



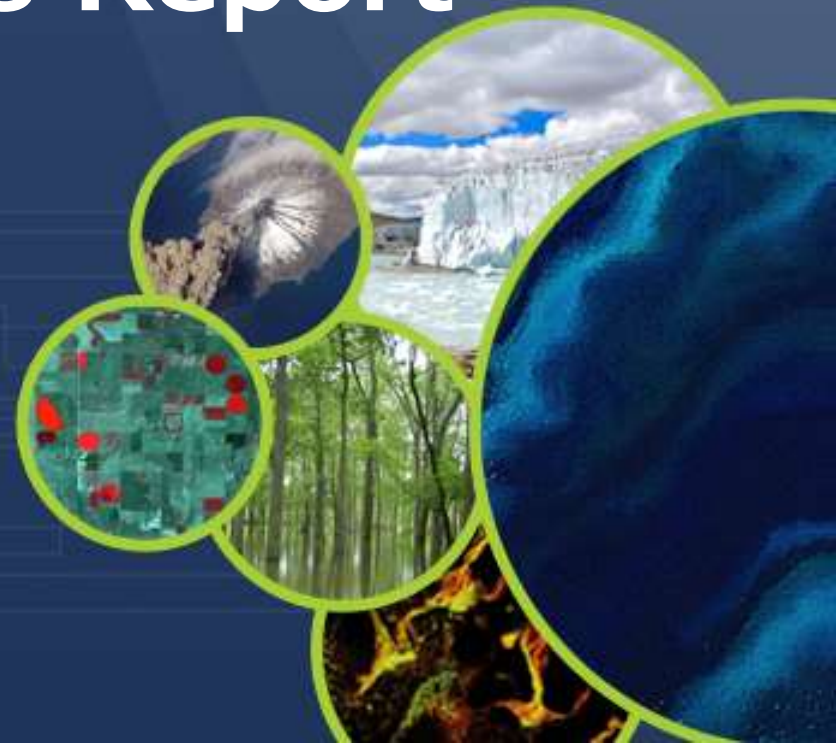
Committee on Earth Observation Satellites



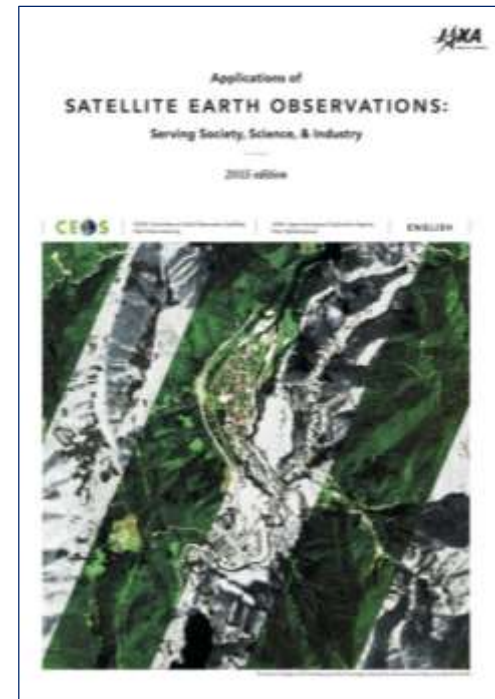
# データ利用事例集の分析 Analysis of Data Applications Report

**Chu Ishida, JAXA**

**JAXA Symposium for data applications of  
Earth observation satellites 2015  
Roppongi, Tokyo  
2 November 2015**



- CEOS produced satellite data applications report in 1993 by JAXA and 2002 by NOAA.
- Significant events in Earth observation for last decade:
  - establishment of GEO (Group on Earth Observations) in 2005
  - Release of Google Earth in 2005
  - Open and free data policy of Landsat in 2008 and Sentinel satellites in 2013
- DAR was produced as one of 2015 CEOS Chair initiatives.
- 49 case study articles and 5 background papers were collected.
- The Editorial Committee selected 11 articles for “Summary Brochure” hard copy and the Full Report containing the 49 in PDF at CEOS website.



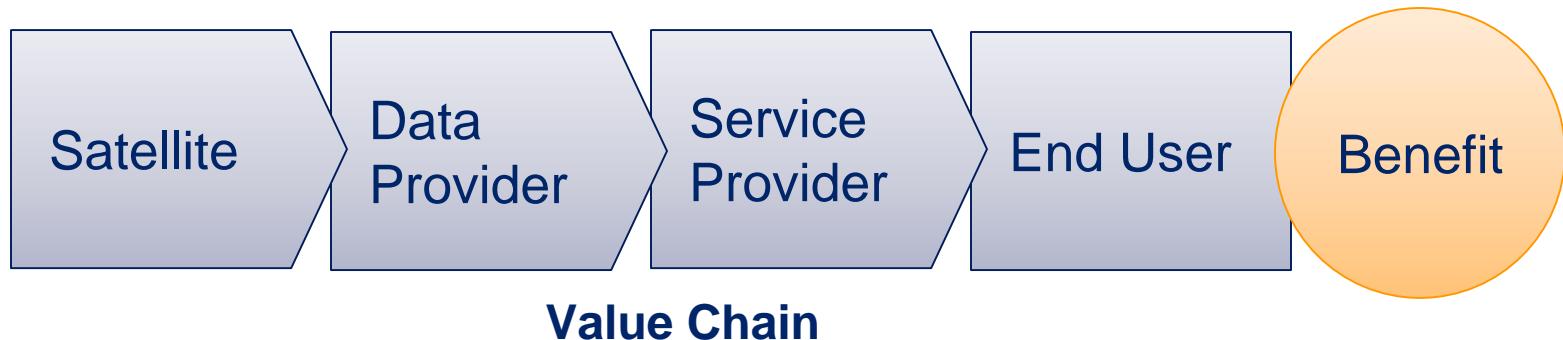
<http://www.ceos.org/dar2015>

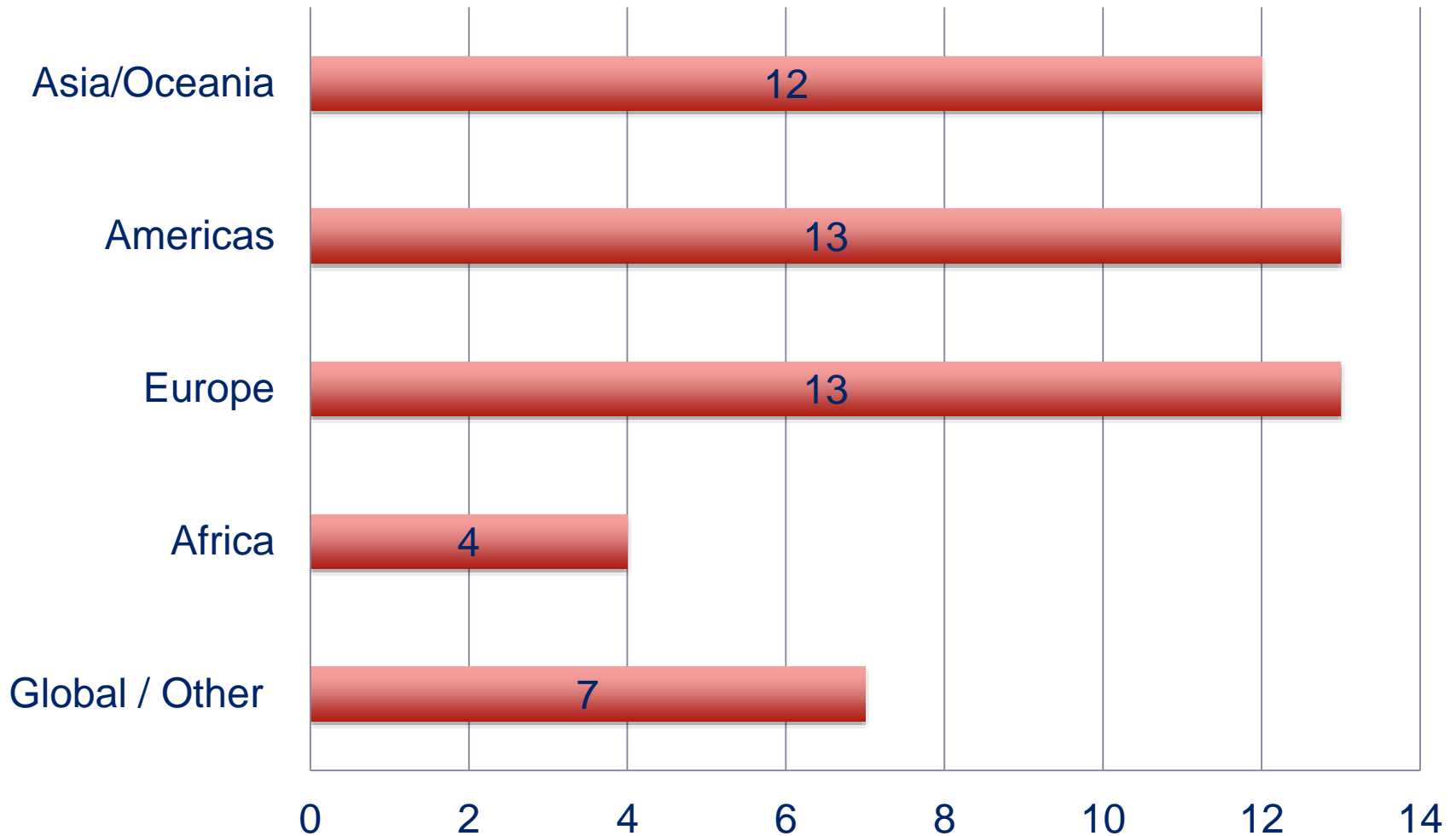
## Chapter 1

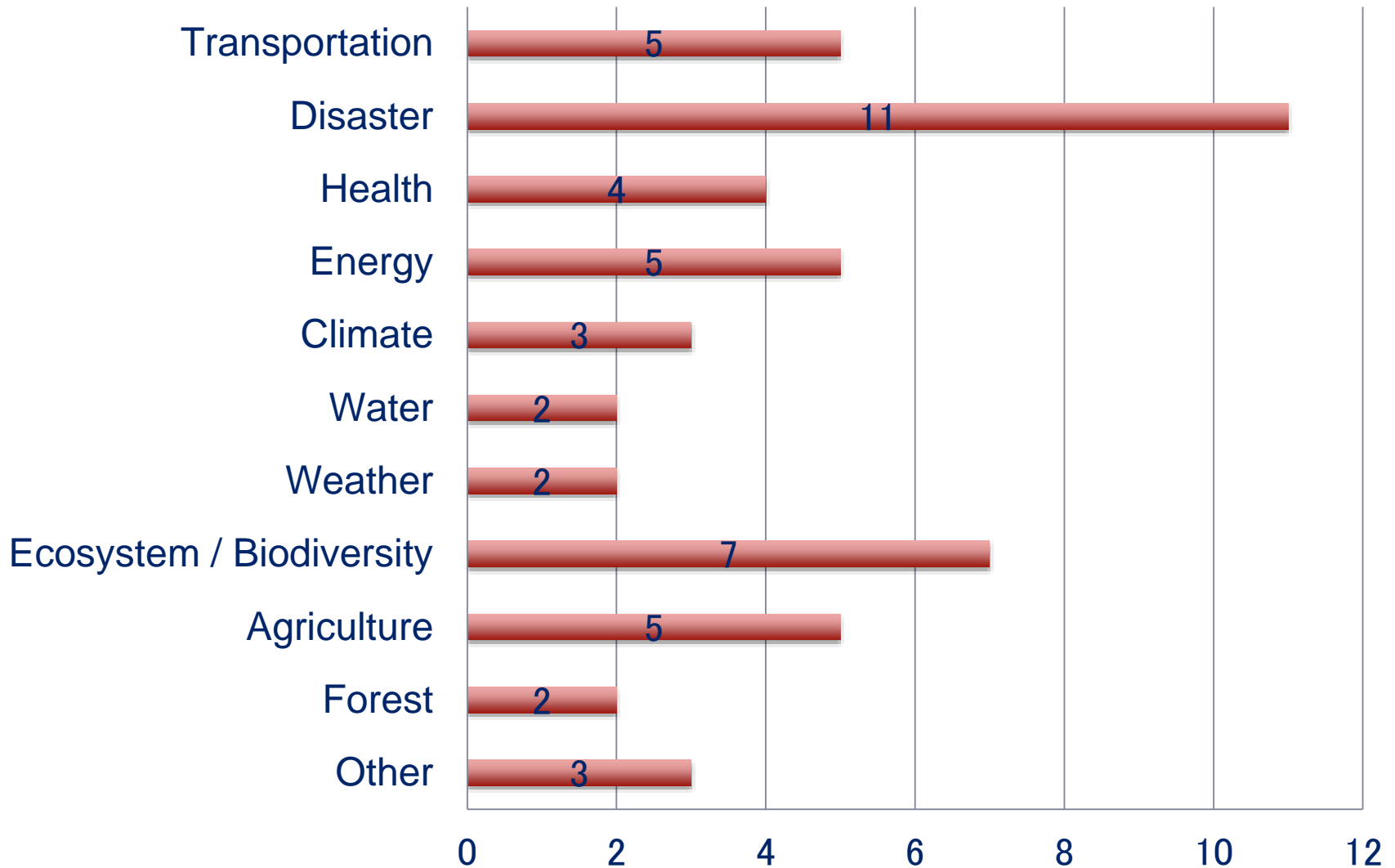
- Evolution of capabilities
- Data policy
- Cooperation framework
- Future possibilities via new technologies

## Chapter 2

- Problems
- Data applications
- Value chain
- End users and benefit





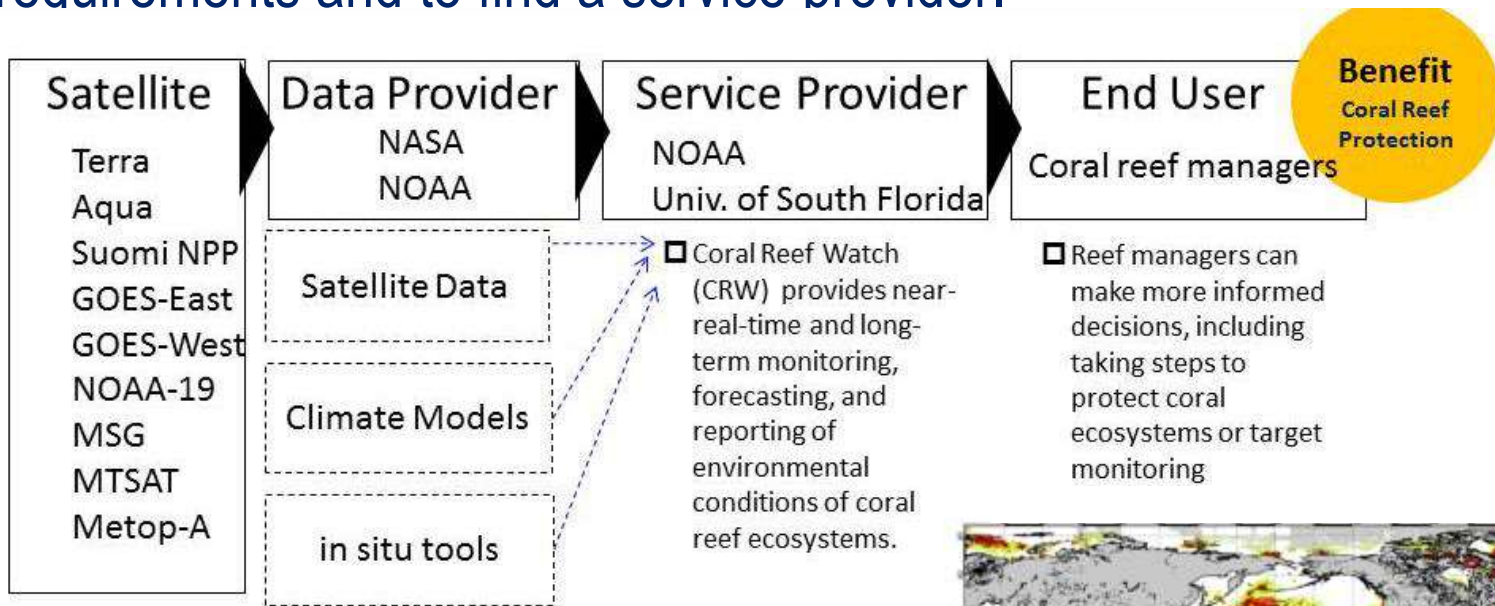


# 分析結果 - データ統合

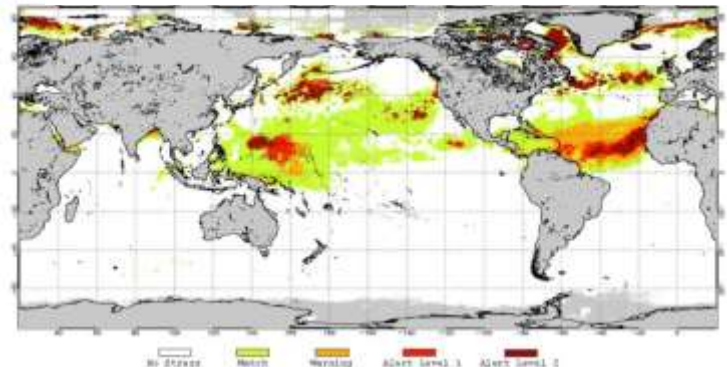
## Findings – Data Integration



- The value chains indicate that multiple satellites data are integrated with in-situ data, model data and sometimes socio-economic data.
- Particular importance are to identify end-users and their requirements and to find a service provider.



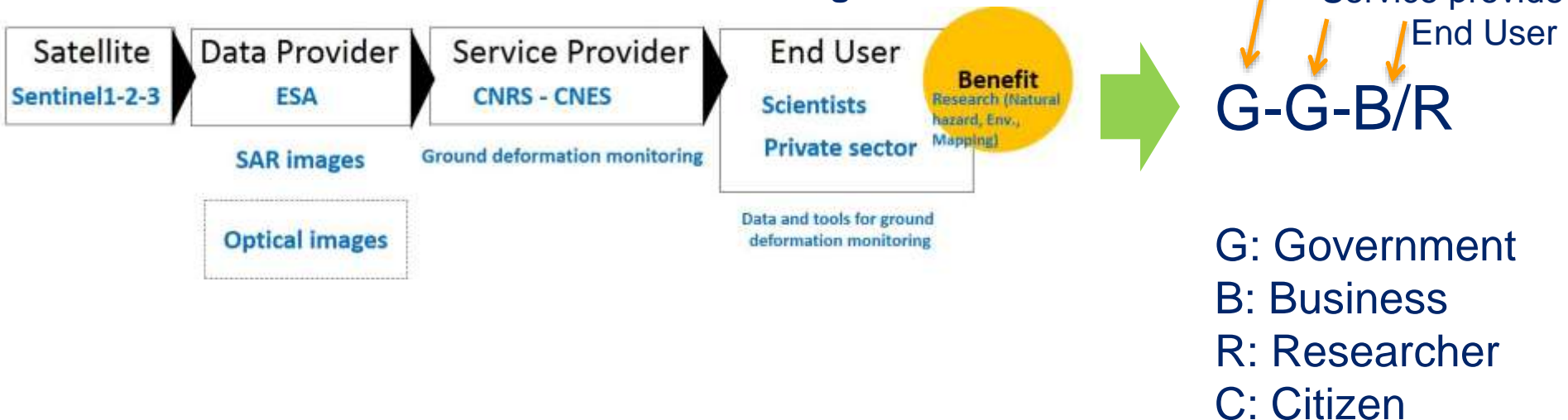
**Daily coral  
bleach alert  
3 Oct 2013**



# 分析結果 – 公共利用と民間利用 Public Use vs. Commercial Use

- Public use cases dominate applications of the data provided by CEOS space agencies.
- But, commercial services to government and other commercial sectors are growing.

## Ground Deformation Monitoring



	Asia/Oceania	Americas	Europe	Africa
1	G-G-B/C	G-G-G	G-B-G/C	G-R-G
2	G-G-G	G-G-G	G-G-G/B	G/B-G-G
3	G-G-G/C	G-G-G	B-B-G/B	G-G/B-C
4	G-G-G/C	G/C-G-G	B-B-G/B/C	B-B-G/B
5	G-G-G/B/C	G-G-G/C	G-B-G	
6	G-G-G/C	G/B-B-B	G-G-B/R	
7	G-G-G/B/C	G-B-B	G-G-G/R	
8	G-G-G	G-G-G	B-B-B	
9	G-G-G	G-G-G/C	G-B/R-G/B	
10	G-G-G/B/C	G-G-G/R	G/B-B-G/B	
11	G-G-G/C/R	G-G/R-G	G-G-G	
12	G-B-G/B		G-G-B	
13			G-B-B/C	

**G: Government**  
**B: Business**  
**R: Researcher**  
**C: Citizen**

民間サービス提供者の役割が増大

Role of private sector as service provider is growing.



# 分析結果ーリスク評価

## Finding - Risk assessment



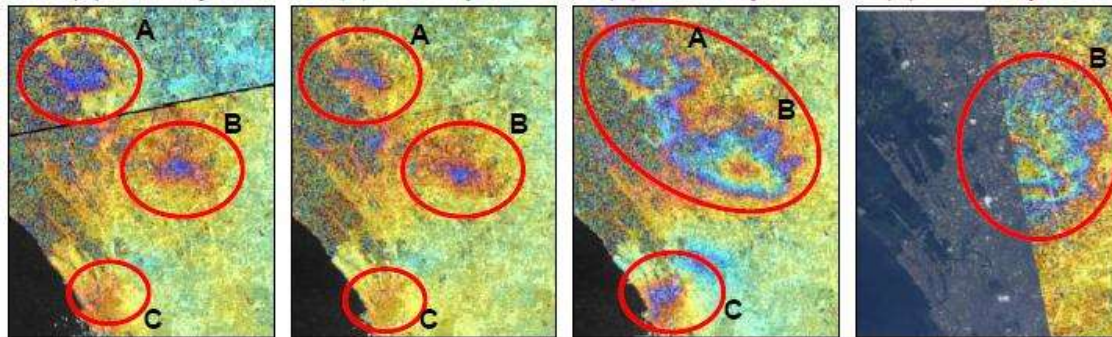
- Data applications for risk assessment is increasing, with data being used to evaluate risks related to natural disasters, agriculture and public health.
- A simple hazard map to complex models are used to provide a new-term to long term risks.

(1) 414 days

(2) 368 days

(3) 1058 days

(4) 1380 days



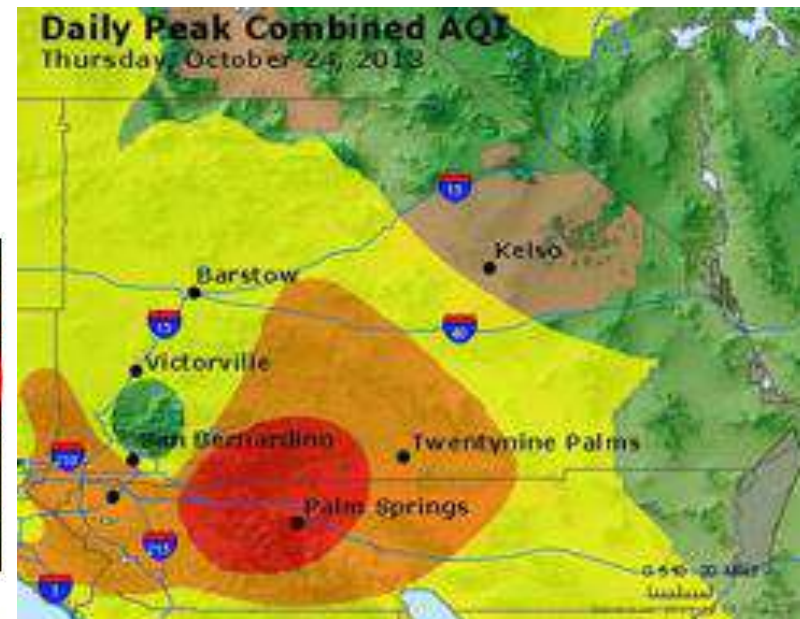
A(center) : 5~6cm  
B(center) : 4~5cm  
C(center) : 0~2cm

A(center) : 5~6cm  
B(center) : 4~6cm  
C(center) : 2~4cm

A(center) : 16~18cm  
B(center) : 12~14cm  
C(center) : 8~10cm

B(center) : 16~18cm

Land subsidence near Manila, Feb 2007- Feb 2010  
Upper circle: 12 cm subsidence, lower circle: 4 cm

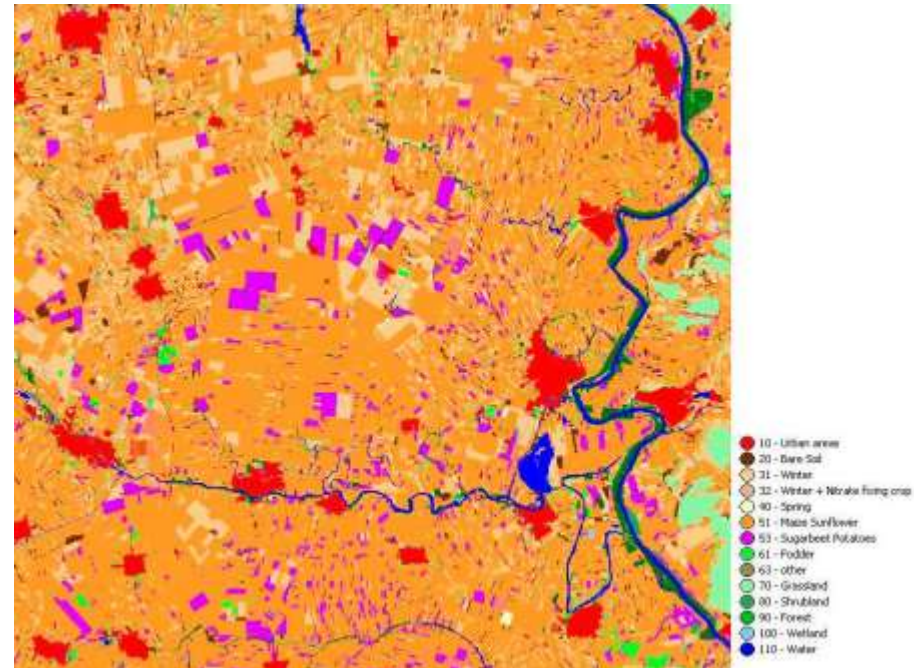


Air quality map of San Bernardino.  
CA, US, Oct 24, 2013

- Australia uses satellite data to monitor and manage water and carbon resources on a national-scale.
- Airbus produced national map of Serbia with SPOT data.

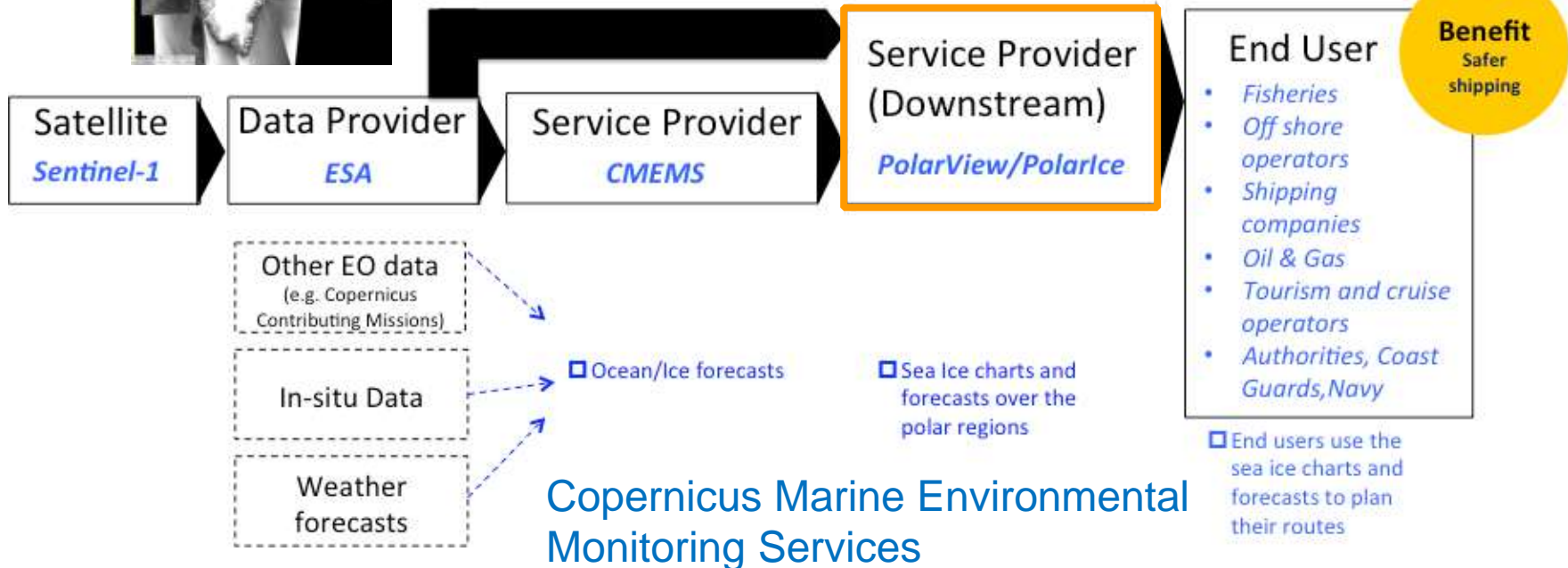
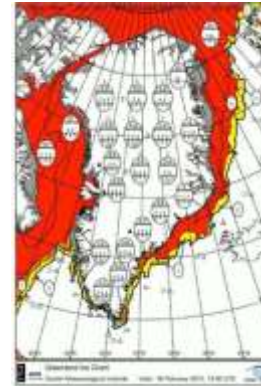


Land-use changes by Landsat in Australia:  
regrowth (yellow), forest fire (red)



Land-use map by SPOT in Serbia:  
urban (red), potatoes (purple), sunflower (brown) 10

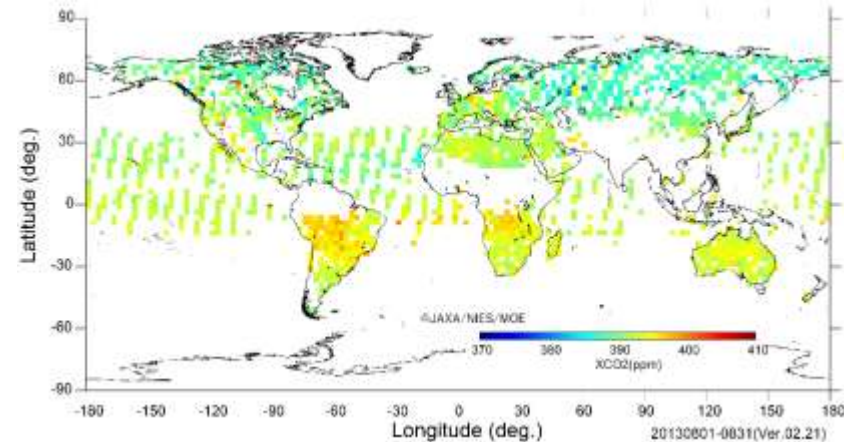
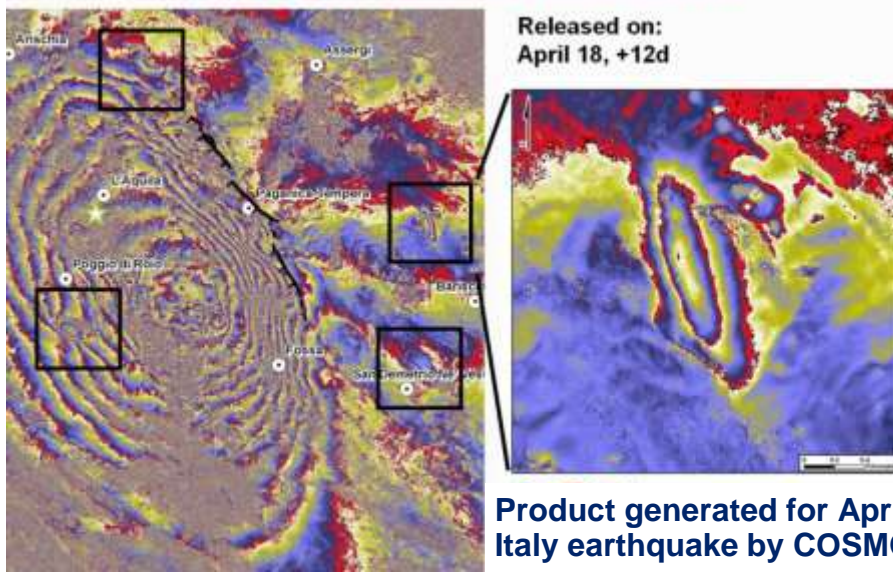
The Copernicus Sentinels downstream service is clearly shown in the value chain.



The past decade has seen great innovations in the application of Earth observation technology, including:

- Earth surface deformation monitoring using Interferometric SAR
- Ground water monitoring using highly-sensitive gravity measurement instruments
- GHG monitoring using satellite instruments has filled gaps in ground observations of CO<sub>2</sub> and CH<sub>4</sub>.

**Map of local earthquake effects**



**Monthly Global Map CO2 concentration Aug 2013**



- **CEOS DAR 2015 demonstrated the applications of satellite Earth observation data are expanding significantly.**
- **Multiple-satellite data are being integrated with in-situ and model data, enabling prediction of phenomena and decision making.**
- **Partnership with private sectors, development banks, UN and international organizations as service provider are very important to promote data applications.**
- **JAXA will continue analysis of data applications to promote use of Earth observation data with support by CEOS agencies.**