UNITED NATIONS
Office for Outer Space Affairs

8 December 2017

Technical Workshop
Launch of the Sendai Framework Monitoring Process

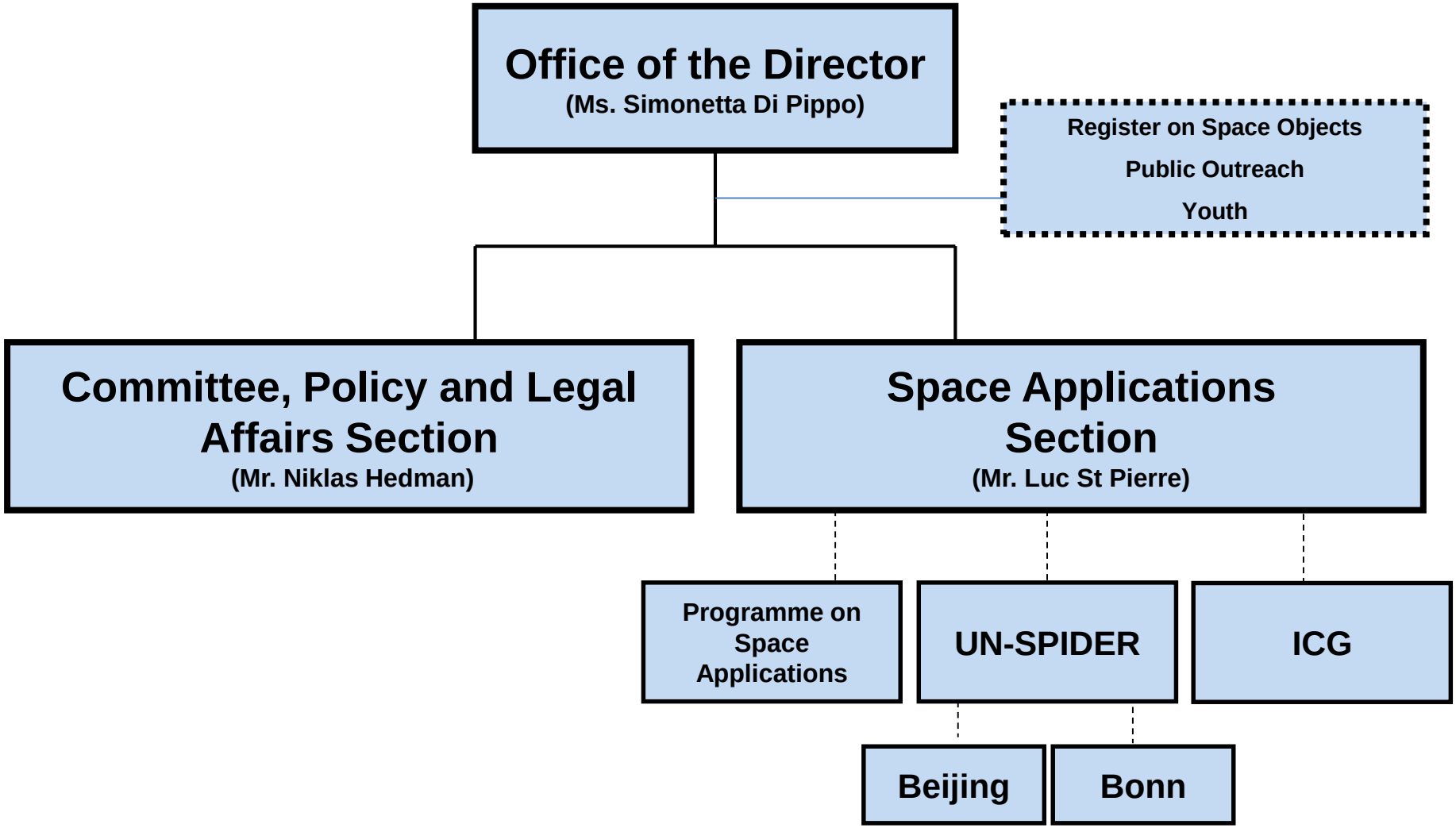
United Nations Office for Outer Space Affairs
United Nations Office at Vienna
www.unoosa.org

UN-SPIDER: Mission statement

„Ensure that all countries have access to and develop the capacity **to use** all types of **space-based information** to support the **full disaster management cycle**.“

General Assembly Resolution 61/110 (2006)

United Nations Office for Outer Space Affairs



Network of Regional Support Offices

Space-based technologies

Support from space technologies

What you see (info on hazards and exposure):

- **Exposure: The built environment in cities, agriculture, forests, water bodies; glaciers, deserts…**
- **What is below the clouds (floods);**
- **Soil moisture;**
- **Natural hazards (tropical storms, volcanic activity, landslides, mass movements, …)**

Where you are and what is your heading:

Global Navigation Satellite Systems;

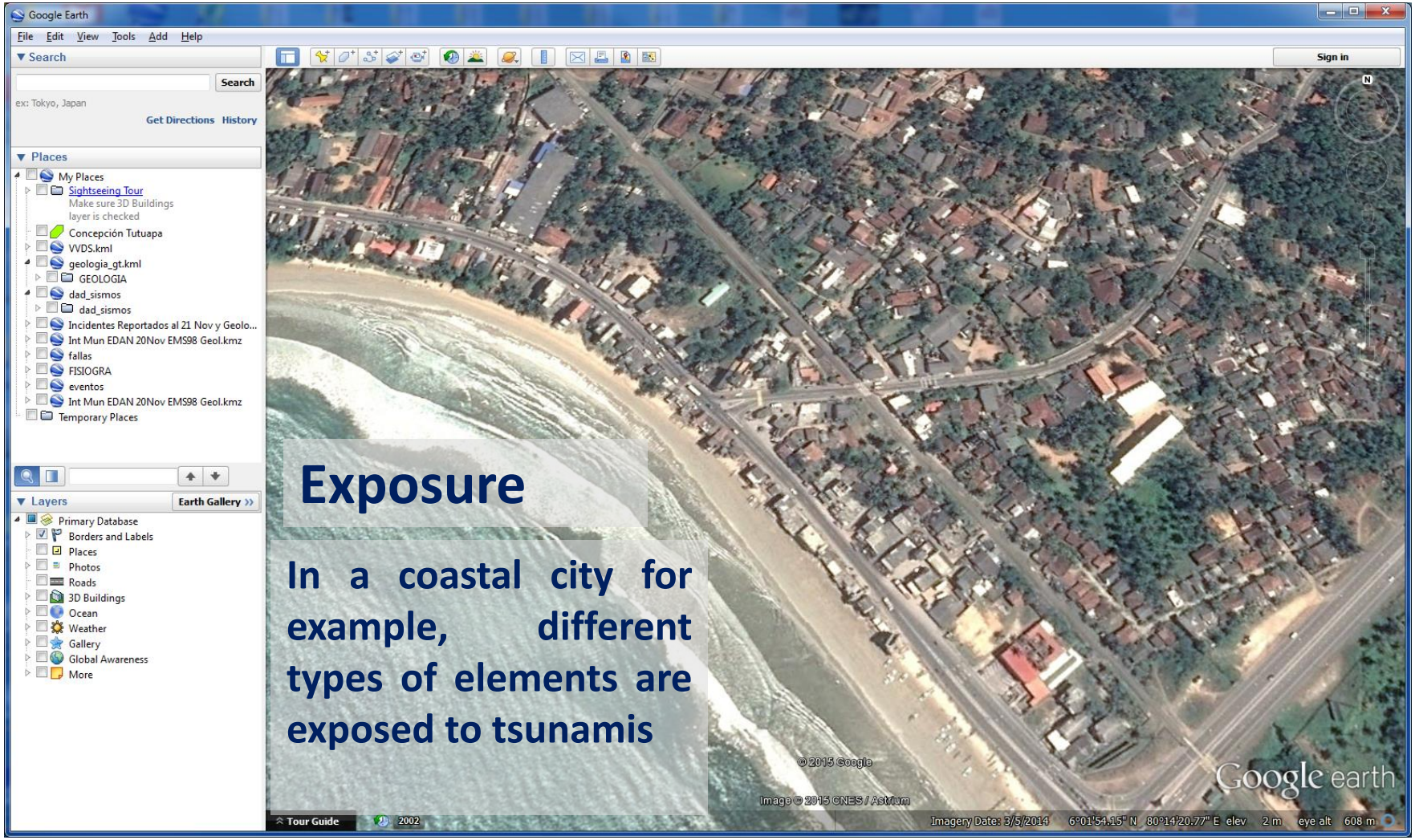
Connecting data sources and users:

Satellite telecommunications to transmit data from instruments in the field to Observatories

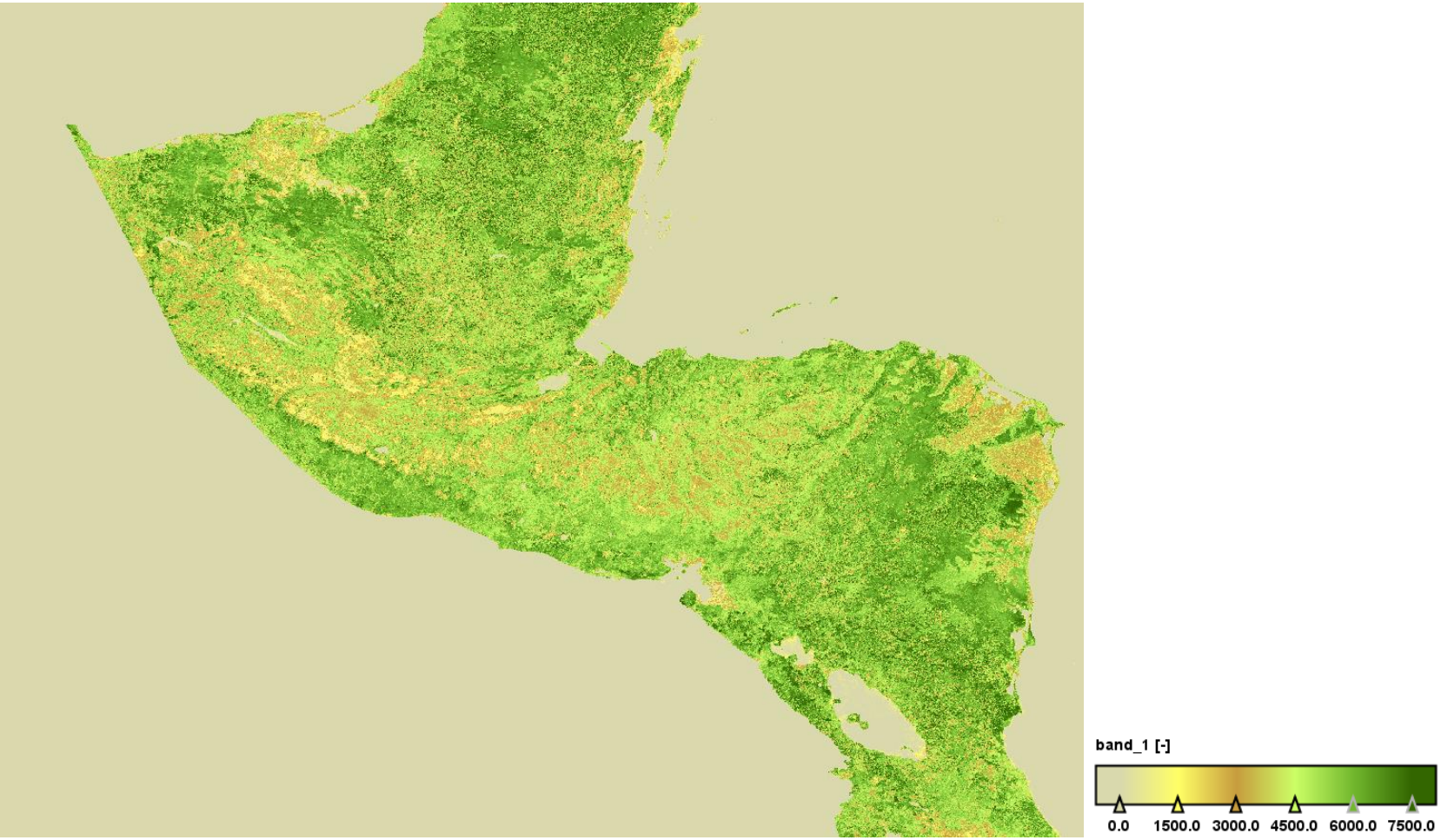
Something else:

Sea-level rise, trends (deforestation, subsidence, etc)

Space-based technologies



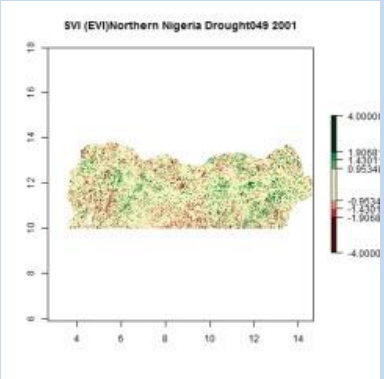
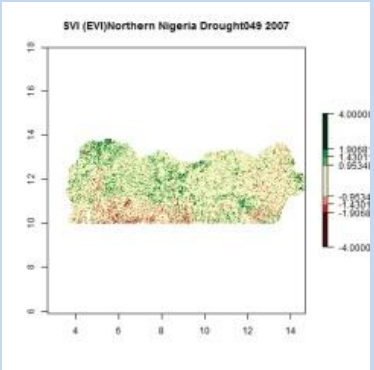
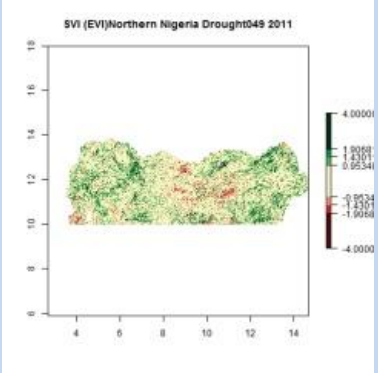
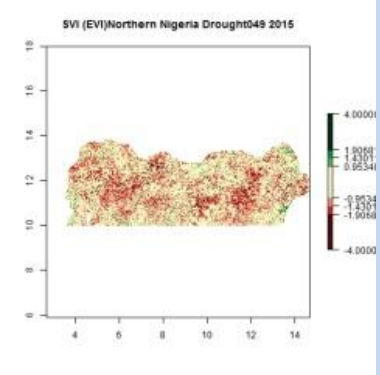
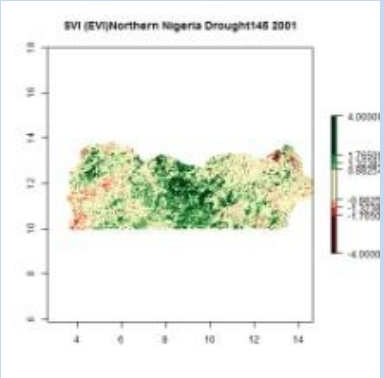
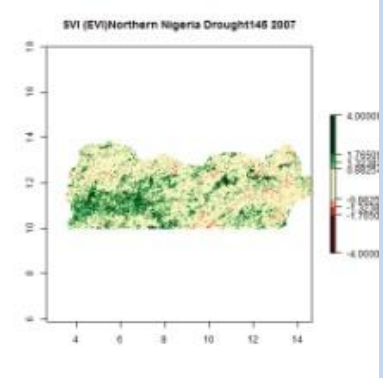
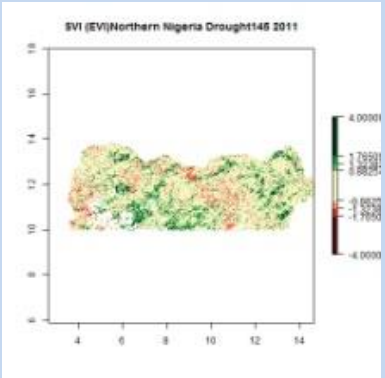
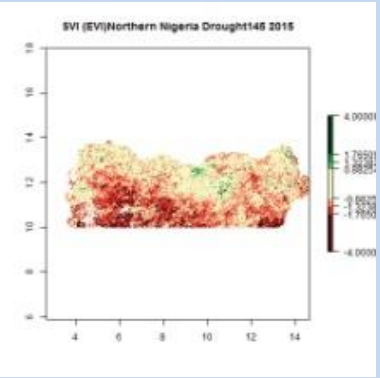
Space-based technologies: vegetation and drought



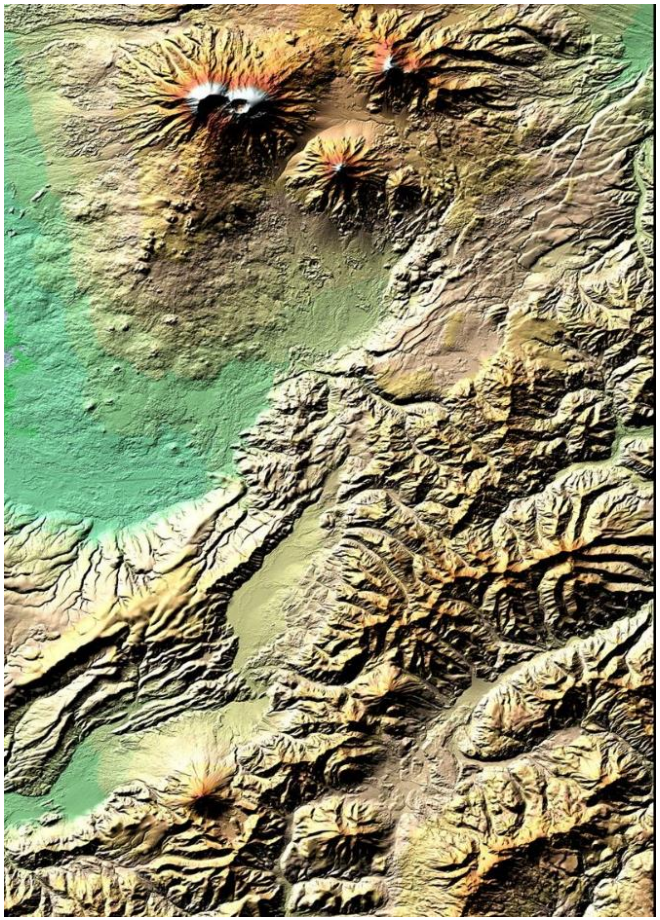
MOD13Q1, 250m, 16 days EVI
Example: DOY 273, 2011, Central America

Space-based technologies

SVI maps for Julian day 97 corresponding to 4 distinct years using EVI composite products from MODIS - Northern Nigeria

	2001	2007	2011	2015
Days 49 to 64				
Days 145 to 160				

Some trends to take note of:



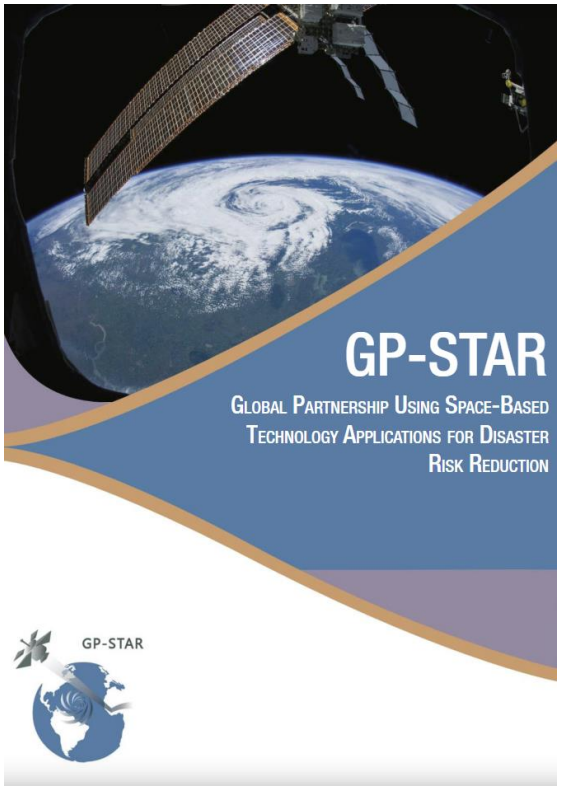
Digital Elevation Model, courtesy of DLR

- **Some space agencies introducing open-data policies:** some types of satellite data are now accessible free of charge by anyone; usually low or moderate resolution;
- **Private sector more engaged in deploying satellites:** the cost of high-resolution imagery is going down, and the frequency of re-visit is going up;
- **Commercial and open software:** there are several types of commercial and open software to process this data as a way to generate information;
- **From satellite imagery to products and services:** Institutions and the private sector are offering information, products and services, as opposed to raw data, to facilitate its use. For example: Digital Elevation Models.

Space technologies and the Sendai Framework:

- **Priority 1 – Understanding Risk:** facilitating access to and use of satellite imagery to monitor hazards, to track exposure, understand changes in exposure;
- **Priority 4 – Preparedness and early warning:** Strengthening different types of early warning systems; contributing to multi-hazard monitoring
- **Sendai Indicators:** Impacts on agriculture, on critical infrastructure (built environment, road network); suggesting exposure to track changes in risk;
- **International Cooperation: 2 dedicated:** GP-STAR and IN-MHEWS.

Global Partnership using Space-based Technology Applications for Disaster Risk Reduction (GP-STAR):



http:/www.un-spider.org/network/post2015_drr

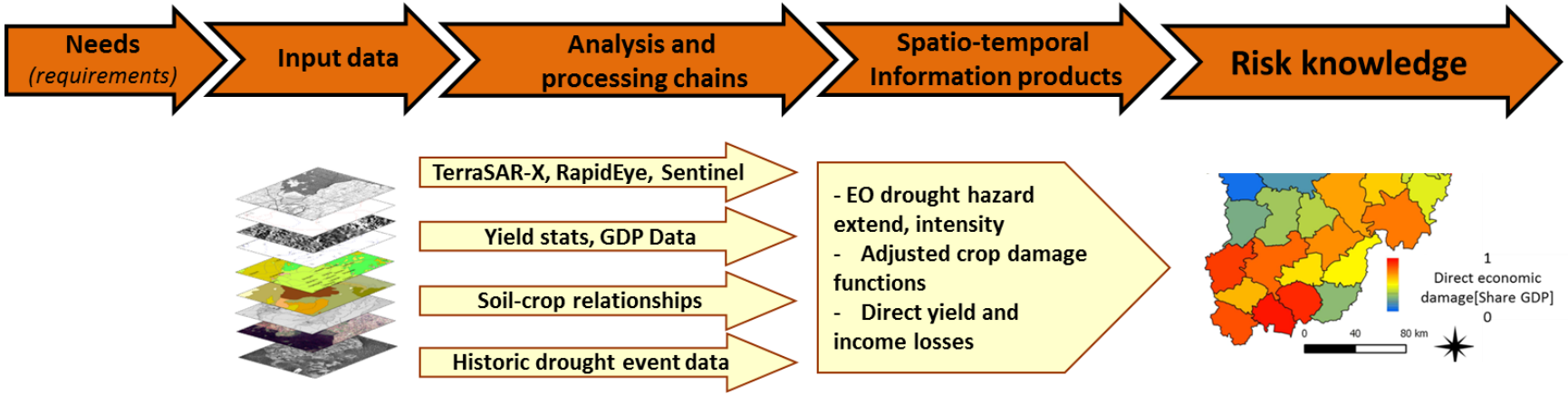
- **Continue facilitating the dialogue among stakeholders** engaged in satellite technologies and the global community of DRR experts and policy makers;
- **Serve as a collective source and repository of information** on efforts carried out worldwide by the satellite technology communities, including surveys and guidelines to improve the applications of existing and emerging technology to monitor hazards, exposure and risks;
- **Generate policy-relevant advice** to contribute to the integration of satellite technologies into development process and public policies relevant to DRR;
- **Facilitate the use of satellite technologies** to monitor progress in the implementation of the Sendai Framework.

Assessing impacts: EvIDENz project

- The project is geared to develop methods to be used to estimate potential losses (risk information) in the agricultural sector due to droughts.
- Methods to be developed by the partners will be tested in Ukraine and in South Africa.

B: EvIDENz value-adding chain

Example 2: Direct economic loss agricultural sector in relation to Gross Domestic Product



Assessing impacts: parallel approach

Mechanisms that have been set up by the space community which could contribute to generate data:

- International Charter Space and Major Disasters;
- COPERNICUS EMS;
- Sentinel Asia;
- SERVIR (NASA).

UNITED NATIONS
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United Nations Institute for Training and Research

MEXICO

Tlaquiltenango town / Tlaquiltenango Municipality / Morelos State

Imagery analysis: 05 October 2017 | Published 9 October 2017 | Version 1.0

Earthquake

EQ20170919MEX

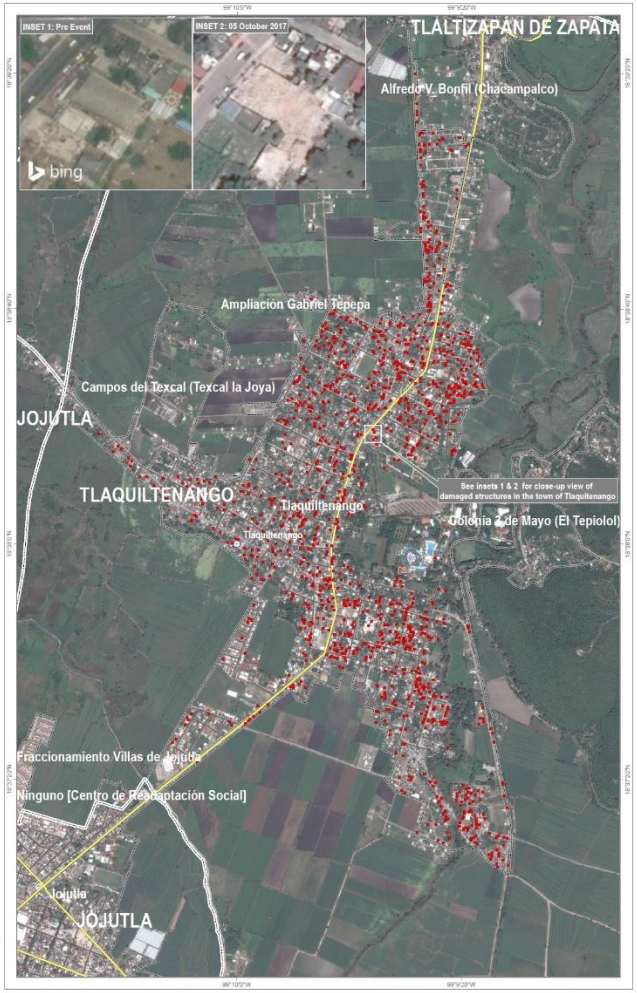
UNOSAT

Damage Assessment in Tlaquiltenango Town, Municipality of Tlaquiltenango, State of Morelos, Mexico

This map illustrates satellite-detected, potentially damaged structures in the town of Tlaquiltenango, Tlaquiltenango Municipality, Morelos State, Mexico. The analyzed area is located approximately 72 km west of the main shock epicenter of the 19 September 2017 M7.1 earthquake. UNITAR-UNOSAT identified 1,216 potentially affected structures within the town boundary. The analysis was performed using a post-event Pleiades satellite image acquired on 05 October 2017 and Bing as pre-event image. This is a preliminary analysis and has not yet been validated in the field. Please send ground feedback to UNITAR - UNOSAT.

Legend

- Damaged structure
- City / Town
- Primary road
- Local road
- Municipality boundary
- Urban and rural block



cnes AIRBUS DEFENCE & SPACE

Map Scale for A3: 1:16,000

0 75 150 300 450 600 Meters

Analysis conducted with ArcGIS v10.4.1

Coordinate System: WGS 1984 UTM Zone 14N
Projection: Transverse Mercator
Datum: WGS 1984
Units: Meter

Satellite Data (1): Pleiades
Imagery Dates: 05 October 2017
Resolution: 0.5 m
Copyright: CNES 2017, Distribution Airbus Defence and Space
Source: Airbus Defence and Space

Satellite Data (2): Bing
Imagery Date: October 2010 / December 2013
Copyright: Microsoft Corporation, 2017
Source: Microsoft Corporation, 2017

Road Data: Open Street Map
Boundary Data: Instituto Nacional de Estadística y Geografía (INEGI)
Analysis: UNITAR - UNOSAT
Production: UNITAR - UNOSAT

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United Nations Institute for Training and Research

MEXICO

Central West Cuernavaca City / Cuernavaca Municipality / Morelos State

Imagery analysis: 22 September 2017 | Published 27 September 2017 | Version 1.0

Earthquake

EQ20170919MEX

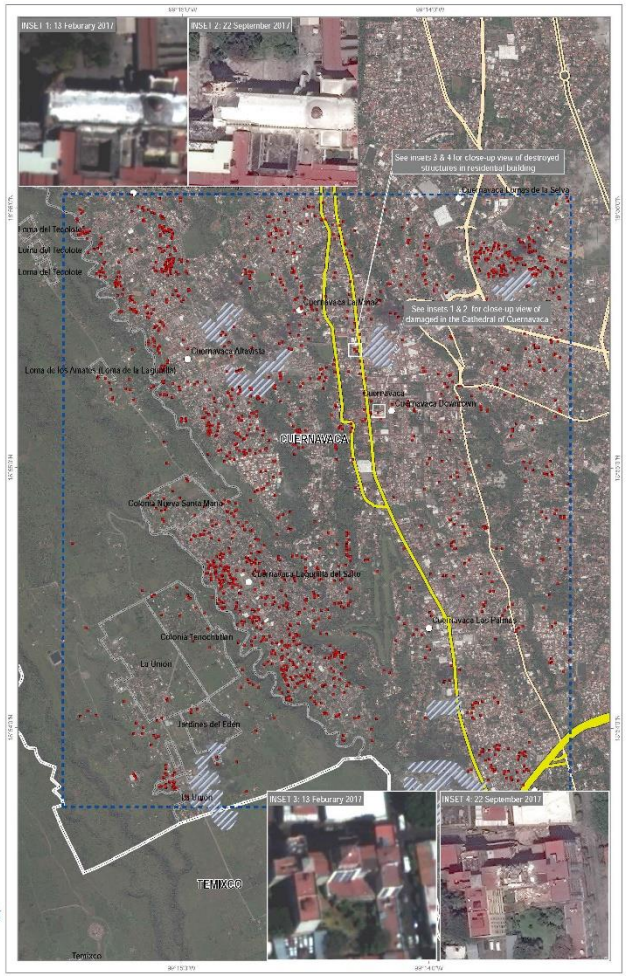
UNOSAT

Central West Cuernavaca City, Municipality of Cuernavaca, State of Morelos, Mexico

This map illustrates satellite-detected, potentially damaged structures in the central western part of the city of Cuernavaca and more specifically in the neighborhoods of Downtown, La Mina 2 and Altavista, Cuernavaca Municipality, Morelos State, Mexico. UNITAR-UNOSAT detected a general moderate damage with a few collapsed structures and identified 1,494 potentially affected structures. The analysis was performed using a post-event WorldView-3 satellite image acquired on 22 September 2017 and a pre-event WorldView-2 satellite image acquired on 13 February 2017. This is a preliminary analysis and has not yet been validated in the field. Please send ground feedback to UNITAR - UNOSAT.

Legend

- Damaged structure
- Populated place
- Primary road
- Secondary road
- Local road
- Cloud mask
- Analysis extent
- Municipality boundary
- Urban and rural block



USGS science for a changing world DigitalGlobe

Map Scale for A3: 1:20,000

0 100 200 400 600 800 Meters

Analysis conducted with ArcGIS v10.4.1

Coordinate System: WGS 1984 UTM Zone 14N
Projection: Transverse Mercator
Datum: WGS 1984
Units: Meter

Satellite Data (1): WorldView-3
Imagery Dates: 22 September 2017
Resolution: 0.3 m
Copyright: DigitalGlobe, Inc
Source: USGS - HDDS

Satellite Data (2): WorldView-2
Imagery Date: 13 February 2017
Resolution: 0.5 m
Copyright: DigitalGlobe, Inc
Source: USGS - HDDS

Baseline Data: Humanitarian OSM
Boundary Data: Instituto Nacional de Estadística y Geografía (INEGI)
Analysis: UNITAR - UNOSAT
Production: UNITAR - UNOSAT

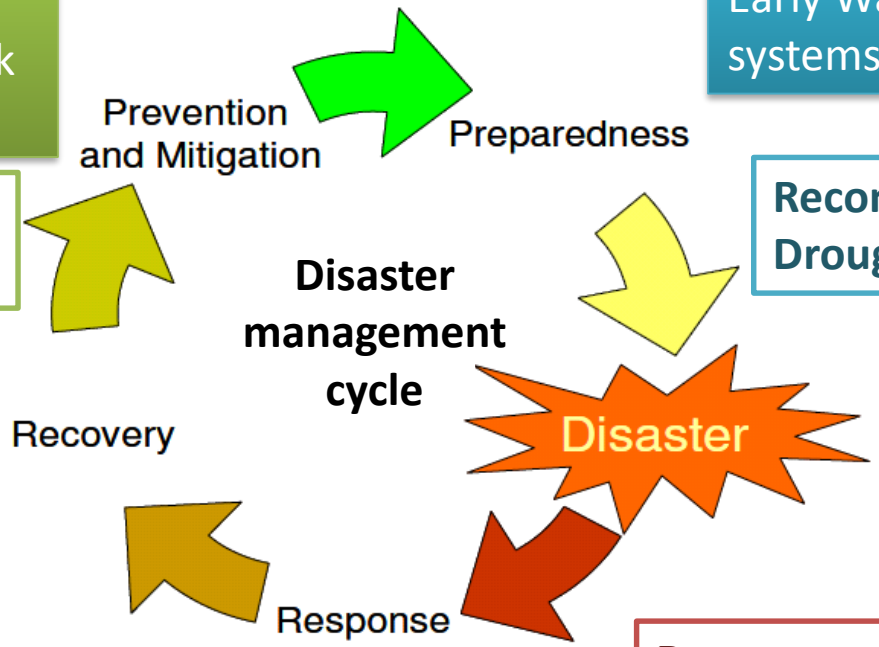
Access to Knowledge

Geoinformation for Hazard, exposure, vulnerability, and risk assessment

Geoinformation for Early Warning systems

Recommended Practice on Flood Hazard Mapping

Recommended Practice for Drought Early Warning



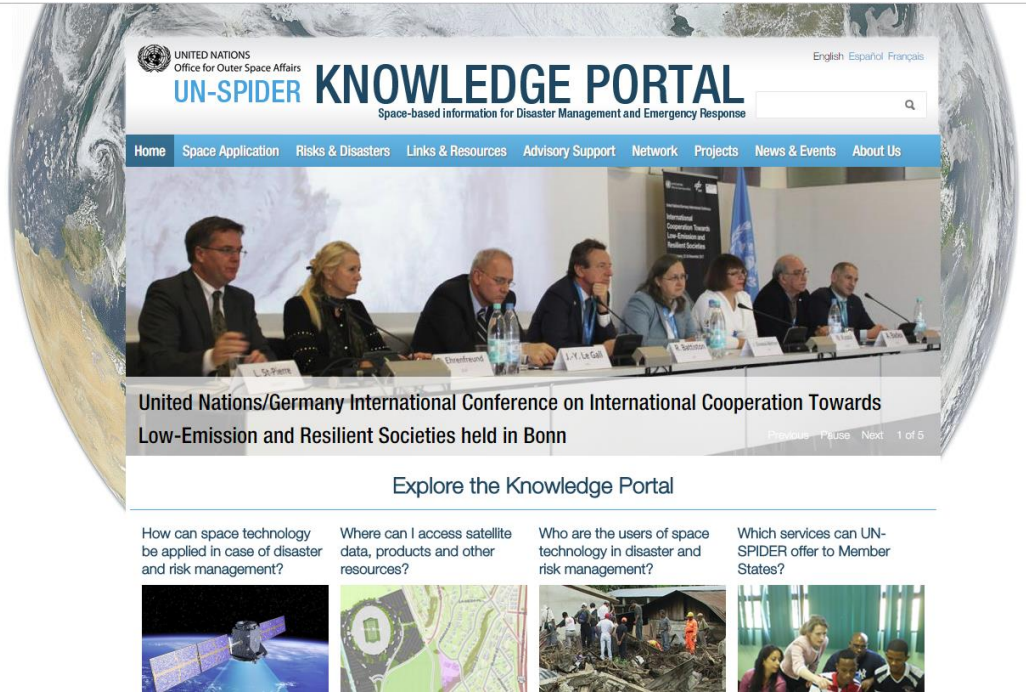
Geoinformation for Post Disaster Needs Assessment (PDNA)/ Damage and Loss Assessment (DaLA)

Geoinformation for Rapid mapping: Extent and impact

Recommended Practices on Flood Extent Mapping and Burnt severity in case of forest fires

UN-SPIDER Knowledge Portal

In a nutshell: a gateway to space-based information



http://www.un-spider.org

1. **Examples regarding how space technologies are used in disaster risk reduction and emergency response efforts;**
2. **Links to websites and portals that host satellite imagery, products and software;**
3. **Recommended Practices (step-by-step procedures to generate specific types of products);**

UNITED NATIONS
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THANK YOU

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United Nations Office at Vienna

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