



Open Data Cube and Vietnam Data Cube Summary

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Benefits of Data Cubes

- Expanded use of satellite data
- Reduced data preparation
- Enables data interoperability and efficient time series analyses
- Free and open access
- Flexible deployment (local or cloud) using a common architecture
- Community development and sharing
- Proven concept ... Australia, ~~China~~ Switzerland, Taiwan **and now Africa!**



The Data Cube Vision

A solution supporting priority objectives ...

- Build capacity of users to apply CEOS satellite data
- Support GEO and United Nations agendas

Customer focused ...

- Easy to install and maintain with training materials
- A brand that people know and trust

Scalable solution ...

- Operational Data Cubes in **20 countries by 2022**
- Partnerships with ...
Google, Amazon



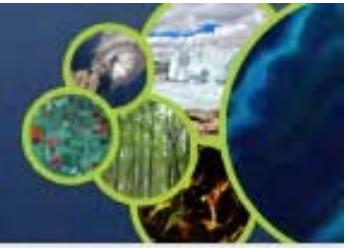
49 countries in 20 months



Operational: Australia, Colombia, Switzerland, Taiwan, Kenya, Tanzania, Ghana, Sierra Leone, Senegal

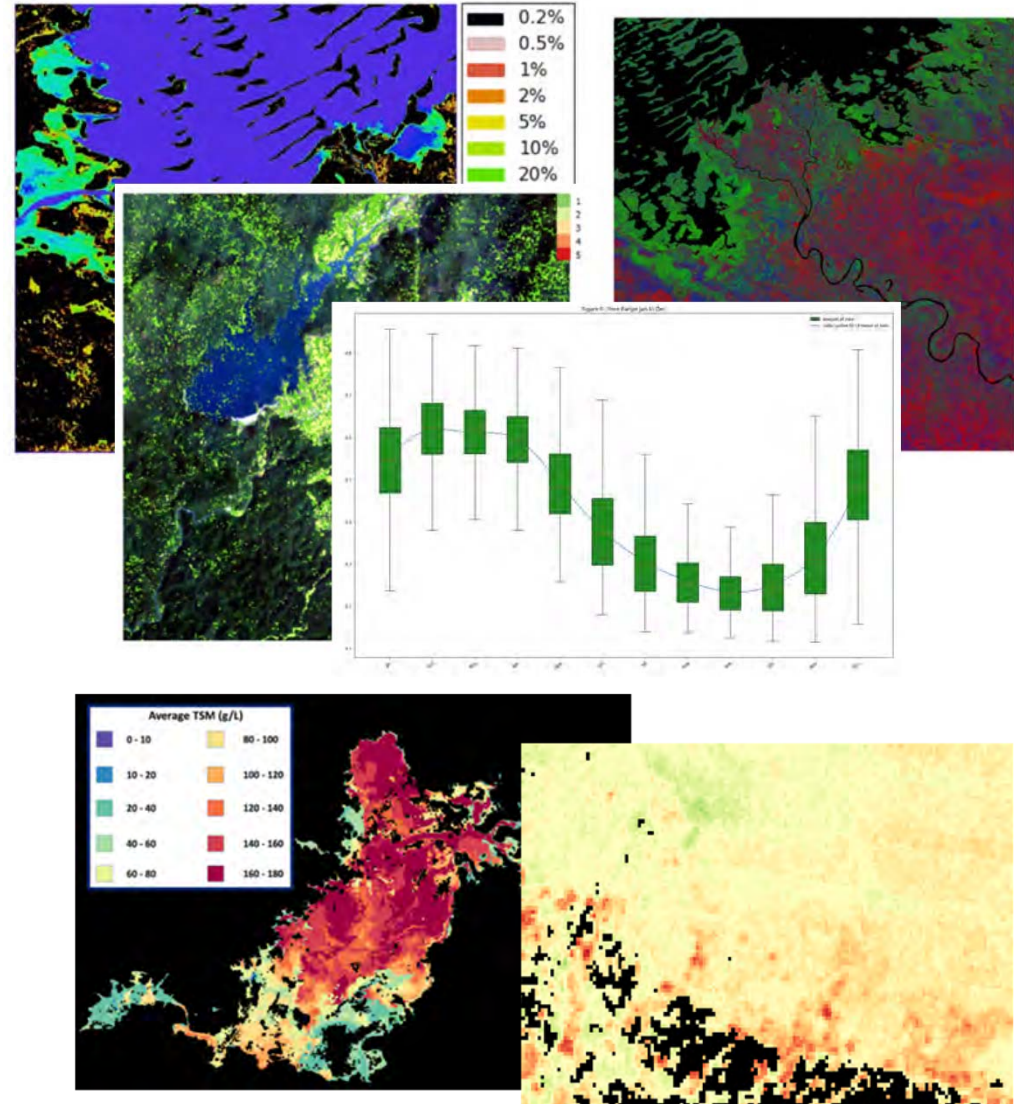


Application Products



20+ algorithms

- **Cloud-free Mosaics:** Recent Pixel, Median, Geomedian, Max-NDVI
- **Spectral Indices:** NDVI, EVI, NDBI, NDSI, NDWI, FC, TCT
- **Land Classification:** K-Means, Random Forest, Snow (from Swiss)
- **Water:** WOFS (from Australia), WASARD (radar), Total Suspended Matter (TSM)
- **Land Change:** PyCCD (from USGS), PCA (from Colombia), NDVI Trend (Vogelmann), NDVI Anomaly, S1 Radar (Deutscher), Coastal Change, SLIP-Landslides (NASA GSFC)



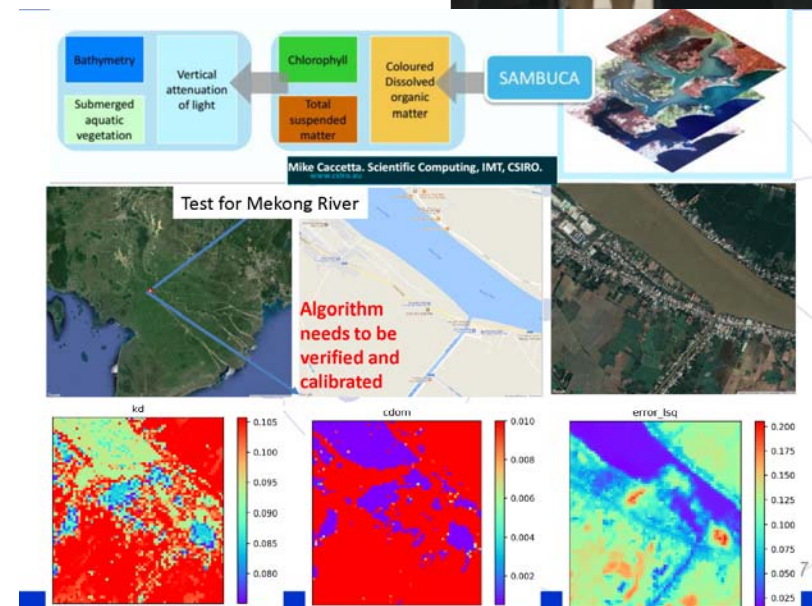


Vietnam Data Cube



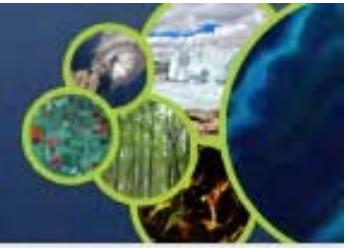
<http://datacube.vn>

- **Hosting:** VNSC servers in Hanoi. Python notebooks and CEOS SEO UI.
- **Data:** USGS Landsat (full coverage shipped March 2018), ALOS, Sentinel-1, SRTM DEM
- **Applications:** Forest change (VNSC), Swampy (water quality), Mangroves change (GMW), plus CEOS UI apps
- **Partners:** CEOS SEO, CSIRO, JAXA, USGS, CNES, DLR
- **Regional initiatives:** Mekong River Commission, AsiaRice, GFOI
- **Overall status:** Developing well
 - Updates to DC software required
 - Additional staff and student training
 - International partnerships are strong
 - Domestic stakeholder network is growing



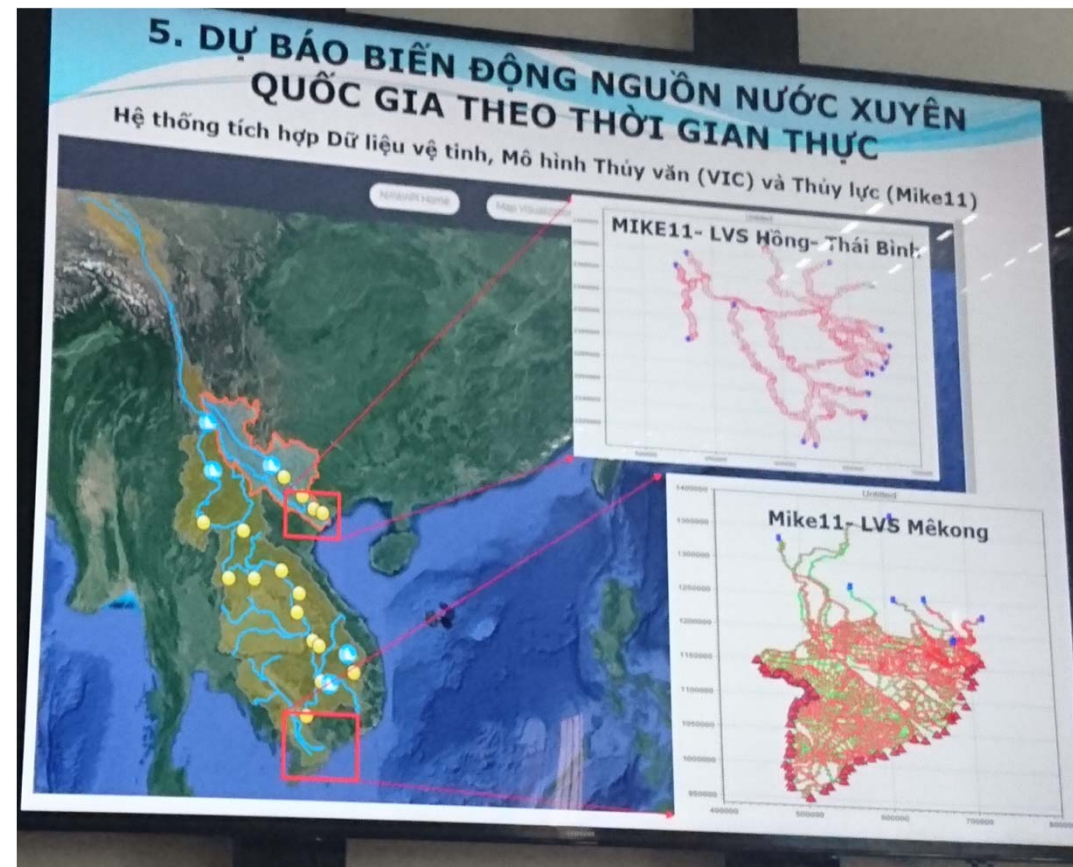


Vietnam Rivers



Nation Center for Water Resources Planning and Investigation (NAWAPI)

- **River Gauges:** Active network in Vietnam on Mekong and Red River systems
- **MRC:** Storage levels upstream
- **EO:** Supplement upstream information
- **Hydrological modelling:** Combine the above data sources to monitor and predict flood and low-level events
- **Opportunity:** Example of a (near) operational warning service.
Towards:
 - a regional system?
 - a network of systems across domains?



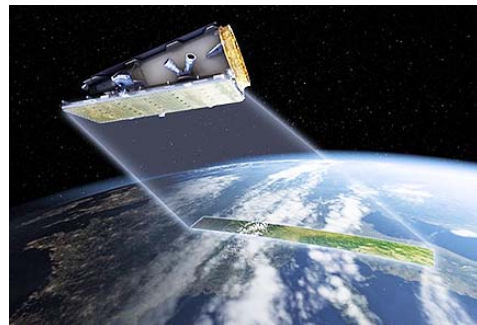


Opportunities



Analysis Ready Data

- **Data cubes:** Ideal way to prove the benefits of ARD, as every instance is using ARD
- **Radar data:** Growing interest, particularly when demonstrated in a data cube and combined with optical/IR data
- **NRT ARD:** Will be dependent on fast processing by agencies and efficient transfer to application (e.g., cloud)



“Disasters” applications

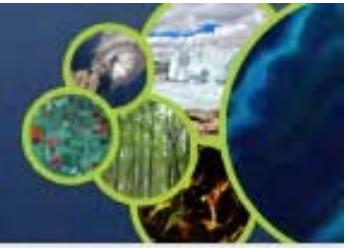
- Most current applications are for terrestrial forestry water and agriculture domains
- **What data and applications would WG-Disasters suggest we prioritise for Data Cubes?**

Stakeholders

- Our experience across all countries is that sustained stakeholder engagement improves the likelihood that a system will be adopted
- **What is the medium-term plan beyond any pilot disaster service for Vietnam or SE Asia?**



More information



Contact names

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 - Matt Paget
 - Rob Woodcock (WGISS vice-Chair)
- **VNSC:**
 - Pham Anh Tuan (Director)
 - Vu Anh Tuan (vice Director)
- **Symbios**
 - Stephen Ward

