European
Commission

BigData@JRC

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Directorate I Competences, Unit I.3 Text and Data Mining

Joint
Research
Centre

Joint Research Centre

Established in **1957**

3000 staff
Almost **75%** are scientists and researchers.

10 Directorates

>1000 Publications per year

Geel · Belgium

Brussels · Belgium

Petten · The Netherlands

6 Locations 5 Member States

Karlsruhe · Germany

42 Large scale facilities

Seville · Spain

Ispra · Italy

JRC's Mission

As the science and knowledge service

of the Commission our mission is to support

EU policies with independent evidence

throughout the whole policy cycle

Big data for policy

Exploit data volume, velocity, and variety to generate policy relevant information

Big data

Cross-domains: Earth Observation, in situ, crowd sourcing, social sensing, text data, IoT, web scrapping, …

Indicators

Decisions

directives, regulations, communications, …

Copernicus — Europe's eyes on Earth

- atmosphere
- marine
- land
- climate
- emergency
- security

Data Volume, Velocity, Variety

- Using **FAIR** data principles (findable, accessible, interoperable, reusable)
- With data mining competence in shared and collaborative environment
- Relying on reproducible workflows

Policy relevant information

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From Baveno to Copernicus and beyond

Global Monitoring for Environmental Security
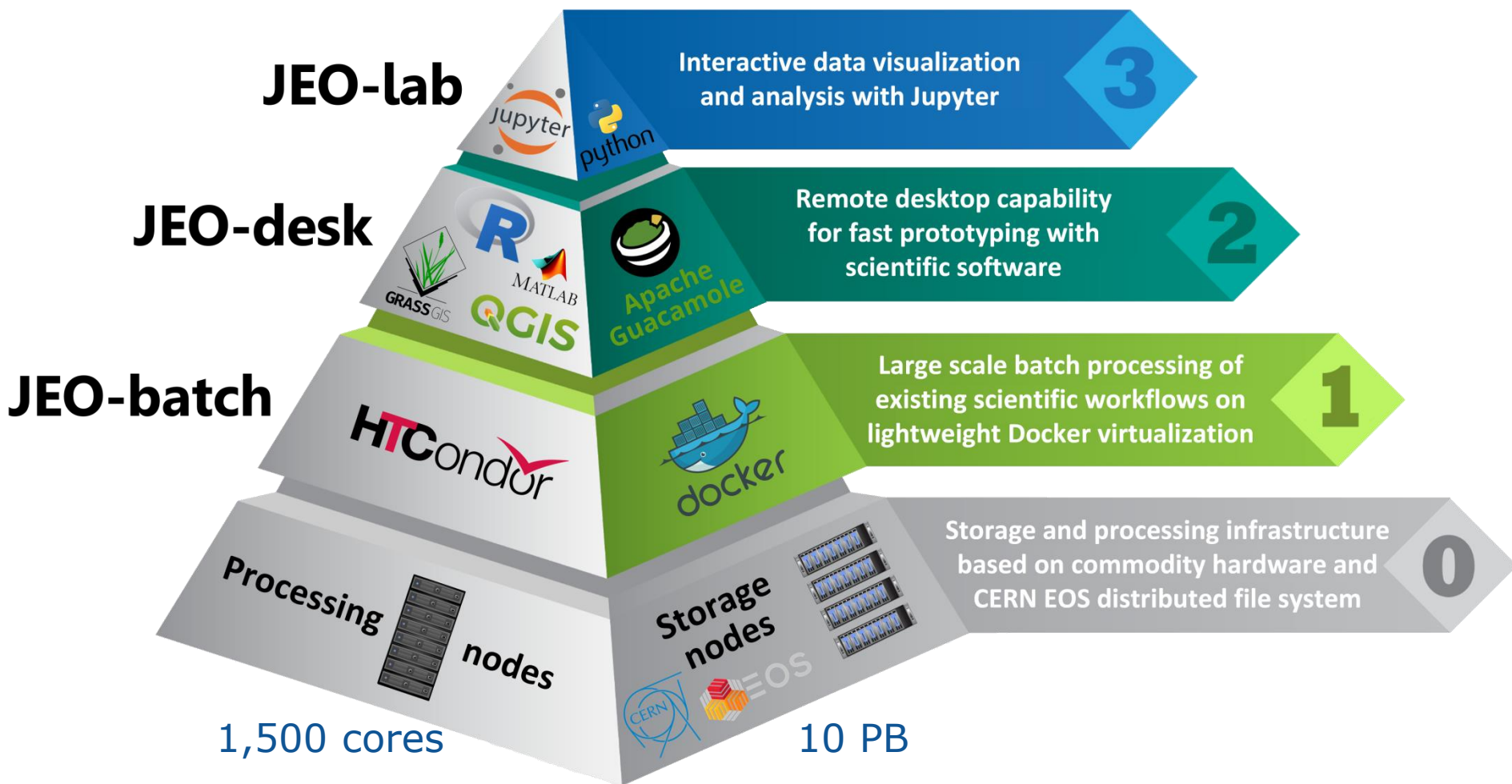A Manifesto for a New European Initiative

Baveno manifesto 1998

- **2010**: Regulation (EU) No 911/2010 of the European Parliament and of the Council of 22 September 2010 on the **European Earth monitoring programme (GMES)** and its initial operations (2011 to 2013)

- **2014**: Regulation (EU) No 377/2014 of the European Parliament and of the Council of 3 April 2014 establishing the **Copernicus Programme** and repealing Regulation (EU) No 911/2010

- **2018**: Proposal for a future new EU regulation establishing the space programme of the Union.

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JRC Big Data Platform: Conceptual representation

JEO-lab

JEO-desk

JEO-batch

3 Interactive data visualization and analysis with Jupyter

2 Remote desktop capability for fast prototyping with scientific software

1 Large scale batch processing of existing scientific workflows on lightweight Docker virtualization

0 Storage and processing infrastructure based on commodity hardware and CERN EOS distributed file system

Processing nodes

Storage nodes

1,500 cores

10 PB

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Dense Sentinel time series

- Analysis ready data for multi-sensor data cubes

- Exploit other data sources for machine learning

- At the basis of new policy relevant indicators
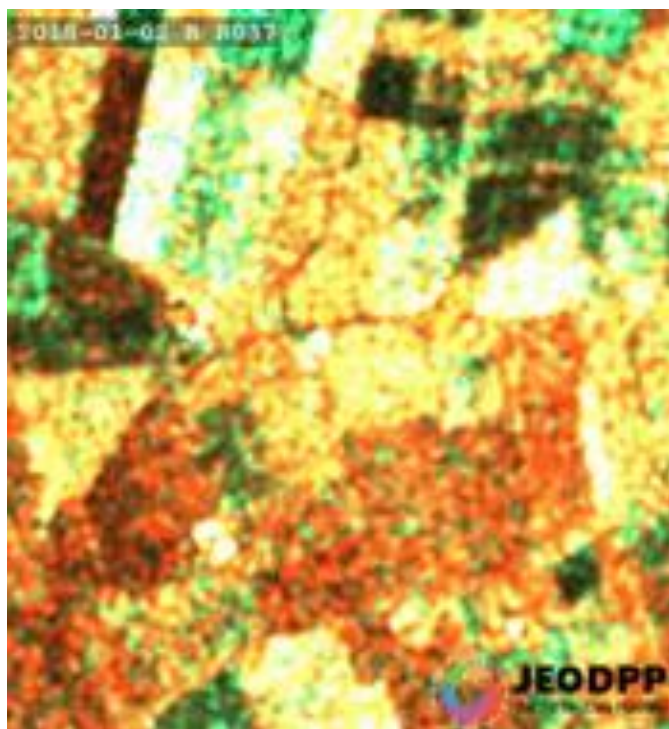
2018 S1-A/B times series
(55 images for R037 descending)

2018 S2-A/B cloud free times series
(31 images for R008 & R051)

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Big Data for Policy:
The Global Human Settlement Layer

GEO Human Planet Initiative

GEO
GROUP ON
EARTH OBSERVATIONS

Big Data for Policy:
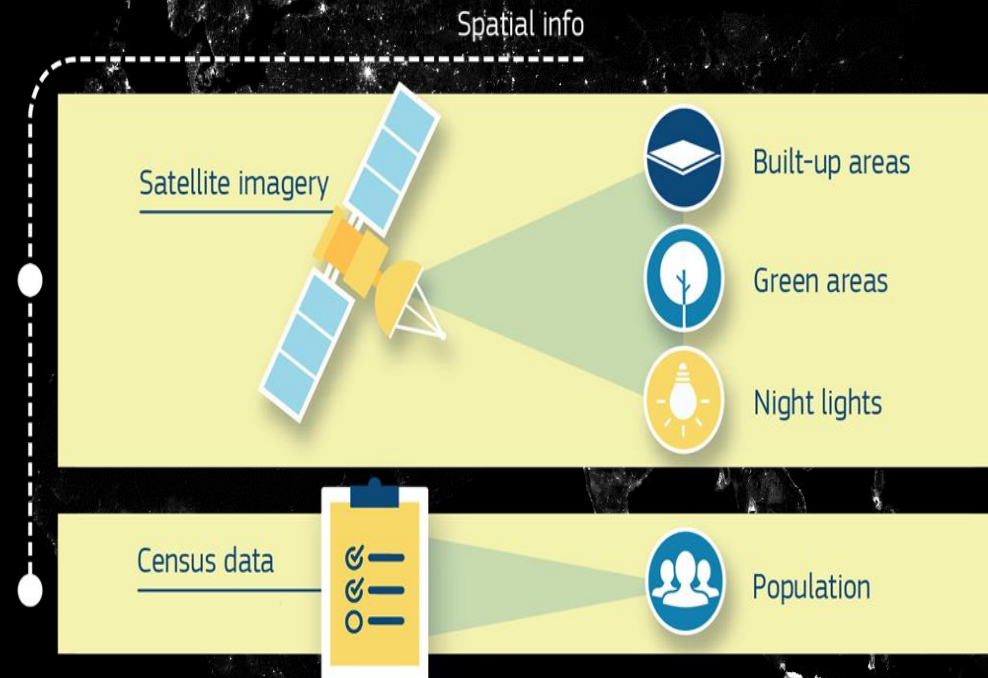# The Global Human Settlement Layer

Objective

Produce new evidence for decision making:

- 2030 Agenda for Sustainable Development (SDGs)
- Sendai Framework for Disaster Risk Reduction
- New Urban Agenda
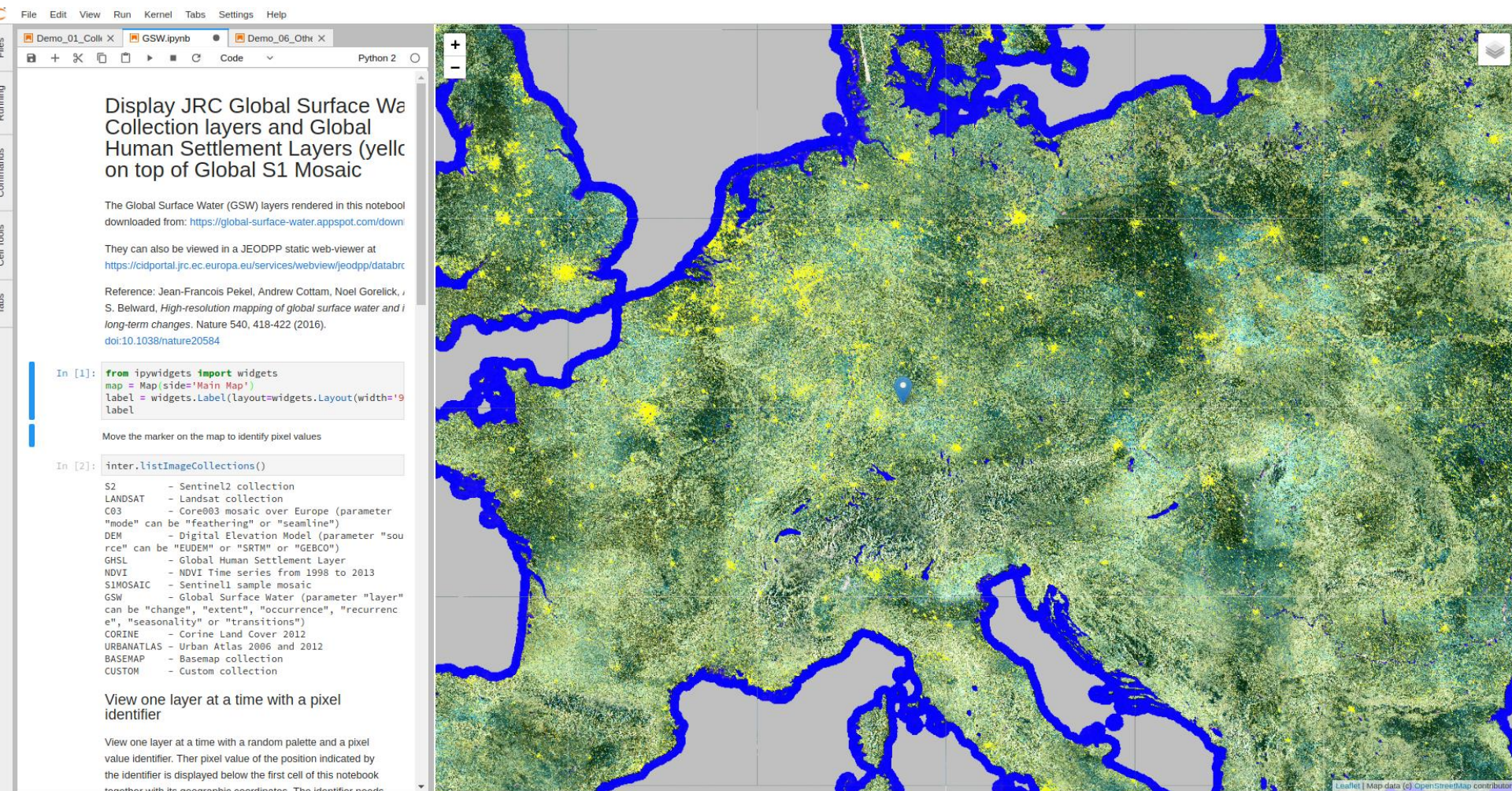
Key requirements for policy support

- Reproducible, scientifically sound, synoptic
- Sustainable information production
- Free and open access

http://ghsl.jrc.ec.europa.eu

➢ Facilitate information sharing and collective knowledge building

Global Human Settlement Layer with Global Surface Water Occurence on top of Global S1 mosaic
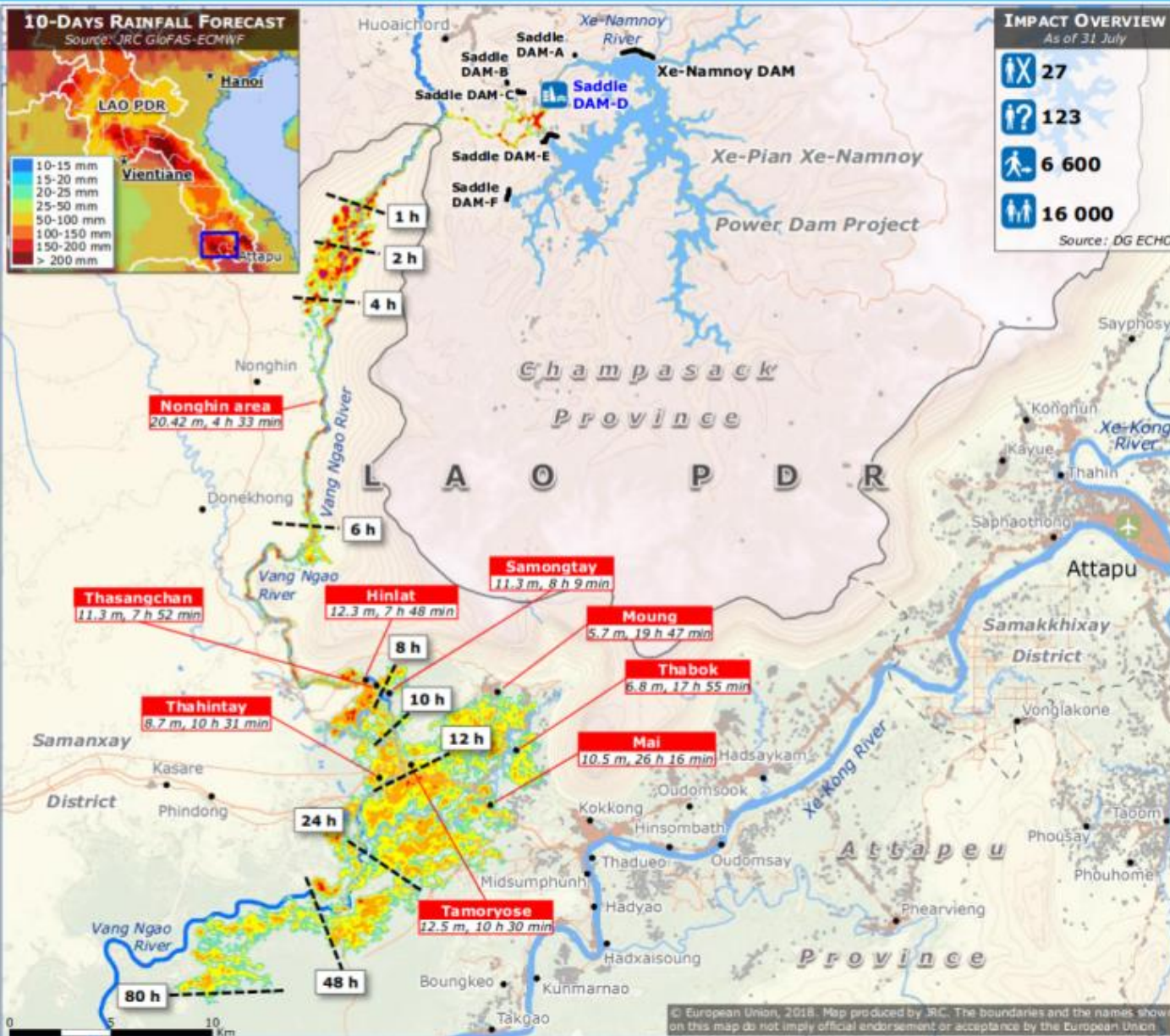
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Lao PDR | Dam collapse – Numerical modelling of the flood wave

European Commission

10-DAYS RAINFALL FORECAST
Source: JRC GloFAS-ECMWF

LAO PDR
Hanoi

Vientiane
Attapu

10-15 mm
15-20 mm
20-25 mm
25-50 mm
50-100 mm
100-150 mm
150-200 mm
> 200 mm

IMPACT OVERVIEW
As of 31 July

27
123
6 600
16 000

Source: DG ECHO

JRC Calculations
Maximum Inundation Depth

>20 m
10-20 m
5-10 m
2-5 m
0.2-2 m

Location Analysed
Inundation Depth (m),
Arrival Time

Estimated arrival time
Settlement

Collapsed dam section
Dam section
Fatalities
Missing people
Displaced people
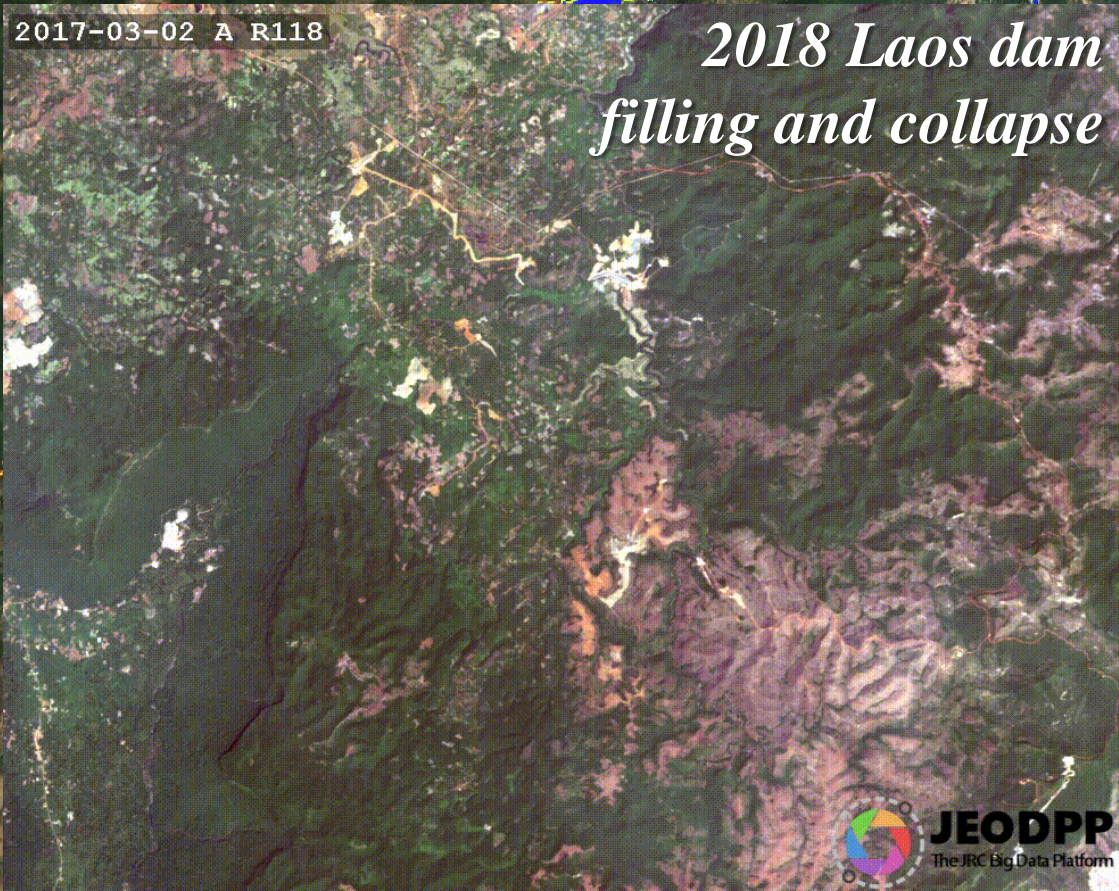Affected people
Airport

After the collapse on 23 July of the Saddle Dam-D section of the Xepian-Xe Nam Noy hydropower dam, the death toll reached 27 people. The dam break analysis, performed by JRC and shown in the main map, has identified the areas mostly affected and the extent is in good agreement with the analysis performed by UNOSAT using radar satellite data. The JRC analysis has shown that the most affected locations have been hit after about 7 h from the break, with an estimated water height of about 5-10 m. *Source: JRC*

SATELLITE*-DETECTED FLOOD WATERS
13-29 JULY (Source: UNOSAT-UNITAR)

Huoaichord
Xe-Namnoy River
Saddle DAM-A
Saddle DAM-B
Saddle DAM-C
Xe-Namnoy DAM
Saddle DAM-D
Saddle DAM-E
Saddle DAM-F

Xe-Pian Xe-Namnoy
Power Dam Project

Champasack Province

Sayphosy
Konghun
Kayue
Xe-Kong River
Thahin

LAO PDR

Nonghin
1 h
2 h
4 h
6 h

Nonghin area
20.42 m, 4 h 33 min

Vang Ngao River
Donekhong
Saphaothong

Vang Ngao River

Samongtay
11.3 m, 8 h 9 min

Thasangchan
11.3 m, 7 h 52 min

Hinlat
12.3 m, 7 h 48 min

8 h

Moung
5.7 m, 19 h 47 min

Attapu

Samakkhixay District

Thabok
6.8 m, 17 h 55 min

Thahintay
8.7 m, 10 h 31 min

10 h

12 h

Mai
10.5 m, 26 h 16 min

Hadsaykam

Vonglakone

Samanxay
Kasare
Phindong

District

24 h

Kokkong
Hinsombath
Oudomsook
Oudomsay

Attapeu

Phousay
Phouhome

Thadueo
Midsumphunh

Tamoryose
12.5 m, 10 h 30 min

Hadyao
Pnearvieng

48 h

Vang Ngao River

80 h

Boungkeo
Hadxaisoung
Kunmarnao
Takgao

Province

0 5 10 Km

© European Union, 2018. Map produced by JRC. The boundaries and the names shown on this map do not imply official endorsement or acceptance by the European Union

Saddle DAM-D

Nonghin

Champasack Province

Attapeu Province

Hinlath
Moung
Thasangchan
Tamoryose
Samongtay Thabok
Thahintay
Mai

Xe-Kong River

Flood Water Extent
29 July
25 July
13 July (Pre-collapse)

*Sentinel-1 Resolution 10 m

JRC Global Surface Water
Extended: 1984—2018
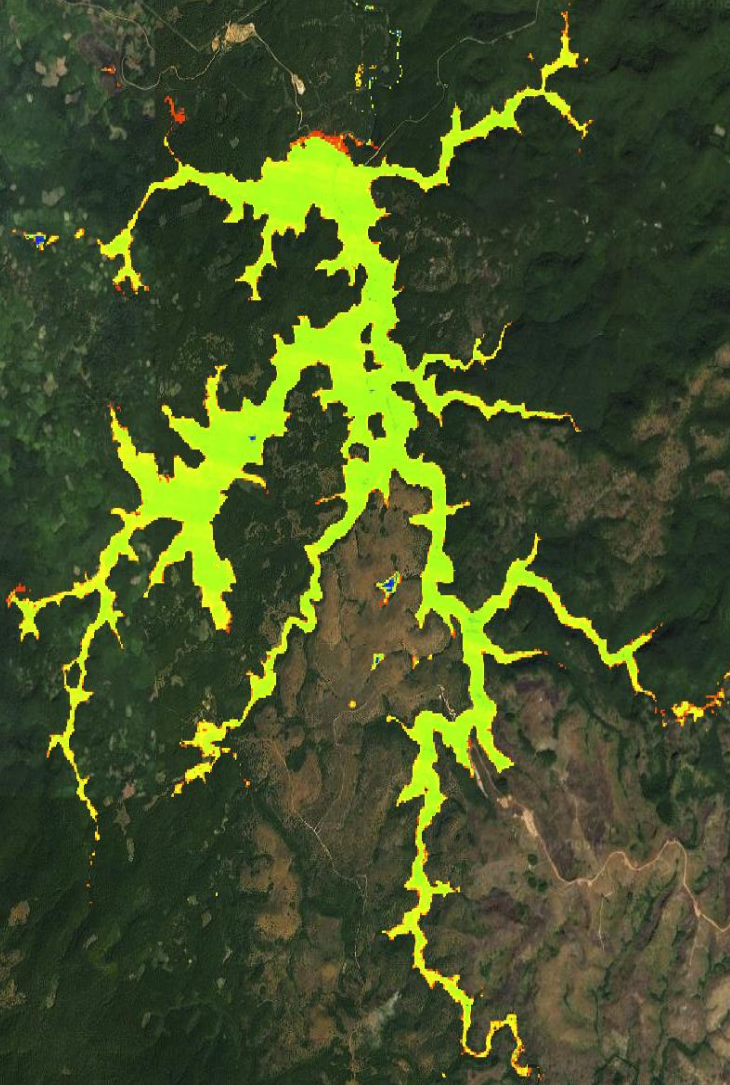
2017-03-02 A R118

*2018 Laos dam
filling and collapse*

JEODPP
The JRC Big Data Platform

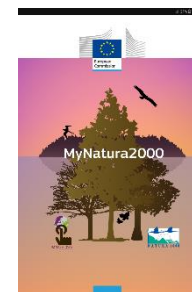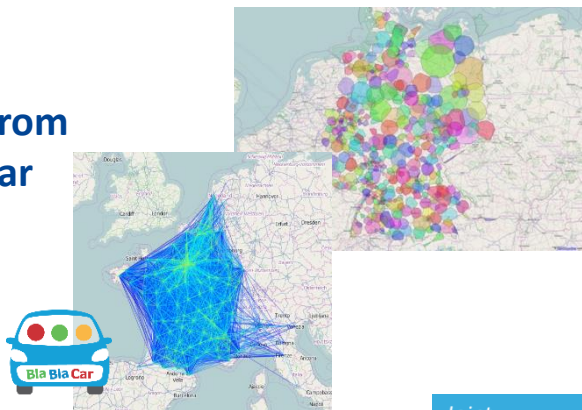# Include new data sources to support policy-making

Use of citizen-generated content to develop new social indicators (here, quality of life)
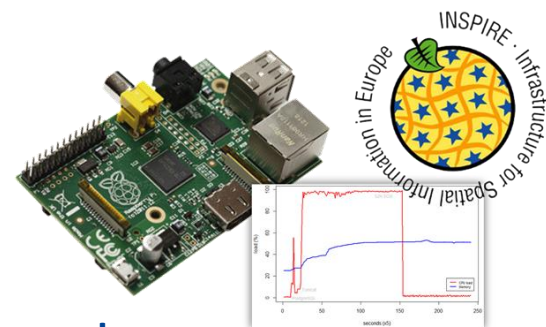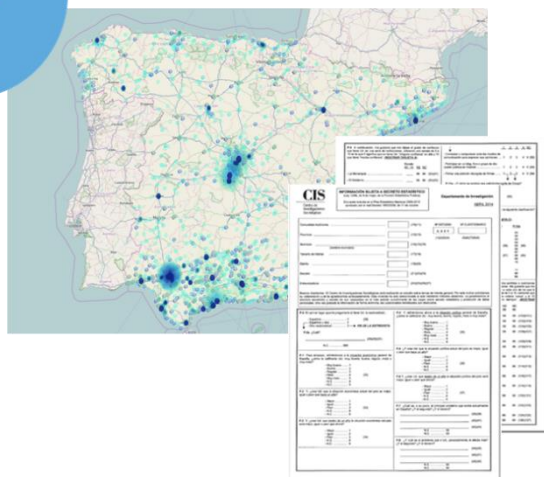
Use of low-cost sensors to complement official environmental measurement networks (here, air quality)

Facilitation of mobile applications for environmental monitoring and early detection

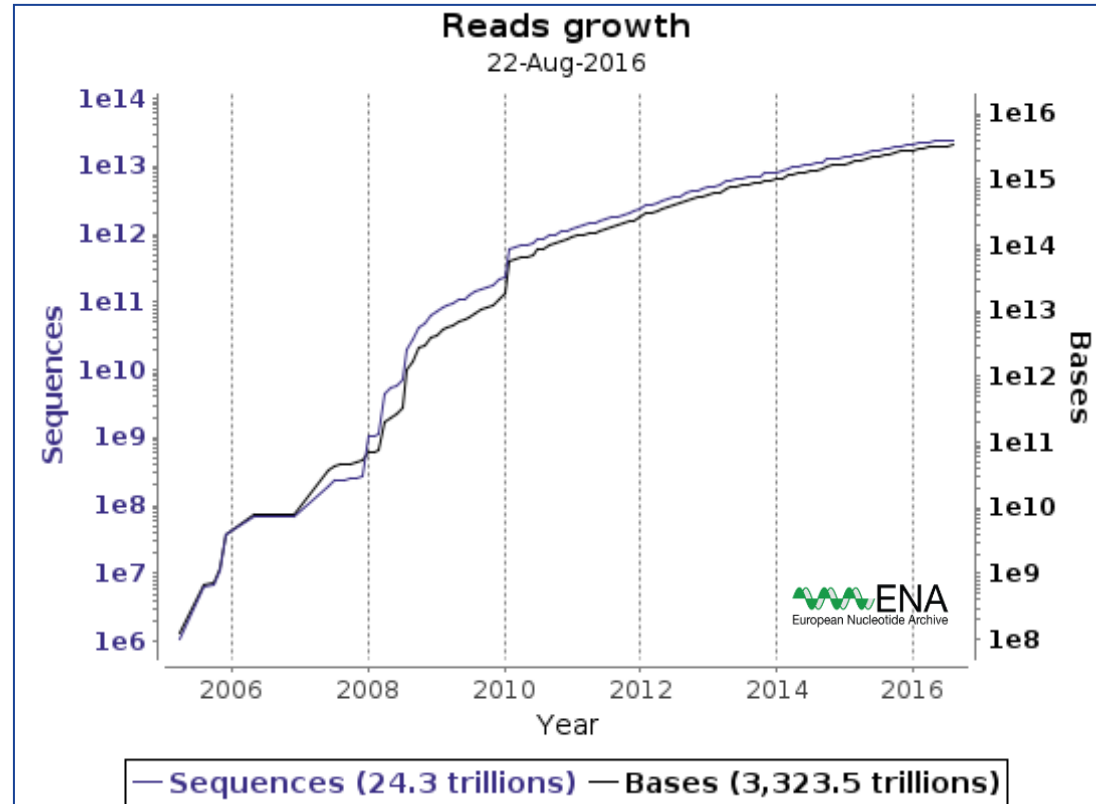**Development of new indicators on mobility from mobile phone data or car sharing platforms**

Invasive Alien Species in Europe

MyNatura2000

http://digitalearthlab.jrc.ec.europa.eu/

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Genomics

~ 250 PB of human genomic information (2015)

100M – 2B people with genome sequenced by 2025

20-40 PB / year within a decade

Reads growth
22-Aug-2016

— Sequences (24.3 trillions) — Bases (3,323.5 trillions)

ENA
European Nucleotide Archive

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Omics in Society:
foster collaborations and bridging

EMBL-EBI

elixir

Global Alliance
for Genomics & Health
Collaborate. Innovate. Accelerate.

CRSR

...
...
...

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Declaration for delivering cross-border access to **genomic database**

1 million **genomes accessible** in the EU by 2022

Linking access to existing and future genomic database across the EU

Providing a sufficient scale for **new clinically impactful** associations in research

European Commission
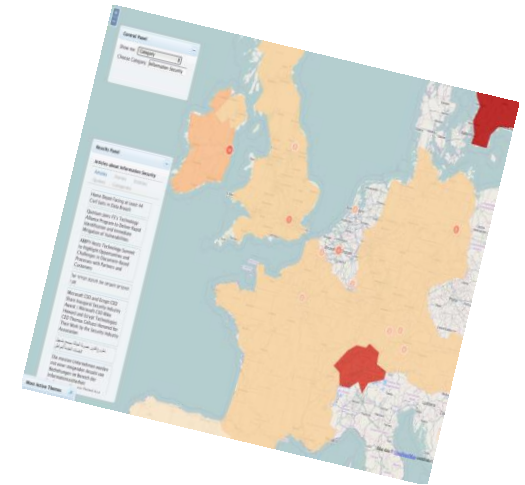
e HEALTH

DG-SANTE
DG-RTD
DG-CNECT
...
...
...

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Text Mining
-European Median Monitoring (EMM)-

Medium Data
- **300.000 articles /day**
- **55 Million tweets / day**

- **6.000 News Sites**
- **70 Languages**
- **1000 Categories/Topics**
- **30000 keywords**
- **Runs 24/7**
- **Visitors 25000**

Domains:
- **Border Security, Cybercrime & Fighting Crime**
- **Socio Political Event Monitoring**
- **Public Health Threats & Food Safety**
- **Conflict Early Warning**
- **Science and the Citizen**
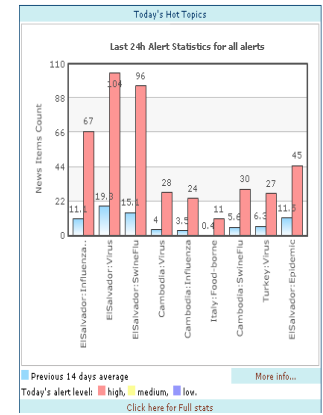
http://emm.newsbrief.eu

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ЕММ
10 YEARS
EST. 2002

Top Stories

UPDATED EVERY 10 MINUTES, 24 HOURS PER DAY.

Search

Biggest 10 Stories Over Last 24h
Language: en Period: Feb 17, 2019 9:10 PM - Feb 18, 2019 9:10 PM
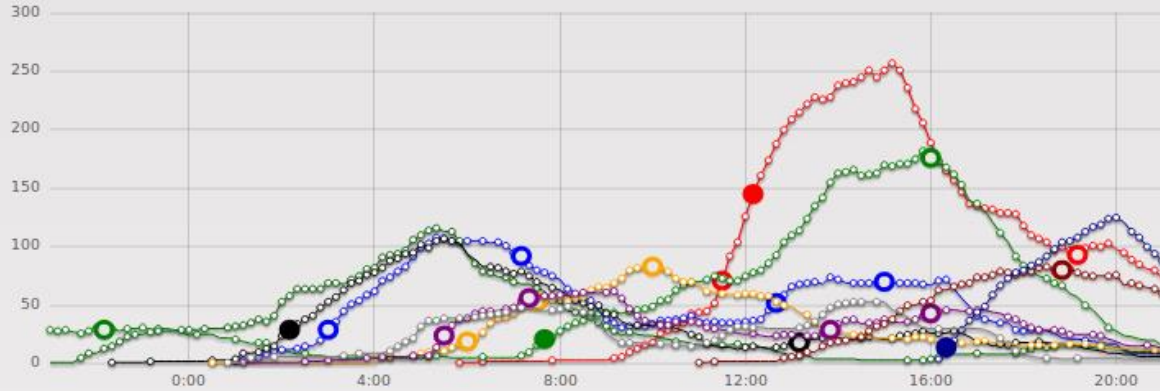
Seven MPs quit the Labour Party over Brexit and anti-Semitism Seven UK lawmakers have quit the Labour Party over issues including Brexit and anti-Semitism. 7 hours ago

Articles : 420 | Last update : Feb 18, 2019 8:57:00 PM | Start : Feb 18, 2019 5:50:00 AM | Sources : 193

Nigel Farage ridicules Labour rebel press conference - 'AMATEUR HOUR!'
🇬🇧 express Monday, February 18, 2019 8:32:00 PM CET | info [other]

The seven former members of the Labour party arranged a meeting to formally identify themselves as members of a new 'Independent Group'. But Mr Farage had little but disdain for the way in which they'd organised themselves. He told his LBC show this evening: "I thought that today's launch was amateur in the extreme....

More articles...

Poland shuns Israel summit amid Holocaust row

Articles : 389 | Last update : Feb 18, 2019 7:22:00 PM | Start : Feb 17, 2019 2:51:00 PM | Sources : 0

Owner of New Delhi hotel where fire killed 17 arrested
🇺🇸 koaa Monday, February 18, 2019 6:57:00 PM CET | info [other]

NEW DELHI (AP) — Indian authorities say they have arrested the owner of a New Delhi hotel where 17 people were killed by a fire. Police say Arpit Palace Hotel owner Rakesh Goel appeared Sunday in court, which ruled that police could take him into custody for questioning....

More articles...

'Digital gangsters': UK wants tougher rules for Facebook

Articles : 251 | Last update : Feb 18, 2019 6:00:00 PM | Start : Feb 18, 2019 1:03:00 AM | Sources : 0

Why Facebook was labelled 'digital gangsters' by UK lawmakers
🇮🇳 business-standard Monday, February 18, 2019 4:16:00 PM CET | info [other]

. During its 18-month-long investigation into disinformation and "fake news", a committee of the invited to appear before it three times, didn't show up once. This was, however, not the only reason why in its final

Tools

Monday, February 18, 2019
9:22:00 PM CET

RSS | MAP

Facebook

manage

info

Available on the
App Store
ANDROID APP ON
Google play

Languages —

Select top stories in other languages.

ar bg cs da de el
en es et fi fr hr
hu it lt lv mt nl
pl pt ro ru sk sl
sv sw tr zh

Show additional languages
Interface: en - English

Legend +

Country Watch

The country most in the news at the momen

United States of America (US)

News about United States of America

News sources from United States of America

Big Data and AI

- Digital transformation of our economy and society

- Artificial intelligence is permeating all fields of science and technology

- Raises many societal and ethical questions

- JRC AI flagship report: https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/artificial-intelligence-european-perspective

Takeaway messages

- JRC role in scientific and technical support to EU policies calls for **Turning (Big) Data into Insights**

- Increasing role of **AI/machine learning**

- Importance of **versatile and interoperable platforms** suitable to cross-domain data as well as HPC applications

- Importance of **knowledge sharing and collaborative working across disciplines**

- Importance of **FAIR data principles** and their application to analysis workflows

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