



# International Charter Space and Major Disasters

## International Charter Space and Major Disaster- 2016 Annual Report

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on behalf Charter Executive Secretariat

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# Purpose



An International agreement among Space Agencies to support with space-based data and information relief efforts in the event of emergencies caused by major disasters.

- **Disaster response**
- **Multi-satellite data acquisition planning**
  - Fast data turn-around – priority acquisition
- **Archive retrievals and spacecraft tasking**
- **Data processing at pre-determined level**
- **Space Agency contribution in image/ data**
- **Space Agency initiative for value-added-data fusion**



# Disasters Types Supported



The International Charter executes priority tasking of different EO missions in a rapid fashion; it is designed to address requests concerning major disasters caused by:

## Natural events

1. Earthquakes
2. Fires
3. Floods
4. Ice jams
5. Landslides
6. Tsunamis
7. Ocean storms
8. Volcanic eruptions

## Man-made events

10. Oil spills
11. Industrial accidents

## Others

- MH370 search
- Ebola virus street map





# Charter Members







# Activating the Charter: Authorized Users (AU)

The only bodies authorized to **directly** request the Charter to be activated are the **Authorized Users** - AUs (typically civil protection agencies, governmental relief organizations, or other authorities with a mandate related to disaster management).





# Charter Activations

((disaster types))



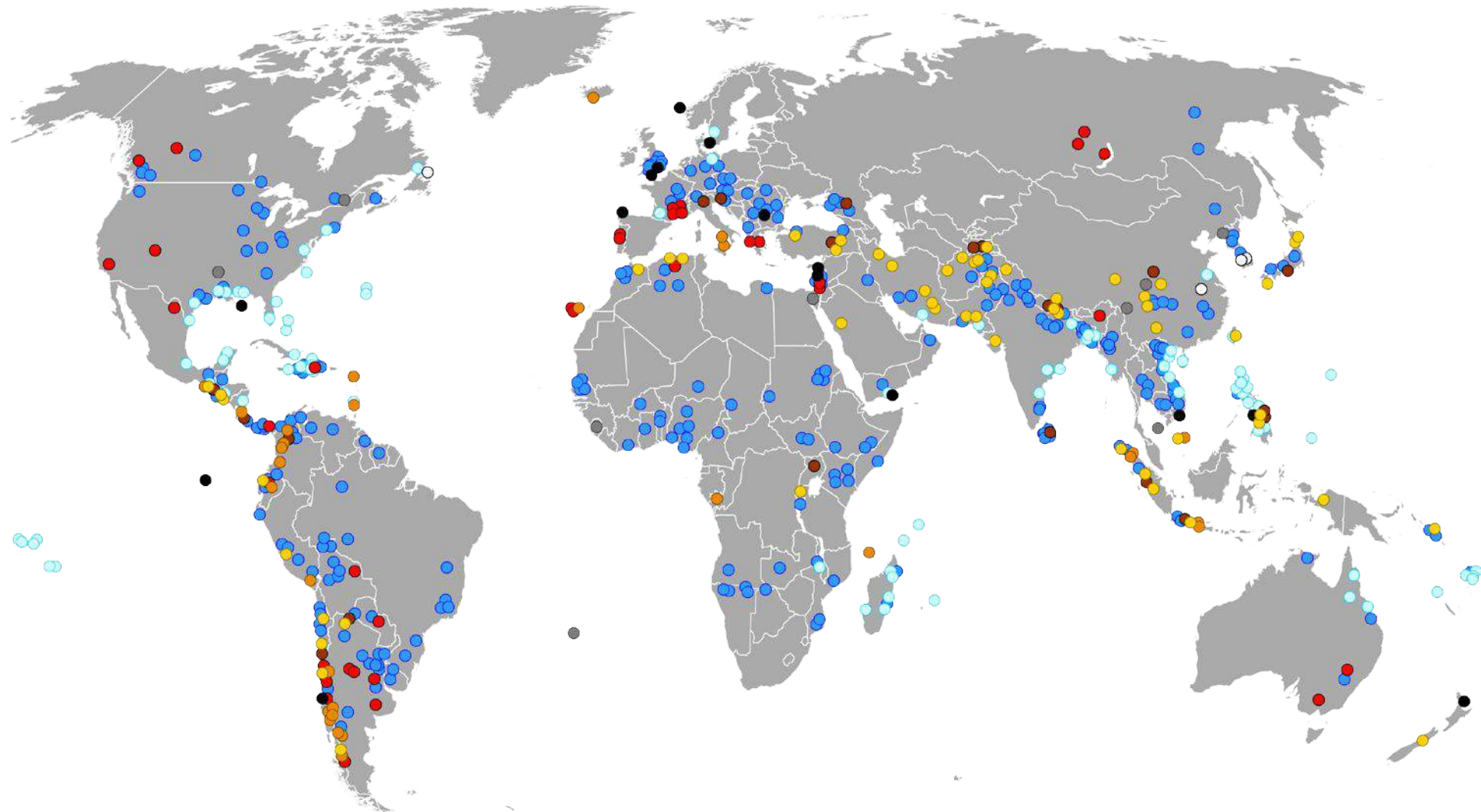
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Sub-totals	
Solid Earth	Earthquake		3	1	3	5	3	2	5	4	3	5	5	3	4	1	5	4	1	57	110
	Landslide	1	1	2	2			1			4	2	2		1	4	2			22	
	Volcano		1	1	2	2	1	1	2	3	3	2	2	1	3	2	4	1		31	
Technological	Oil spill		3	2				4	3			1	1				1			15	24
	Others					1						3			1	2	1		1	9	
Weather / Atmospheric	Fire				5	1	2		4	2	4	1	3	2	2	3	2	4	3	38	400
	Flood/Ocean wave*		3	8	4	9	13	16	22	23	19	25	16	25	21	22	18	16	11	271	
	Ice/Snow hazard								1			1	1			1				4	
	Storm/Hurricane**			1	2	3	6	1	8	8	7	11	2	9	6	6	5	11	1	87	
Total / year		1	11	15	18	21	25	25	45	40	40	51	32	40	38	41	38	36	17		
TOTAL																					534

\*Includes solid earth related phenomenon of a tsunami.

\*\*Includes all wind type storms (hurricane, cyclone, typhoon and tornado).

As of June 12, 2017 – 534 Charter Activations

# Activation Distribution

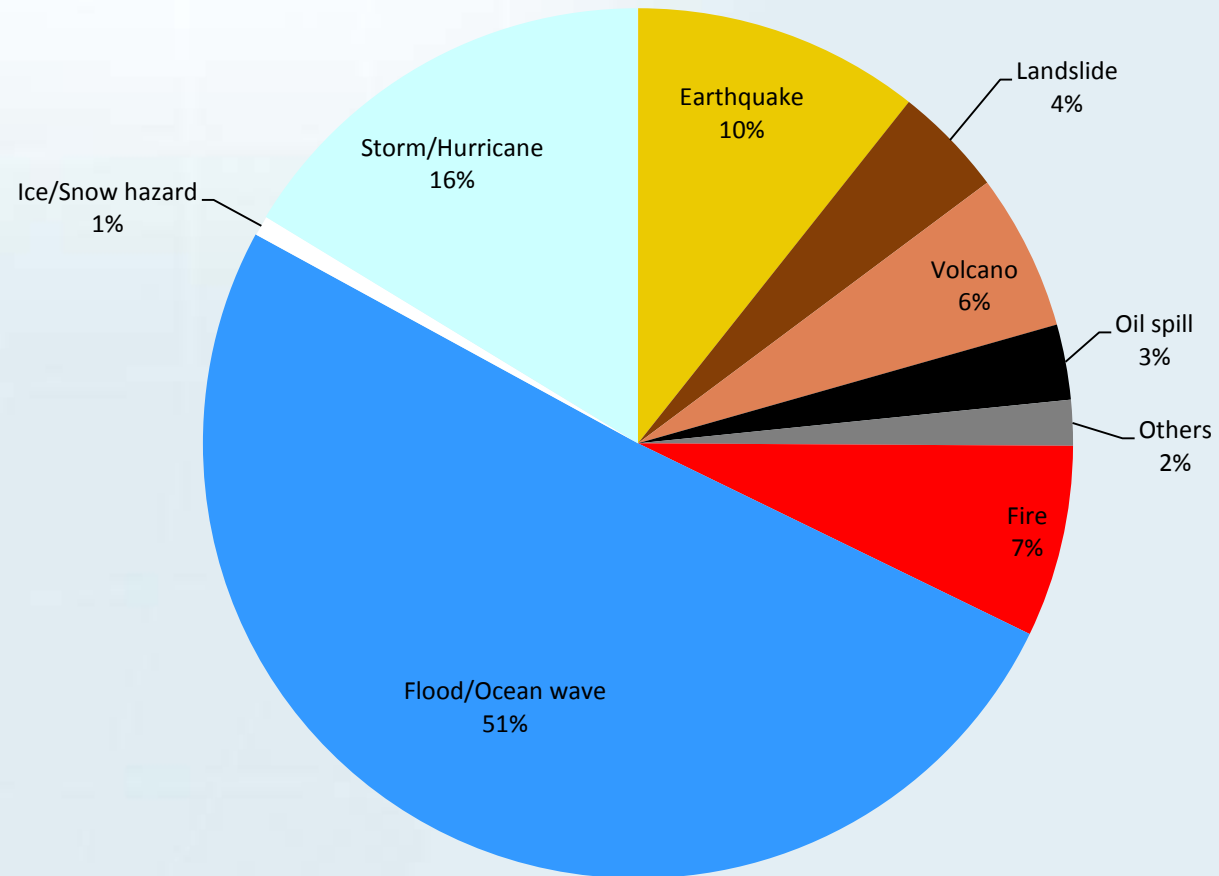


Legend:    ● Earthquake    ● Landslide    ● Volcano    ● Storm/hurricane    ● Flood/ocean wave    ○ Ice/snow hazard    ● Fire    ● Oil spill    ● Other

As of June 12, 2017 – 534 Charter Activations



# Activations by Disaster Type



As of June 12, 2017 – 534 Charter Activations

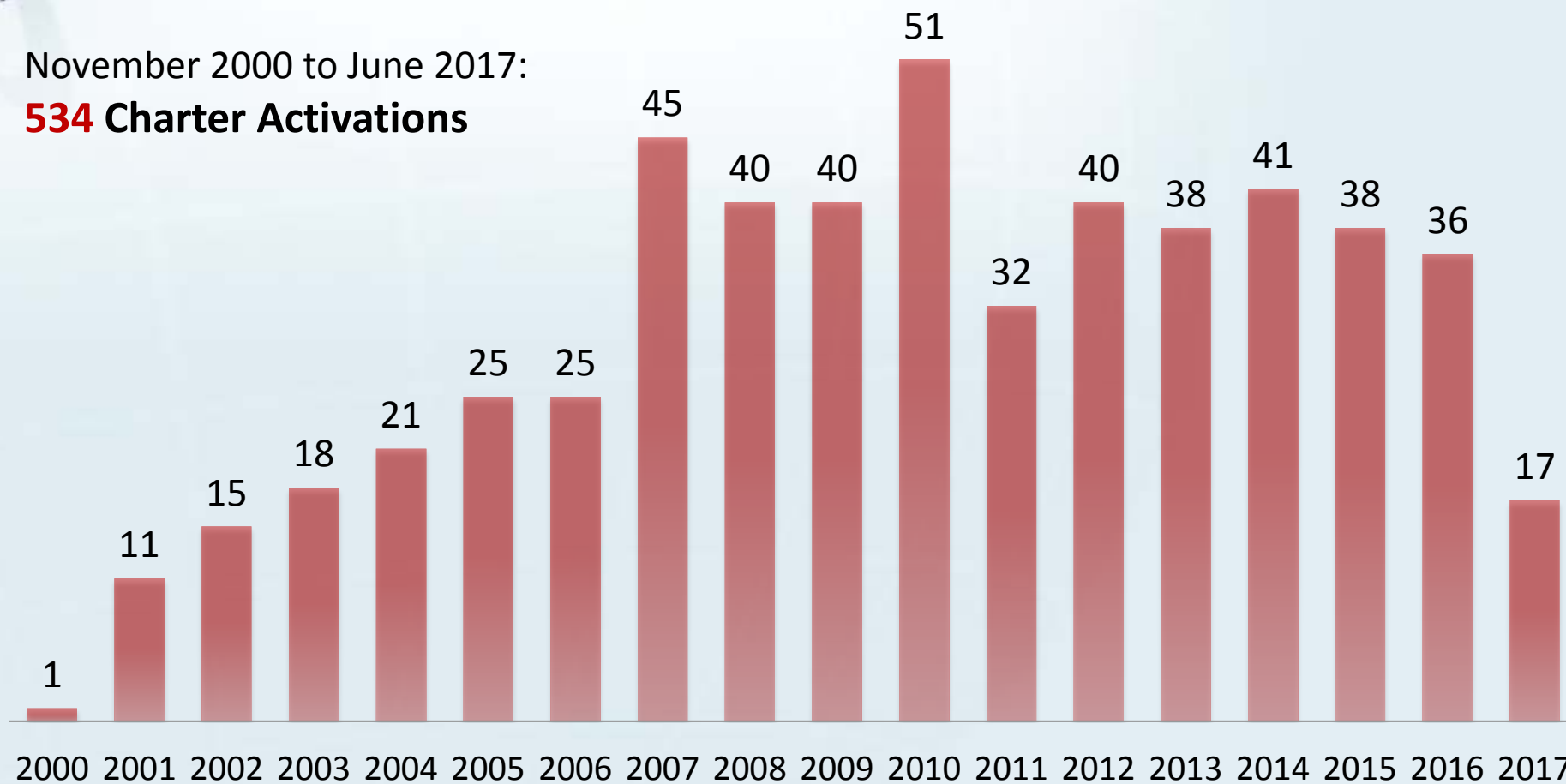




# Number of Activations

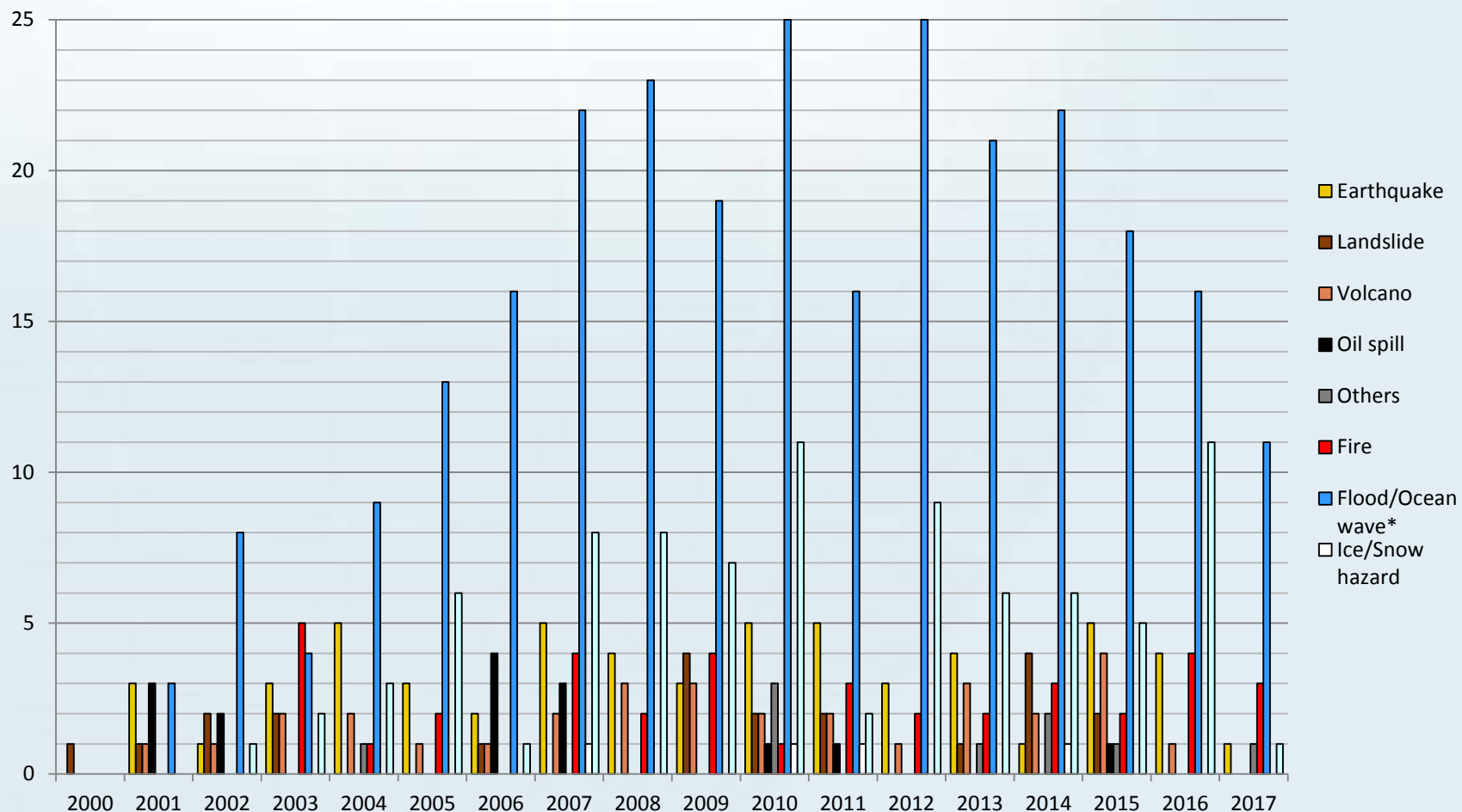
November 2000 to June 2017:

**534 Charter Activations**





# 2000-2017 Distribution of Activations by Hazard Type



\*Includes solid earth related phenomenon of a tsunami.

\*\*Includes all wind type storms (hurricane, cyclone, typhoon and tornado).

As of June 12, 2017 – 534 Charter Activations

# Universal Access

launched in September 2012

Any national disaster  
management authority  
can apply to become a  
Charter Authorized User







# INTERNATIONAL CHARTER SPACE & MAJOR DISASTERS

## **International Charter Space & Major Disasters 2016 Annual Report**





# 2016 Highlights (1)



**Main achievements during the Lead of USGS (October 2015- April 2016), CONAE (April 2016 – October 2016) and ROSCOSMOS (October 2016- April 2017) :**

- **Bolivarian Agency for Space Activities (ABAE)** fully integrated into the Charter with official accession signature ceremony during the 36th Board meeting in Moscow, Russia on 19 October 2016.
- **Request of the United Arab Emirate Space Agency (UAESA)** to become Charter member with support from the Mohammed Bin Rashid Space Centre (MBRSC) - operating two VHR optical satellites.
- **36 activations in 24 countries over 2016:** 7 activations (USGS Lead), 22 activations (CONAE Lead), 7 activations (ROSCOSMOS Lead).



*36<sup>th</sup> Charter Board representatives from ROSCOSMOS, ABAE and ESA during the official signature of ABAE as a new member in Moscow, Russia, October 2016.*



## 2016 Highlights (2)

- **Sentinel-2A of the Copernicus programme** was launched in June 2015 and integrated in Charter operations in 2016. First Sentinel-2A images provided to Charter for floods in Australia in September. The same activation was also supported for the first time with EO data using **ABAE's VRSS-1**.
- **KARI's SAR mission KOMPSAT-5** launched in August 2013 and added to the Charter constellation in 2016. First data delivery to Charter in August for floods in Bangladesh.
- **Resurs-P3 satellite** of the Resurs-P type was launched in March 2016 and later was integrated in the Charter constellation. First data were provided to the Charter in August 2016 over the flood in Sudan.



# 2016 Highlights (3)



- **Universal Access** is progressing: Belarus, Iraq, El Salvador, Guatemala and Uruguay became Authorized Users (AU);
- **63 user organizations from 55 countries able to directly request Charter activations** (blue in figure). Other candidates under assessment or training.



- 2 Semi-Annual Refresher Exercises (**SARE**): SARE-16 & 17.
- 5 **PM training** sessions held in Philippines, Columbia, Argentina, Indonesia and the UK.
- ESA, CNES, DLR, ROSCOSMOS, CONAE and INPE performed Authorized User Training sessions to 15 AUs: France, Germany, Belarus, El Salvador, Guatemala, Uruguay, Venezuela, Canada, Chile, Iraq, USA, Pakistan, Argentina, UK and Ecuador.
- **COS-2** in operations and used for handling the totality of Charter activations. Emergency on Call Officers (ECOs) and Project Managers (PMs) were able to access & generate information and metadata using the system. COS-2 used for SARE-16 (and 17) exercises in which 46 (and 44) ECOs participated.
- Sharing data with the **CEOS WG Disasters**: **6 requests have been received from the CEOS Flood pilot** requesting data for floods in USA (January 2016), Indonesia (February 2016), Argentina and Seychelles (April 2016), Bangladesh and Sri Lanka (June 2016), USA (September 2016) and for Hurricane Matthew in the Caribbean region and the USA (October 2016). Most of the Charter member agencies shared data with the Flood pilot, when there was an overlap with the area of interest of the Charter activation.



# 2016 Highlights (4)



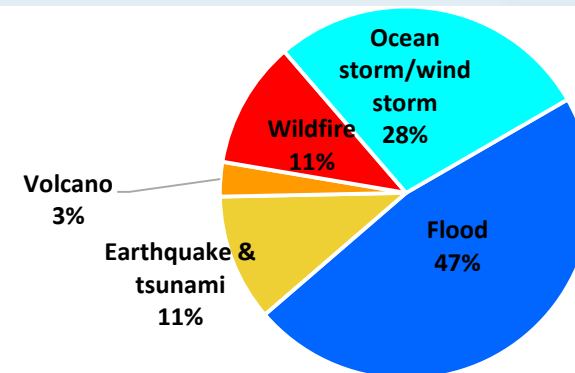
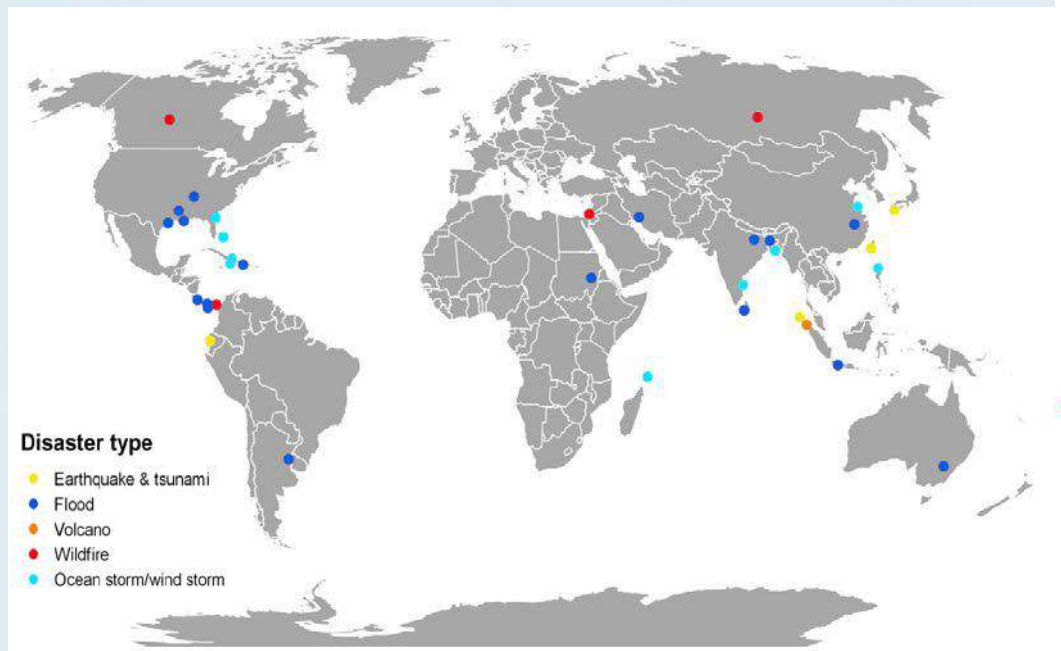
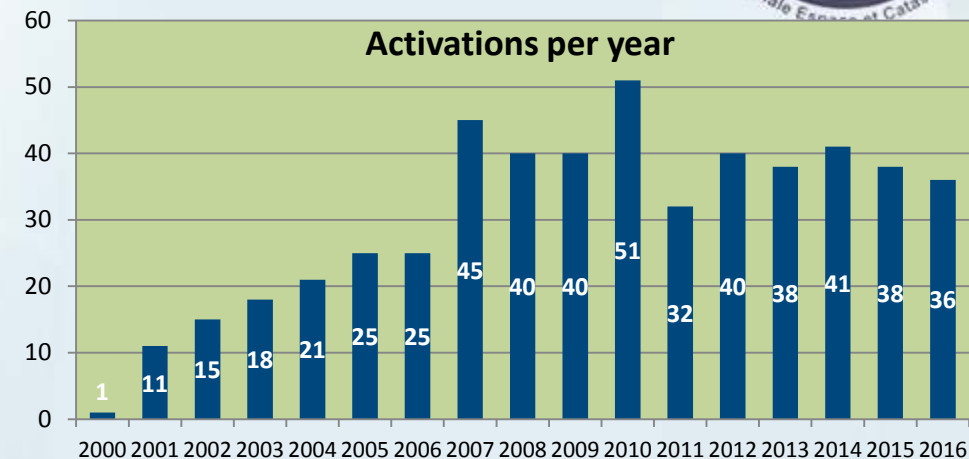
- The Charter website is available in English and some pages are available in French, Chinese, French, Japanese and Spanish. The translation of the web pages in Spanish with the support of CONAE and ABAE, and in French, with the support of CNES, is on going.
- **2 newsletters** were published in July and November 2016.
- **Twitter** account: Charter visibility is also ensured through other social media outlets, such as Twitter, which had around 4000 followers by the end of 2016, which shows that the charter audience continues to increase remarkably compared to 2015 (3160), 2014 (1840) and 2013 (880).
- Participation in **international/ regional events** all over the world to promote the Charter and the Universal Access (UA) initiative.
- Various **papers and articles** published by Charter members.





# 2016 Activations overview

- **2016: 36 activations;** 16 in Asia, 6 activations occurred in North America, 4 in Central America, 4 in the Caribbean, 3 in Middle East, 3 in Oceania, 2 in Africa and 2 in South America.
- Countries with 10+ activations: **USA, China, Chile, Indonesia, India, Indonesia, Argentina, France, Philippines, Pakistan, UK, Vietnam, Canada, Colombia and Brazil.**
- Since 2007, the regime of activations is around **40/year**.



- 2016: Most frequent hazards: flooding (47%) and storms (28%).
- 2016: Hydro-meteorological related hazards represent **75%** of total calls, while solid earth-related hazards represent **14%** of them.
- Activation for **flood** represents **+50% of Charter activations over the last 6 years.**



# Cooperation with Sentinel Asia & the UN



- ❑ Channelling activation requests for users without direct access to the Charter.
- ❑ Improving awareness of the Charter worldwide a promoting Universal Access.

➤ Active cooperation with the UN is continuing on the basis of existing arrangements with **UNOOSA** (awareness, promotion) and **UNITAR/ UNOSAT** (awareness, training and support to Charter operations).

➤ 2016 Operations concerning the UN:

**22,2 % of 2016 Charter activation requests (8 activations) were through UNITAR/ UNOSAT.** UNITAR/UNOSAT supports Charter operations by taking over Project Managements and value-adding services: PMs (and VA) for 6 activations & value-adding services for the Nepal earthquake activation.

➤ 2016 Operations concerning Sentinel Asia:

**Escalation to the Charter: 6 times in 2016** for an earthquake in Taiwan, floods in Sri Lanka, a volcanic eruption in Indonesia, an ocean storm in Bangladesh, flooding in Bangladesh and an earthquake in Indonesia. Sentinel Asia was activated 34 times in 2016.

➤ Over 2007-2016, 57% of activations have been requested on behalf of a user (AUs for another country, UN or Sentinel Asia) i.e. in a country without direct access to the Charter.



# Collaboration with the Copernicus EMS:



European members of the Charter have pursued the collaboration with the Copernicus Emergency Management Service:

- Ensure there is collaboration between different EO disaster response initiatives (Charter, Copernicus, Sentinel Asia, UN, etc.) to **maximise benefit to the user community** and avoid duplications
- Regular **Telco and meetings** with DG GROW (May and December 2016)
- Set up **procedures for notifications** of new Calls and **operational communication** exchanges during activations
- Discussed the **evolution of the collaboration** (managing activations outside Europe, enhancing outreach and training on a global basis, collaboration procedures about EO data access and Value Adding e.g. using Copernicus EMS in the context of Charter activations).





# Promotion



## **Awareness & promotion actions of the Charter by its members:**

- EUMETSAT promoted Universal Access to African Meteorological Services in Kigali, Rwanda.
- ROSCOSMOS promoted the Charter activities to the regional reps of the Russian Federation for Civil Defense, Emergencies and Elimination of Consequences of Natural Disasters (EMERCOM) and relevant organizations.
- CNES published four web articles. DLR published four web-articles incl. an article about satellite EO and Disaster Risk Reduction. KARI published on web based article.
- CNES, DLR, ESA & USGS participated in a paper for Global Trends in Satellite-based Emergency Mapping to promote the Charter me participated in a paper about Global Trends in Satellite-based Emergency Mapping which emphasises the important role of the Charter mechanism.”
- CSA attended the 17th Meeting of the International Ice Charting Working Group to present the Charter and to share with the group that the Charter could support disasters in the arctic seas.

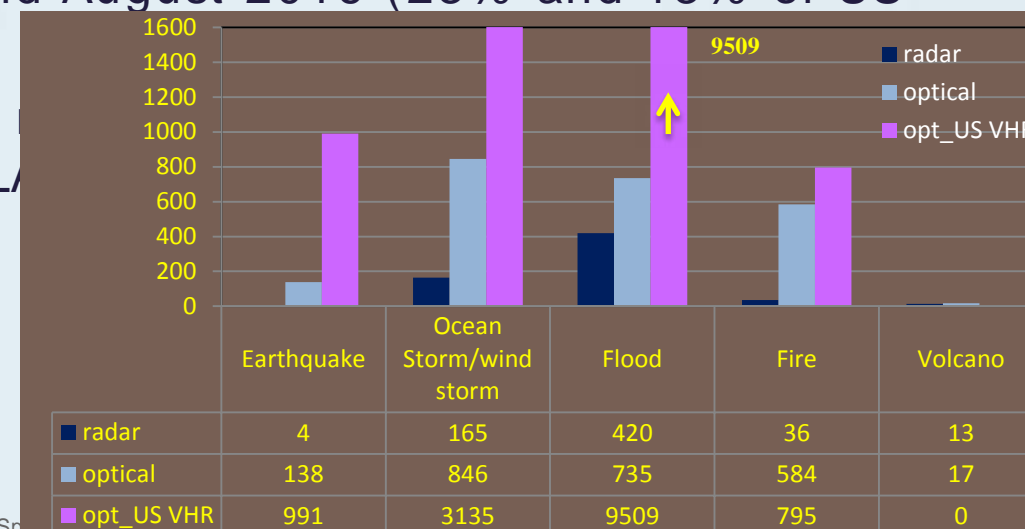




# 2016 data consumption

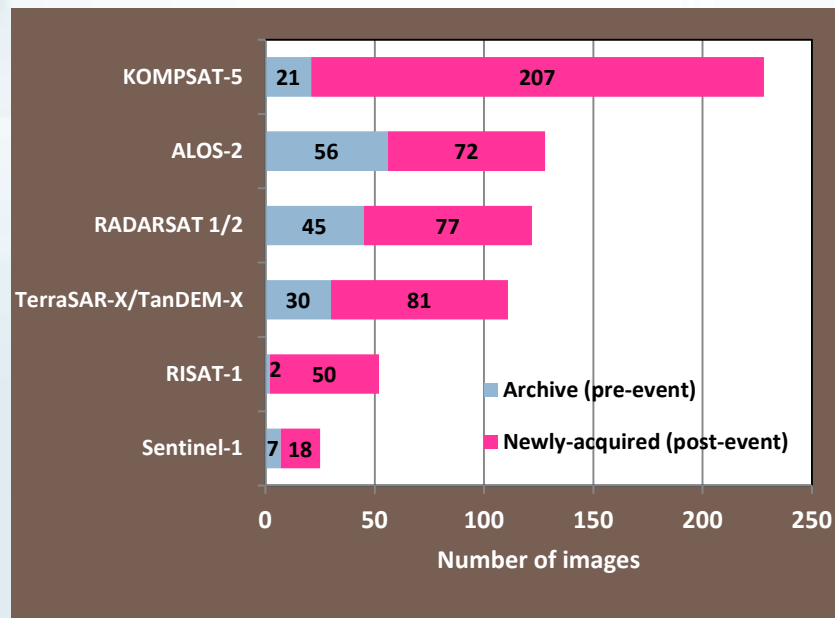
- 36 activations and a total of **2958 images** from EO missions of Charter members, primarily using Optical data (2320 images) while for SAR data (638 images) 65.8% of data were used to monitor the 17 flood events of 2016 (the type of hazards where the contribution of radar imagery is the most important).
- Third Party via USGS: **14,430 images** of US VHR optical satellites (GeoEye, IKONOS, QuickBird, WorldView1, 2 and 3).
- *Example:* A high number of these data were delivered to support floods that occurred in USA in January and August 2016 (23% and 13% of US VHR data, respectively).
- **Other EO data:** USGS provided a (14,430 images), EO-1 (45 images) and PL

Statistics on data consumption by type of disaster: number of data products according to input from member agencies (order desk reports).





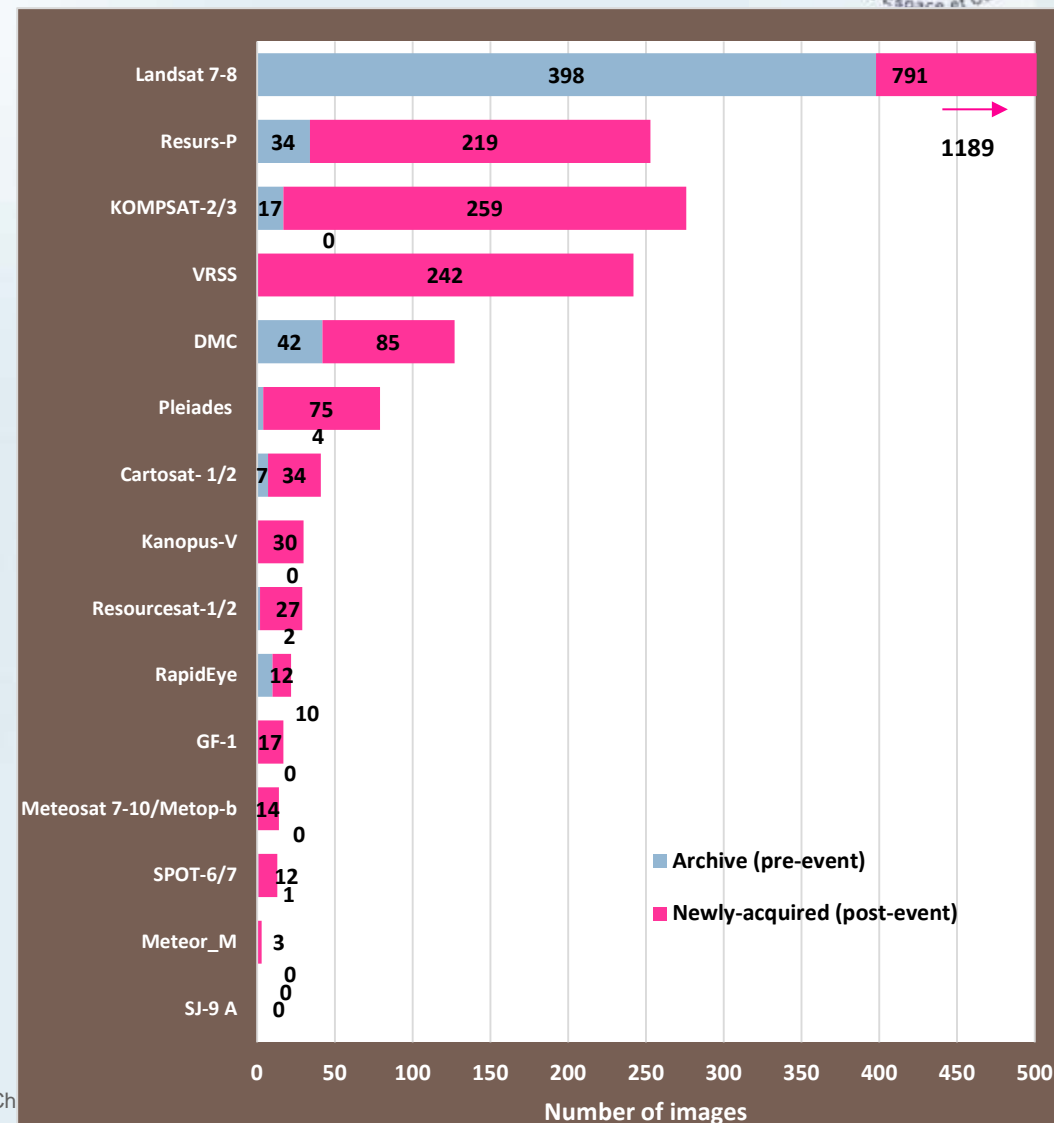
# 2016 data consumption: Radar and Optical sensors



- On average the quantity of **post-event** images is **64 per activation** and of **pre-event** images is **18 per activation**.

*Comment about the Copernicus programme: data accounting not yet in place for Sentinel-1 & 2 that are open and free (data are fetched directly by the Charter Project Manager); accounting will be in place in Q3 2017.*

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# Example of Charter activations: Hurricane Matthew in USA



## 7 calls received:

- 581 for Cyclone in Haiti by USGS on behalf of the Pacific Disaster Center
- 582 for Cyclone in Haiti by french Authorized User COGIC
- 583 for Cyclone in Haiti by UN (UNITAR/UNOSAT on behalf of UNOCHA)
- 584 for Flood in Dominican Republic by Com. Nac. de Emerg. Rep. Dominicana
- 585 for Cyclone in Cuba by UN (UNITAR/UNOSAT on behalf of UNOCHA)
- 586 for Hurricane in the Bahamas by USGS on behalf of the Pacific Disaster Center
- 587 for Hurricane in USA by USGS on behalf of FEMA

➤ **Calls 581, 582 and 583 were merged, as they were the activation concerned the same country/Area of Interest.**

### Call 587: Hurricane Matthew in the United States

- **Requestor:** USGS on behalf of Federal Emergency Management Agency
- **PM:** North Carolina Emergency Management
- **VA:** SERTIT, NTs OMZ (JSC RSS), DLR, GAF AG
- **End User:** Federal Emergency Management Agency

**Description of the Event:** Hurricane Matthew hit the United States on the morning of 6 October. The powerful storm left 46 dead and caused devastating floods that affected almost three million people across the southeastern states.

The storm had been Category Four earlier in the week when it hit Haiti and other Caribbean nations, and there had been concerns that it would be at this intensity when it reached the United States.

**Data:** RADARSAT-2, KOMPSAT-2, KOMPSAT-3, Sentinel-1, Resurs-P and Kanopus-V.



Situation map in  
Wilmington using  
Sentinel-1 data  
(12/10/2016)  
produced by DLR



# Summary of 2016 activities

## The Charter is active and in expansion

- 16 members; additional satellites in the Charter virtual constellation (KOMPSAT-5, Resurs-P3).
- Venezuela's ABAE accepted as 16<sup>th</sup> member; ABAE's signing ceremony took place at the 36<sup>th</sup> Board meeting in Moscow, Russia.
- 36 activations in 24 countries. Five Charter activations were among the 10 most severe natural disasters in 2016 as registered by CRED's EM-DAT. Since 2000 Charter have increased to reach 517 activations in 119 countries.
- Users in general satisfied by the Charter service. Acceptance of satellite based solutions to support emergency response is growing.
- Universal Access implementation progressing: Belarus, Iraq, El Salvador, Guatemala and Uruguay became Authorised Users through Universal Access (reaching 63 AU organisations).
- 5 PM training events to strengthen the network of Charter PMs.
- COS-2 is operational since March 2015; 2 ECO trainings (SARE): SARE-15 supported by COS-2 for the first time; 15 AU training sessions using the COS-2 system.
- Fruitful collaboration with regional & international bodies and networks.





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**[www.disasterscharter.org](http://www.disasterscharter.org)**

Emergency enquiries from users requiring direct  
access to Charter resources  
should be addressed to:

General requests for information  
should be addressed to

[ExecutiveSecretariat@disasterscharter.org](mailto:ExecutiveSecretariat@disasterscharter.org)   [webmaster@disasterscharter.org](mailto:webmaster@disasterscharter.org)

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