server in Southeast Asia (Thailand – Vietnam – Cambodia) open to the scientific and higher education community of Thailand, Vietnam, Cambodia and Laos
→ **Free access**

Applied workshop
→ capacity building

1. Implementation of the master
« all » to do to define the master and be ready to open it…

2. Applied cloud lecture
In the continuity of TORUS, plenary session to present in detail new thematic and lecture session applied to specific cloud services developped in the group (to become new lecture/exercice in the master).

3. Applied Research Project
Research program with funfding from differents sources. Vietnam 911 program (or equivalent today?), French embassy fellowship in Vietnam and Thailand, AUF, Universities fellowhsip (see Vrije University), Other international program (Italy, Belgium, France, Europe), Others partners (Municipalities, Provite companies…)

4. Applied realization
Create new technologies in the aim of environment and urbanism, air pollution monitoring system API, Smart Cities IoT…

Pr. Dominique LAFFLY
Head of TORUS & MONTUS

MONTUS the Team

Co-funded by the Erasmus+ Programme of the European Union

University of Toulouse 2 Jean Jaurès	École Nationale Supérieure d'Architecture	École Internationale des Sciences du Traitement de l'Information	University of Ferrara	Vrije University of Brussel	Vietnam National University of Hanoi	Hanoi Architectural University	University of Da Nang	Nong Lam University Ho Chi Minh City	Walailak University Nkhon Si THammarat	Asian Institute of Technology	Institue of Technology of Cambodia	Royal University of Fine Arts of Cambodia
UT2J	**ENSA**	**EISTI**	**UNIFE**	**VUB**	**VNU**	**HAU**	**UD**	**NLU**	**WU**	**AIT**	**ITC**	**RUFA**

Toulouse University


Dominique LAFFLY
Geo


Serge FARAUT
IT/Archi


Astrid JOURDAN
Math/Stat


Eleonora LUPPI
Physics


Hichem SAHLI
Math/IT


Bui Quang HUNG
IT


Thai Huyen
NGUYEN - Archi


Thanh Binh
NGUYEN
IT


Quoc Tuan LE


N. Thi Kim OANH
Geo


LAY Heng
IT


Dara SOK
Heritage


Benoit COMBEMALE- IT


Tathiane MARTINS
Geo/Archi


Florent DEVIN
IT


Sebastiano Fabio
SCHIFANO - IT


Ann van GRIESVEN
Geo


T. N. Thanh NGUYEN
Math/IT


Minh Phuong LE
Mining&Geology


Vo Trung HUNG
IT


Tri Quang H.
NGUYEN

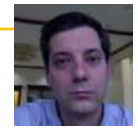

A. P. DIDIN
Geo/IT


VANNDY You
IT


Socheat
NHEAN
Academic
Affair
officer


Léa SÉBASTIEN
Geo


Yannick Le NIR
IT


Luca TOMASSETTI
Physics


Nikos DELIGIANNIS
Math/IT


Hung LUU - IT


VUONG Khanh
Toan - Archi


Tan Khoi NGUYEN
IT/Geo


E. WINIJKUL
Geo/IT


KAING Sainglong


Nathalie
HERNANDEZ
IT


Peio LOUBIERE
IT


Thang LUU - IT


S. SAMADI- IT


HENG Muoy Yi
Geology


Valérie SANCHOU
Administration


Alexandre ANGEL
Cloud engineering
(Equipment design & Installation)

LE Chien Thang - Archi

Truong Van TRAN
Geo

Thanh Thuy NGUYEN
IT

Son PHAM
IT

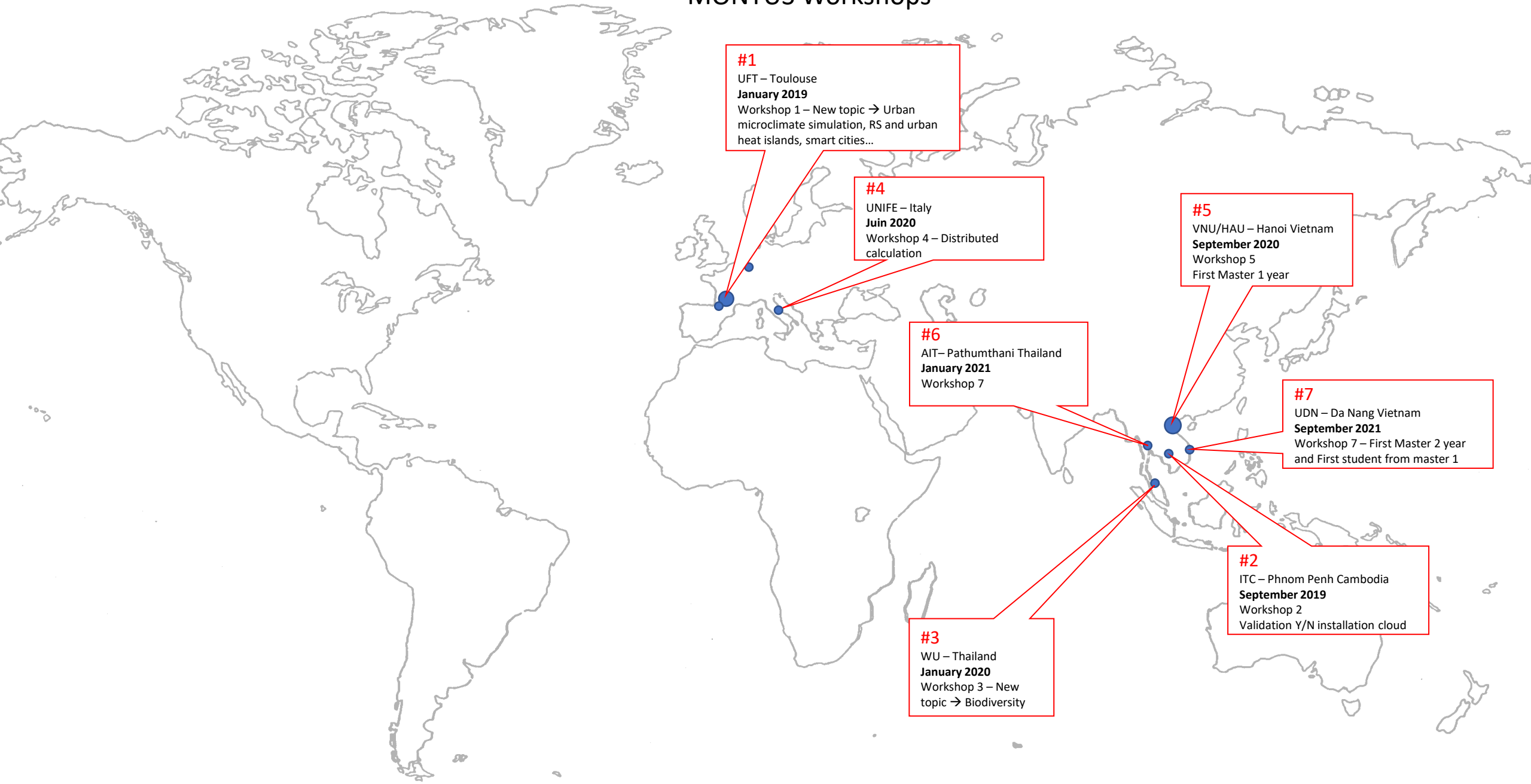
Suthira
THONGKAO

Jantira
RATTANARAT

Pr. Dominique LAFFLY
Head of TORUS & MONTUS

EACEA Annual Grant Holder meeting 2021
Capacity Building for Greener World

MONTUS Workshops



#1
UFT – Toulouse
January 2019
Workshop 1 – New topic → Urban microclimate simulation, RS and urban heat islands, smart cities…

#4
UNIFE – Italy
Juin 2020
Workshop 4 – Distributed calculation

#5
VNU/HAU – Hanoi Vietnam
September 2020
Workshop 5
First Master 1 year

#6
AIT– Pathumthani Thailand
January 2021
Workshop 7

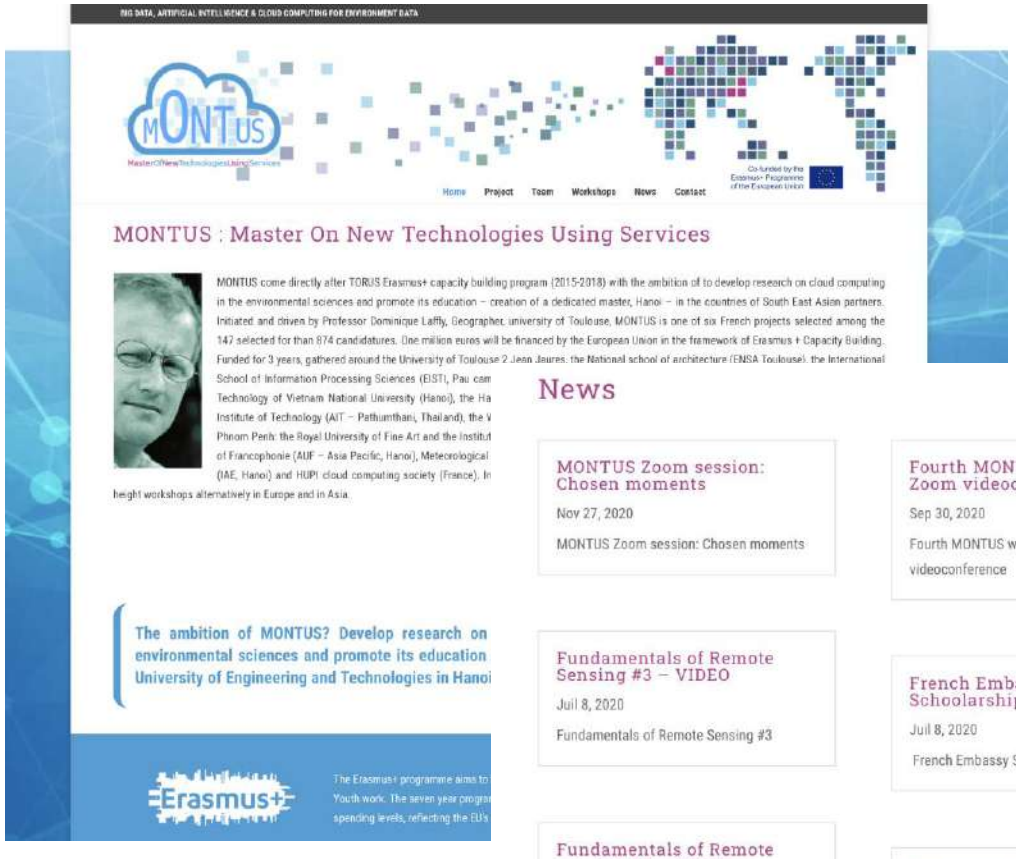
#7
UDN – Da Nang Vietnam
September 2021
Workshop 7 – First Master 2 year and First student from master 1

#2
ITC – Phnom Penh Cambodia
September 2019
Workshop 2
Validation Y/N installation cloud

#3
WU – Thailand
January 2020
Workshop 3 – New topic → Biodiversity

Pr. Dominique LAFFLY
Head of TORUS & MONTUS

http://www.cloud-montus.com



News

MONTUS Zoom session: Chosen moments
Nov 27, 2020
MONTUS Zoom session: Chosen moments

Fourth MONTUS workshop, Zoom videoconference
Sep 30, 2020
Fourth MONTUS workshop, Zoom videoconference

Fundamentals of Remote Sensing #4 – VIDEO
Juil 9, 2020
Fundamentals of Remote Sensing #4

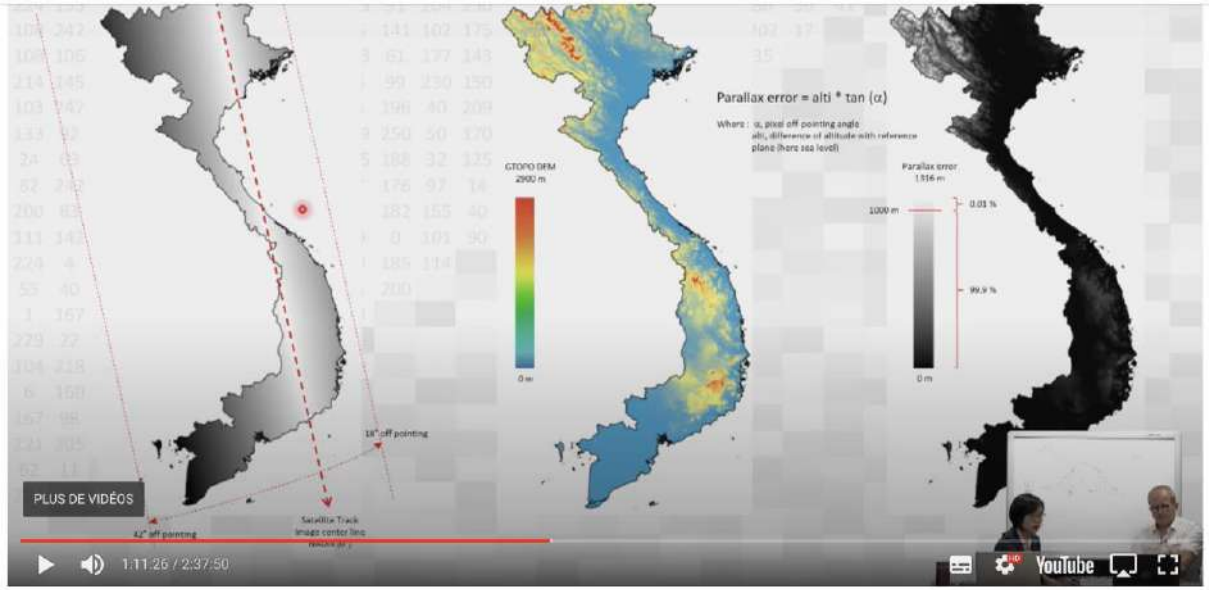
Fundamentals of Remote Sensing #3 – VIDEO
Juil 8, 2020
Fundamentals of Remote Sensing #3

French Embassy Schoolarship Vuong
Juil 8, 2020
French Embassy Schoolarship Vuong

Fundamentals of Remote sensing #2 – VIDEO
Juil 8, 2020
Fundamentals of Remote Sensing #2

Fundamentals of Remote Sensing #1 – VIDEO
Juil 8, 2020
Fundamentals of Remote Sensing

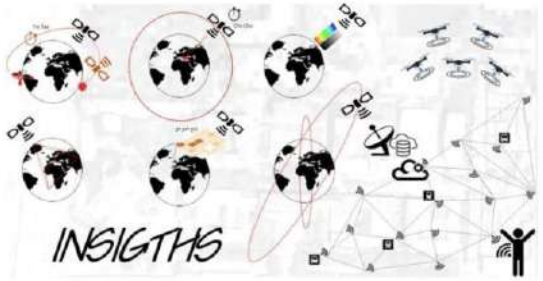
Masters Insights, Third international Workshop
Fév 7, 2020
MONTUS create INSIGTHS for a new master applied to cloud computing of environmental data2020, February 17-21 Hanoi Architectural University Vietnam National University of Hanoi



MONTUS: New master INSIGTHS, accreditation steps

Master ***INSIGHTS***

INnovative ***S***patial ***I***nte***G***rated tec***H***nology
for environmen***T***al ***S***ustainability

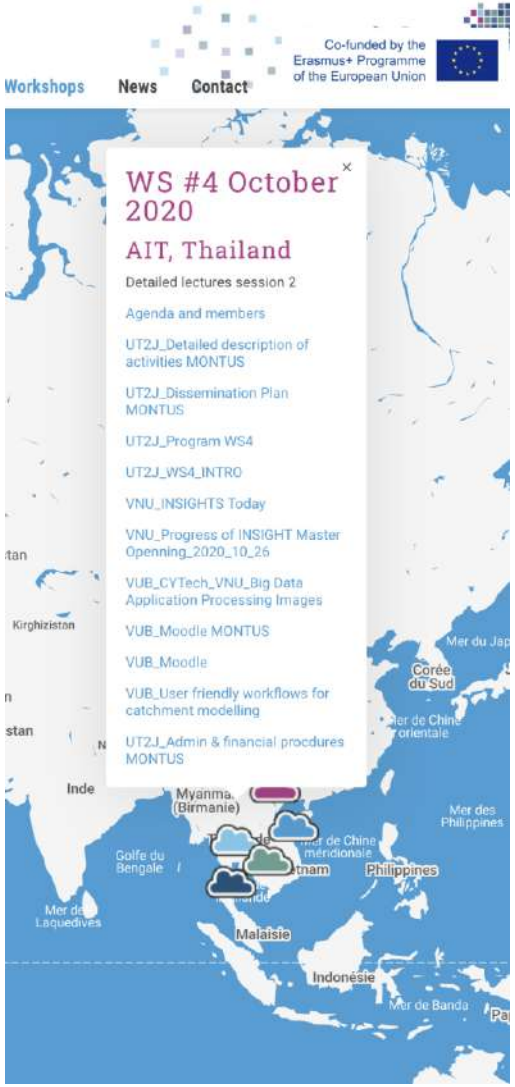


Third International Workshop

MONTUS create INSIGTHS for a new master applied to cloud computing of environmental data

Co-funded by the Erasmus+ Programme of the European Union

2020, February 17-21
Hanoi Architectural University
Vietnam National University of Hanoi



VIETNAM NATIONAL UNIVERSITY
UNIVERSITY OF ENGINEERING AND TECHNOLOGY

PROPOSAL TO OPEN MASTER TRAINING PROGRAM

Major: INnovative Spatial InteGrated tecHnology for environmenTal Sustainability (INSIGHTS)

CODE: Pilot

Discipline of the program: Information Technology

LEVEL: MASTER

Hanoi – 2020

TORUS & MONTUS from capacity building in high education to research and PhD
Co-funding with the help of international fellowship

Pham Van Ha
AUF fellowship – 2016-2021
Remote Sensing/Air Pollution/Cloud Computing
Cotutelle: UT2J&VNU (Dominique Laffly & Thi Nhat Thanh Nguyen)
Codirection EISTI (Astrid Joiurdan)

Imseshi Weerasinghe
Vrije University fellowship – 2016-2020
Water Runoff/Water Management/Cloud Computing
Direction: Ann Van Griensven – VUB

Nguyen Minh Duc
Deep learning techniques for Computer Vision and remote sensing
Vrije University fellowship – 2016-2019
Water Runoff/Water Management/Cloud Computing
Direction: Nikolaos Deligiannis – VUB

Ngo Luu Ly
AUF fellowship – 2018-2021
Remote Sensing/Land Use Change/Cloud Computing
Cotutelle: UT2J&VNU (Dominique Laffly & Truong Van Tran)
Codirection EISTI (Peio Loubière)

KHANH Toan Vuon
French Embassy fellowship – 2020-2023
Smart CITY
Cotutelle: UT2J&HAU (Dominique LAFFLY & Huyen Thai NGUYEN)

TORUS

MONTUS

Unique and very powerful hardware and software equipment totally free to access

Unique configuration in Asia and in Europe in the aim of geoscience*

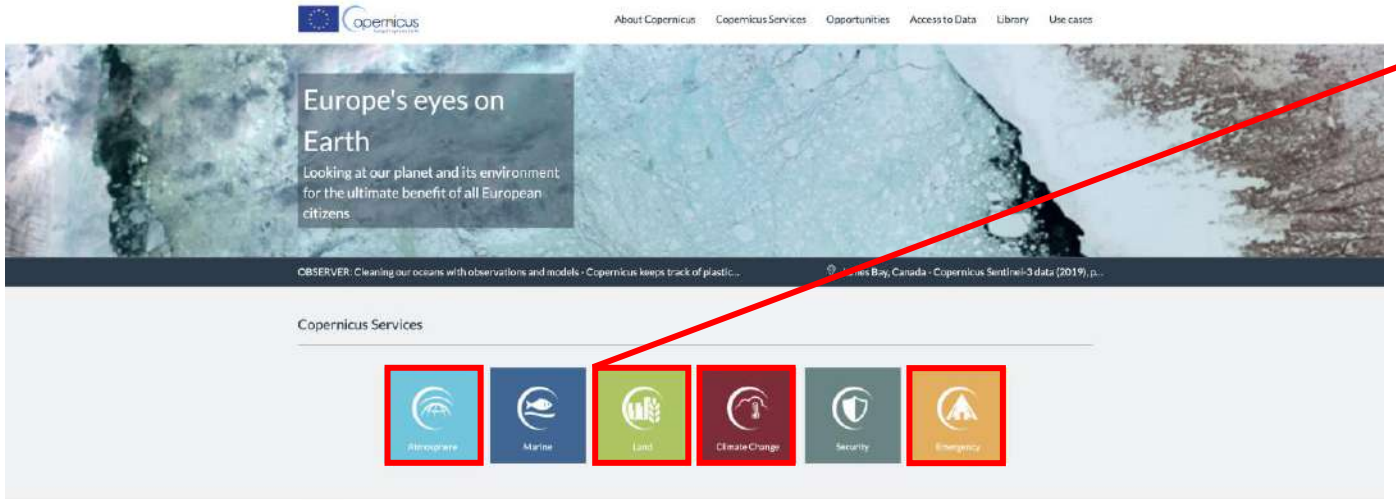
New opportunities for engineering, research and high education

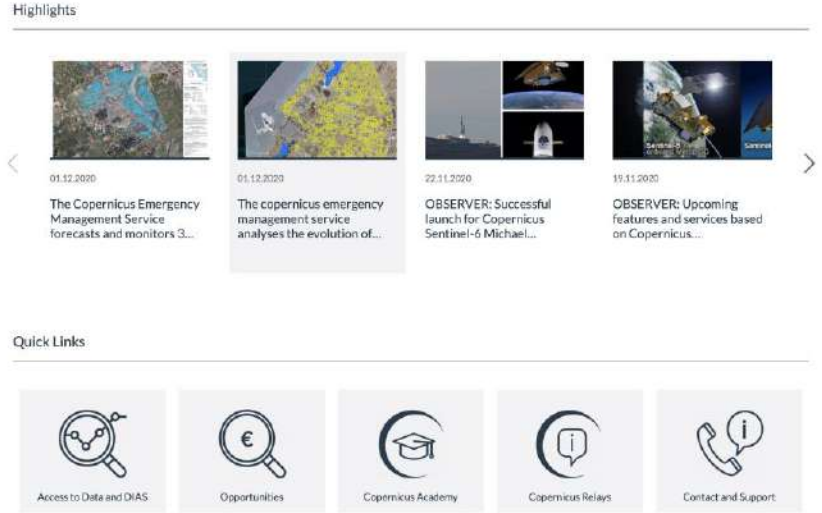
New professional opportunities

Pr. Dominique LAFFLY
Head of TORUS & MONTUS

Co-funded by the Erasmus+ Programme of the European Union

TORUS & MONTUS: Innovative COPERNICUS Data integration – EU program valorization





01.12.2020

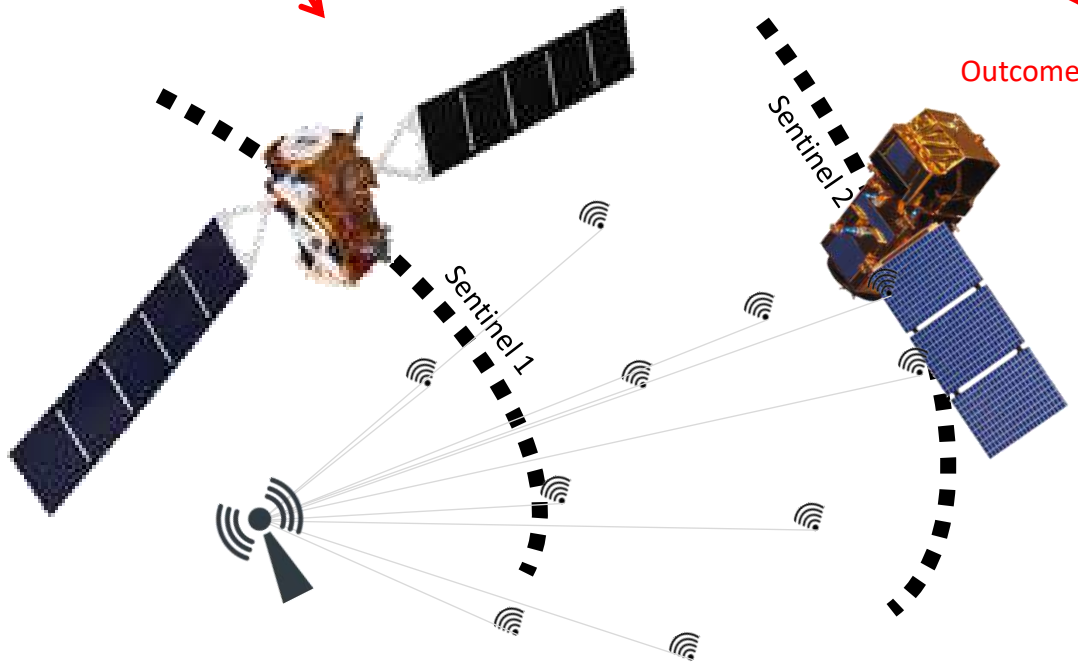
The Copernicus Emergency Management Service forecasts and monitors 3...

01.12.2020

The copernicus emergency management service analyses the evolution of...

Outcome #2 – radar

Outcome #1 – optical



Pr. Dominique LAFFLY
Head of TORUS & MONTUS

“Capacity Building for a Greener World”

Looking for your experience to share as best practice at our Annual Grant Holder meeting 2021

TORUS - Toward an Open Resources Upon Services (2015-2018)
&
MONTUS – Master On New Technologies Using Services (2018-2021)

We still need the ERASMUS + programs to continue building capacities in the field of higher education to bridge the still widening gap between information sciences and environmental sciences in order to promote the commitments of future engineers. , technicians and scientists to work better for a sustainable world. This in Europe and even more in the direction of Asia and Africa.

Pr. Dominique LAFFLY
Head of TORUS & MONTUS

TORUS & MONTUS: Thank you

Pr. Dominique LAFFLY
Head of TORUS & MONTUS