GEOSS Architecture for the Use of Satellites for Disaster Management and Risk Assessment GA.4.Disasters

Karen Moe/NASA Earth Science Technology Office

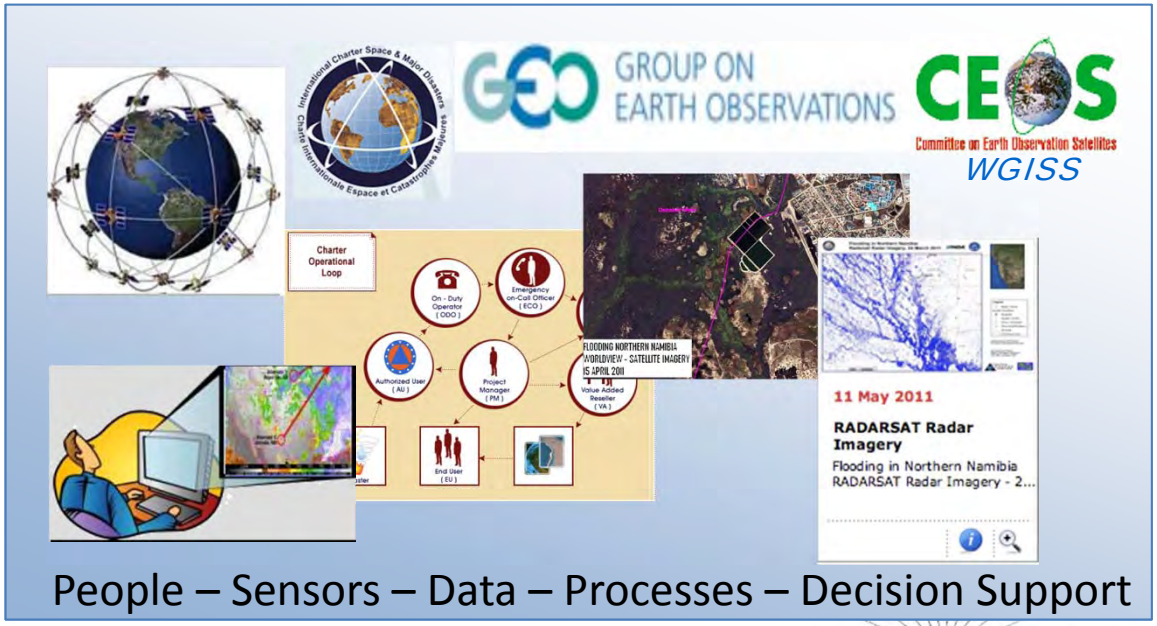
Presented at CEOS-WGISS-34

Hyderabad, India

September 25, 2012

GA.4.Disasters Agenda

- Project Overview: GA.4.Disasters – GEOSS Architecture for the Use of Satellites for Disaster Management and Risk Assessment
- GEOSS AIP-5 contributions and outcomes
- Findings from the July ESA forum on Understanding Risk with Earth observation
- GA.4.Disasters Architecture status
- Case Study findings
- Preliminary recommendations
- Next Steps



GA.4.Disasters WGISS Project Status

- GA.4.Disasters architecture document July 2012
- WGISS GA.4.Disasters project web site updates, key CEOS and GEOSS reference documents for disasters/risk management
- Analysis of recent efforts on understanding risk (Sergii Skakun)
- Sensor web pilots supporting architecture findings – Namibia flood, Caribbean disasters, Ecuador volcanoes
- Expanding case studies including Data Provider perspective (Wyn Cudlip)
- Outreach
  - Joint GA.4.Disasters/GEO Architecture Implementation Pilot (AIP-5) presented at IGARSS July 2012
  - GA.4.Disasters abstract accepted for presentation at AGU Dec 2012

GEOSS Architecture for the Use of Satellite Data in Disaster Management & Risk Assessment

CEOS-GEO Action No. DI-01-C1_2 (POC: K. Moe/NASA, S. Skakun/NASU)

- ***WGISS Project Purpose:*** **Streamline and harmonize how space agencies support hazard management / response with satellite data**
- ***2012 Accomplishments:***
  - **Identified case studies of experience and pilots to identify best practices and gaps in service, e.g.:**
    - **2008 earthquake in China**
    - **2010 tsunami in Japan**
    - **Annual floods in Namibia**
  - **Documented a structured reference model architecture (2nd draft version in review)**
    - **Processes involved**
    - **Stakeholders needs & constraints**
    - **User information needs**
    - **Use of computing systems and services**

Namibia Flood Pilot – Process Flow

- ***Next Steps:***
  - **Complete architecture description**
  - **Review with stakeholders, and develop recommendations**

DI-01-C5_1 Caribbean Satellite Disaster Pilot

S. Frye, G. Seguin

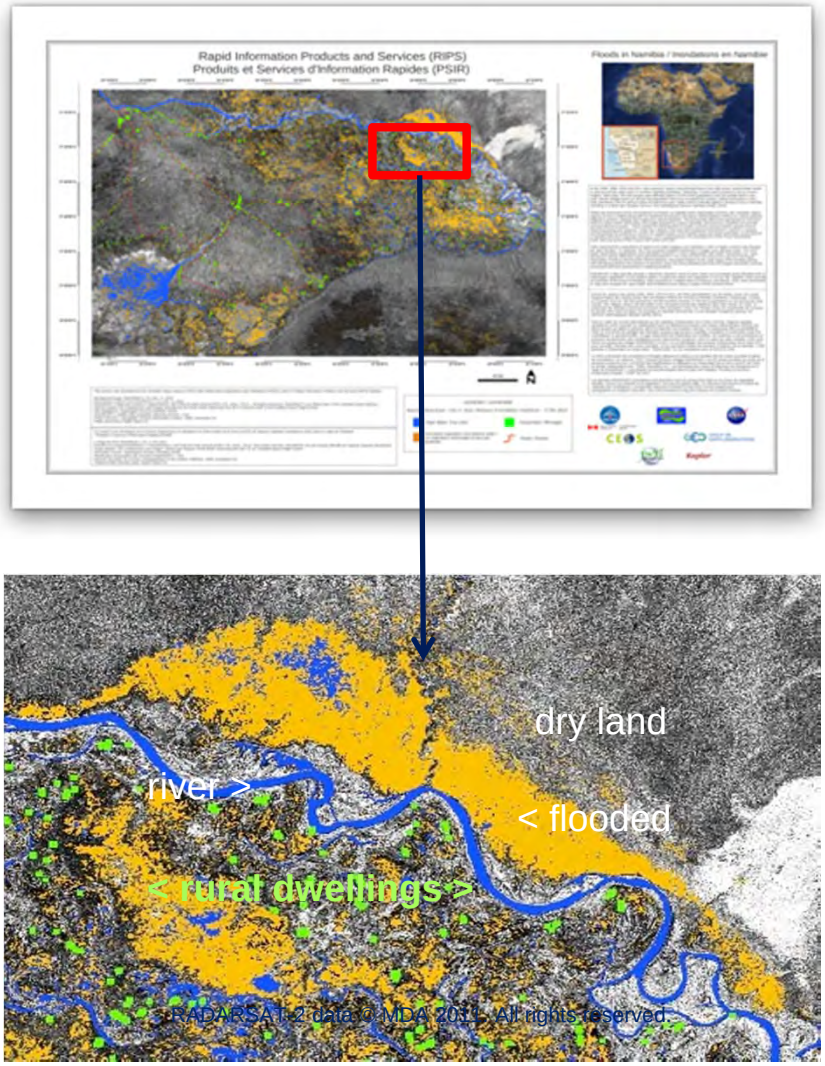
- Partners: CDEMA, NASA, CSA
- 2011 hurricane season had 19 named storms
- Severe rainfall events also in Central America
- Successful pre- post-event data capture and delivery of rapid response products and flood maps
- Ernesto, Isaac and others tropical storm already covered this season.
- Additional data are welcomed !

Flood Data – Caribbean Requirements

Phase Requirements	Mitigation and Preparedness	Warning	Response	Recovery
Target	Topography Hydrological models Historical atlas of floods Flood models/simulations New infrastructure, houses Land-use classification Monitoring of dikes and dams Tropical cyclone seasonal predictive models/simulations Monitoring sea surface temps Monitoring sea-level rise	Precipitation Water level (rivers, lakes) Weather forecast Soil moisture Snow-water equivalent Signs of catastrophic infra failure Signs of active or high tropical cyclone activity Sea-level Signs of coastal erosion and inundation	Water level (rivers, lakes) Extent of flood Status of critical infrastructure Weather forecast Status of coastal infrastructure Predictive model simulations for rising sea level effects	Status of critical infrastructure Damage assessment Flooded areas
Revisit	Monthly (models during season) 1 to 3 years (imagery) 5 to 10 yrs (topography)	Daily or better during high risk period	Daily in early morning; twice daily if possible	Weekly (major floods) for several weeks to several months
Timeliness	Weeks Months (for seasonal predictions) Years (for Global Change)	Hours Days to Months (for tropical cyclone activity)	Hours (2-4 max)	1 day Years (for Global Change)
End use	Integration in land use planning/zoning Baseline for response Integration in coastal area planning/zoning (Global Change)	Decision support for warnings & evacuation Decision support for infrastructure building and population relocation	Situational awareness Resource allocation support Initial damage assessment Impact planning/action	Tracking affected assets Charting progress Assessing scope of Global Change impacts and ability to cope

DI-01-C5_2 Southern African Flood and Health Pilot

S. Frye, G. Seguin



Repeated and severe flooding of the major Namibian rivers during past years has affected more than one-third of the country's population.

NASA and CSA cooperated to provide optical and radar satellite imagery.

CSA and NASA generated regional flood information products from RADARSAT-2 and EO-1 data for use by Namibian authorities.

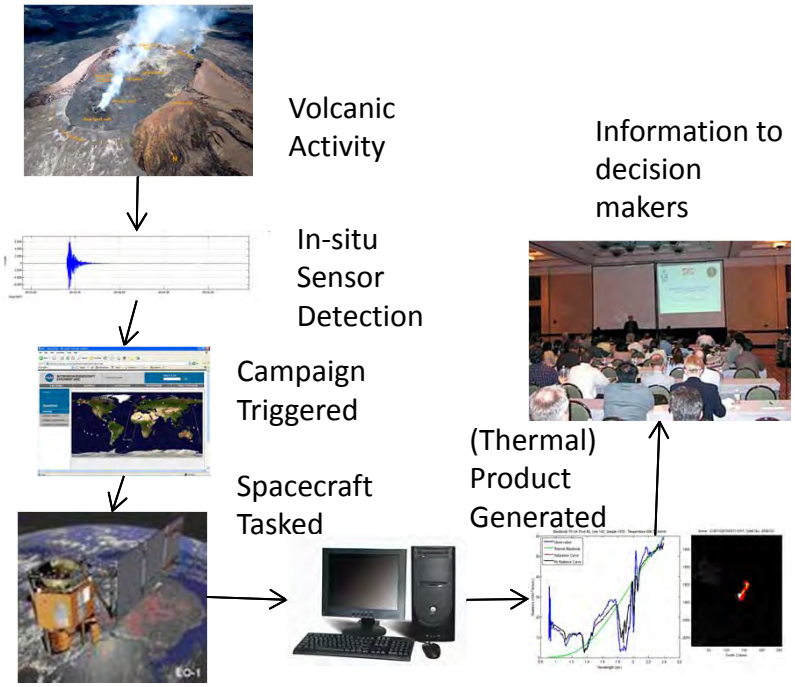
Moreover, radar flood vector data was used effectively with GIS data for flood relief work on the ground and assists further flood assessment and mitigation.

Slide 7

DW1 Pls omit background image, if you find it not useful.
Dirk Werle, 4/19/2012

Global Volcano Pilot
S. Chien/NASA JPL

- *Pilot Goal:* Identify new products, spacecraft tasking methods, and workflows to improve volcano hazard management / response with satellite data
- *2012 Accomplishments:*
  - Identified two areas of potential product/process improvement:
    - o Integration of additional in-situ, volcano observatory networks into global monitoring system (targeting Ecuador and Etna)
    - o Integration of point source volcano output measurements (thermal, ash) into larger mesoscale ash models



Global Volcano Pilot – Process Flow

- *Next Steps (October – December 2012):*
  - Integrate Ecuador &Etna Observatories into Worldwide Volcano Sensorweb
  - Investigate means of integrating point source measurements into mesoscale models.

GA.4.Disasters Agenda

- Project Overview: GA.4.Disasters – GEOSS Architecture for the Use of Satellites for Disaster Management and Risk Assessment
- GEOSS AIP-5 contributions and outcomes
- Findings from the July ESA forum on Understanding Risk with Earth observation
- GA.4.Disasters Architecture status
- Case Study findings
- Preliminary recommendations
- Next Steps