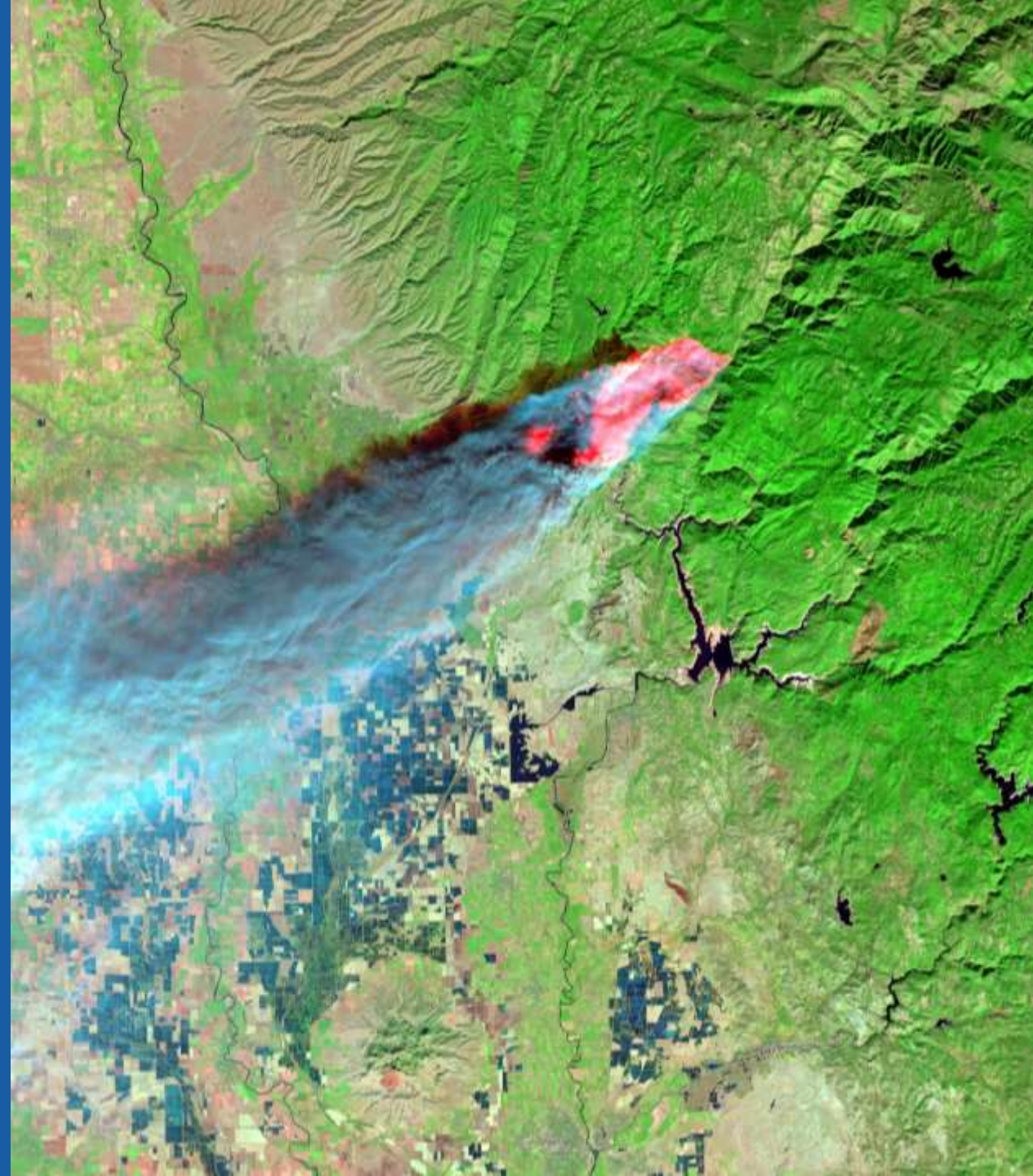
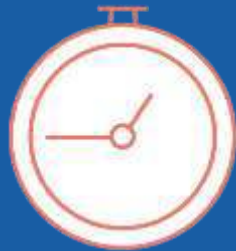


DISPOSITIFS DE CARTOGRAPHIE D'URGENCE POUR LA GESTION DES CRISES EN EUROPE ET DANS LE MONDE

COPERNICUS EMS / CHARTE INTERNATIONALE ESPACE ET
CATASTROPHES MAJEURES / DISPOSITIFS REGIONAUX



LE SERTIT, PRÉSENTATION

Plateforme technologique et de services
du laboratoire ICube au sein de l'Université de Strasbourg

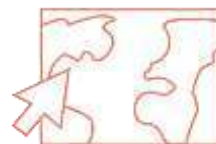
- Plus de 30 ans d'expérience dans la valorisation et le transfert technologique dans le domaine de l'Observation de la Terre
- Production de géo-informations pour :



Aménagement du
territoire



Suivi des ressources
naturelles



Catastrophe
naturelle et gestion
des risques



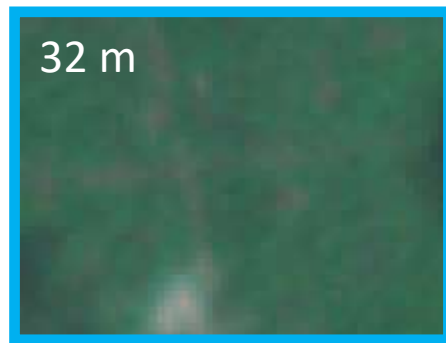
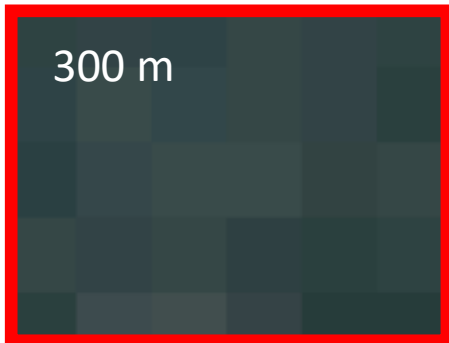
24/7
Service de
cartographie rapide



APPORT DE L'IMAGERIE SPATIALE POUR LA GESTION DES RISQUES ET DES CRISES

- Outil d'aide à la décision, complémentaire des observations terrain et de la modélisation
- Pour **toutes les phases du risques**
 - prévision / prévention, crise,
 - réhabilitation / reconstruction
- **20 ans d'utilisation** des images d'Observation de la Terre pour la gestion de crise

Taille des pixels



OBJECTIFS DES SYSTÈMES DE RÉPONSE À L'URGENCE



- Offrir aux acteurs impliqués dans la gestion des catastrophes un **service mondial** disponible **24/7**
- Contribuer à l'organisation des opérations de secours pendant la phase de **réponse à l'urgence**, grâce à des cartographies des zones impactées
- Programmation urgente et en priorité des satellites adaptés
- Organisation de la **cartographie rapide** à partir des images satellites



© CNES



© CNES



Gratuité du service
pour ses usagers



CHARTER INTERNATIONALE ESPACE & CATASTROPHES MAJEURES (DISASTER CHARTER)



- Dispositif international créé par le CNES et l'ESA en 1999
17 agences spatiales membres



- En support à la gestion de crise lors d'évènements naturels majeurs
- Couverture mondiale
- Fourniture gratuite et à la demande d'images spatiales
Pas de cartographie rapide systématique
- Activation par des **utilisateurs autorisés (AU)**
733 activations dans 129 pays depuis 2000

Charte Internationale Espace & Catastrophes Majeures



En France :

- Activation par la DGSCGC / COGIC (AU)
- Mobilisation maximale des **moyens satellites** français par le CNES (Pléiades ...)
- Production de valeur ajoutée en mode urgent (cartographie rapide) par le SERTIT, à la demande du CNES
Livraison aux utilisateurs en quelques heures après réception des images satellites
- Produits (contenu, format) adaptés à la demande de chaque utilisateurs



<https://www.disasterscharter.org/web/guest/home>

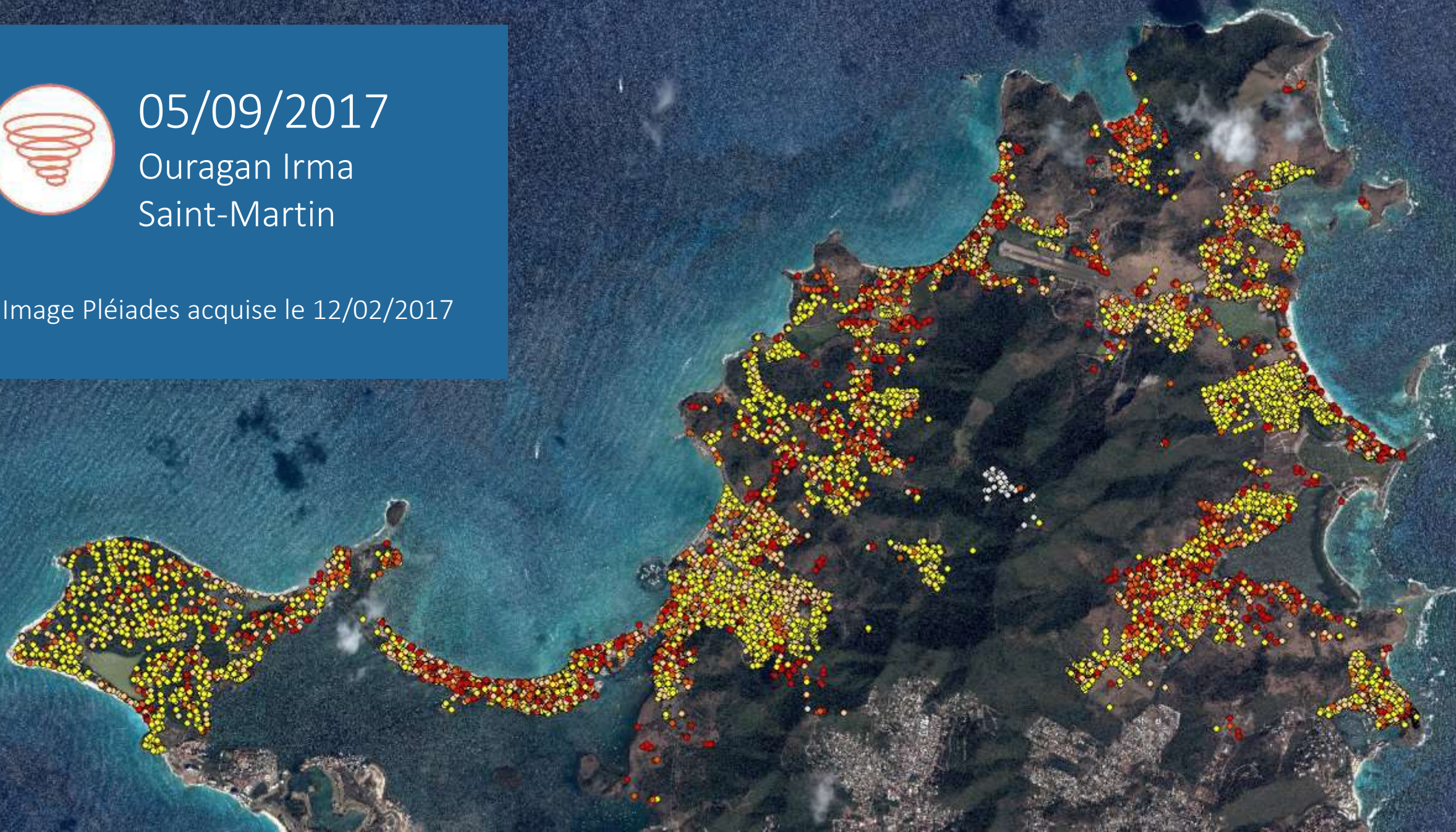
<https://sertit.unistra.fr/cartographie-rapide/>



05/09/2017

Ouragan Irma
Saint-Martin

Image Pléiades acquise le 12/02/2017





05/09/2017

Ouragan Irma
Saint-Martin

Image Pléiades acquise le 12/02/2017





05/09/2017

Ouragan Irma
Saint-Martin

Image Pléiades acquise le 14/09/2017





05/09/2017

Ouragan Irma
Saint-Martin

Image Pléiades acquise le 12/02/2017





05/09/2017

Ouragan Irma
Saint-Martin

Image Pléiades acquise le 14/09/2017

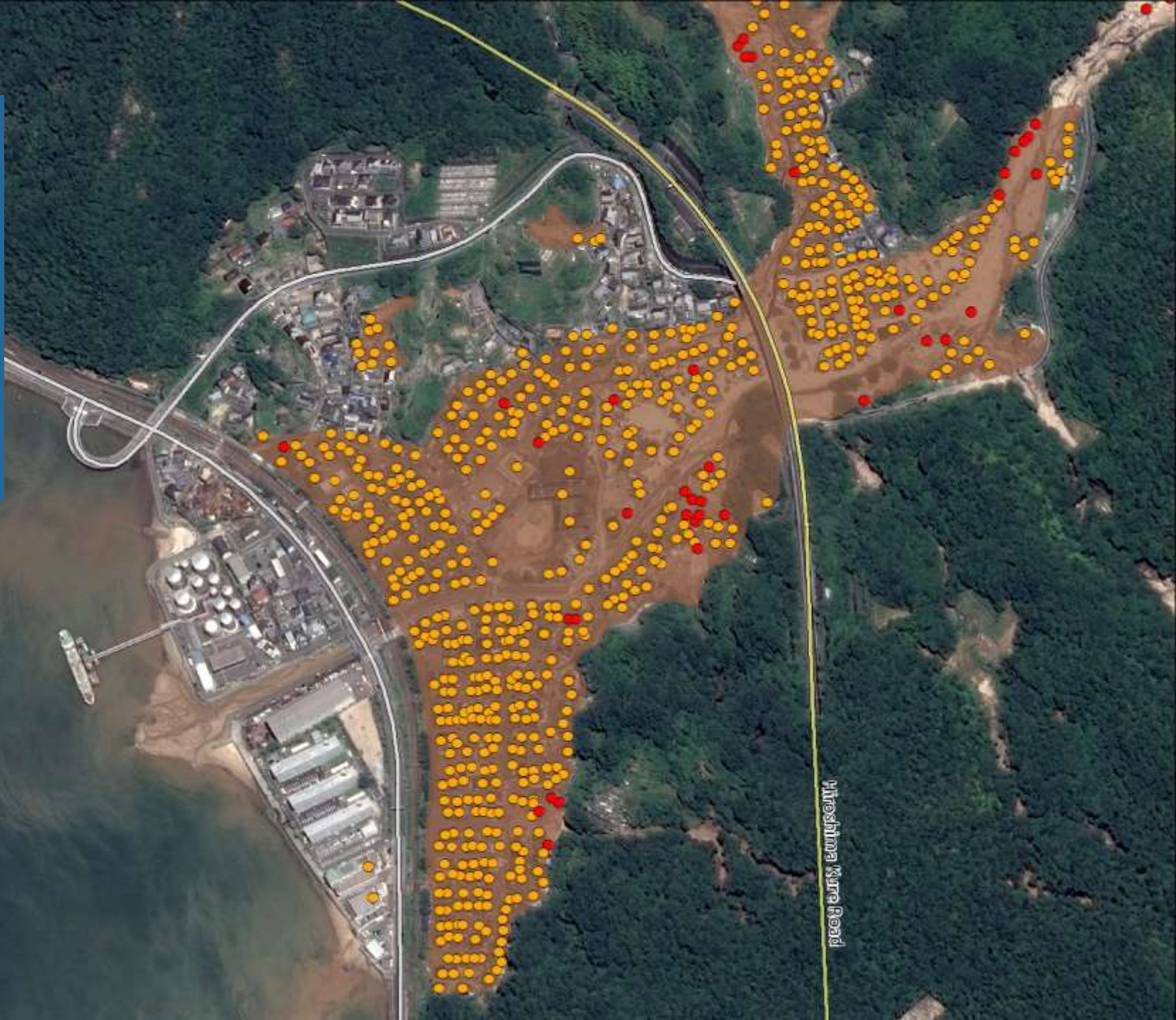




07/07/2018

Inondation
Japon

Image Pléiades acquise le 09/07/2018





07/07/2018

Inondation
Japon

Image Pléiades acquise le 16/02/2017





07/07/2018

Inondation
Japon

Image Pléiades acquise le 09/07/2018





29/09/2018

Tsunami
Indonésie

Image Pléiades acquise le 30/09/2018





29/09/2018

Tsunami
Indonésie

ESWI le 13/07/2015





29/09/2018

Tsunami
Indonésie

Image Pléiades acquise le 30/09/2018





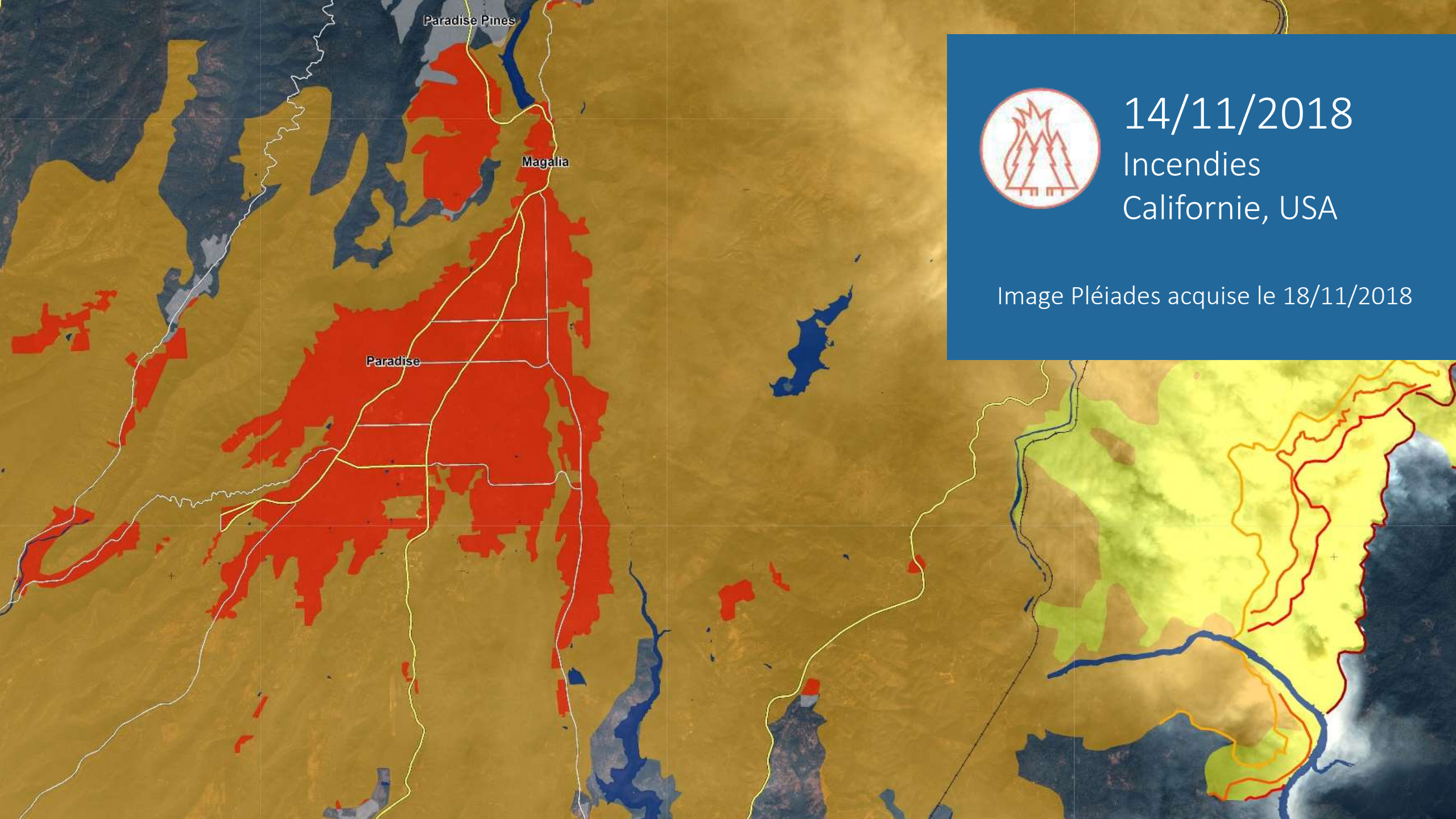
14/11/2018

Incendies

Californie, USA

Image Landsat-8 acquise le 08/11/2018





14/11/2018

Incendies
Californie, USA

Image Pléiades acquise le 18/11/2018



14/11/2018

Incendies
Californie, USA

ESWI le 02/02/2012





14/11/2018

Incendies

Californie, USA

Image Pléiades acquise le 18/11/2018

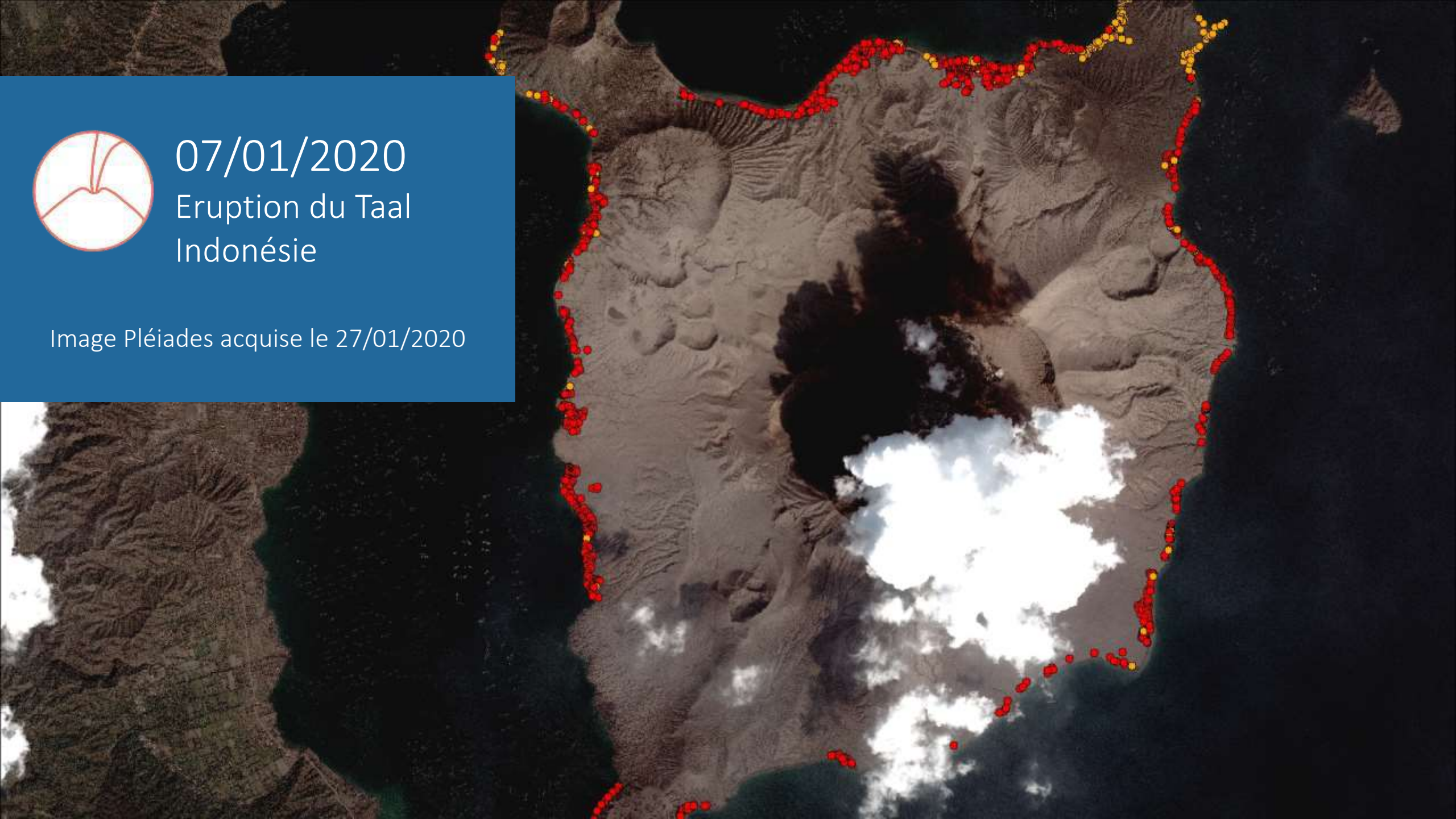




07/01/2020

Eruption du Taal
Indonésie

Image Pléiades acquise le 27/01/2020

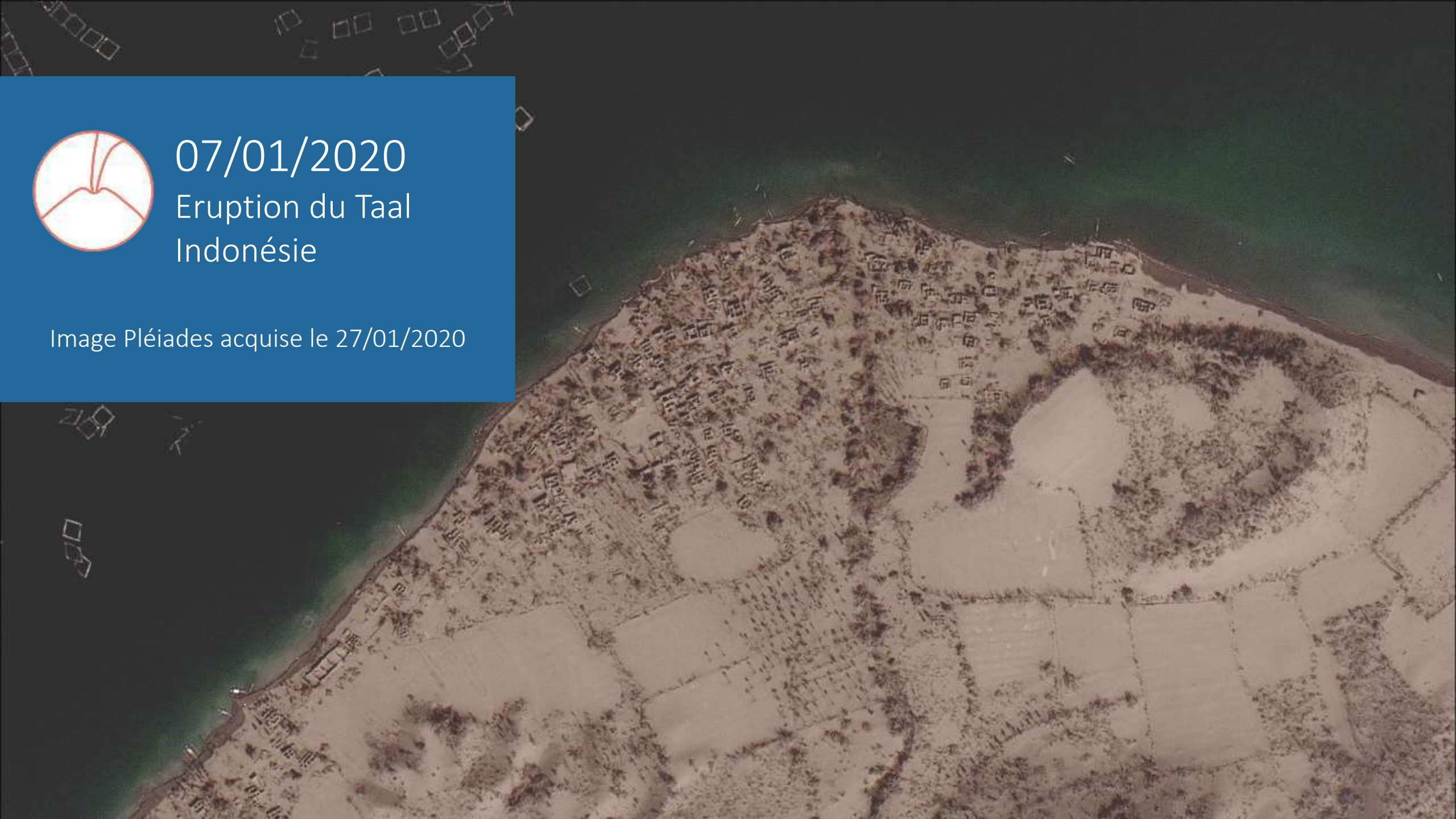




07/01/2020

Eruption du Taal
Indonésie

Image Pléiades acquise le 27/01/2020





07/01/2020

Eruption du Taal
Indonésie

Image Pléiades acquise le 27/01/2020





07/01/2020

Eruption du Taal
Indonésie

Image Pléiades acquise le 27/01/2020





07/01/2020

Eruption du Taal
Indonésie

Image Pléiades acquise le 27/01/2020





05/08/2020

Accident Industriel
Beyrouth, Liban

Image Pléiades acquise le 05/08/2020





05/08/2020

Accident Industriel
Beyrouth, Liban

Image Pléiades acquise le 20/07/2020





05/08/2020

Accident Industriel
Beyrouth, Liban

Image Pléiades acquise le 05/08/2020





05/08/2020

Accident Industriel
Beyrouth, Liban

Image Pléiades acquise le 20/07/2020





05/08/2020

Accident Industriel
Beyrouth, Liban

Image Pléiades acquise le 05/08/2020



Copernicus Emergency Management Service



- Dispositif européen créé en 2012 (CE)
- En support à la gestion des risques et des crises lors de catastrophes naturelles ou anthropiques
 - 🚒 **Rapid Mapping (RM)**
24/7, besoins urgents (gestion de crise)
 - 🚒 **Risk & Recovery Mapping (RRM)**
8/7, analyse des risques, suivi de la reconstruction
 - 🚒 **Early Warning** (alertes : EFAS, EFFIS)
- Couverture mondiale (RM/RRM)
- Fourniture gratuite et à la demande d'information géospatiale
- Activation par des **utilisateurs autorisés** (AU)
547 activations en Europe et dans le monde depuis 2012



Copernicus Emergency Management Service



Copernicus EMS Rapid Mapping

- Portfolio standardisé
- Production de valeur ajoutée en mode urgent

Livraison en quelques heures / jours
aux utilisateurs autorisés

- AU français : DGSCGC / COGIC



<http://emergency.copernicus.eu/mapping/>



Copernicus Emergency Management Service



Copernicus EMS Rapid Mapping

- Portfolio **standardisé**
- Livraison de produits raster (cartes) et vecteur (shapefile, kml)
- Sites http et FTP dédiés



Produit	Contenu	Livraison mode urgent (SL1)
Reference (REF)	Informations de référence sur un territoire et ses enjeux (hors Europe)	12 heures
First Estimate Product (FEP)	Evaluation rapide de l'étendue / impact d'un évènement	3 heures
Delineation (DEL)	Etendue de l'évènement (+ monitoring)	9 heures
Grading (GRA)	Impact / gradation des dommages (+ monitoring)	12 heures



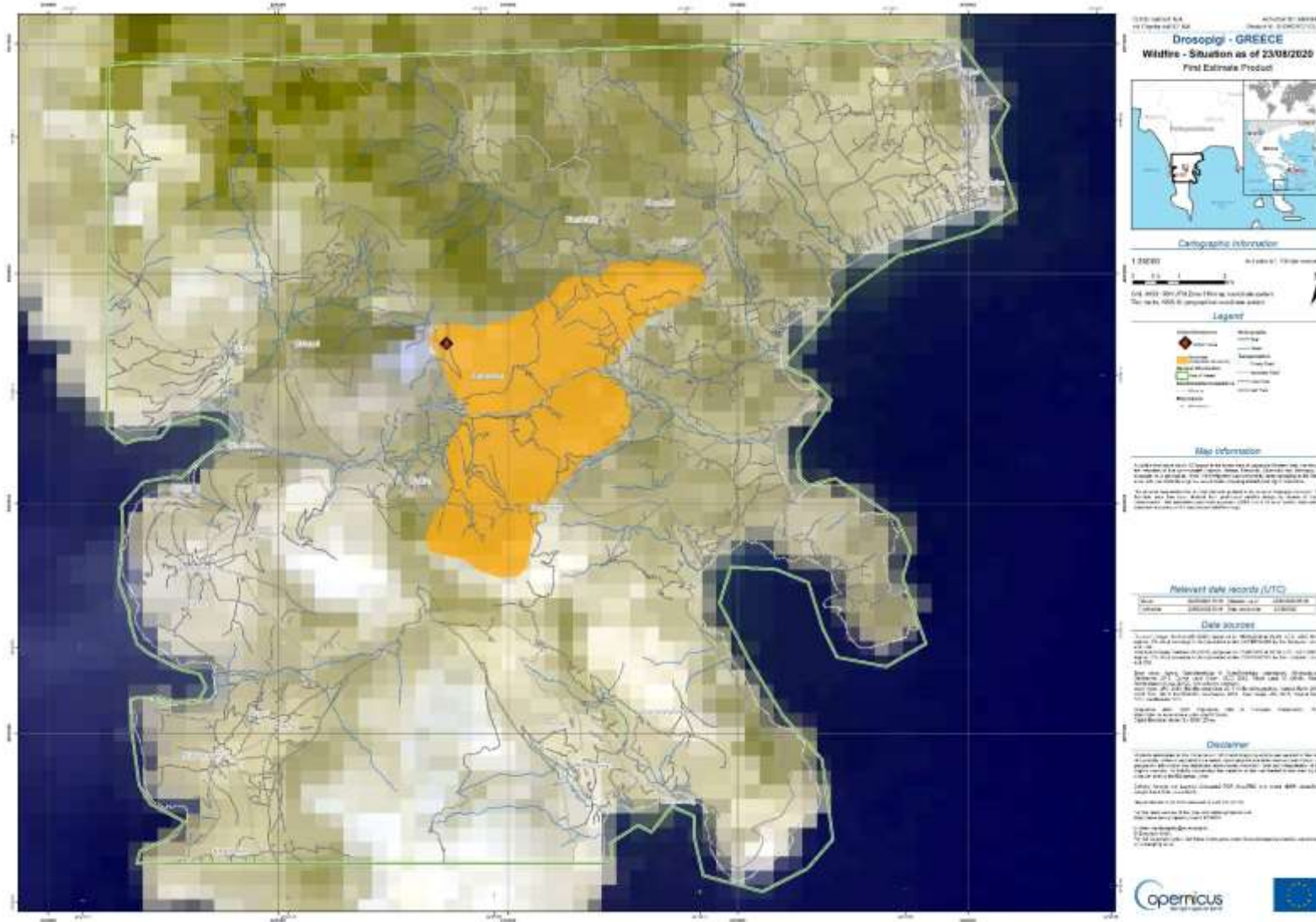
<http://emergency.copernicus.eu/mapping/>

COPERNICUS EMERGENCY MANAGEMENT SERVICE RAPID MAPPING - PORTFOLIO



Reference maps (REF)
Information de référence sur un territoire et ses enjeux en utilisant des données disponibles acquises avant l'évènement : réseau routier, infrastructures, zones habitées, etc...

COPERNICUS EMERGENCY MANAGEMENT SERVICE RAPID MAPPING - PORTFOLIO

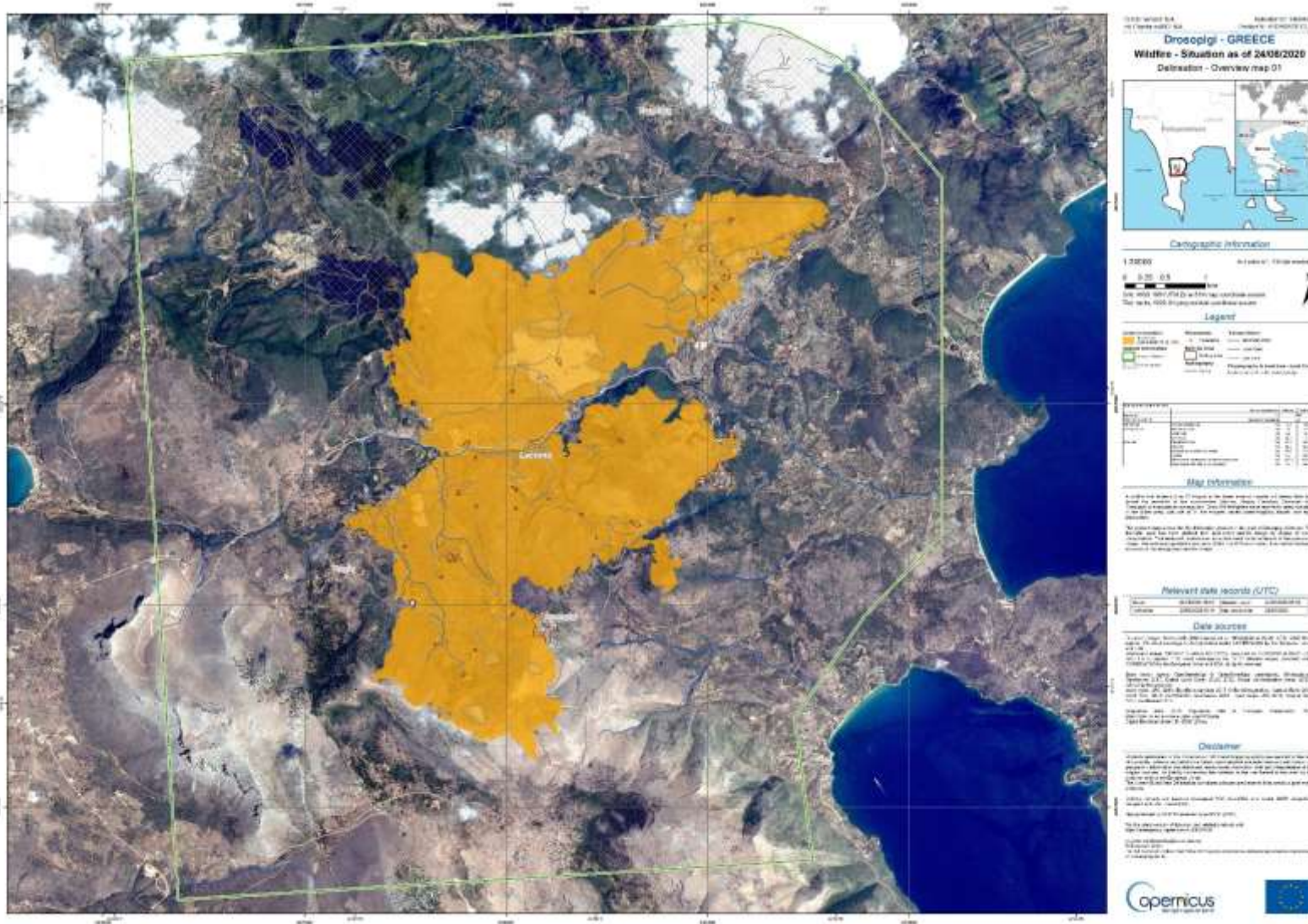


First Estimate Product (FEP)

Première information de crise dérivée d'images satellites acquises juste après l'évènement.

Contenu à définir au cas par cas, en fonction du type d'évènement et de l'image source.

COPERNICUS EMERGENCY MANAGEMENT SERVICE RAPID MAPPING - PORTFOLIO



Delineation maps (DEL)

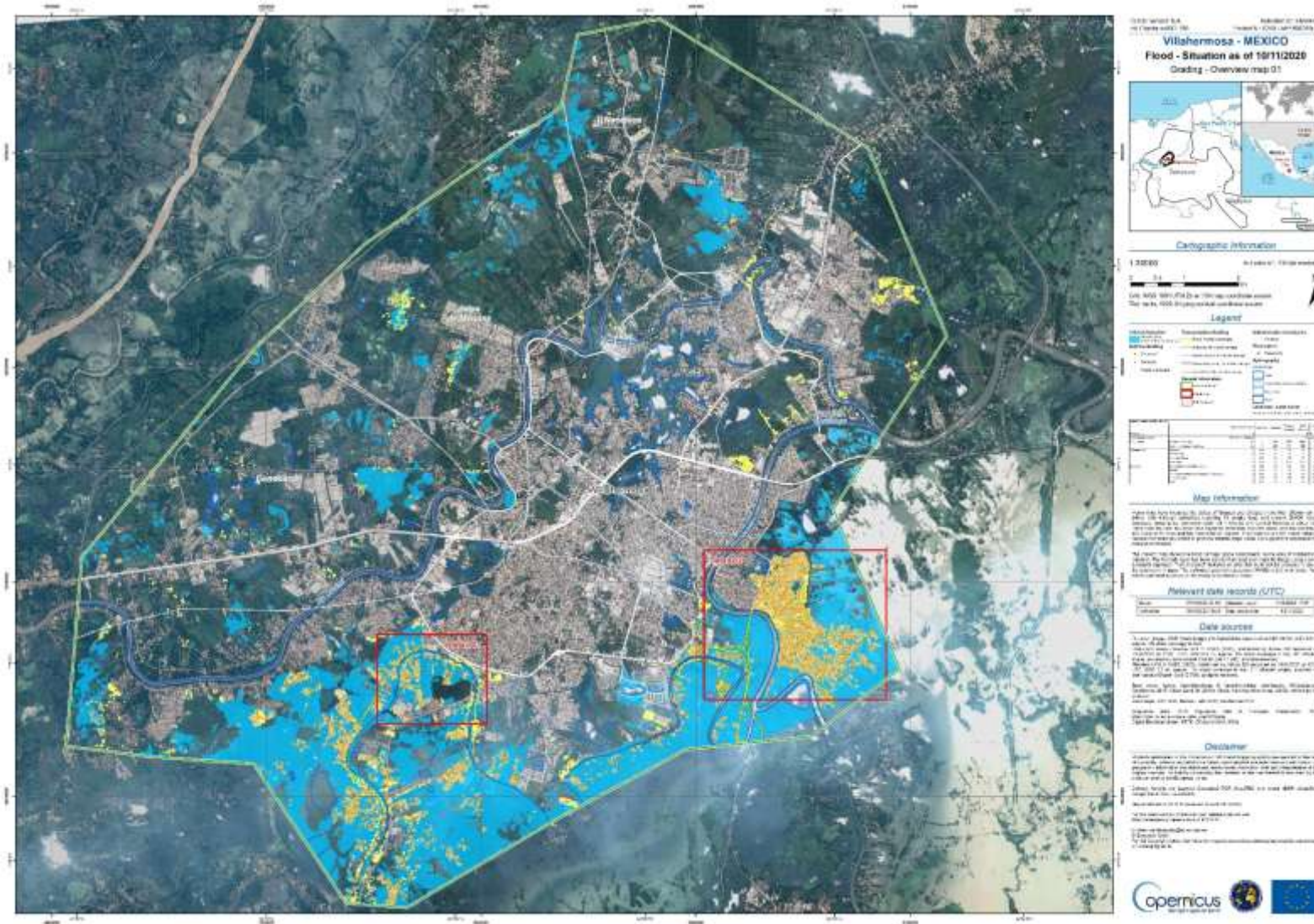
Cartographie de l'étendue d'une catastrophe à partir d'images satellites acquises juste après l'évènement.

Par exemple : emprise d'une zone brûlée ou d'une inondation.

Monitoring (MONIT)

Suivi de l'évènement sur 1 à plusieurs jours.
Utile pour les feux de forêt et les inondations.

COPERNICUS EMERGENCY MANAGEMENT SERVICE RAPID MAPPING - PORTFOLIO



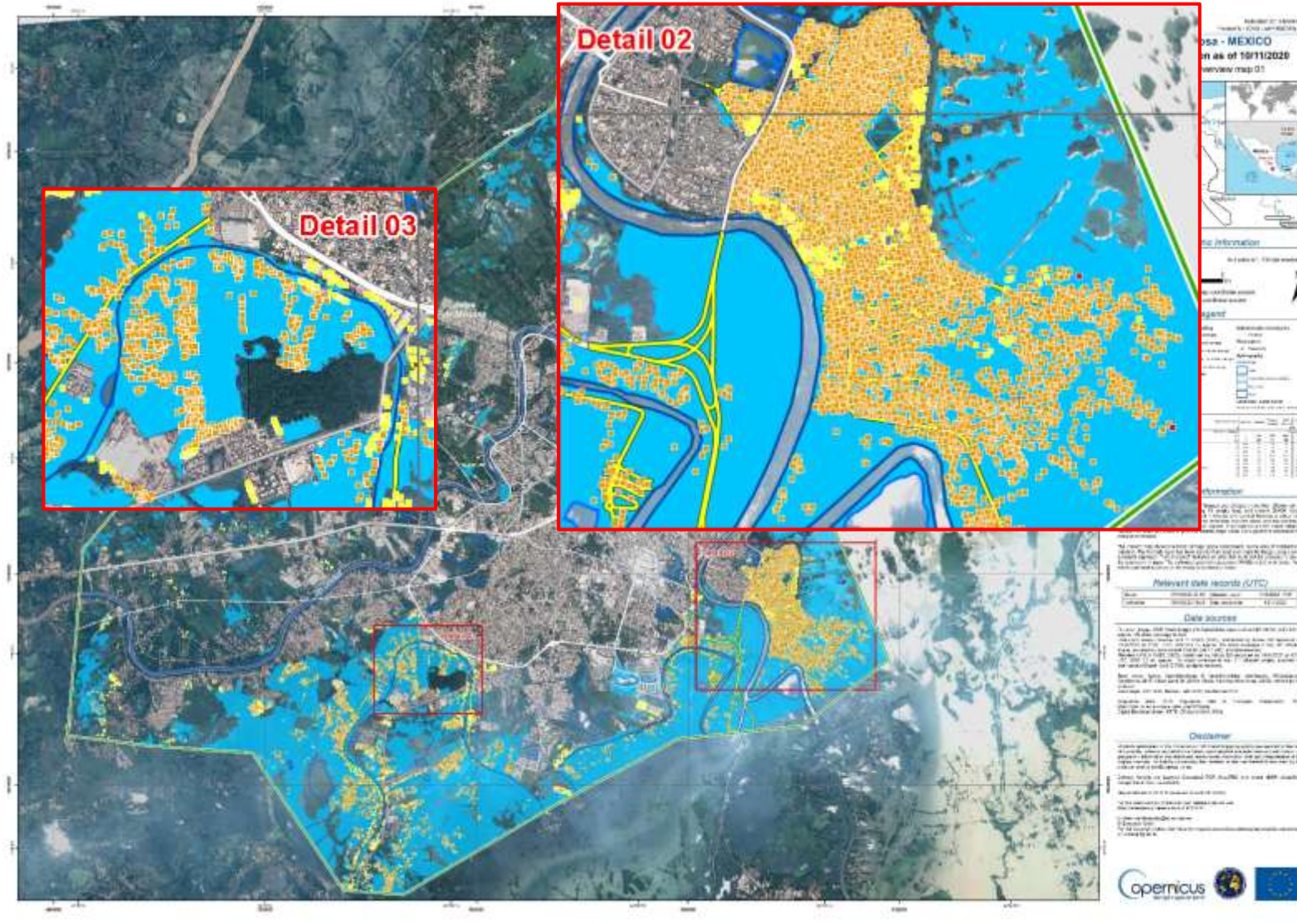
Grading maps (GRA)

Analyse de l'impact d'une catastrophe :
gradation des dégâts sur les infrastructures.

Monitoring (MONIT)

Suivi de l'évènement sur 1 à plusieurs jours.
Utile pour les feux de forêt et les inondations.

COPERNICUS EMERGENCY MANAGEMENT SERVICE RAPID MAPPING - PORTFOLIO



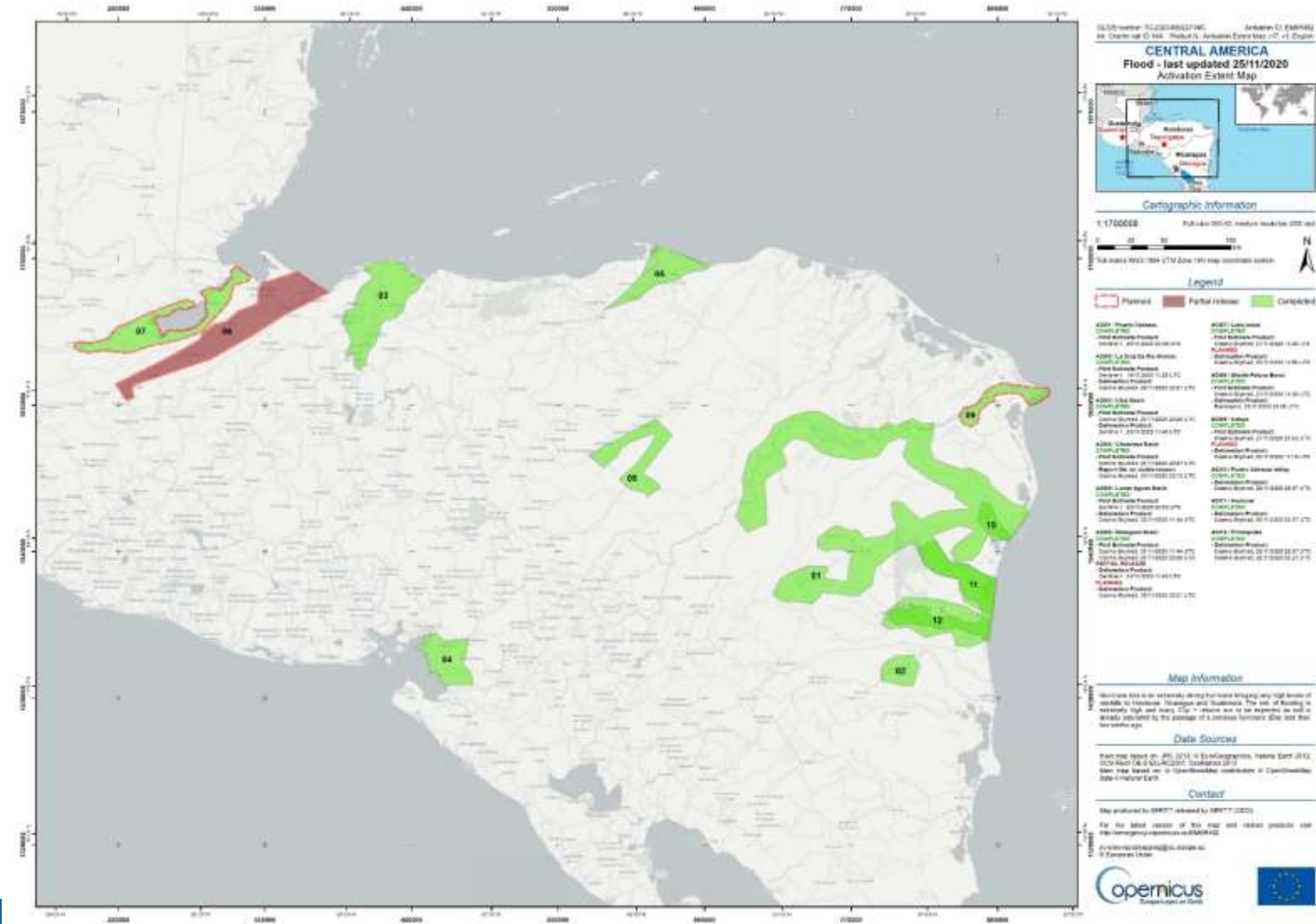
Grading maps (GRA)

Analyse de l'impact d'une catastrophe :
gradation des dégâts sur les infrastructures.

Monitoring (MONIT)

Suivi de l'évènement sur 1 à plusieurs jours.
Utile pour les feux de forêt et les inondations.

COPERNICUS EMERGENCY MANAGEMENT SERVICE RAPID MAPPING - PORTFOLIO



Activation Extent Map (AEM)
Récapitulatif de l'état d'avancement de la
production par AOI

COPERNICUS EMERGENCY MANAGEMENT SERVICE RAPID MAPPING - PORTFOLIO



Contenu et format des produits standardisés

Livrables :

➤ Vector package

Formats : SHP, JSON, KMZ

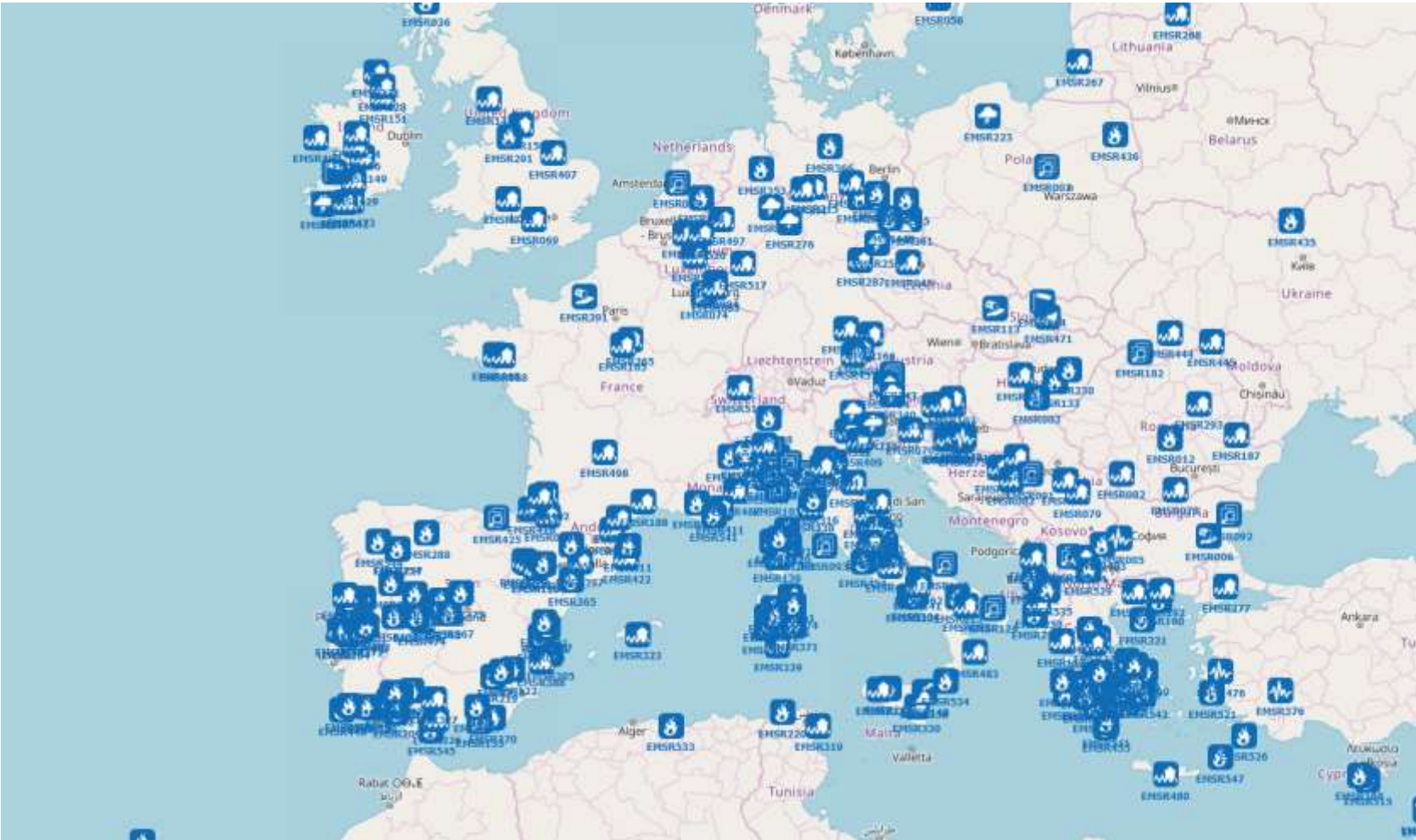
➤ Ready-to-print map (RTP)

- sur l'ensemble de l'AOI (overview)
- et/ou sur des zooms

Formats : JPEG, PDF

COPERNICUS EMERGENCY MANAGEMENT SERVICE RAPID MAPPING

Activations du service en Europe...



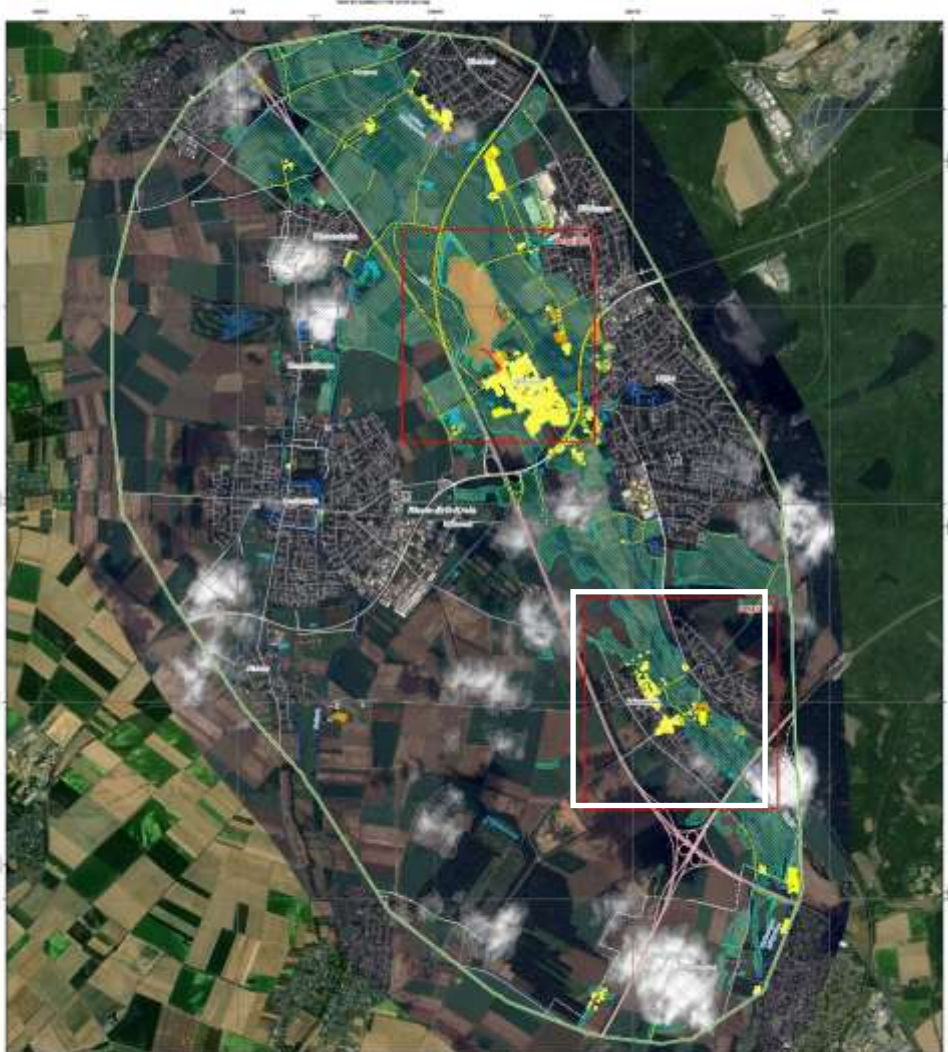
... et dans le reste du monde







Erftstadt - GERMANY
Flood - Situation as of 15/07/2021
Grading - Overview map 81



Map information
The map is based on the Copernicus Flood Service, which provides information on flood risk and damage. The map is updated regularly and is available for public use.

Data sources
The data is derived from the Copernicus Flood Service, which uses satellite data and ground-based measurements to assess flood risk and damage.

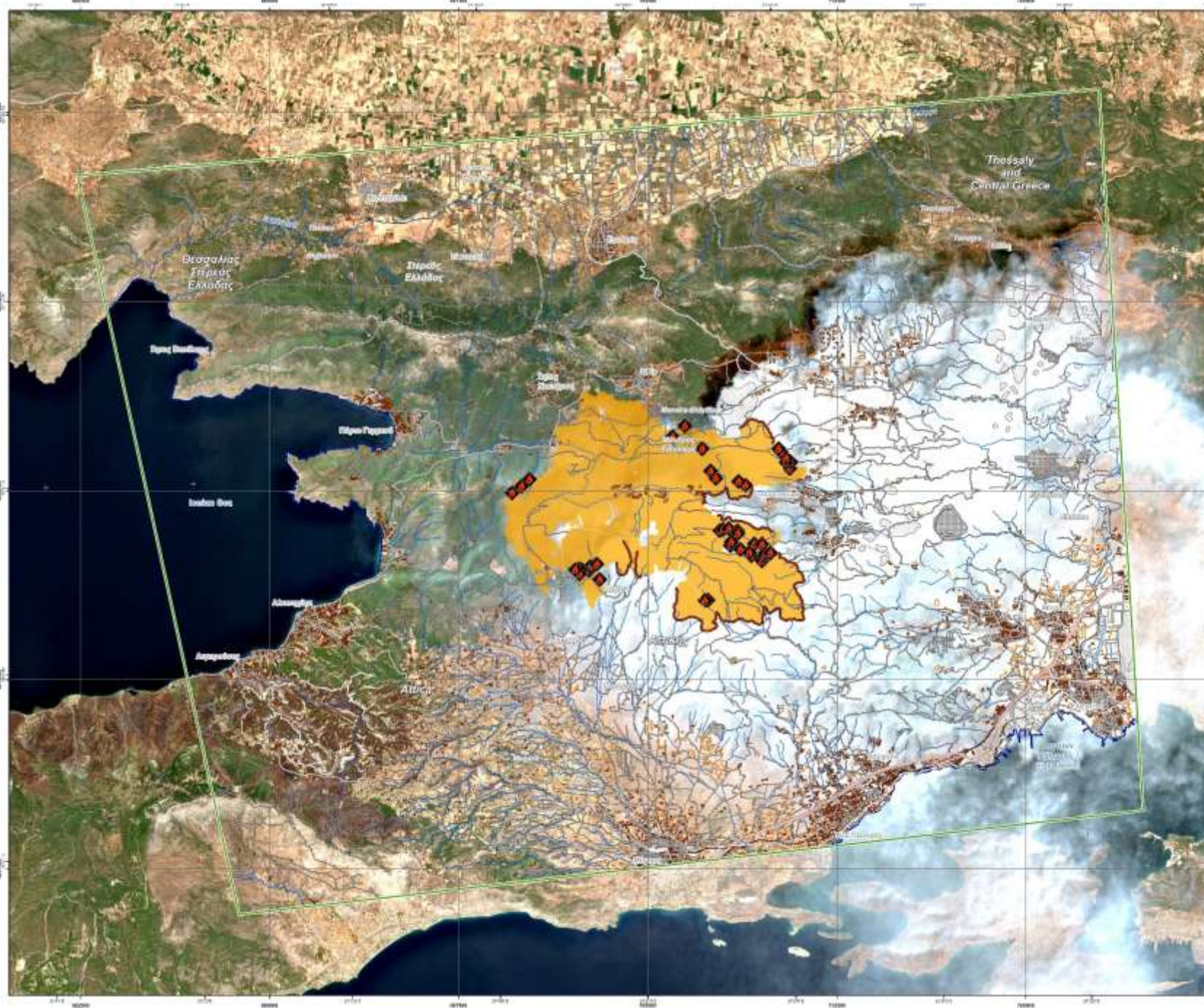
Disclaimer
The map is provided for informational purposes only and should not be used for legal or financial decisions. The Copernicus project is not responsible for any errors or omissions.

Legend
The legend describes the symbols used on the map to represent different types of flood areas and infrastructure.

Scale
The scale of the map is 1:10,000, meaning that 1 cm on the map represents 10,000 cm in reality.

North arrow
The north arrow indicates the orientation of the map, pointing towards the top of the page.





GLUE POINT 188
1st Character: 01 008
Product: 008 01 01

Author: D. LIOUROS
Publisher: 008 01 01

Bilia - GREECE

Wildfire - Situation as of 18/08/2021

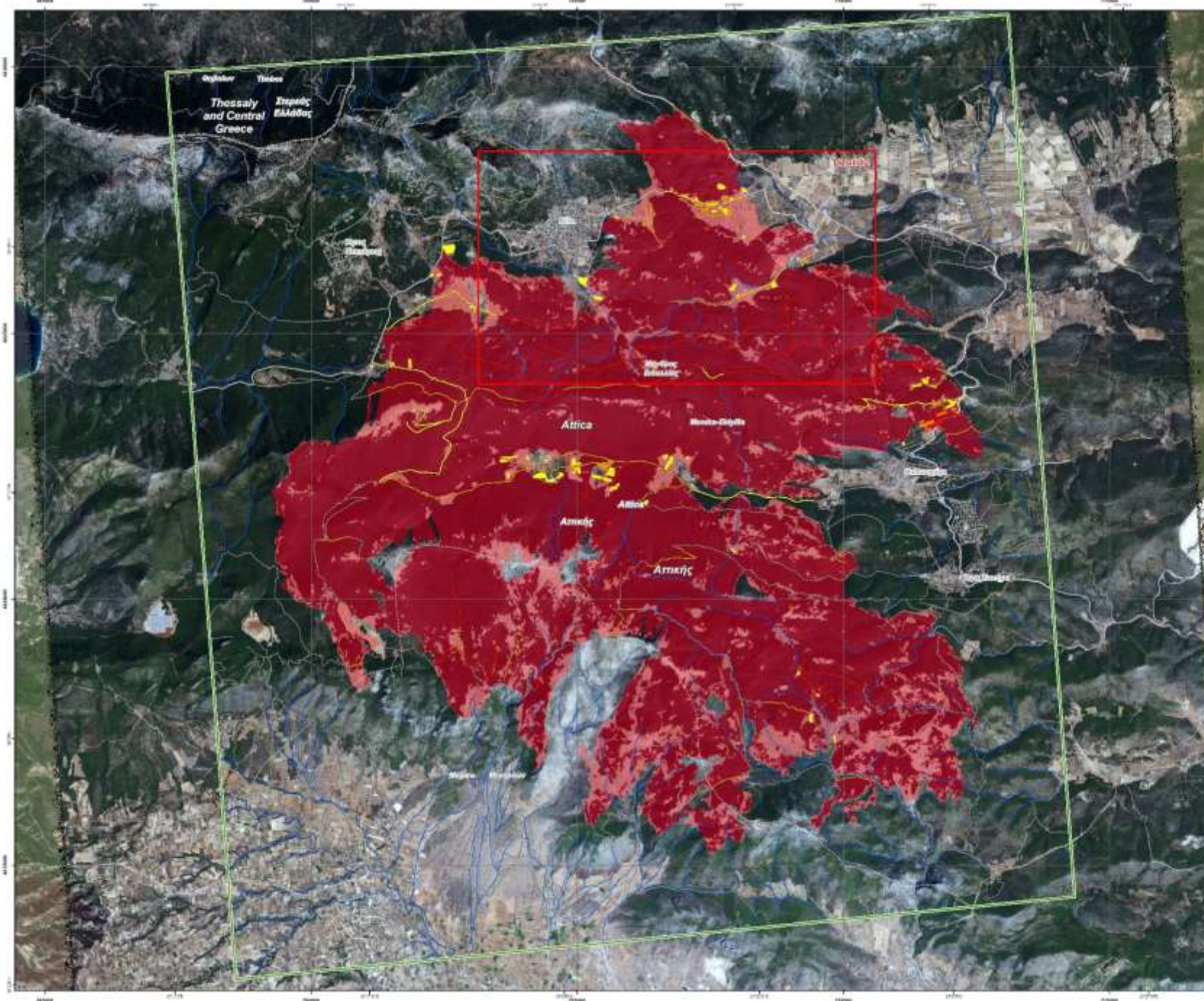
Delimitation - Overview map 01



Cartographic Information

1:70000
Full paper A1 204 cm resolution

Scale: 1:70000
Data: 2021, 2020, 2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012, 2011, 2010, 2009, 2008, 2007, 2006, 2005, 2004, 2003, 2002, 2001, 2000, 1999, 1998, 1997, 1996, 1995, 1994, 1993, 1992, 1991, 1990, 1989, 1988, 1987, 1986, 1985, 1984, 1983, 1982, 1981, 1980, 1979, 1978, 1977, 1976, 1975, 1974, 1973, 1972, 1971, 1970, 1969, 1968, 1967, 1966, 1965, 1964, 1963, 1962, 1961, 1960, 1959, 1958, 1957, 1956, 1955, 1954, 1953, 1952, 1951, 1950, 1949, 1948, 1947, 1946, 1945, 1944, 1943, 1942, 1941, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1922, 1921, 1920, 1919, 1918, 1917, 1916, 1915, 1914, 1913, 1912, 1911, 1910, 1909, 1908, 1907, 1906, 1905, 1904, 1903, 1902, 1901, 1900, 1899, 1898, 1897, 1896, 1895, 1894, 1893, 1892, 1891, 1890, 1889, 1888, 1887, 1886, 1885, 1884, 1883, 1882, 1881, 1880, 1879, 1878, 1877, 1876, 1875, 1874, 1873, 1872, 1871, 1870, 1869, 1868, 1867, 1866, 1865, 1864, 1863, 1862, 1861, 1860, 1859, 1858, 1857, 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GLUE number: 166
1st Character: 01
Revision ID: 01082021
Revision No: 01082021

Bilia - GREECE

Wildfire - Situation as of 25/08/2021

Grading Monday - Overview map 01



Cartographic Information

1:30000
Scale: 1:30000
Projection: UTM
Datum: WGS 1984
Units: Meter

Legend

Legend	Legend
Wildfire	Water
Forest	Urban
Open land	Infrastructure
Grassland	Other
Water	Other
Urban	Other
Infrastructure	Other
Other	Other

Map Information

Available data sources for this map are: 1. Satellite imagery (Sentinel-2, Landsat-8, etc.) 2. Topographic data (DEM, etc.) 3. Administrative data (municipalities, etc.) 4. Other data (e.g., road network, etc.)

Relevant data records (UTC)

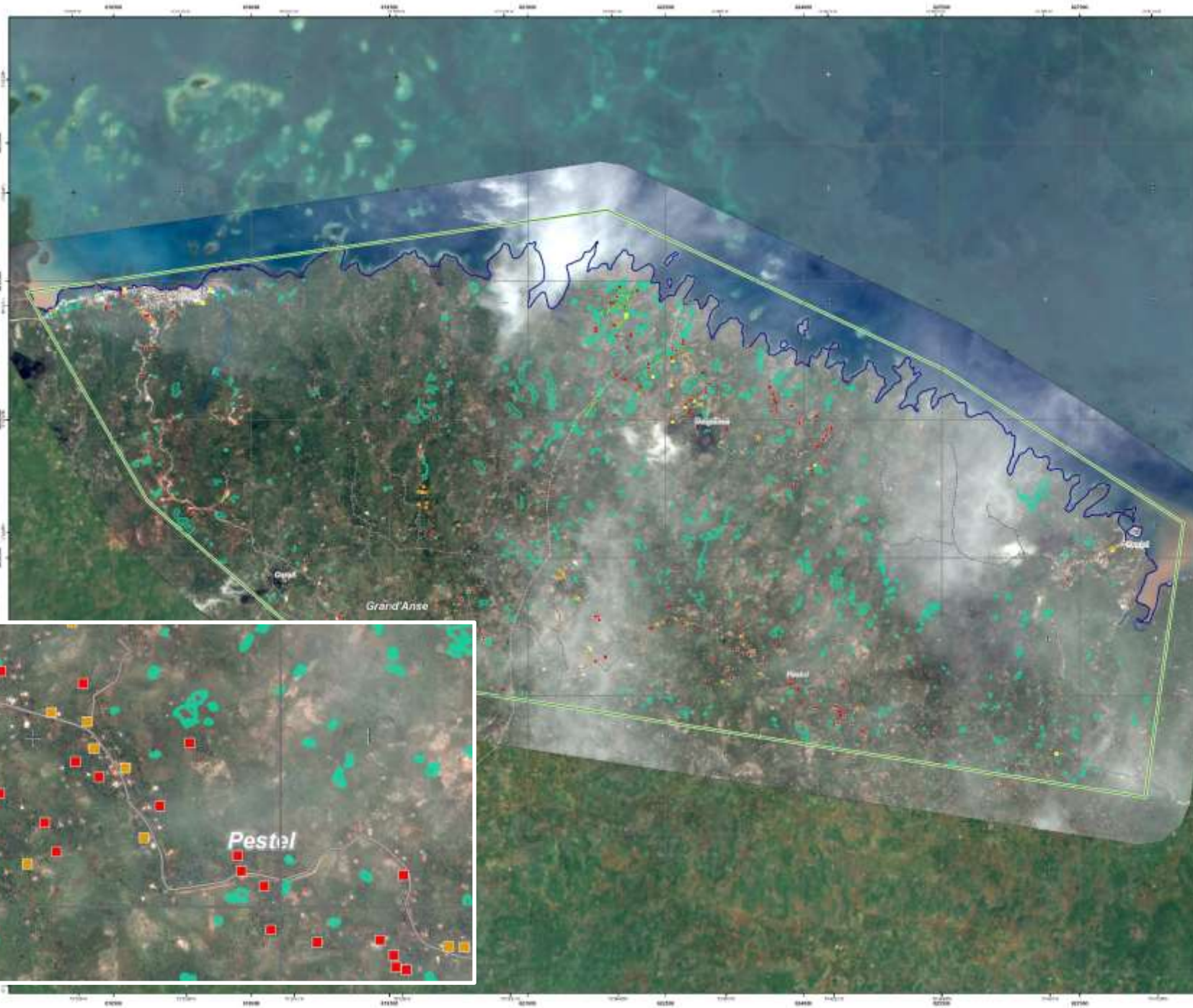
Source	Record ID	Record Date	Record Description
Source 1	Record 1	2021-08-25	Record 1

Data sources

1. Satellite imagery (Sentinel-2, Landsat-8, etc.) 2. Topographic data (DEM, etc.) 3. Administrative data (municipalities, etc.) 4. Other data (e.g., road network, etc.)

Disclaimer

This map is for informational purposes only. It is not intended to be used for any other purpose. The map is not a guarantee of accuracy. The map is not a guarantee of completeness. The map is not a guarantee of timeliness. The map is not a guarantee of any other thing.



GLEE, number LG-252-00018-HH
Mr. Charles W. 57 79

CORAIL - HAITI
Earthquake - Situation as of 18/08/2021
Grading - Overview map 01



Cartographic information

0 0.25 0.5 1 km

WGS 1984 UTM Zone 18N Map coordinate system used for maps. WGS 84 geographical coordinate system.

Legend

The diagram shows a cell with various organelles and their functions:

- Cell membrane**: The outer boundary of the cell.
- Cell wall**: The rigid structure surrounding the cell membrane.
- Chloroplasts**: Organelles responsible for photosynthesis.
- Mitochondria**: Organelles responsible for cellular respiration.
- Nucleus**: The central organelle containing genetic material.
- Rough ER**: Endoplasmic reticulum studded with ribosomes.
- Smooth ER**: Endoplasmic reticulum without ribosomes.
- Golgi apparatus**: A series of stacked sacs for processing and transport.
- Lysosomes**: Organelles containing digestive enzymes.
- Vacuole**: A large fluid-filled sac for storage.
- Centrioles**: Two cylindrical structures involved in cell division.
- Cytoskeleton**: A network of fibers providing structural support.

Table 1. Demographic characteristics of the study population		Age (years)		Gender		Education (years)		Occupation	
Characteristic	n	Mean	SD	Male	Female	Mean	SD	Mean	SD
Age (years)	100	45.2	12.5	55	45	12.5	3.5	10.5	2.5
Gender	100			55	45				
Education (years)	100			55	45				
Occupation	100			55	45				

Map information

A strong negative correlation of 7.2 is found between the number of hours spent in the office and the number of hours spent in the home. The correlation of 0.4 is found between the number of hours spent in the office and the number of hours spent in the home. The correlation of 0.4 is found between the number of hours spent in the office and the number of hours spent in the home.

Relevant date records (UTC)

Book	475.377 1111	Number of P	475.377 1111
Author	475.377 1111	Age of person	1000-1111

Data sources

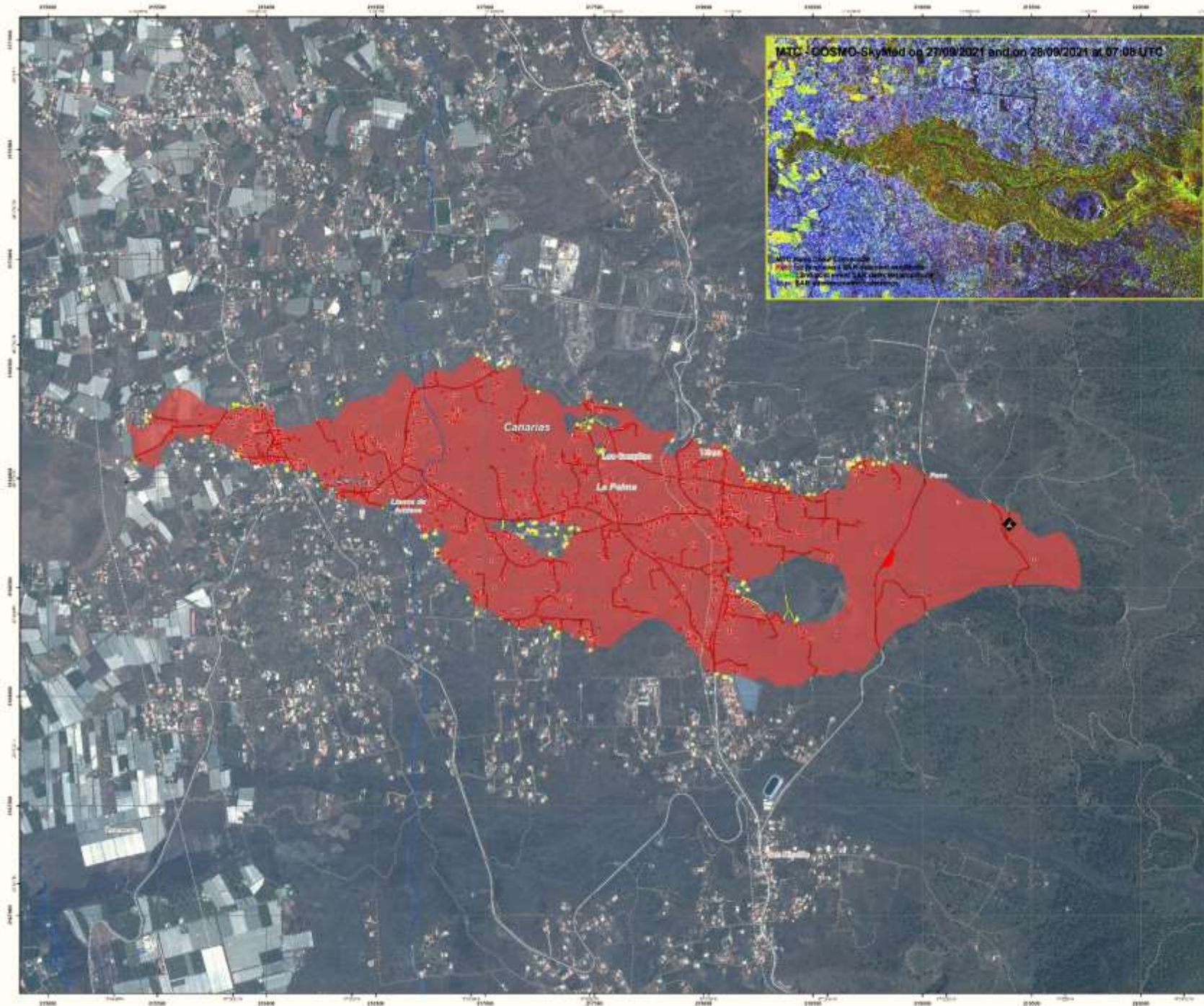
[illegible][illegible]

Disclaimer

Practical structures in this OpenOffice 3.5-based template are also useful to the best of my ability, with a few caveats. I have, unfortunately, the printing date and/or version. All graphical information has limitations due to screen resolution, size and resolution of the source images. No limit to copying. The contents of the eye itself is captured by the printer and not the computer. Just.

This paper was first presented at the 1987 Annual Meeting of the American Psychological Association.

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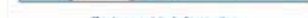




Kerathos - GREECE

Wildfire - Situation as of 28/09/2021

ପ୍ରକାଶନ - ଡିସେମ୍ବର ୫୫ ଓ ୨୦୦୩/୨୦୧୧
ପ୍ରକାଶକ - ଶ୍ରୀମତୀ ସୁମିତ୍ରା ଦାଶ



Full cycle A1 2010 (p) results (continued)



Legend

☐ **Normal** ☐ **Abnormal** ☐ **Unknown**

Figure 10.10: A plot of the function $f(x) = \sin(x)$ for $x \in [0, 2\pi]$. The x-axis is labeled x and ranges from 0 to 2π . The y-axis is labeled $f(x)$ and ranges from -1 to 1. The curve starts at (0,0), reaches a maximum at $(\pi/2, 1)$, crosses the x-axis at $(\pi, 0)$, reaches a minimum at $(3\pi/2, -1)$, and ends at $(2\pi, 0)$.

Map information

about 16 hours, leaving behind the strong, white, soft, barbed, it about how
the is between them, what the are, it together, very great, according to the

The present study tested the storage gate hypothesis in the area of hippocampal LTP. The storage gate can be viewed as a neural switch that is closed by stimuli of visual information, the goal of which is to allow the stimulus previously entering PFC to be stored in LTP. Thus, visual information, stimulus of the storage gate, can be

Event	27-07-2021 13:36	Publication de la	20210727 13:36
Publication	27-07-2021 13:36	de la publication	20210727 13:36

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Received: Dec. 3-05; Accepted: Oct. 5; Internet: November, 2005
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Disclaimer

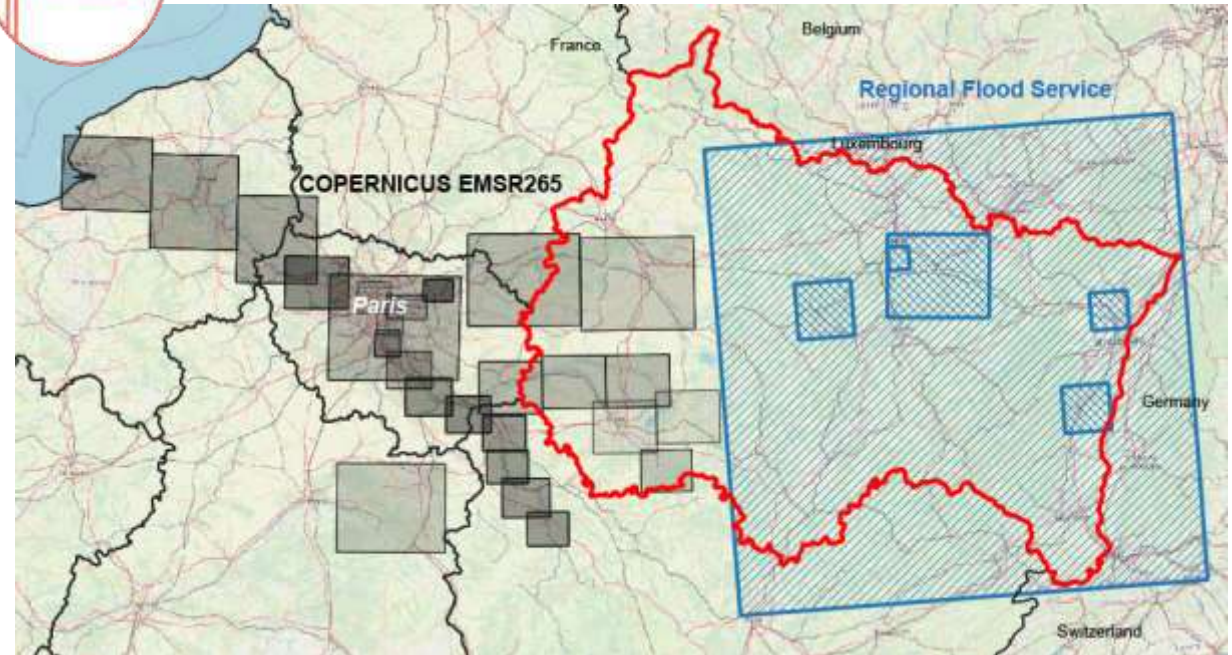
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For the latest details of this new distributed system visit <http://www.ibm.com/press/us/04/040401.htm>

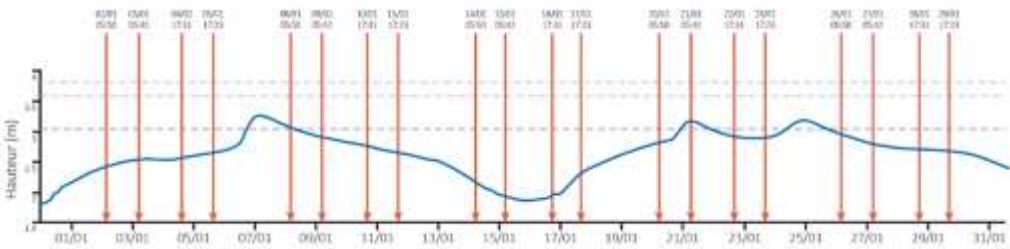
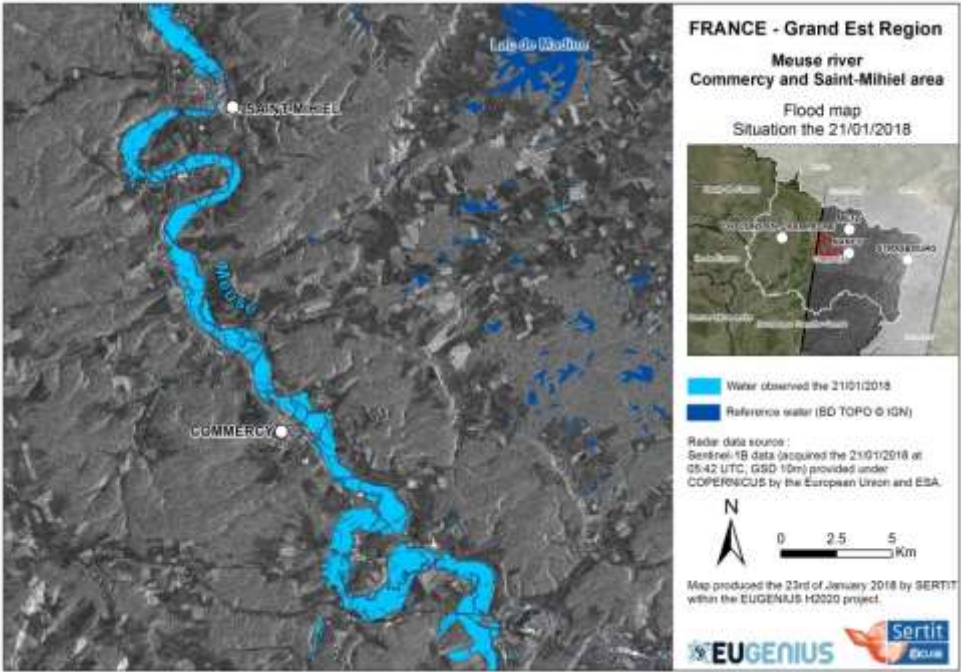
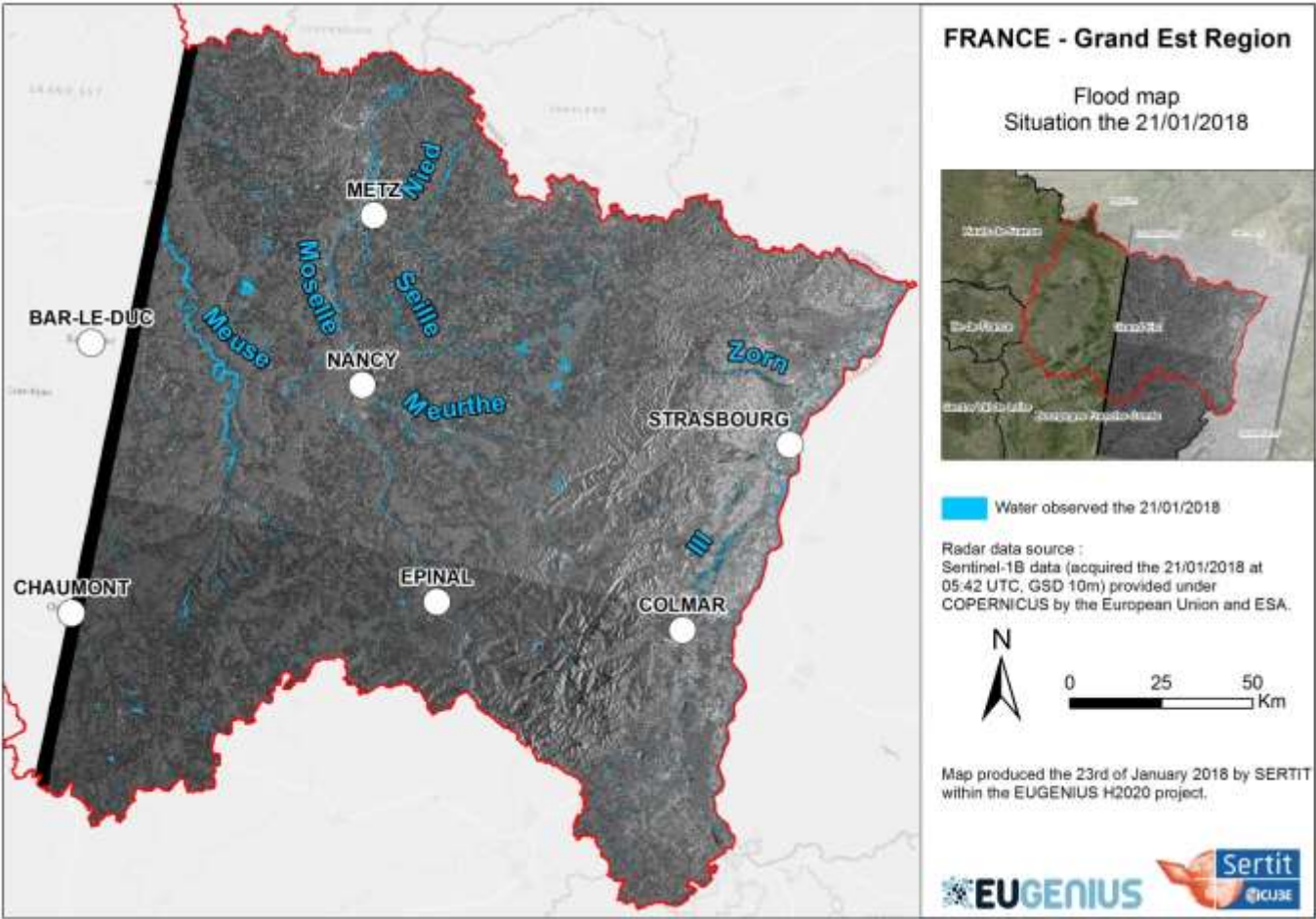
The full "Visualaid" online web site has been developed separately as the knowledge base for the system and is being updated.

DISPOSITIF RÉGIONAL DU SERTIT DANS LE GRAND EST

- La tempête Eleanor a touché l'Europe de l'Ouest les 2 et 3 janvier 2018, apportant des vents forts et de fortes pluies qui ont duré presque tout le mois
- Activation de Copernicus EMS Rapid Mapping sur le nord de la France pour les crues de la Seine, de la Marne et des principaux affluents (EMSR265) par la Sécurité Civile française
- Évènement de moins grande ampleur sur la région Grand-Est
- Le service régional de cartographie des crues (SERTIT) a suivi l'évolution de la situation des principaux cours d'eau du nord-est de la France avec l'exploitation des données Sentinel-1 pour des acteurs locaux (DREAL, DDT, ...)



DISPOSITIF RÉGIONAL DU SERTIT DANS LE GRAND EST

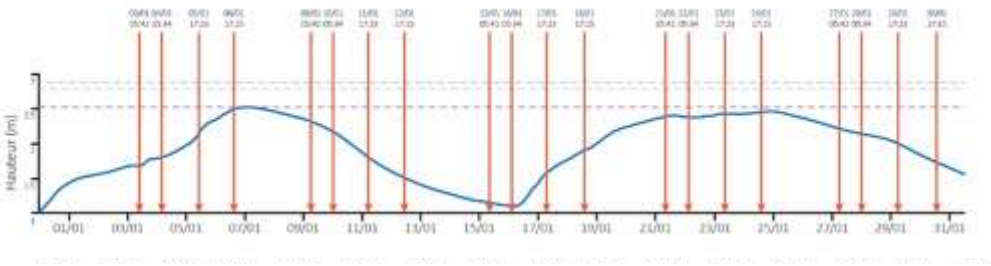
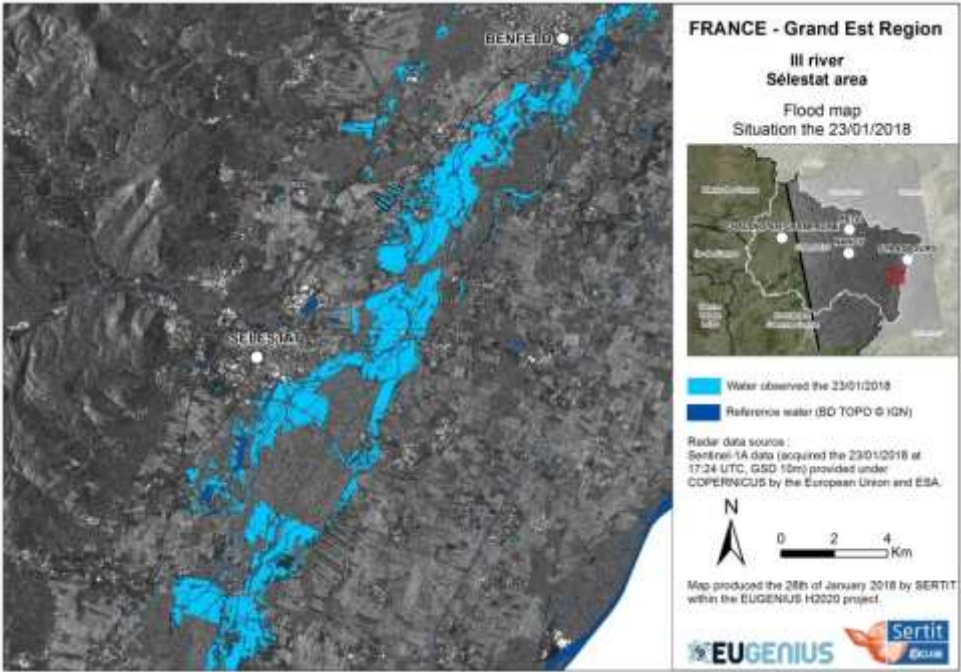
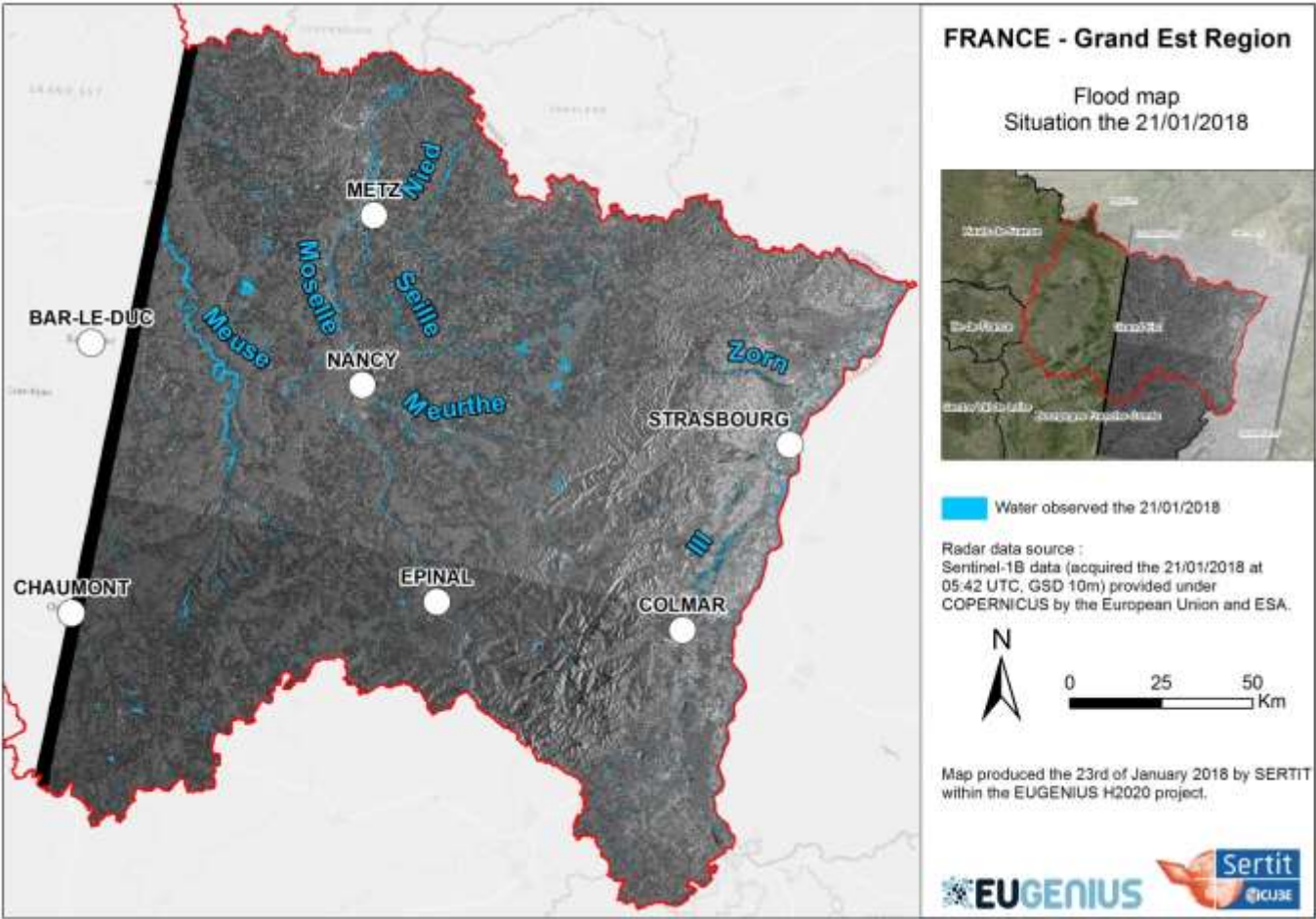


Suivi durant 1 mois avec Sentinel-1 : 20 observations



Moselle, Meuse, Nied, Saône, Ill, Zorn rivers flooded areas have been mapped from Sentinel-1 imagery.

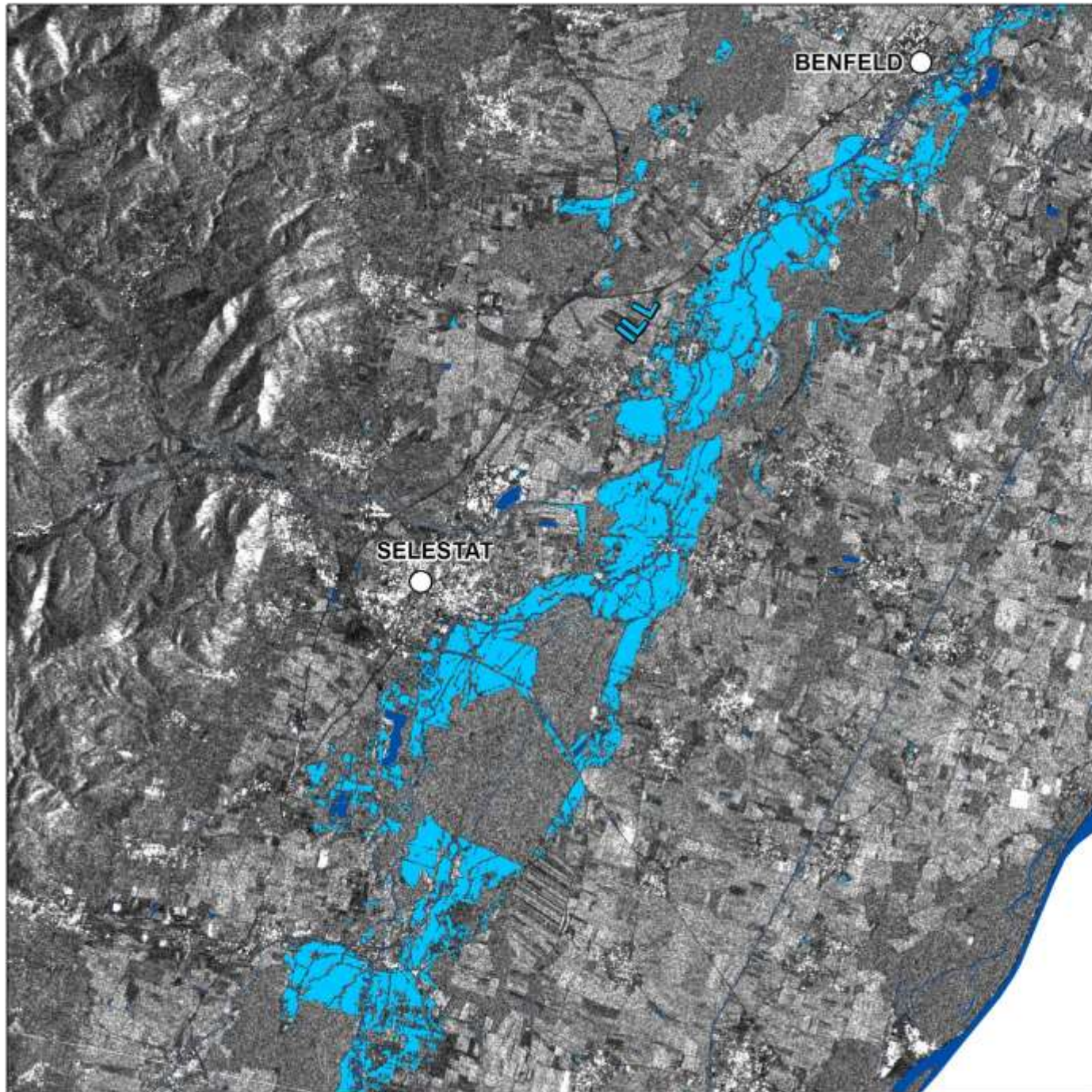
DISPOSITIF RÉGIONAL DU SERTIT DANS LE GRAND EST



Suivi durant 1 mois avec Sentinel-1 : 20 observations



Moselle, Meuse, Nied, Seille, Ill, Zorn rivers flooded areas have been mapped from Sentinel-1 imagery.



FRANCE - Grand Est Region

Ill river
Sélestat area

Flood map
Situation the 21/01/2018



 Water observed the 21/01/2018

 Reference water (BD TOPO © IGN)

Radar data source :
Sentinel-1B data (acquired the 21/01/2018 at
05:42 UTC, GSD 10m) provided under
COPERNICUS by the European Union and ESA.

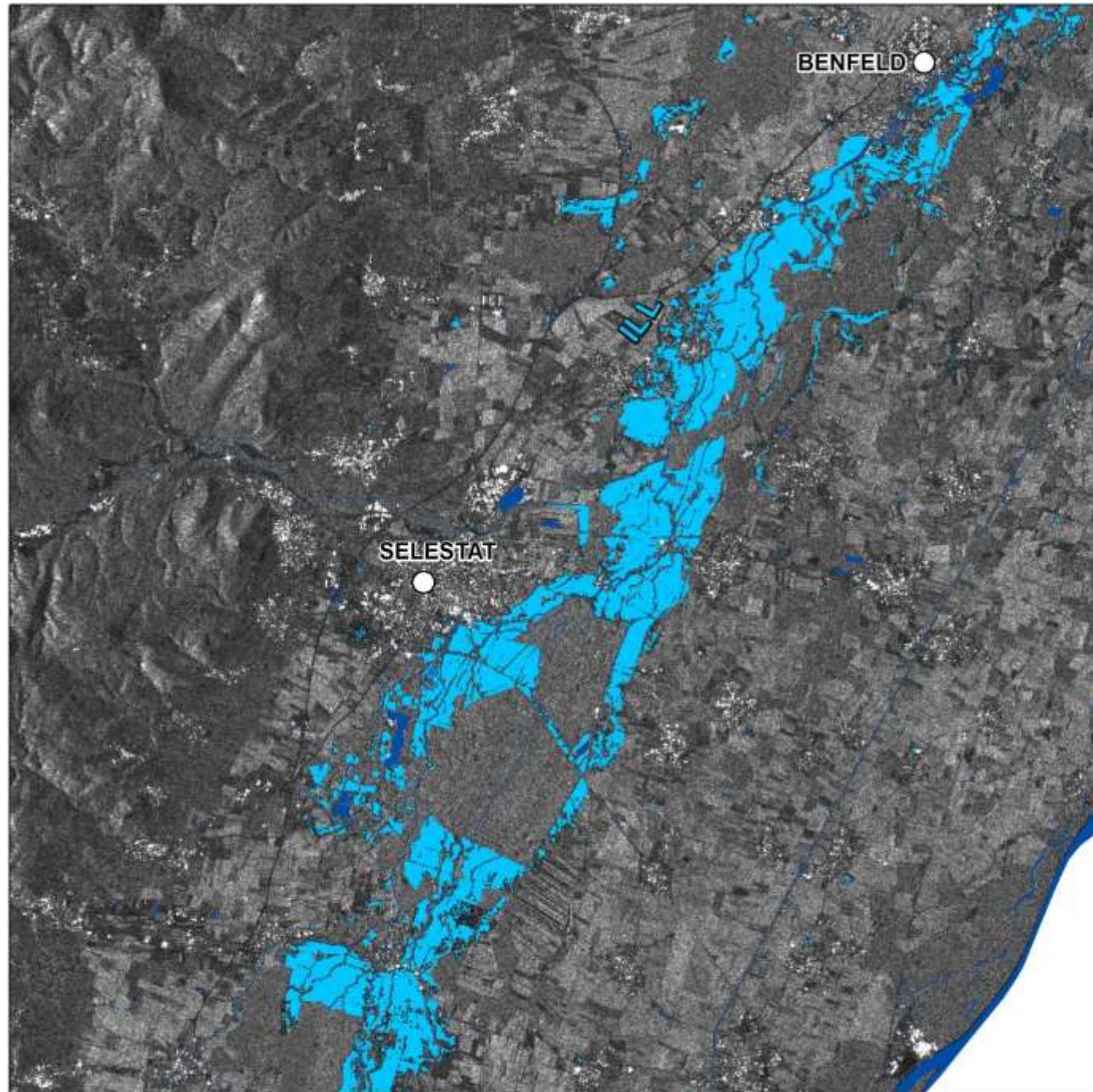


0 2 4
Km

Map produced the 26th of January 2018 by SERTIT
within the EUGENIUS H2020 project.

 **EUGENIUS**





FRANCE - Grand Est Region

Ill river Sélestat area

Flood map
Situation the 23/01/2018



 Water observed the 23/01/2018

 Reference water (BD TOPO © IGN)

Radar data source :
Sentinel-1A data (acquired the 23/01/2018 at
17:24 UTC, GSD 10m) provided under
COPERNICUS by the European Union and ESA.

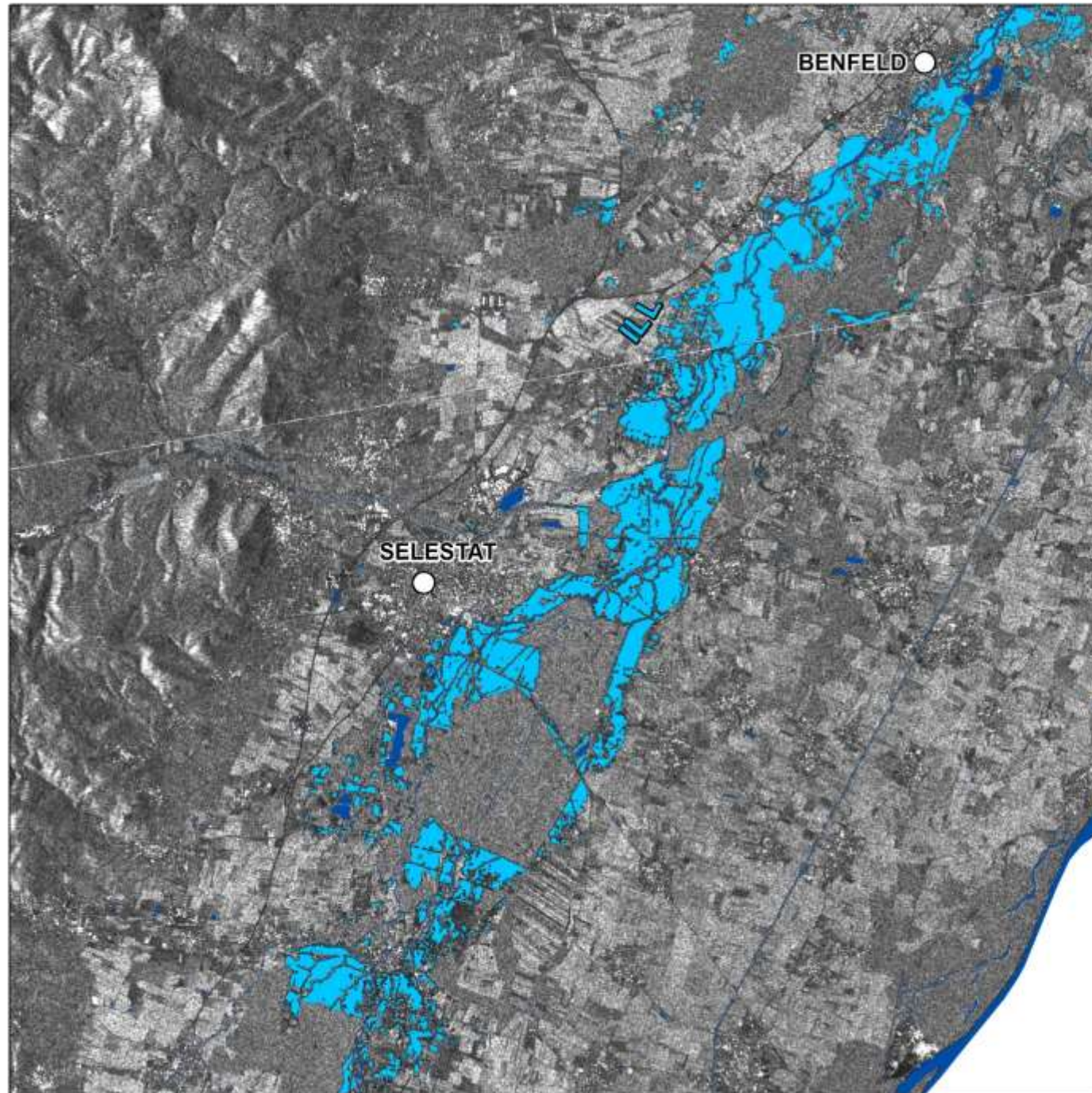


0 2 4
Km

Map produced the 26th of January 2018 by SERTIT
within the EUGENIUS H2020 project.

 EUGENIUS





FRANCE - Grand Est Region

Ill river Sélestat area

Flood map
Situation the 24/01/2018



-  Water observed the 24/01/2018
-  Reference water (BD TOPO © IGN)

Radar data source :
Sentinel-1B data (acquired the 24/01/2018 at
17:15 UTC, GSD 10m) provided under
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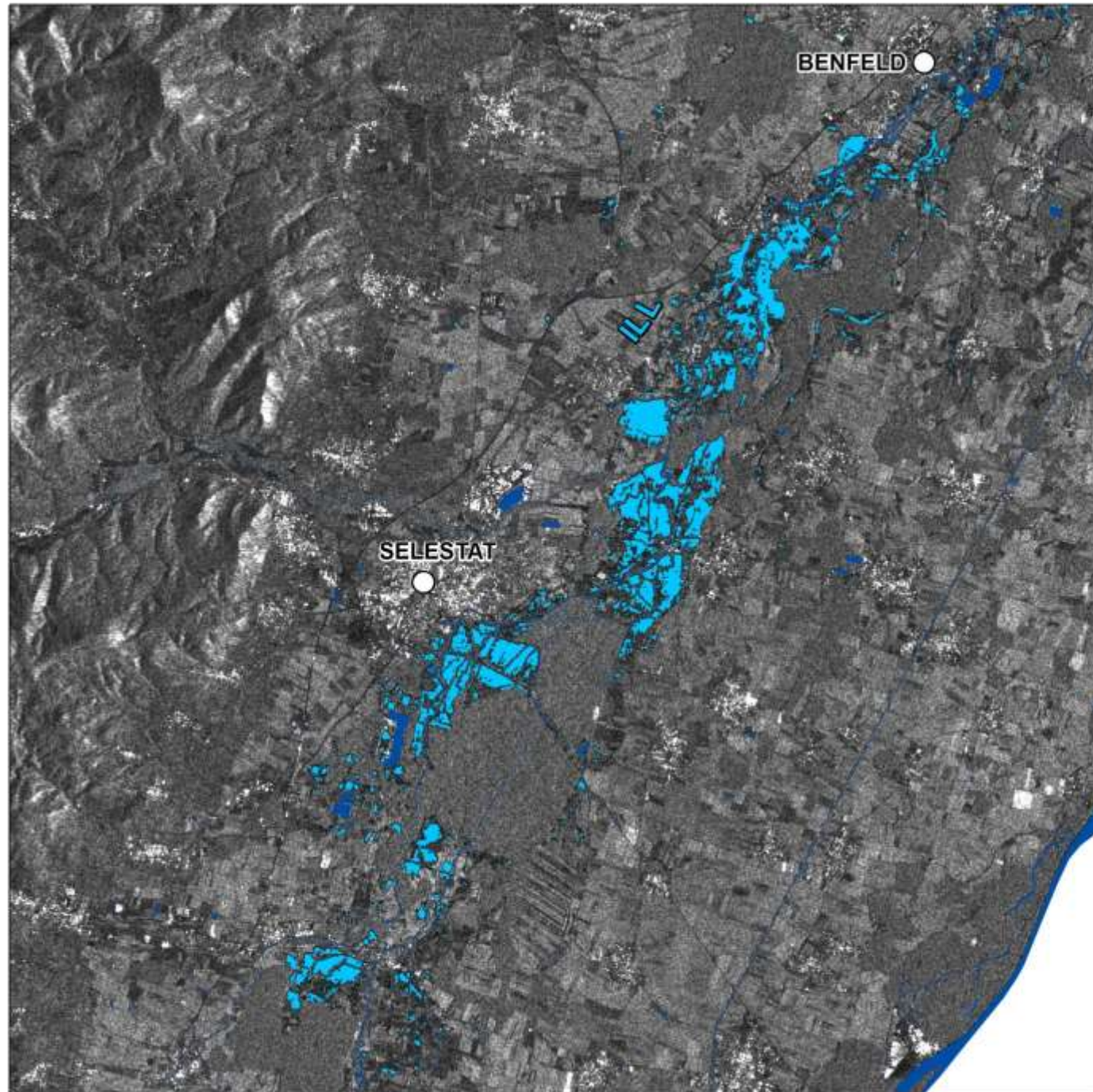


0 2 4 Km

Map produced the 7th of February 2018 by SERTIT
within the EUGENIUS H2020 project.

 **EUGENIUS**





FRANCE - Grand Est Region

Ill river
Sélestat area

Flood map
Situation the 27/01/2018



-  Water observed the 27/01/2018
-  Reference water (BD TOPO © IGN)

Radar data source :
Sentinel-1A data (acquired the 27/01/2018 at 05:42 UTC, GSD 10m) provided under COPERNICUS by the European Union and ESA.

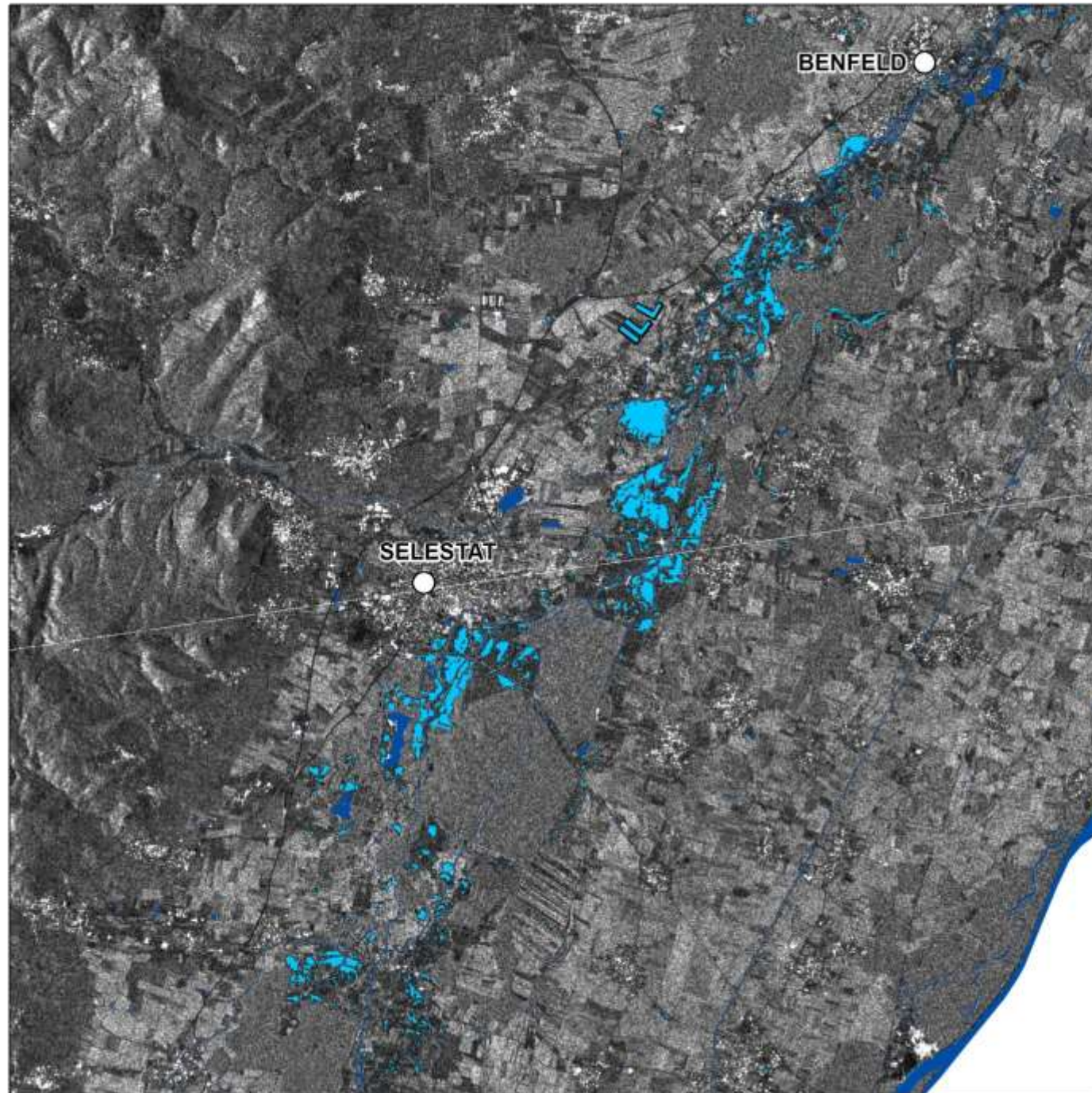


0 2 4 Km

Map produced the 29th of January 2018 by SERTIT within the EUGENIUS H2020 project.

 **EUGENIUS**





FRANCE - Grand Est Region

Ill river Sélestat area

Flood map
Situation the 29/01/2018



-  Water observed the 29/01/2018
-  Reference water (BD TOPO © IGN)

Radar data source :
Sentinel-1B data (acquired the 29/01/2018 at 17:23 UTC, GSD 10m) provided under COPERNICUS by the European Union and ESA.

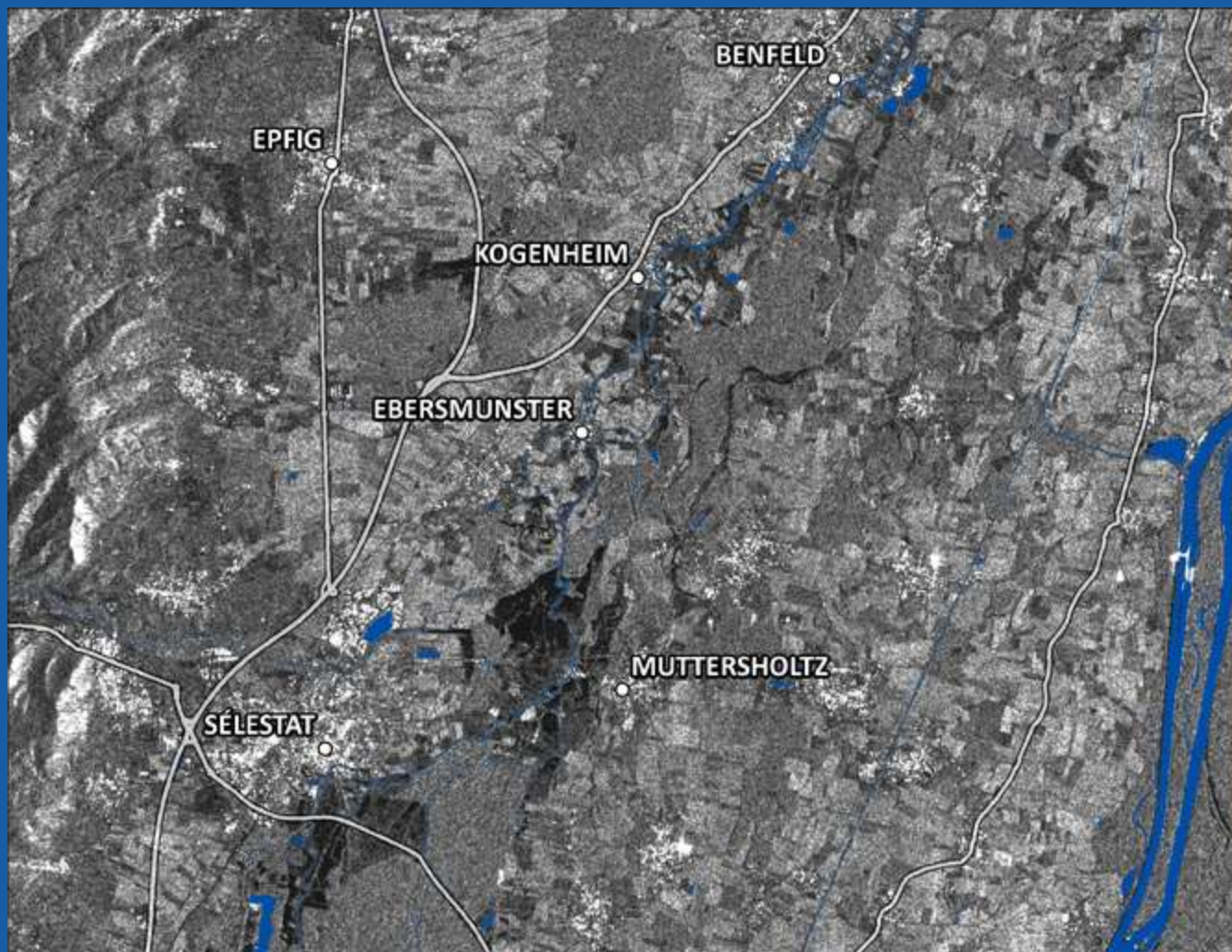


0 2 4 Km

Map produced the 1st of February 2018 by SERTIT within the EUGENIUS H2020 project.

 **EUGENIUS**





Flood in Bas-Rhin *Grand-Est, France*

Observation the
29/01/2021

Sentinel-1
©Copernicus data (2021)

2 km

Copernicus
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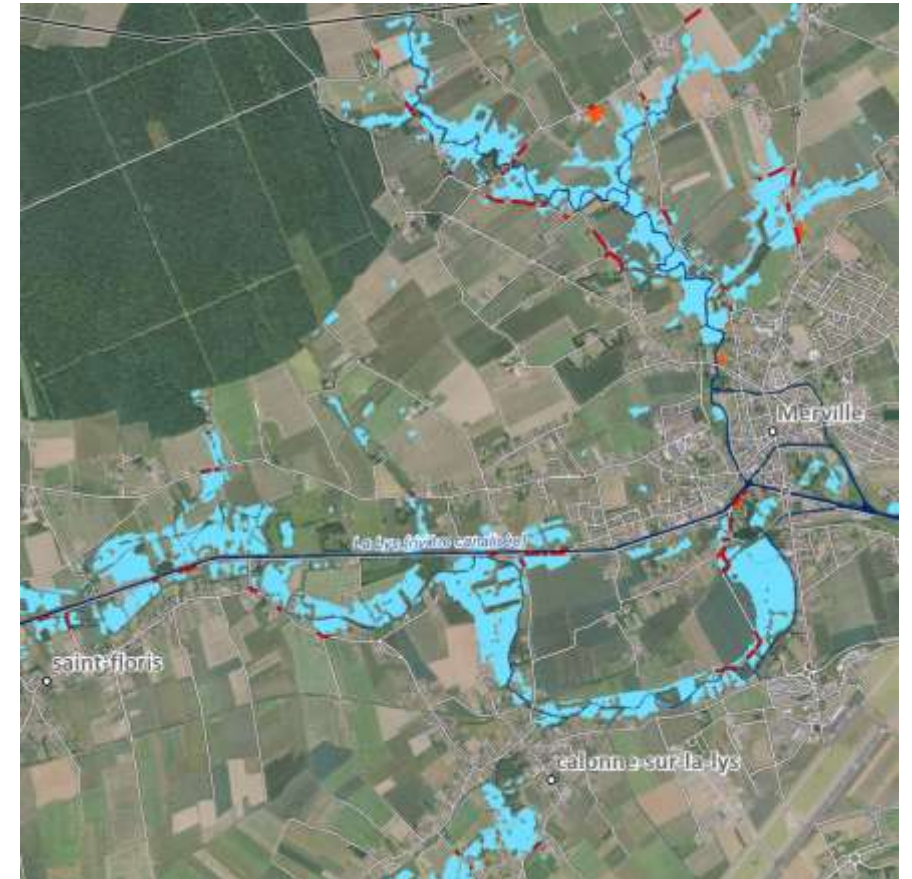
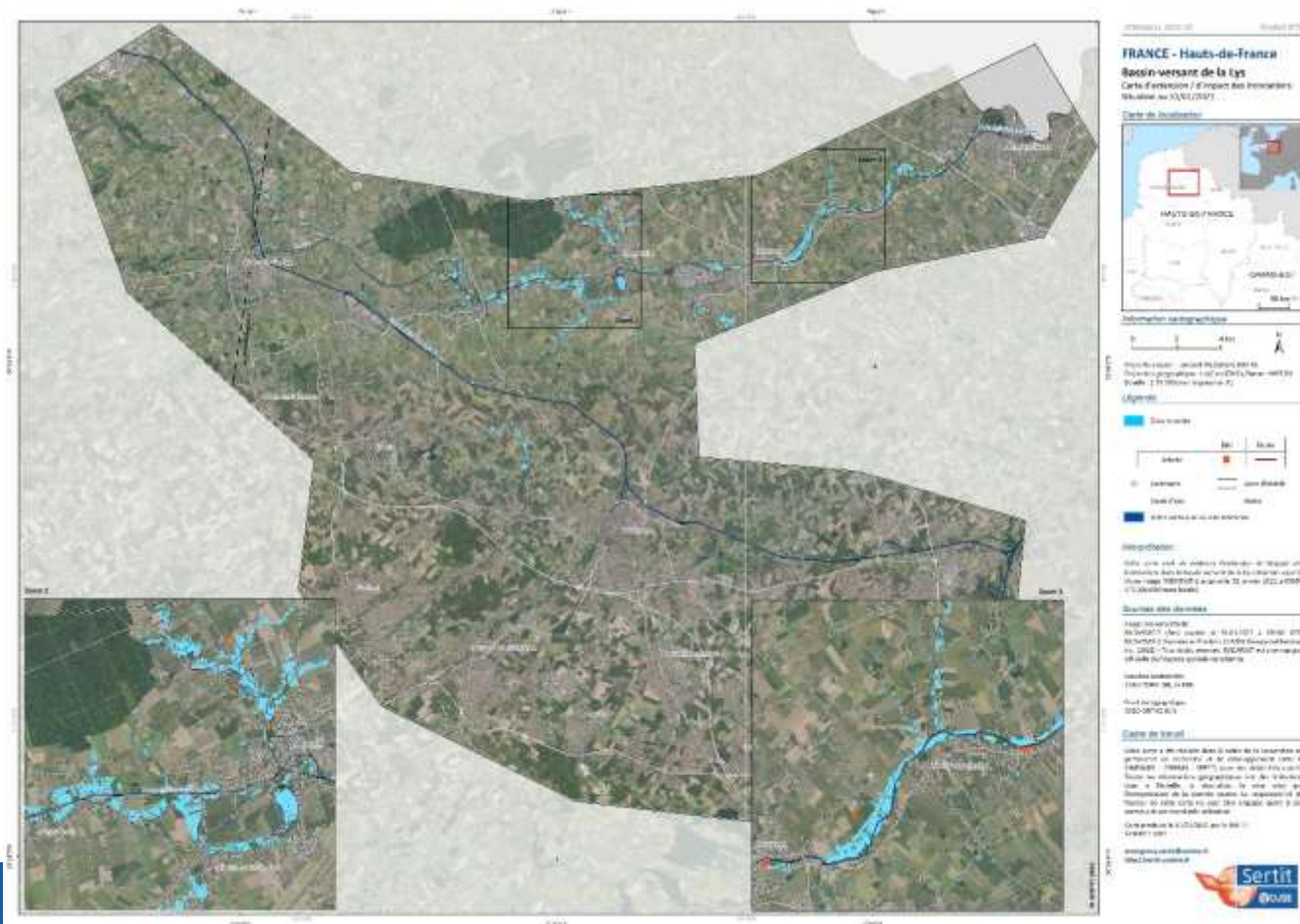
DISPOSITIF RÉGIONAL DU SERTIT DANS LE BASSIN VERSANT DE LA LYS (NORD)



- Utilisateur : SYMSAGEL (Syndicat Mixte pour le SAGE de la Lys), partenariat depuis 2018
- Type d'évènement : inondations
- Service 24/7 du SERTIT, livraison en 12h après réception des images satellites
- Produits : extension et impact des inondations, suivi, extension maximum
- Basé sur des images satellite, extension prévue vers le drone prochainement

DISPOSITIF RÉGIONAL DU SERTIT DANS LE BASSIN VERSANT DE LA LYS (NORD)

- Activation du service de cartographie rapide régional par le Symsagel (Région Hauts de France) suite aux inondations ayant affecté la plaine de la Lys fin janvier, début février 2021.



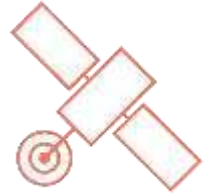
PERSPECTIVES ET CONCLUSION



- Un dispositif régional est en cours de mise en place dans le Sud Est de la France (PACA) avec d'autres partenaires pour les besoins des acteurs locaux (lors d'inondations, incendies notamment)

- Le Service de Cartographie Rapide du SERTIT peut répondre aux besoins de tous
 - les acteurs de la gestion des risques et des crises,
 - les collectivités locales,
 - les services déconcentrés de l'Etat (comme les DREAL, DDT...)
 - les assureurs
 - ...

Contact



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