



What elements of the pilot have proven to be successful, especially with regard to user interest and involvement? Are there specific elements that will be "missed" if stopped now? Which ones and why? (1 of 2)

- **Access to previously unavailable data (e.g., COSMO-SkyMed, Radarsat-2, ALOS-2) and products during flood disaster improved response cycle in all regions**
 - **Capacity developed to generate products locally (e.g., RCRMD in Nairobi, Kenya; Regional Climate Change Program in Costa Rica; CIMH in Barbados) from these data sets**
- **Monitoring and model products delivered through standard interfaces in compact vector map layer format via Open GeoSocial API—highly useful to end users (e.g., FEMA; Pacific Disaster Center, Namibia Department of Hydrology)**



What elements of the pilot have proven to be successful, especially with regard to user interest and involvement? Are there specific elements that will be "missed" if stopped now? Which ones and why? (2 of 2)

- **Dashboard interface**
 - Because of Pilot efforts, operational users in Costa Rica and Kenya are now not only retrieving relevant products, but posting their own for redistribution to their user community
 - Allows easy intercomparison of monitoring / modeling products for each event
- All these elements would be “missed” because they provided / enhanced situational awareness and flood preparedness



Are there elements of the pilot that are likely to be supported (possibly financially) from outside CEOS and the pilot going forward beyond 2017? If yes, what organizations might be willing to contribute to a sustainability plan? (1/2)

- **Elements that will not continue:**
 - Southeast Asia Flood Dashboard (NSF grant expires)
- **Elements that will continue but will be degraded:**
 - Dartmouth Flood Observatory (Univ. Of Colorado)—loss of ALOS-2 data for current flood mapping and retrospective analysis
- **Elements that will not be affected:**
 - Lower Mekong River Basin Project (NASA GSFC/SERVIR)
 - NASA near-real-time (NRT) Global Moderate resolution Imaging Spectroradiometer (MODIS) Flood Mapping
 - NASA-GSFC Open GeoSocial API delivery of iMERG and GFMS products
 - Global Flood Monitoring System (U. of Maryland)
 - Global Flash Flood Guidance (HRC)



Are there elements of the pilot that are likely to be supported (possibly financially) from outside CEOS and the pilot going forward beyond 2017? If yes, what organizations might be willing to contribute to a sustainability plan? (2/2)

- **Potential contributors to a sustainability plan:**
 - GEO-DARMA (connecting to good DRR initiatives but still spinning up)
 - Global Flood Partnership (not funded)
 - UN (UNOOSA, UN-SPIDER, GGIM, UNISDR)
 - World Bank
 - Regional Development Banks
 - Other organizations may be willing to sustain individual projects but not necessarily in view of a broader sustainability plan
 - Other organizations (e.g., IRC, Open StreetMap Team) do not have funding but may be willing to champion these activities



**In considering successes that should go forward, do these involve a transition from research to operations?
Are there data issues involved?**

- **Regional dashboards are operational but do require hosting and system support (e.g., Mekong Dashboard will terminate by end of Pilot period because NSF funding will end)**
- **Some (but not all) users (e.g., the Inter-American Development Bank, World Food Programme) are now budgeting for product processing and infrastructure, so utilization of these capabilities is in jeopardy without continued CEOS data quotas**



Do you consider that data for the sustainable elements should come from CEOS, or from commercial providers, or some mix?

- **This problem has been greatly alleviated by the increased availability of free data (e.g., Sentinel); however, serious gaps remain in supporting user needs using free data; e.g., Sentinel cannot be targeted.**
- **Data must come from a mix—some users are now identifying budgets to purchase data but some users may never have the means to purchase imagery; the latter can be coordinated and supported by CEOS**



Who are the key partners for achieving sustainability?

- **Academic and non-profit institutions (can provide training as well as data processing/interpretation)**
- **Regional, national, and international disaster agencies; e.g., Global Flood Partnership; International Red Cross / Red Crescent Societies; UNISDR; GEO initiatives (e.g., AmeriGEOSS, GEO-DARMA) providing support and / or endorsements**
- **Space Agencies (providing data and improved image access and data awareness capabilities)**
- **CEOS (see slide 9 for more details)**



Who are the main clients and users of the sustainable services?

- **Regional (RCMRD; ADPC; RCCP; CIMH), national (GEO countries in the Americas and Africa), and international (Red Cross / Red Crescent; Humanitarian Open Street Map Team; World Bank) disaster agencies**
- **Academic Institutions (University of Colorado, University of Maryland, University of Santa Maria (Chile), University of Namibia, University of West Indies)**
- **Operational Institutions (e.g., FEMA, ONEMI / Chile)**



What if any is the role for CEOS in the sustainable service?

- **Facilitating access to satellite data for use in hazards assessment/mitigation and disaster response (beyond the International Charter), particularly for disadvantaged users without the means to purchase imagery**
- **Progress toward common licensing or open access for humanitarian applications**
- **Continued progress toward standardized interfaces, data format, and data distribution methods (data distribution remains very labor-intensive which greatly interferes with timely product delivery; data format issues restrict usability)**



What are the largest threats to sustainability, and what are the consequences of not achieving a sustainable service as proposed?

Threats

- **Data availability and ease of access (foundational to timely production and distribution of products)**
- **Need trained practitioners to work on data, communicate with intermediate and end users, interface with space agencies**

Consequences

- **Degraded ability to monitor and respond to floods, including where to deploy resources and how to mitigate potential future impacts**



Does sustainability imply a simple continuation, or does it involve scaling something developed in the pilot to a global level, or other larger level? What is involved? Can you provide a description/vision of this larger system and what it entails from a cost perspective (using elements from the pilot as a the starting point for costing)?

- **Many possibilities, from regional to global, depending on the level of support:**
 - **GEO-DARMA and AmeriGEOSS (either continue or expand to other regional settings)**
 - **Ongoing support for the Global Flood Dashboard and its components, including training for local data intermediaries**
 - **Hosting and O&M (\$100K/year for Amazon cloud hosting plus a part-time person to monitor / maintain / upgrade as required)**
 - **Specific management support for conducting follow-on data acquisition, tracking and delivery activities leading to a more streamlined process with standardized interfaces and formats**
 - **Continuing and building on this effort would require a team of 30 part-time people providing data and products with a level of effort equivalent to 8-10 FTEs / year (currently provided by applied science grants from affiliated projects, but dedicated funding would significantly reduce risk)**



Tier 0 [Pre-pilot]

- **Limited regional coordination of flood monitoring, modeling, and observation strategy**
- **Weak connection between global and regional entities**
- **Limited, ad hoc data availability from commercial satellites (ALOS-2, COSMO-SkyMed, RADARSAT-2)**
- **Somewhat restrictive access policies to Charter data for many users**



Tier 1a [no cost, just data]: continued regional activities

- **Quotas of satellite data from commercial satellites (write proposals, manage quotas, write reports)**
- **Coordinated approach—teams of academics work with practitioners**
- **Best effort response to crises and continued integration of EO data in flood disaster protocols**

Tier 1b [no cost, just data]: continued global activities

- **Larger quotas from commercial satellites (write proposals, manage quotas, write reports)**
- **Continued inclusion of new EO assets in the data stream as they come online**
- **Moderate-resolution global modeling and monitoring validated with higher-resolution regional products when available**
- **Best effort response to crises and continued integration of EO data in flood disaster protocols**



Tier 2a [some new funds]: expanded regional activities

- **Quotas of satellite data available from commercial satellites**
- **Partial FTE to support project management: proposals, quotas, reports, telecons, communicate with space agencies and practitioners**
- **Coordinated approach—teams of providers work with practitioners to build capacity and improve delivery**
- **Best effort response to crises**

Tier 2b [some new funds]: expanded global activities

- **Upgrading global delivery system to include flood products from new EO assets**
- **Partial FTE (larger fraction than with Tier 2a) to support project management: proposals, quotas, reports, telecons, communicate with space agencies and global practitioners**
- **Coordinated approach—teams of providers for each region work directly with practitioners**
- **Best effort response to crises**



Tier 3 [new funds]: scalable to regional or global

- **Large quotas of satellite data available from commercial satellites**
- **Automated processing and distribution of flood maps from all available assets (e.g., MODIS, VIIRS, Sentinel, Landsat) for every event worldwide**
- **One or more FTE's:**
 - **Project management by a scientifically trained person: write proposals, manage quotas, write reports, communicate with space agencies and practitioners, participate in telecons**
 - **Routine, near real time, largely automated data processing—interpretation and processing strategy needs continuous scientific input (not just an advisory board); who will do the work, who has the oversight, and how this will be funded needs to be worked out**
- **Coordinated approach—teams of providers work directly with supported FTEs and with practitioners**
- **Interface with other global and regional organizations (Red Cross, FEMA, Copernicus, etc.) to ensure their access to and use of these data**