

6th Annual UN-SPIDER Conference in Beijing

United Nations International Conference on Space-based Technologies for
Disaster Risk Reduction - "Understanding Disaster Risk"

Plenary Session 3 - Access to data and information for risk assessment
20 September 2016

Processing and sharing of space-based geospatial information for Disaster Management



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ITHACA

Non-profit association

Mission

Use of Geomatics techniques in support of emergency management, with a focus on disaster preparedness and response



Founders:



POLITECNICO
DI TORINO

Donors:



In cooperation with:



Main Topics

Excerpts from the Conference [information note](#) about the focus of Section 3 «Access to data and information for risk assessment»:

- *“Various types of space-based and geospatial information needed for risk assessment”*
- *“Access to such information” and “Ways to share information”*
- *“Information available in public domain” and “range of satellite data available”*

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Various types of space-based and geospatial information needed for risk assessment

[Sendai framework](#) > Priority 1

25.a) “ To strengthen [...] **disaster multi-hazard early warning systems**”

Monitoring/Now-Casting systems developed by ITHACA:

- Extreme Rainfall Detection System (ERDS)
- Global Drought Monitoring System
- Flood hazard delineation tool

25.a) “[...] to **record and share disaster losses and relevant disaggregated data** and statistics”

- *Copernicus Emergency Management Service*
(© European Union, 2012-2016)

ITHACA Extreme Rainfall Detection System (ERDS)

It is the result of a research activity devoted to the monitoring and forecasting of extreme precipitation at global scale.

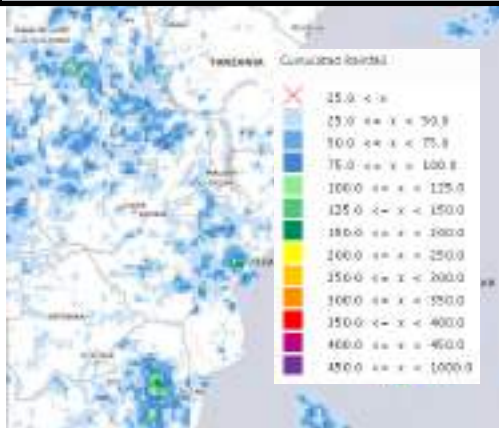
Extreme precipitation warnings understandable also to **non specialized users** are disseminated through a WebGIS application.



The Global Flood Partnership is a **cooperation framework between scientific organisations** and flood disaster managers worldwide to develop flood observational and modelling infrastructure, leveraging on existing initiatives for **better predicting and managing flood disaster impacts and flood risk globally**. GFP is hosted as an Expert Working Group by GDACS.

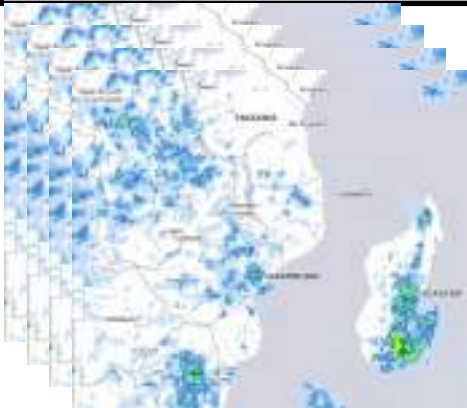
ITHACA Extreme Rainfall Detection System (ERDS)

Hazard monitoring and forecasting:



Accumulated precipitation from NASA-TRMM (GPM) and NOAA-GFS (Pixel Based)

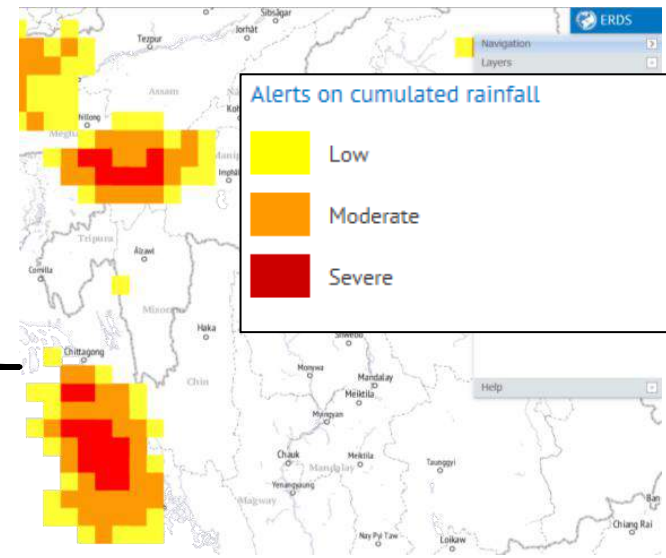
Extreme Rainfall thresholds:



Historical dataset
NASA-TRMM
(1998-2014)

Alert: 3 levels,
defined for each cumulate
range

Extreme Precipitation **Warnings**



Data Dissemination

WebGIS application conceived for disseminating **understandable warnings** also to **non specialized users**

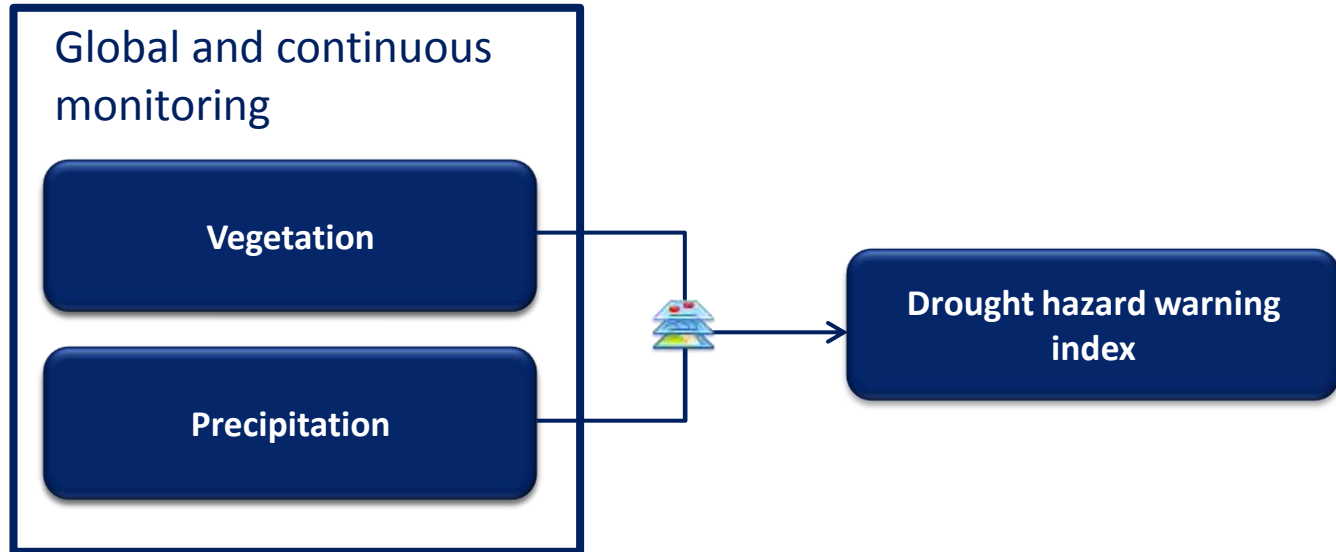
ITHACA global drought monitoring system

The system is aimed at providing drought hazard warnings based on **precipitation and vegetation anomalies** monitoring by means of satellite data processing.

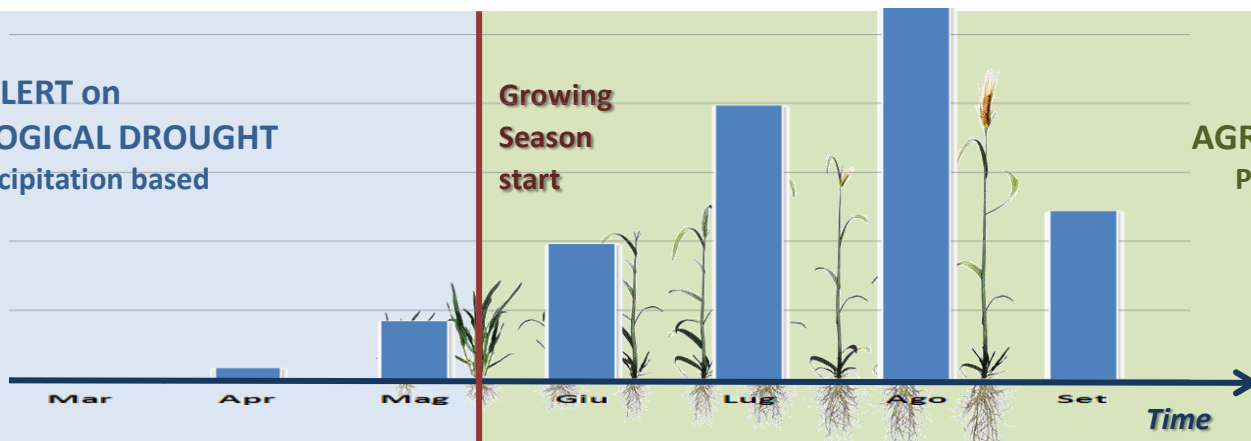


ITHACA global drought monitoring System

ITHACA EWS for drought is based on seasonal vegetation productivity deviation (based on SSDI, an index describing the expected seasonal vegetation productivity), integrated with precipitation anomalies.



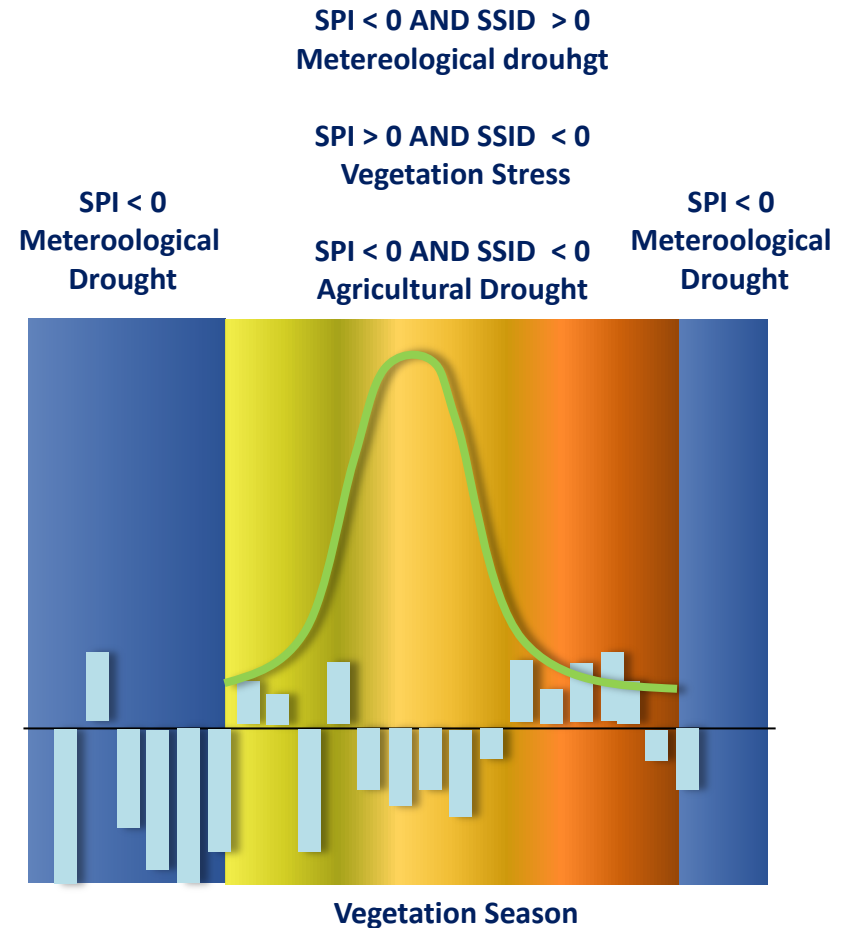
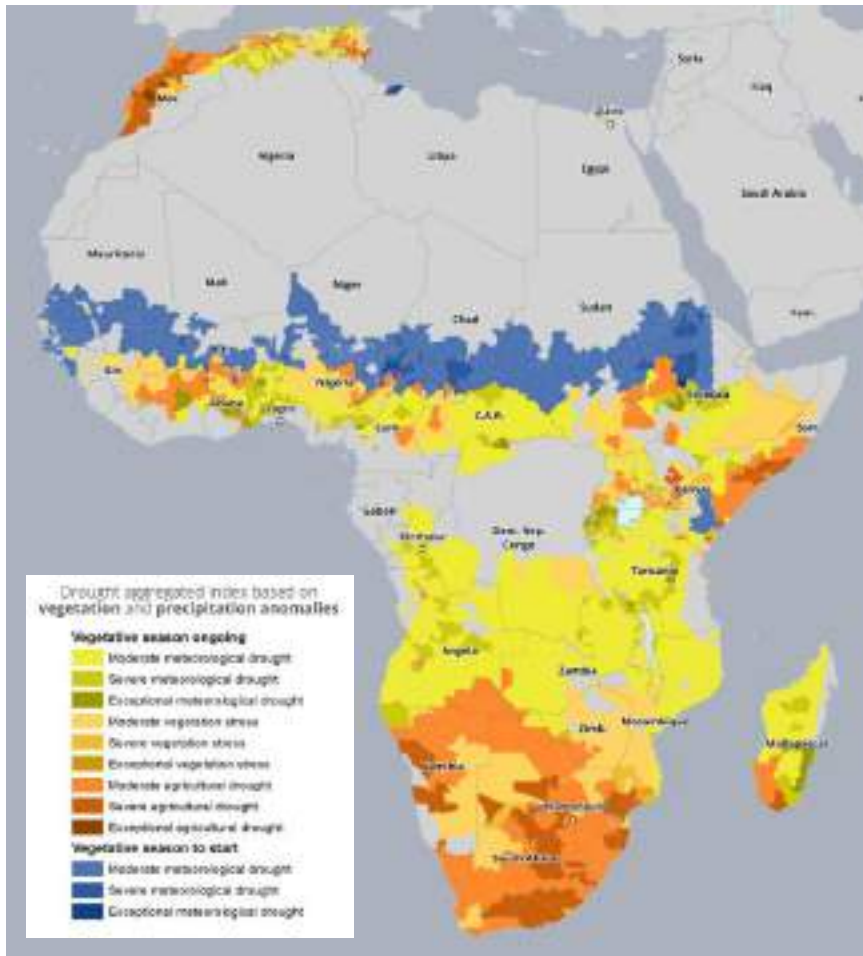
**ALERT on
METEOROLOGICAL DROUGHT**
only precipitation based



**ALERT on
AGRICULTURAL DROUGHT**
Precipitation shortage +
vegetation stress

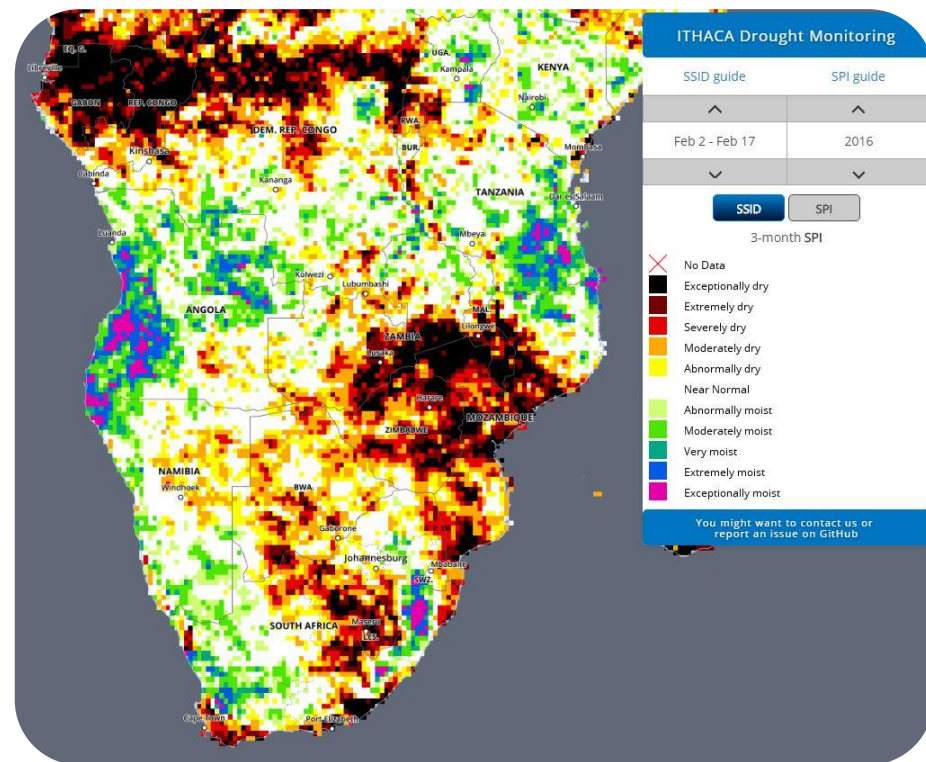
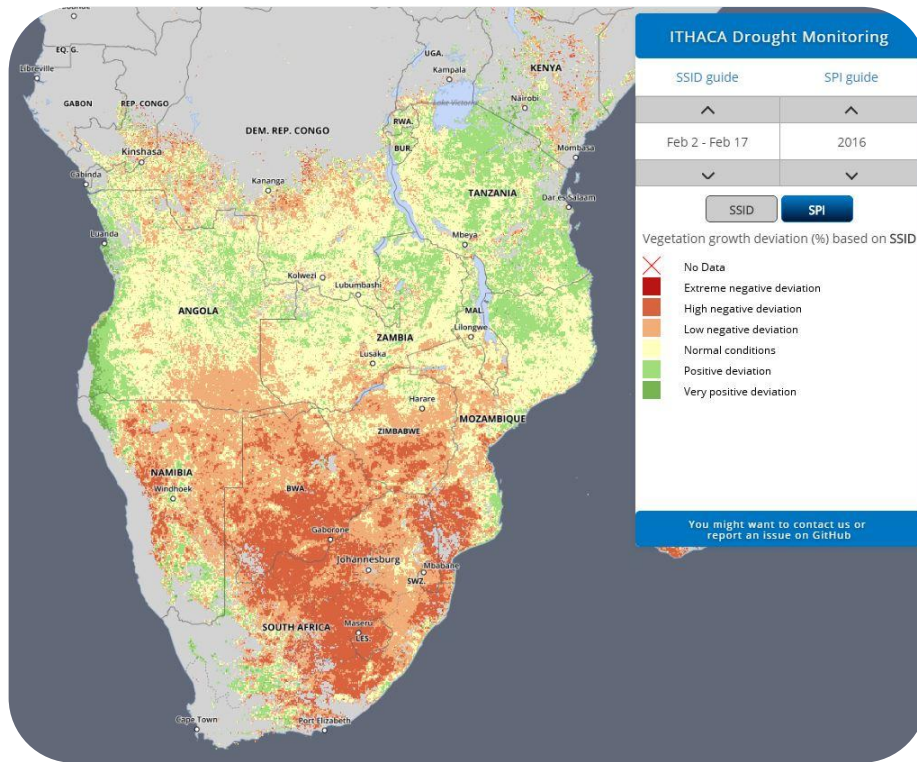
ITHACA global drought monitoring system

The **drought warning index** is intended to provide timely warnings before and after the vegetation season (**meteorological drought**) and during the vegetation season (**agricultural drought/vegetation stress**).



ITHACA global drought monitoring system

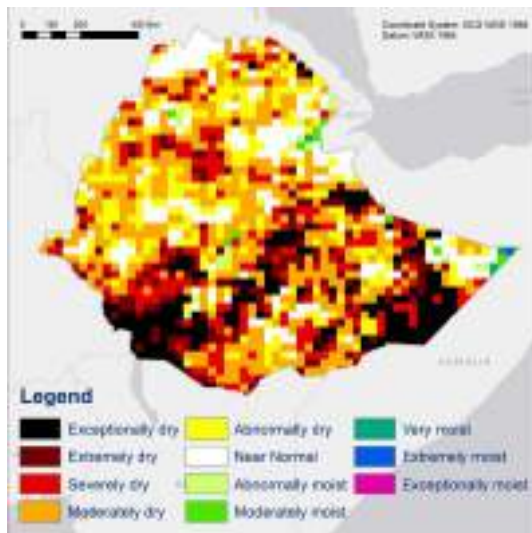
The system currently disseminates on a WebGIS platform **historical and NRT hazard maps** (i.e. vegetation and precipitation anomalies) produced fortnightly on a pixel basis.



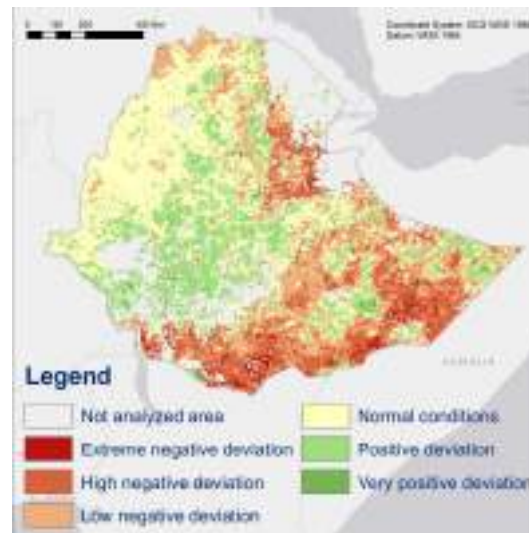
ITHACA global drought monitoring system

Additionally, the drought hazard warnings can be exploited for further **risk-related analyses**: at ITHACA, we combine drought hazard with **agricultural vulnerability** and **market catchments** data for **food security analyses**.

October-December 2010 SPI



2011 vegetation anomalies



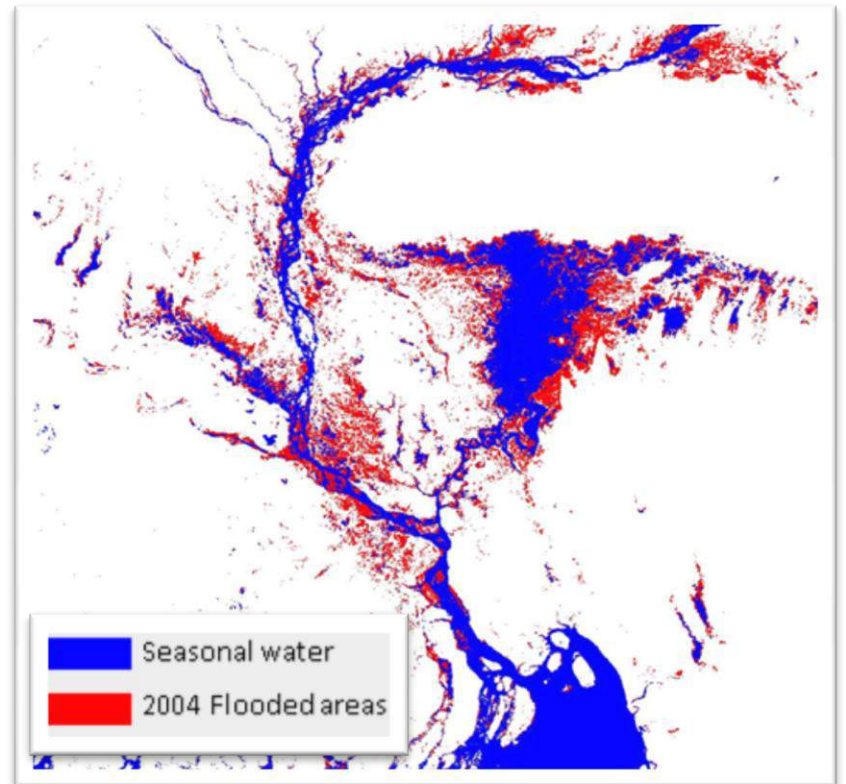
2011 food security warnings



Food security warnings are given per Risk surface unit: by introducing market analysis and a modelisation of people principal strategies to access food, the hazard is transformed in a food security warning.

ITHACA Flood hazard delineation tool

It is aimed at generating **dynamic water bodies reference data**, related to different climatic periods/seasons, by means of automatic classification of historical archives of medium/low resolution remotely sensed imagery (based on daily 10 days periods classifications)



Copernicus Emergency Management Service

(© European Union, 2012-2016)

Copernicus Emergency Management Service (EMS) Mapping started on February 2015 (it is the next EMS phase of GMES Initial Operations – GIO started in 2012).

The EMS - Mapping consists of a set of **mapping services** funded by the European Commission.

The Copernicus EMS Mapping addresses, with a worldwide coverage, a wide range of **emergency situations** resulting from natural or man-made disasters. **Satellite imagery is used as a main datasource** about disasters.

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

Copernicus EMS - Risk and Recovery Mapping

What can Risk and Recovery mapping service deliver?

Maps and analyses in support of **disaster risk reduction, preparedness and prevention, recovery and reconstruction** in order to assist disaster managers.

- **pre-disaster situation** when lending support to disaster prevention and preparedness actions (hazard exposure, vulnerability, resilience, risk status, evacuation plans and modelling scenarios...)
- **post-disaster situation** when providing support after a disaster, such as reconstruction planning and progress monitoring (post-disaster needs assessment, recovery plans, reconstruction/rehabilitation monitoring, including Internally Displaced Persons (IDP) and refugee camps monitoring.)

Supported **disaster types** ranging from :

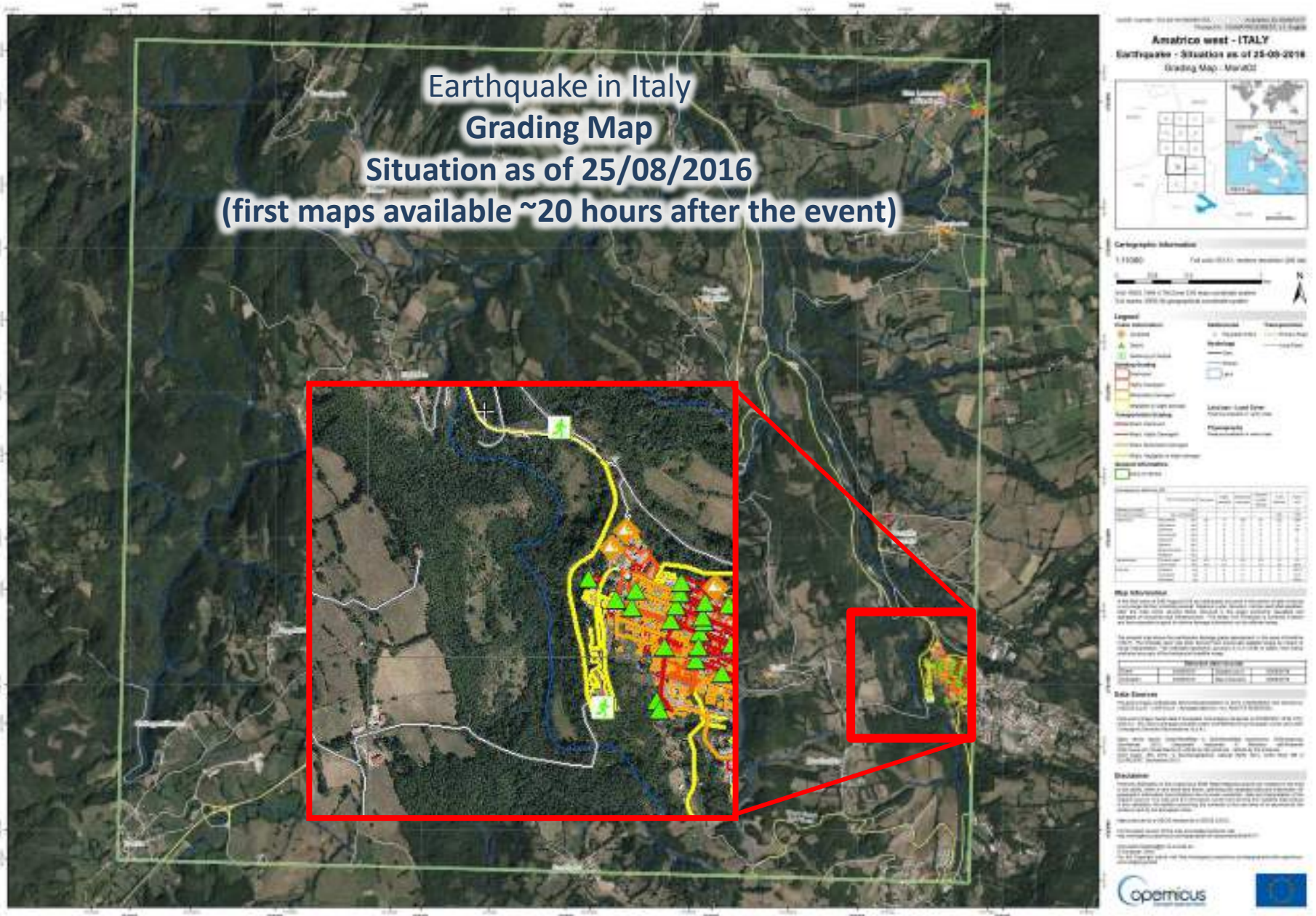
- natural hazards such as floods, fires, storms, tsunamis, volcanic eruptions, landslides and earthquakes to industrial accidents and humanitarian crises.

Copernicus EMS – Rapid Mapping

- **On-demand 24/7/365** mapping service (for authorised users)
- Provides **post-disaster information** (maps and layers) in hours (days) after the disaster
- Addresses natural & man-made disasters globally
- Based on space data combined with other data sources
- 3 products types:
 - Reference Maps
 - Delineation Maps
 - Grading Maps

Copernicus EMS – Rapid Mapping

Earthquake in Italy
Grading Map
Situation as of 25/08/2016
(first maps available ~20 hours after the event)



Copernicus EMS – Rapid Mapping

- Potential input for Disaster Damage and Loss Data (i.e. Damage Indicators)



The image is a screenshot of the European Commission Disaster Risk Management Knowledge Centre (DRMKC) website. The header includes the European Commission logo and the text "EUROPEAN COMMISSION Disaster Risk Management Knowledge Centre". The navigation menu features "OVERVIEW", "PARTNERSHIP", "KNOWLEDGE", and "INNOVATION". Below the menu, there is a "Welcome to DRMKC" section with the text "Enhancing the Knowledge base to support Disaster Risk Management" and "The DRMKC is a new Commission initiative on better knowledge and competence management for sounder EU policy making." A "Register as a user of the DRMKC" link is provided. The "DRMKC News" section includes two articles: "A Wealth of Practitioners Validate Requirements for EU interoperable Broadband Mobile for PDR" (29 AUG 2016) and "DCPM Emergency Preparedness Workshop on the Mosul Dam, Iraq" (30 JUN 2016). The "DRMKC Events" section lists "Bilateral Workshops for Capacity Building in EU Neighbourhood Countries for Severe Implementation" (APR 2016) and "Various EU Neighbourhood Countries" (DEC 13 2015).

<http://drmkc.jrc.ec.europa.eu/>

Copernicus EMS – Rapid Mapping

- A recent publication on Science journal: a review of global trends of rapid mapping in 15 years (2000-2014)



<http://science.sciencemag.org/content/353/6296/247>

DOI: 10.1126/science.aad8728

Main Topics

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- ***“Access to such information” and “Ways to share information”***
- *“Information available in public domain” and “range of satellite data available”*

“Access and Ways to share information”

Sendai framework > Priority 1

- 24.a) “[...] **ensure** its (i.e. relevant data, edit. note) **dissemination**, taking into account the needs of different categories of users, as appropriate”
- 24.c) “[...] and **disseminate, as appropriate**, location-based disaster risk information[...]
- 25.C) “To promote and enhance, through international cooperation, [...] **access to and the sharing** and use of non-sensitive data and information”

Data/Information access and sharing: **ad-hoc WebGIS applications**

A few Examples (related to the previous tools/services):

- <http://erds.ithacaweb.org/>
- <http://drought.ithacaweb.org/>
- <http://emergency.copernicus.eu/>
- <http://emergency.copernicus.eu/mapping/list-of-activations-rapid>
- <http://emergency.copernicus.eu/mapping/list-of-activations-risk-and-recovery>

Layers

Cumulated Forecast

Cumulated Near-Real-Time

Alert Forecast

Alert Near-Real-Time

Alert Forecast (District)

Alert Near-Real-Time (District)

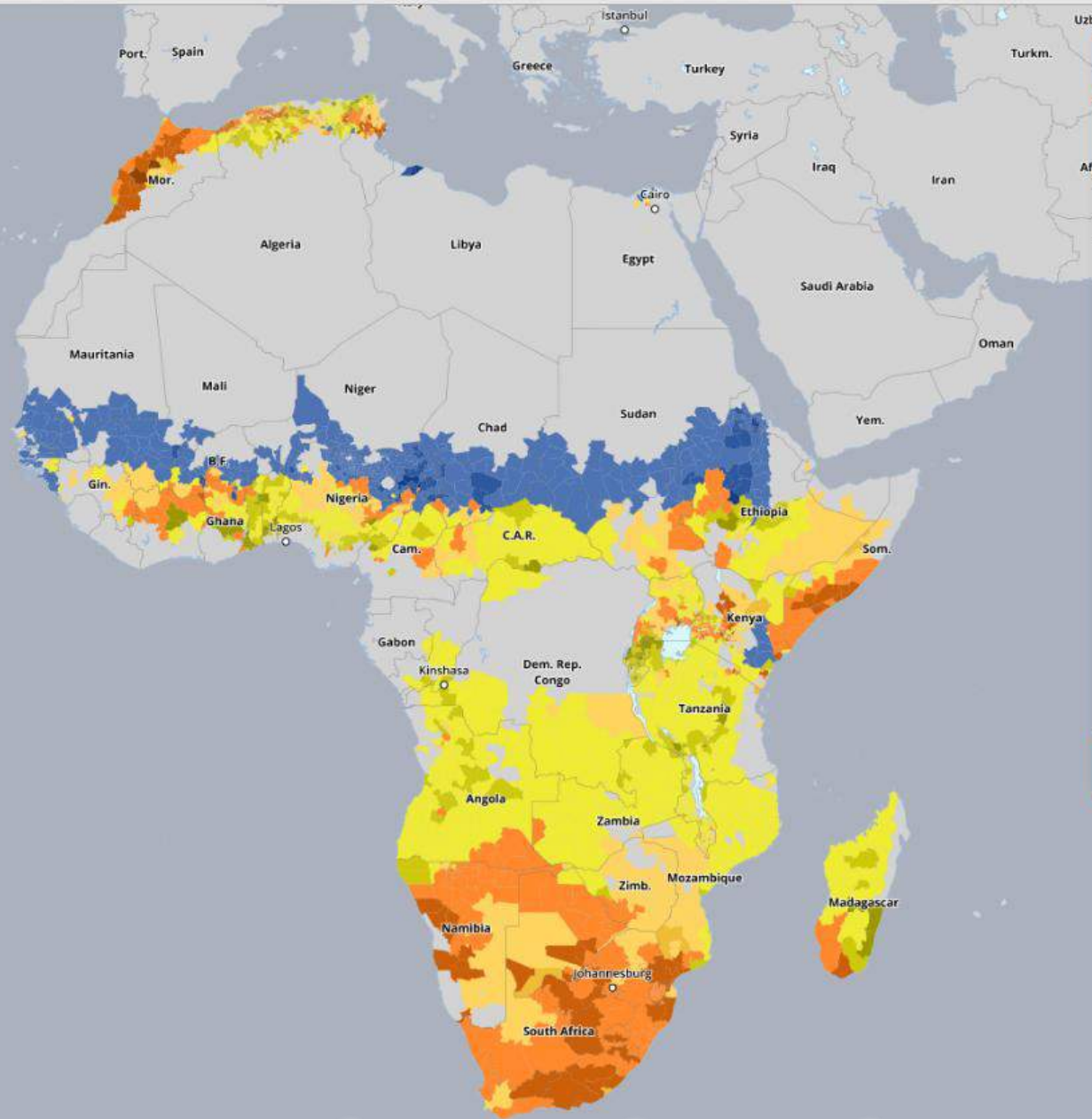
Flooded Population Forecast

- FC 24
- FC 72h
- FC 144h

Overlays



erds.ithacaweb.org



ITHACA Drought Monitoring

- Drought warning
- Vegetation/precipitation anomalies

Drought warning guide

Drought aggregated index based on vegetation and precipitation anomalies

- Vegetative season ongoing**
- Moderate meteorological drought
 - Severe meteorological drought
 - Exceptional meteorological drought
 - Moderate vegetation stress
 - Severe vegetation stress
 - Exceptional vegetation stress
 - Moderate agricultural drought
 - Severe agricultural drought
 - Exceptional agricultural drought
- Vegetative season to start**
- Moderate meteorological drought
 - Severe meteorological drought
 - Exceptional meteorological drought

Last update May 7th, 2016

You might want to contact us or report an issue on GitHub © ITHACA CC BY NC ND 4.0



COPERNICUS

Emergency Management Service

Home | What is Copernicus | EMS - Mapping | EMS - Early Warning System | News

LATEST NEWS · 2016-03-21 | [EMSN023] Flood and Heat risk assessment and mitigation, Poland

EMS - MAPPING

- Service Overview
- Who can use the service
- How to use the service
- Products: Rapid Mapping
- Products: Risk and Recovery
- Quality control / Feedback
- New phase in brief
- User Guide

RAPID MAPPING

- List of Activations
- Map of Activations
- GeoRSS Feed 84 readers

RISK AND RECOVERY

- List of Activations
- Map of Activations
- GeoRSS Feed 55 readers

OTHER

- Map of Activations of Other Organizations
- Map Coverage Planner
- Meetings, Workshops
- Citation Guidelines
- Citations
- Calls for Tender



Follow @CopernicusEMS

[EMSR177] Amatrice Aerial: Grading Map



Published: 2016-08-31 13:36 (UTC)
 Product version: v3
 Map scale: 1:1000
 Status:
 Production finished, quality approved.

Show all maps produced in 0

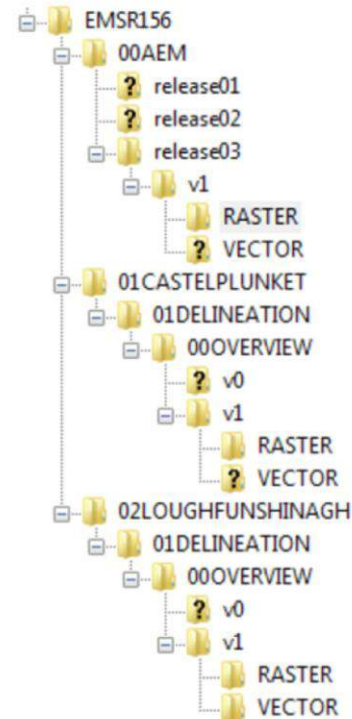
Geographic Extent:



Map Preview:



sftp.emergency.copernicus.eu



http://emergency.copernicus.eu/

Data/Information access and sharing:

GeoNode



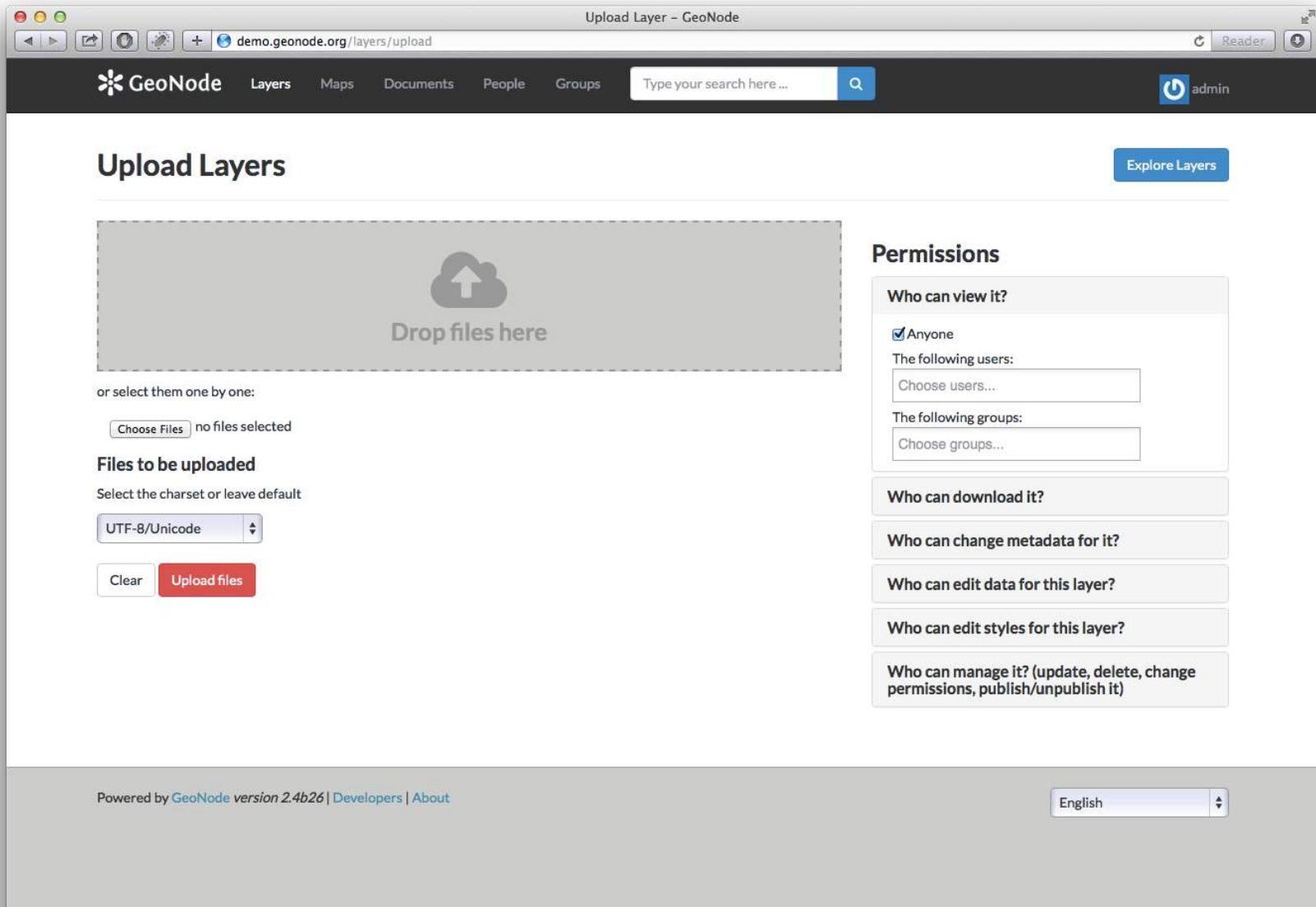
GeoNode: an Open Source CMS for Spatial Data Sharing

- A spatial data Web CMS
- **Promote spatial data sharing**
- Management in simple environment

- Responsive



Data/Information access and sharing: GeoNode Data upload



Upload Layer - GeoNode

demo.geonode.org/layers/upload

GeoNode Layers Maps Documents People Groups Type your search here... admin

Upload Layers

Explore Layers

Drop files here

or select them one by one:

Choose Files no files selected

Files to be uploaded

Select the charset or leave default

UTF-8/Unicode

Clear Upload files

Permissions

Who can view it?

Anyone

The following users:

Choose users...

The following groups:

Choose groups...

Who can download it?

Who can change metadata for it?

Who can edit data for this layer?

Who can edit styles for this layer?

Who can manage it? (update, delete, change permissions, publish/unpublish it)

Powered by GeoNode version 2.4b26 | Developers | About

English

Data/Information access and sharing: GeoNode Layer

The screenshot displays the GeoNode web interface for a layer titled "Natural Earth 10M Bathymetry L0". The browser address bar shows the URL: `demo.geonode.org/layers/geonode%3Ane_10m_bathymetry_l_0_clipped`. The page header includes the GeoNode logo, navigation links for Layers, Maps, Documents, People, and Groups, a search bar, and a user profile for "admin".

Natural Earth 10M Bathymetry L0

The main content area features a map of the world with bathymetry data. The map shows the oceans in blue and landmasses in shades of green and brown. Key geographical features are labeled, including the Amazon Basin, Congo Basin, Sahara, Arabi Peninsula, and Gobi. The map includes a scale bar (0 to 2000 km / 0 to 1000 mi) and a scale dropdown menu set to 1:139770286. Below the map are navigation and interaction icons.

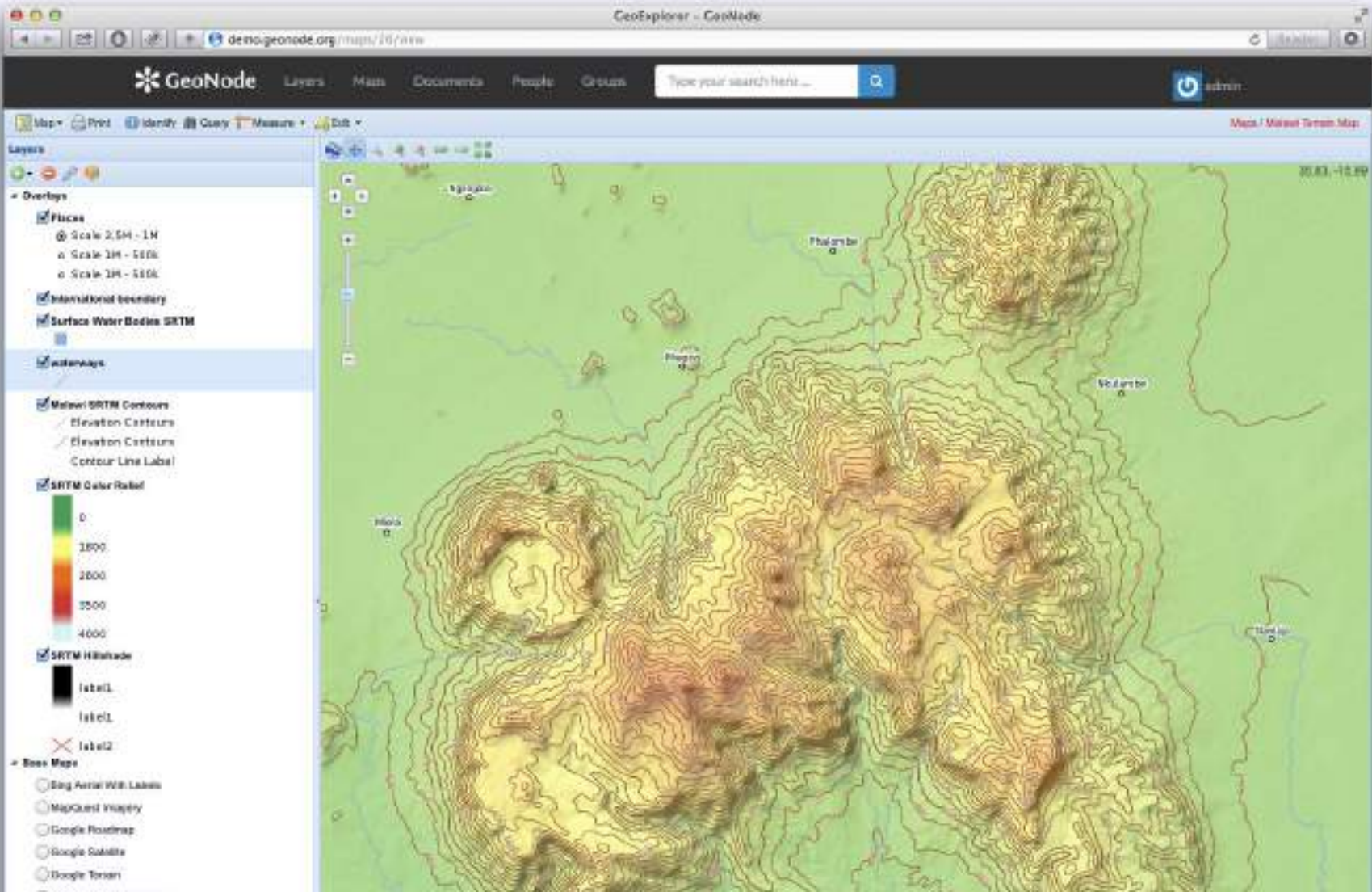
Below the map, there are several tabs: Info, Attributes, Share, Ratings, and Comments. The "Info" tab is active, displaying the following metadata:

Title	Natural Earth 10M Bathymetry L0
Abstract	No abstract provided
Publication Date	Sept. 28, 2015, 3:18 a.m.
Type	Vector Data
Category	Oceans i
Owner	admin
More info	-

On the right side of the page, there are several interactive elements:

- Download Layer** (blue button)
- Edit Layer** (blue button)
- Download Metadata** (white button)
- Legend**: A legend entry for "Ocean" with a blue square icon.
- Maps using this layer**: A section stating "This layer is not currently used in any maps."
- Create a map using this layer**: A section with the text "Click the button below to generate a new map based on this layer." and a **Create a Map** (blue button).
- Styles**: A section stating "The following styles are associated with this layer. Choose a style to view it in the preview map." with a radio button selected for `ne_10m_bathymetry_l_0_clipped`.
- Permissions**: A section header for permissions.

Data/Information access and sharing: GeoNode Map



Data/Information access and sharing: GeoNode

A few examples:

- <http://geonode.wfp.com>
- <http://geonode.state.gov/>
- <http://www.masdap.mw/>
- <http://geonode.jrc.ec.europa.eu>
- <http://landscapeportal.org>
- <http://mapstory.org>
- <http://cigno.ve.ismar.cnr.it>
- <https://platform.openquake.org>
- <http://worldmap.harvard.edu>

□ <http://www.masdap.mw/>

Welcome! - MASDAP

www.masdap.mw

MASDAP Layers Maps Documents People Search... Sign in

Malawi Spatial Data Portal

Welcome to the BETA version of MASDAP, a public platform for GIS Data to support development in Malawi

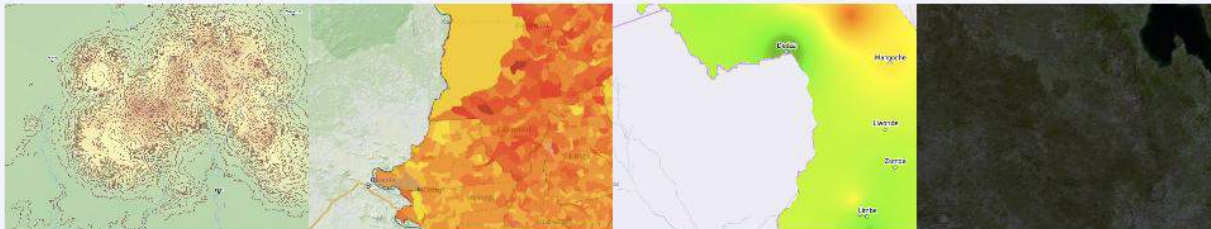
Learn more

- Reference data
- Disaster risk and vulnerability data
- Historical data (e.g. flooded areas)
- Climate data

Welcome to MASDAP

MASDAP is a web-based data sharing tool launched in November 2012, managed by the National Spatial Data Center (in the Department of Surveys), in collaboration with the National Statistics Office and a number of technical Ministries.

[Get Started](#) →



□ <http://geonode.wfp.com/>

The screenshot shows the WFPGeoNode website interface. At the top, there is a blue navigation bar with the WFP logo and the text "WFPGeoNode". To the right of the logo is a search bar and a "Sign in" button. Below the navigation bar are four menu items: "LAYERS", "MAPS", "RESOURCES", and "USERS". The main content area features a large banner with a satellite image of a coastline. The banner text reads "Welcome to the WFPGeoNode" and "Our corporate web application for creating and sharing geospatial data and maps designed for non-GIS experts." Below the banner is a "Get Started" button. A statistics bar shows: Layers 697, Maps 70, Static Maps 2151, and Users 200. There is also a search bar. Below the statistics bar is a "Recent Maps" section with four map thumbnails: "School Feeding in Egypt" (92 views), "CAR Operational OverView..." (326 views), "WFP Presence by Region..." (338 views), and "Chad Cash & Vouchers Pl..." (157 views). At the bottom, there are three main sections: "Explore Data" (with a diamond icon), "Explore Maps" (with a location pin icon), and "Upload Data" (with a cloud upload icon). Each section has a brief description of its functionality.

WFPGeoNode

WFP
wfp.org

Sign in

LAYERS MAPS RESOURCES USERS

Welcome to the WFPGeoNode

Our corporate web application for creating and sharing geospatial data and maps designed for non-GIS experts.

Get Started

Image Credit: NASA

Layers 697 Maps 70 Static Maps 2151 Users 200

Search...

Recent Maps

- School Feeding in Egypt 92
- CAR Operational OverView... 326
- WFP Presence by Region... 338
- Chad Cash & Vouchers Pl... 157

Explore Data

Click to search for geospatial data from our corporate SDI or published by other users, organizations and public sources.

Explore Maps

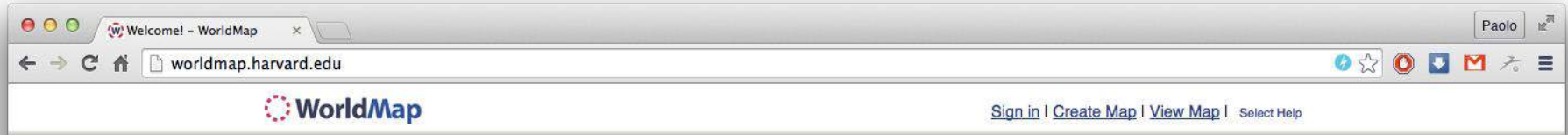
Data is available for browsing, aggregating and styling to generate maps which can be shared publicly or restricted to specific users only.

Upload Data

GeoNode allows registered users for easily upload geospatial data in several formats including shapefile, GeoTiff and KML.



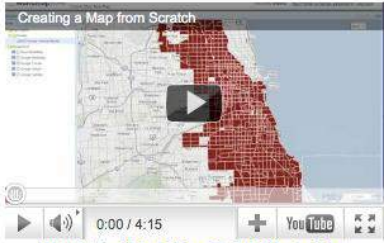
□ <http://worldmap.harvard.edu>



[Create a Map](#) [View a Map](#) [About](#)



Build your own mapping portal and publish it to the world or to just a few collaborators. WorldMap is open source software.



[Watch the WorldMap Quick Start video](#)

WorldMap is being developed by the [Center for Geographic Analysis](#) at [Harvard University](#).

Main Topics

Excerpts from the Conference [information note](#) about the focus of Section 3 «Access to data and information for risk assessment»:

- *“Various types of space-based and geospatial information needed for risk assessment”*
- *“Access to such information” and “Ways to share information”*
- ***“Information available in public domain” and “range of satellite data available”***

*"Information available in public domain" and
"range of satellite data available"*

Sendai framework > Priority 1

- 24.e) *"to make [...] **information freely available and accessible**, as appropriate"*
- 24.f) *«to promote **real time access to reliable data**, make use of space and in situ information [...]"*

*"Information available in public domain" and
"range of satellite data available"*

OpenAerialMap

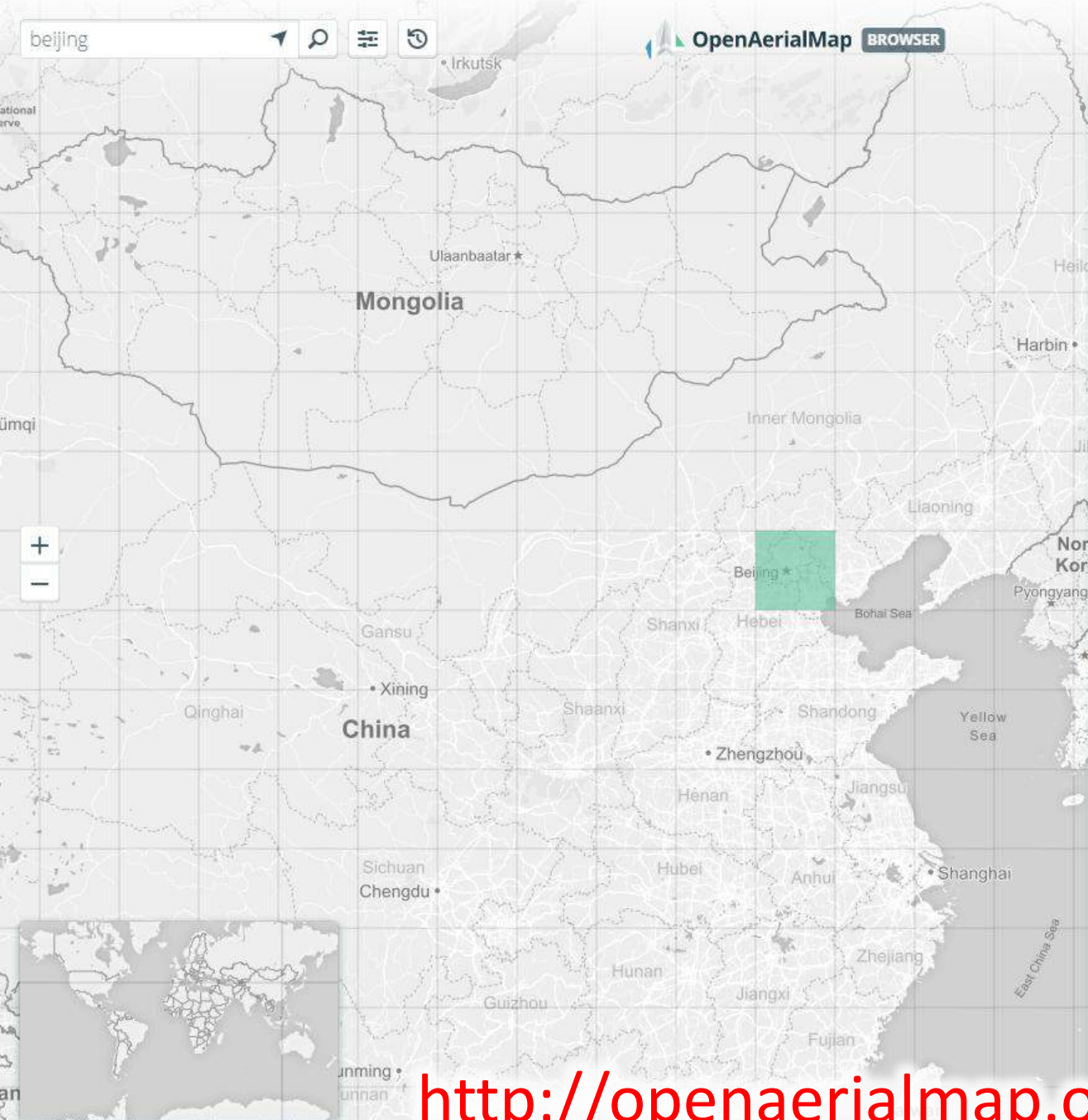
Made by Development Seed and HOT-OSM, is an **open service** to provide **access to** a commons of **openly licensed imagery and map layer services**.

Anyone can **download or contribute imagery** to the growing commons of openly licensed imagery.

Search bar containing 'beijing' and navigation icons (back, forward, search, layers, home)









OpenAerialMap BROWSER

Upload icon and information icon



Available Imagery

16 results

	
TYPE: Image + Map Layer DATE: 2015-08-22 RES: 39 m	TYPE: Image + Map Layer DATE: 2015-04-25 RES: 39 m
	
TYPE: Image + Map Layer DATE: 2016-02-23 RES: 39 m	TYPE: Image + Map Layer DATE: 2015-06-12 RES: 39 m
	
TYPE: Image + Map Layer DATE: 2015-07-30 RES: 39 m	TYPE: Image + Map Layer DATE: 2015-12-03 RES: 40 m
	
TYPE: Image + Map Layer DATE: 2015-09-07 RES: 40 m	TYPE: Image + Map Layer DATE: 2015-11-10 RES: 40 m

<http://openaerialmap.org>

"Information available in public domain" and "range of satellite data available"

E.g.: Copernicus Sentinel satellites

*"users shall have **a free, full and open access to Copernicus Sentinel Data**"*

(Source: "Legal notice on the use of Copernicus Sentinel Data and Service Information")

SENTINEL-1

With the objectives of Land and Ocean monitoring, SENTINEL-1 will be composed of two polar-orbiting satellites operating day and night, and will perform **Radar imaging**, enabling them to acquire imagery regardless of the weather.

SENTINEL-2

The objective of SENTINEL-2 is land monitoring, and the mission will be composed of two polar-orbiting satellites providing **high-resolution optical imagery**. Vegetation, soil and coastal areas are among the monitoring objectives. The first SENTINEL-2 satellite was launched in June 2015.

SENTINEL-3

The primary objective of SENTINEL-3 is **marine observation**, and it will study sea-surface topography, sea and land surface temperature, ocean and land colour. Composed of three satellites, the mission's primary instrument is a radar altimeter, but the polar-orbiting satellites will carry multiple instruments, including optical imagers.

...

"Information available in public domain" and "range of satellite data available"

E.g.: Copernicus Sentinel satellites

*"users shall have **a free, full and open access to Copernicus Sentinel Data**"*

(Source: "Legal notice on the use of Copernicus Sentinel Data and Service Information")

The screenshot shows the homepage of the ESA Sentinel website. The browser address bar displays <https://sentinel.esa.int/web/sentinel/home>. The page features the ESA logo and the URL <https://sentinel.esa.int> in large red text. Navigation links include "Need Help?", "FAQ", "Contact Us", and "About Sentinel Online". A search bar labeled "Google™ Custom Search" is present. A main navigation menu contains "Missions", "User Guides", "Technical Guides", "Thematic Areas", "Data Access", and "Toolboxes". A breadcrumb trail shows "You are here Home". The main content area is divided into several sections: "Welcome to Sentinel Online" with a video player titled "SENTINEL-1 CONSTELLATION OVERVIEW" and a "Read more" link; "Sentinel News" with a list of news items; "Events" with a list of upcoming events; and "Browse to Other Sites" with links to "EU Copernicus" and "ESA Copernicus".

esa <https://sentinel.esa.int>

Need Help? FAQ Contact Us About Sentinel Online

Missions User Guides Technical Guides Thematic Areas Data Access

Toolboxes

You are here Home

+ Share | f G t e

- Welcome to Sentinel Online

SENTINEL-1 CONSTELLATION OVERVIEW

In this special edition of Earth from Space, ESA's Sentinel-1 Mission Manager Pierre Potin discusses the benefit of a two-satellite radar mission.

[Read more](#)

- Sentinel News

- Sentinel-1B products covering earthquake in
- Data Hub maintenance activities on 14
- Decommissioning of the Sentinel-2A Pre-

- Events

- 1st ESA Advanced Training Course on Remote Sensing of the Cryosphere
- Atmospheric Composition Validation and Evolution
- [See all Sentinel Events](#)

- Browse to Other Sites

- [EU Copernicus](#)
- [ESA Copernicus](#)

- Sentinel Missions

- Thematic Areas

"Information available in public domain" and "range of satellite data available"

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*"users shall have **a free, full and open access to Copernicus Sentinel Data**"*

(Source: "Legal notice on the use of Copernicus Sentinel Data and Service Information")

The image shows a screenshot of a web browser displaying the Copernicus Sentinel Scientific Data Hub website. The browser's address bar shows the URL <https://scihub.esa.int>. The website features a blue header with the Copernicus logo, the text "Sentinels Scientific Data Hub", and logos for ESA and the European Commission. A dark blue banner below the header reads "Welcome to the Sentinels Scientific/Other use Data Hub". Below this, a paragraph states: "The Sentinels Scientific Data Hub provides complete, free and open access to Sentinel-1 and Sentinel-2 user products, starting from the In-Orbit Commissioning Review (IOCR)." A row of five navigation buttons is displayed, each with an icon and a label: "Scientific Hub" (satellite icon), "API Hub" (gears icon), "S-2 PreOpsHub" (satellite icon), "User Guide" (book icon), and "Roadmap" (road icon). At the bottom, a dark blue bar contains the text "Access Points".

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Welcome to the Sentinels Scientific/Other use Data Hub

The Sentinels Scientific Data Hub provides complete, free and open access to Sentinel-1 and Sentinel-2 user products, starting from the In-Orbit Commissioning Review (IOCR).

Scientific Hub API Hub S-2 PreOpsHub User Guide Roadmap

Access Points

6th Annual UN-SPIDER Conference in Beijing

United Nations International Conference on Space-based Technologies for
Disaster Risk Reduction - "Understanding Disaster Risk"

Plenary Session 3 - Access to data and information for risk assessment
20 September 2016

Processing and sharing of space-based geospatial information for Disaster Management



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