Satellite Rapid Mapping & Open Data

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Crisis management for "natural" disaster

Focus on: flooding

Need for "fast" information

Preliminary estimation of emergencies and damages

Satellite Rapid Mapping and Open Data *(Emergency & Disaster)*

Need for "fast" information

Effective and efficient planning & coordination of mitigation actions

Need for "fast" information

Rapidness

Satellite & Opendata

Sharing

Large area

Rapid mapping for flooding

Challenges	Answers
Fast response (best within hours) Bad weather conditions (heavy rain/clouds)	Satellite rapid mapping 1-2 days response Active sensors
Shared and easy access High level crisis management (GIS) Local crisis management units (GIS & charts) On field units (portable devices)	Open (Geo) Data (Geo) Information freely available & usable Well known characteristics and unified standard(s)

Satellite rapid mapping for flooding

Challenges: fast response, bad weather conditions

Earth observation technology: Synthetic Aperture Radar (SAR) sensors

- Not affected by weather conditions or night&day timing
- Very “sensitive” to water covered areas
- Constellation of satellites able to cover in 6-12h thousand of km^2

Mature methodologies:

- “one-shot” detection & multi-temporal analysis
- highly automatic processing

Open Data concept

Challenge: shared and easy access to data for all actors involved

Open Data: a philosophy and a practice for “public” data

- Well defined open licences
- No bureaucracy needed to access the data
- Optimisation of costs for all the public institutions involved
- Further exploitation of the data by private sector
- Maximisation of data value and benefits to citizens

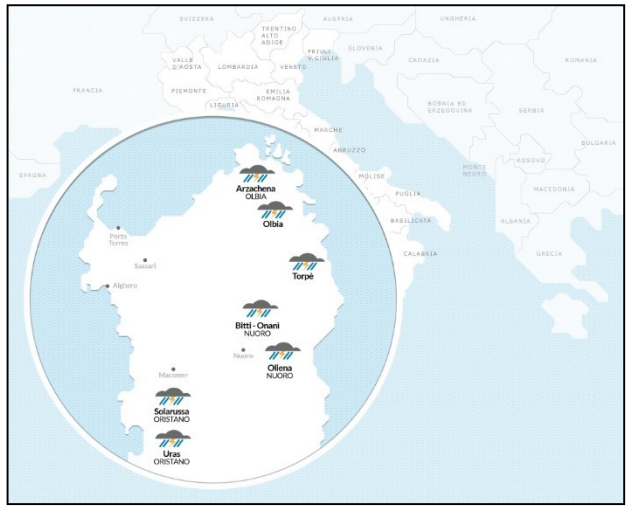
Example of a real application

Event: Sardinia flooding 18th Nov 2013

Purpose: to benefit the community (no-profit) testing satellite rapid mapping & OpenData capabilities

Actors:

- ❖ Satellite providers of SAR data
- ❖ EO processing and maps provision: Planetek Italia
- ❖ User: Sardinia Regional authorities
- ❖ Sharing: OpenStreetMap community



Sardinia flooding 18th Nov 2013

Fast mapping demo

Single TerraSAR-X scene (1,500km²)

- 20th Nov: scene acquisition
- 21st Nov: scene provided
- 22nd Nov: map of water areas
- 25th Nov: shared within OpenStreetMap

SAR capabilities demo

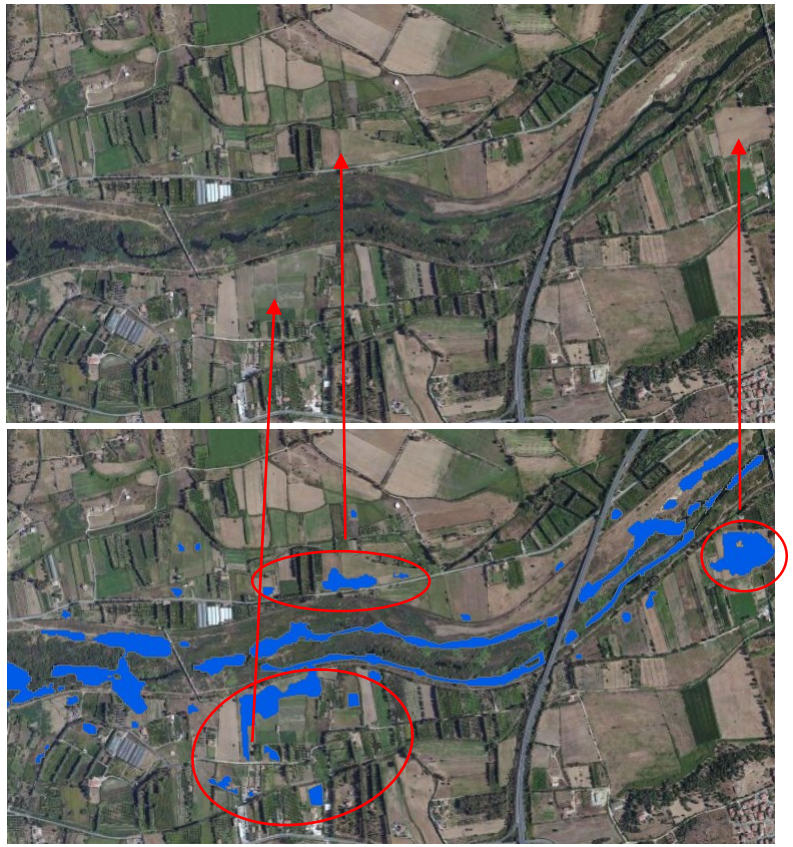
33 COSMO-SkyMed scenes acquired between 18th and 22nd Nov (13,000km²)

- Multi-temporal map of flooded areas
- Maps of water areas for each single scene
- Shared within OpenStreetMap

Maps & Metadata were compliant to EU INSPIRE directive and delivered under the Creative Common licence CC-BY 4.0

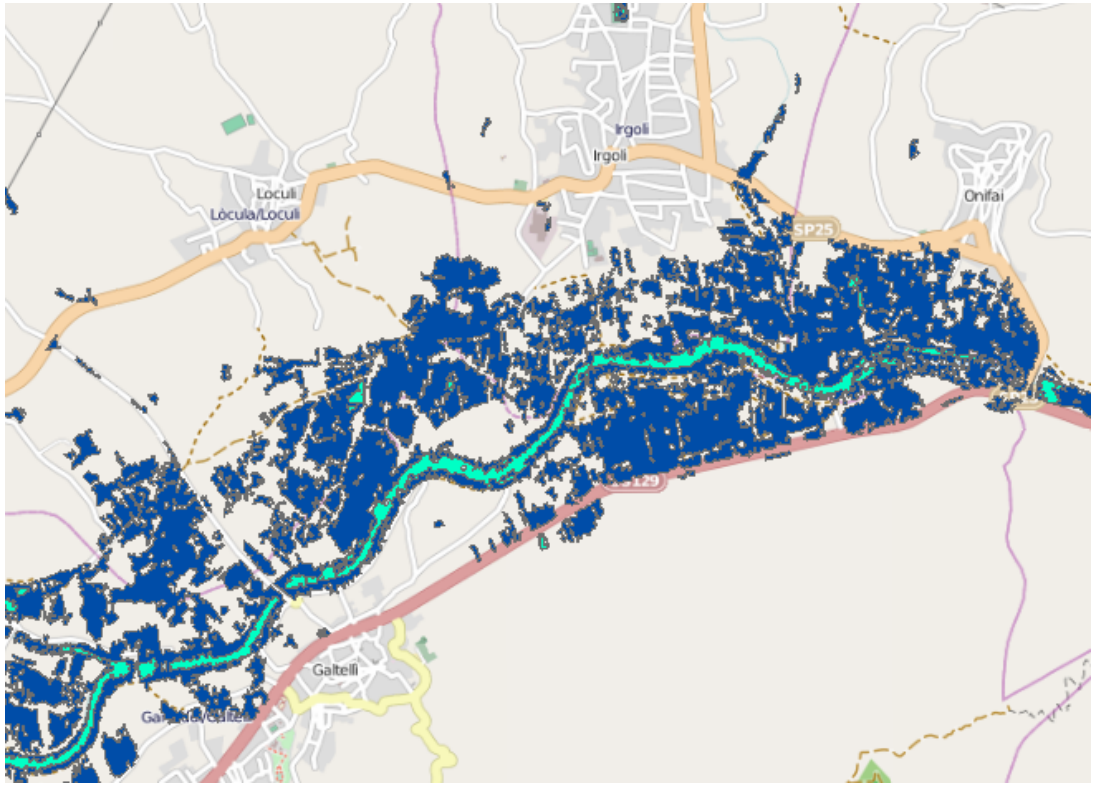
Both approaches adapt for fast mapping

Map examples



Left: map of areas covered by water, obtained from the single TerraSAR-X scene.
Background: Bing™ map

Right: map of flooded areas (dark blue) and permanent water bodies (cyan), obtained from multi-temporal COSMO-Skymed scenes.
Background: OpenStreetMap



User feedback
(Sardinia Regional Authorities)

- Fully compliant with standards adopted by the user (INSPIRE)

- Integrated into user's GIS-based decision system for:
  - Planning of mitigation measures
  - Evaluation of damages entity and reimbursement

Satellite rapid mapping & Open Data
Conclusions

Current strengths	Prospects
✓SAR capabilities for: • fast mapping • flood mapping ✓Full automatic processes ✓OpenGeoData & INSPIRE • sharing and accessibility • re-use	➢Copernicus Sentinel-1 mission: fast availability and procurement of open SAR data ➢Fast mapping services

Satellite rapid mapping & Open Data

Thank you for your attention

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