TORCIA
PIATTAFORMA DI GESTIONE COLLABORATIVA DELLE EMERGENZE

Social media and crisis management
Evidence from the TORCIA project

http://sos-torcia.it/en/

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Crisis Management - lifecycle

Phases of the lifecycle:

- Preparedness
- Response
- Recovery
- Mitigation

Main goal of the project: to leverage information from social media to improve crisis management in all the phases of the crisis lifecycle

A social media paradigm: Crowdsourcing

- Reference model to identify and manage shared issues
- Solutions delegated to the crowd
- Trust on the «*wisdom of the crowd*»

Social networks represent the largest global communities.
Can we leverage their strengths?

Recent use cases

Floods in Sardegna – Sept. 2013:

- Over 30K tweets on the flood
- Use of social networks to get real time information *(#allertameteoSAR*)
- Use of social networks to coordinate recovery activities («*who has room for displaced people»*)

Emergenza24:

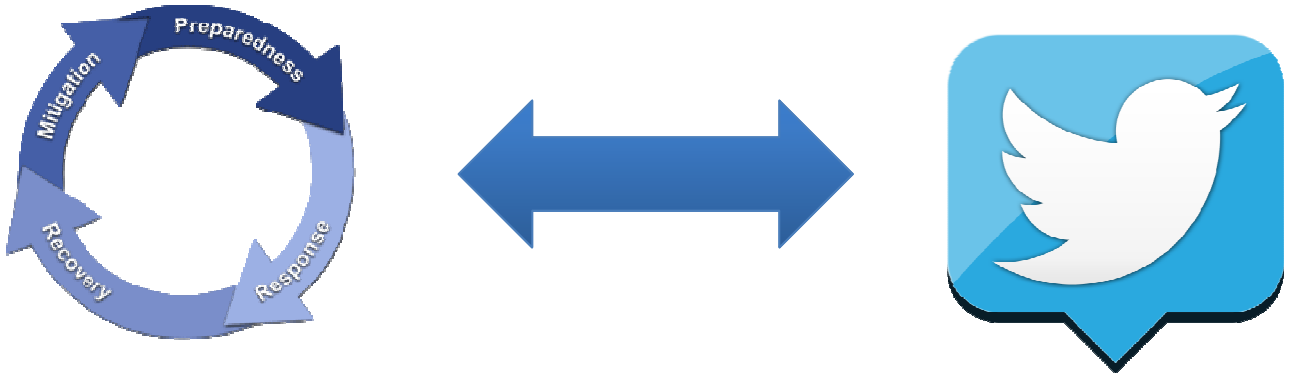
- Use of Social Networks for Emergency Management
- Limited to Twitter with precise guidelines (#Emergenza24)

TORCIA Project – Objectives

To design a platform that supports the real-time access to Twitter information, by selecting dependable posts, by spreading important messages, and by allowing the cooperation between institutions and the crowd.

Innovative technology modules:

1) a semantic engine that helps information management and provides alarms and triggers.
2) a **mobile app** that represents the virtual cooperation environment (under development)



TORCIA project – partners

- Alcatel-Lucent (ALU)
- ACT Solutions
- Beta80 Group
- Dept. of Information, Electronics and bioengineering of Politecnico di Milano
- Politecnico di Milano Foundation
- Vidiemme Services

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PON RICERCA E COMPETITIVITÀ 2007-2013

TORCIA – System architecture

Info points

media

Internet

mobile

Information / Communications acquisition

TORCIA
PIATTAFORMA DI GESTIONE COLLABORATIVA DELLE EMERGENZE

Traffic information

Web 2.0 information

Warnings and alerts

Sensors (physical and virtual)

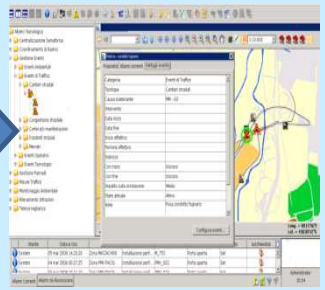
Civil Protection Control Room

Dispatching PSAPs

Planning and optimization

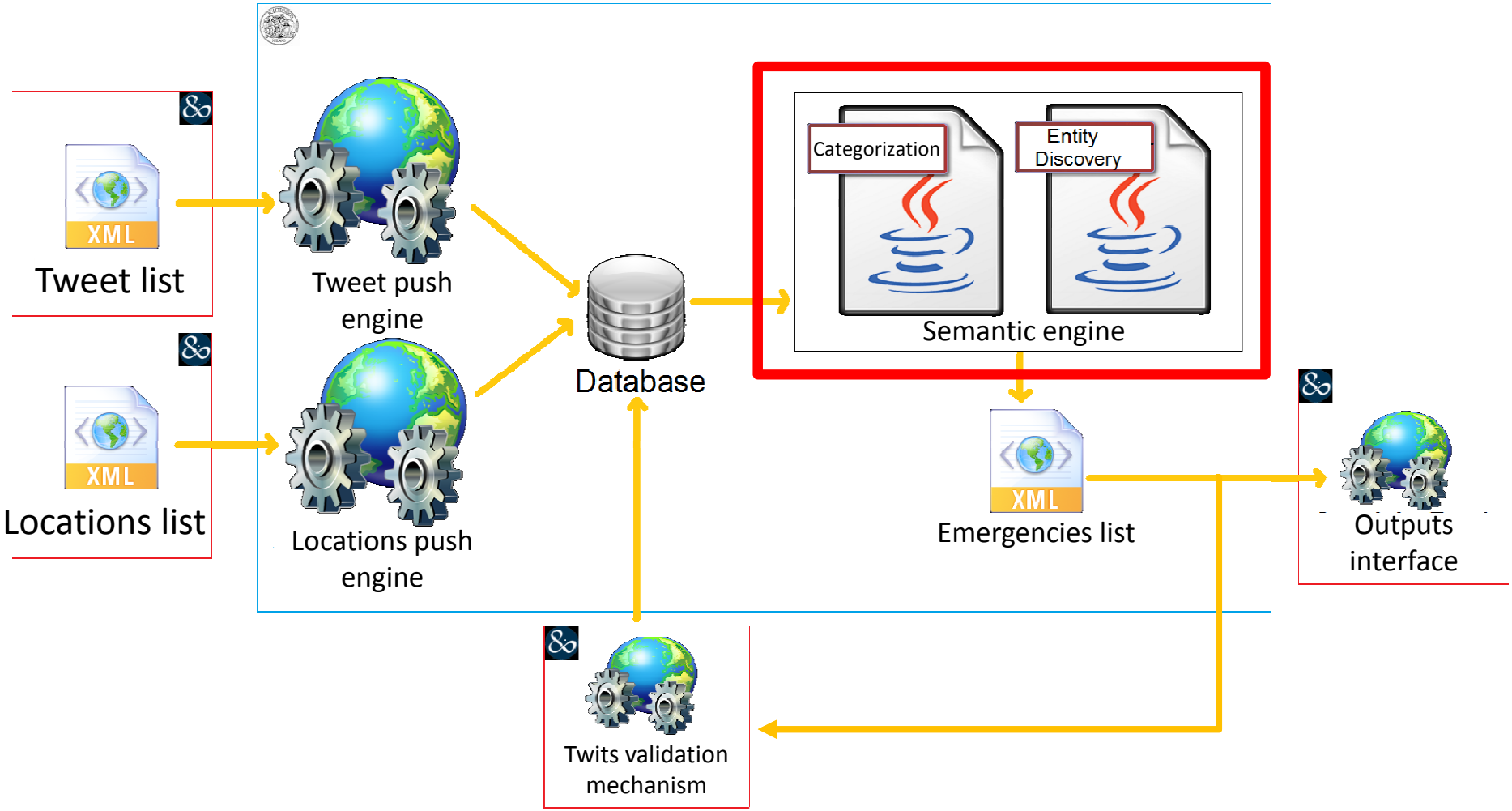
Emergency plans and critical infrastructures

Territory monitoring



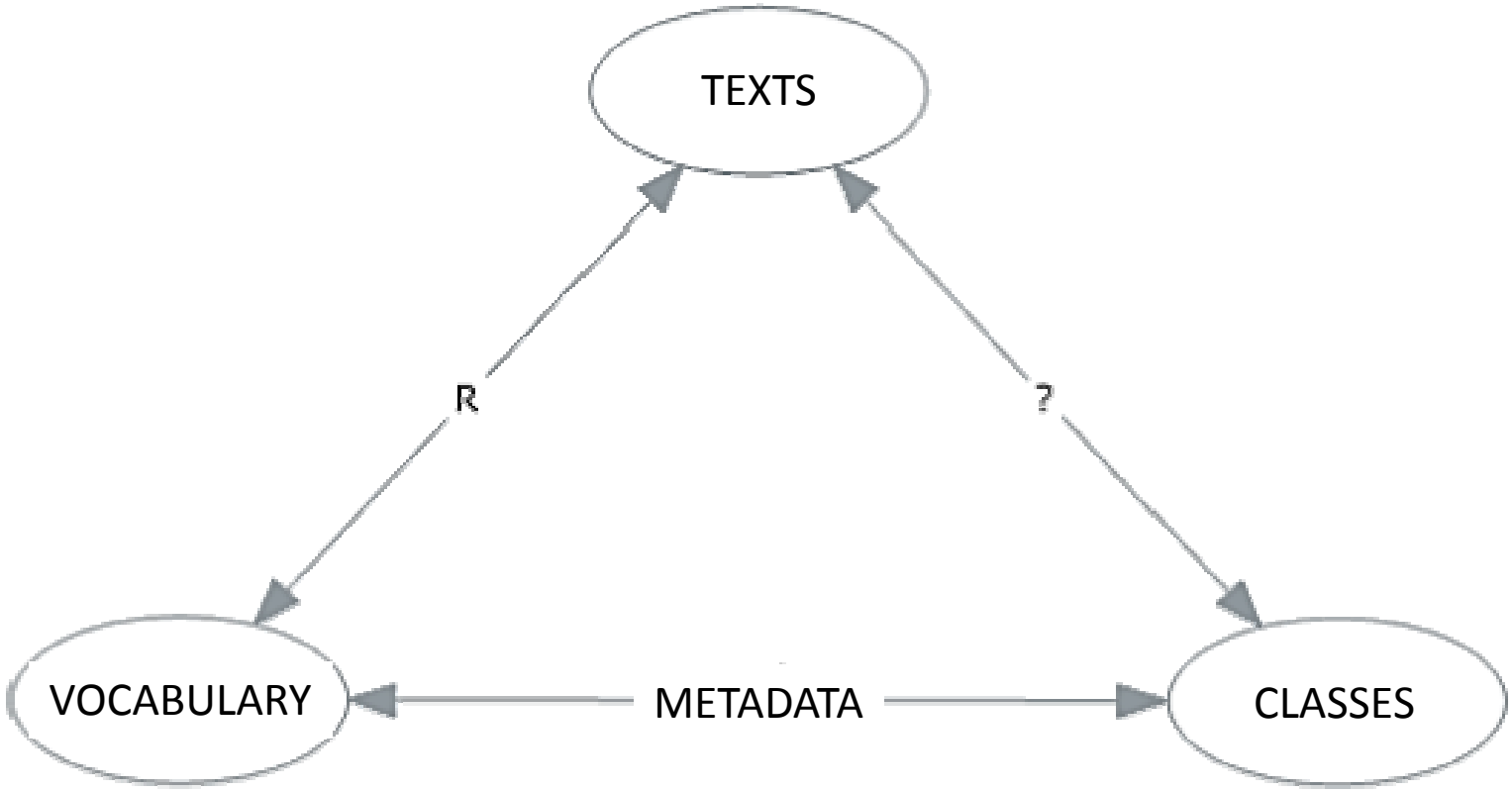
Dashboards

TORCIA – Semantic engine



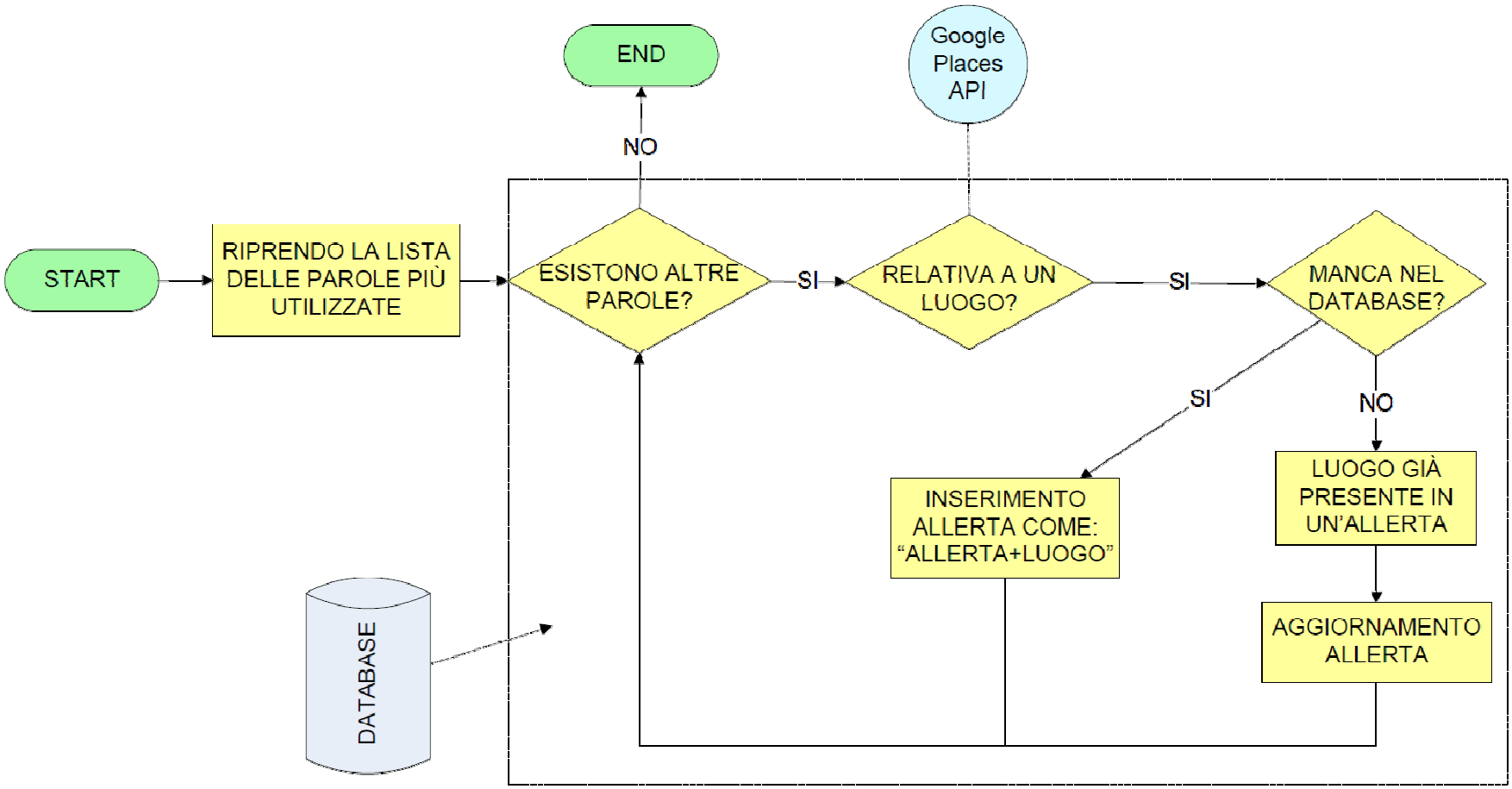
Semantic engine – Categorization

- Text analysis
- Categorization of posts into predefined classes



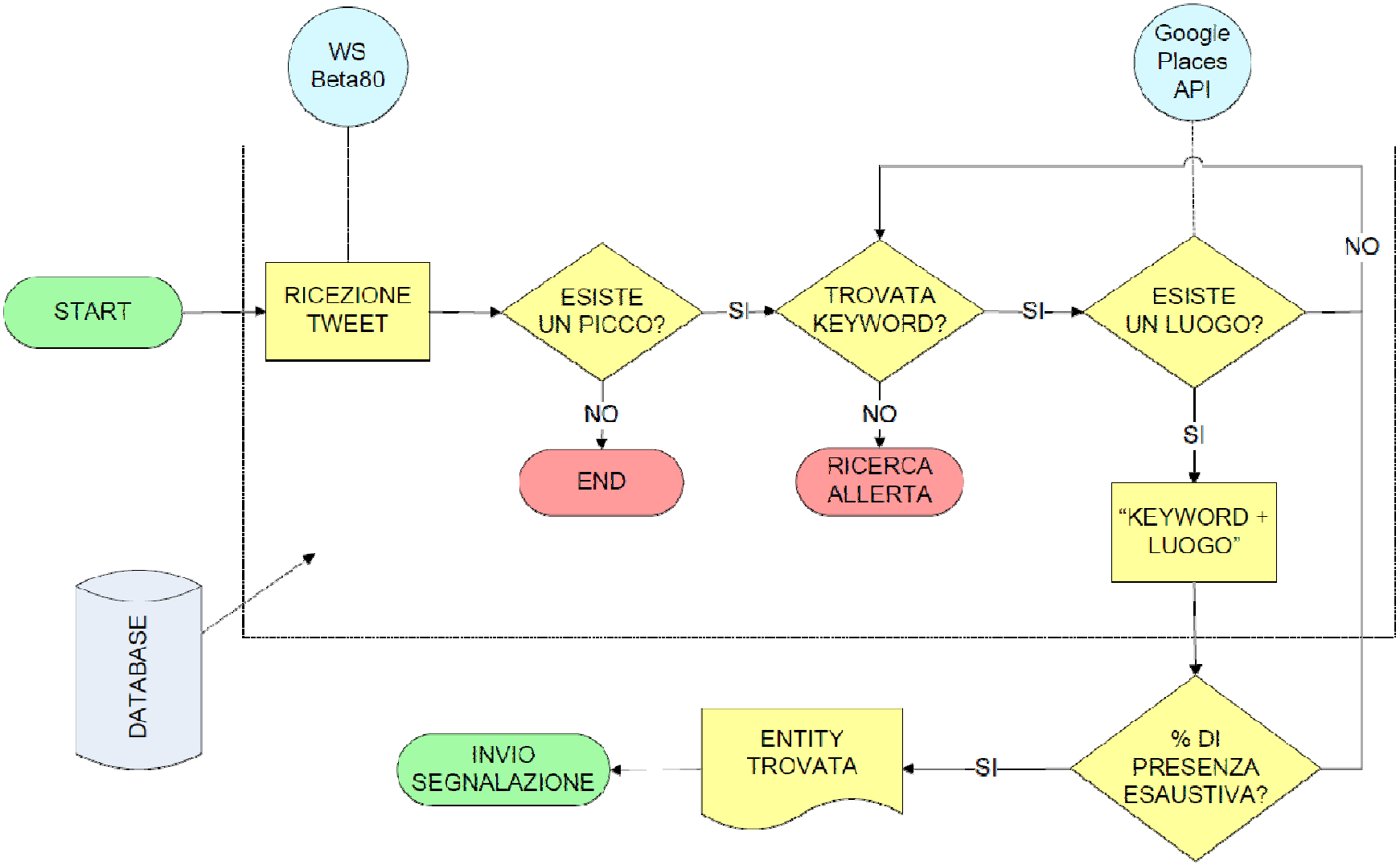
Semantic engine – Entity Discovery

Search for early warnings



Semantic engine – Entity Discovery

Search for alerts



Preliminary analysis of Twitter buzz

Focus: City emergencies

Test case: Floods

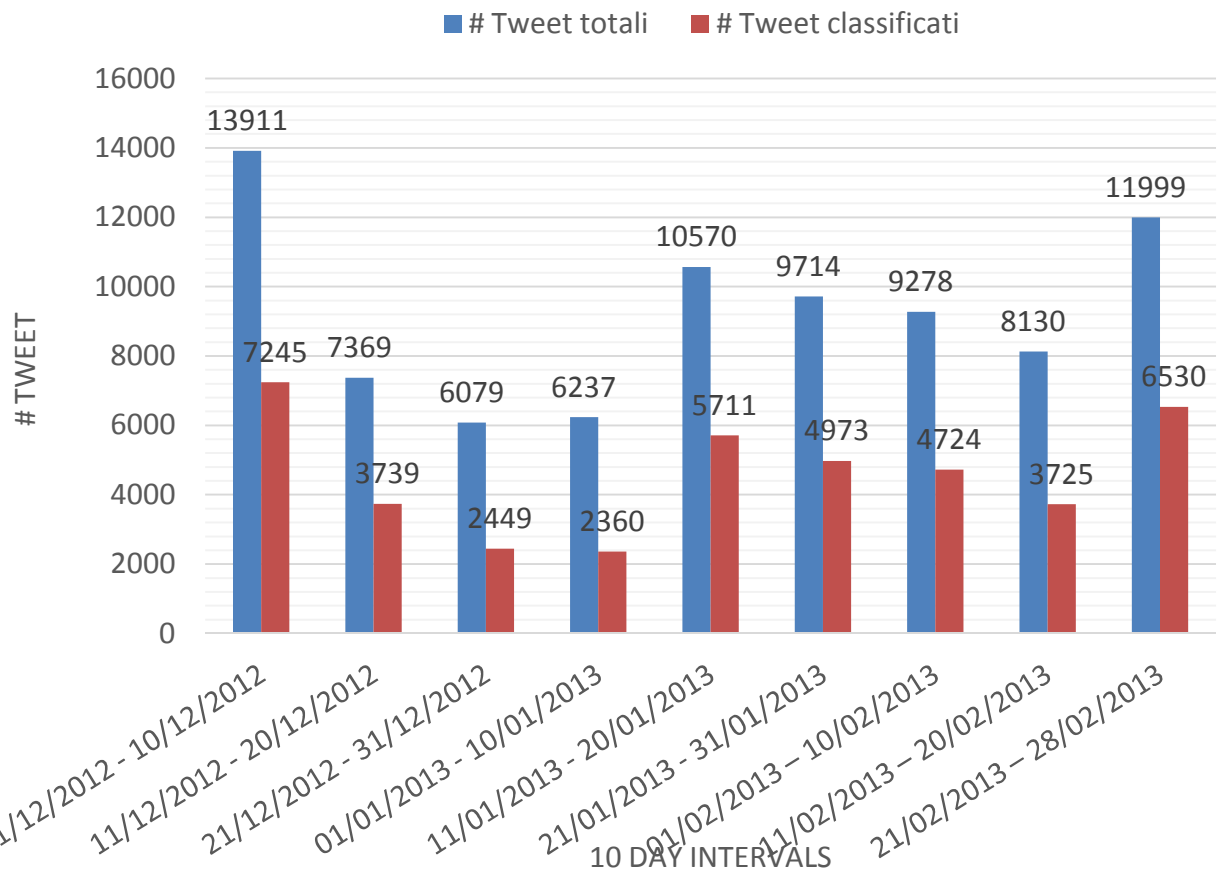
Preliminary analyses:

- Measure the volumes of buzz
- Identify the most popular topics
- Analyze issues related to the geolocation of posts
- Verify the presence and role of institutions on Twitter
- Compare the Italian case with global best practices

Preliminary analysis – volumes of buzz

Volumes in Italian from Dec. 2012 to Feb. 2013

- Average volumes in Italian: 40.000 tweet/month
- Only half of the posts are related to floods after disambiguation
- Volumes in English are ten times higher



Preliminary analysis – topics

Crawling: From Sept. 2012 on 60 keywords related to floods (in Italian and in English, including flood, storm, hurricane, thunderstorm, etc.).

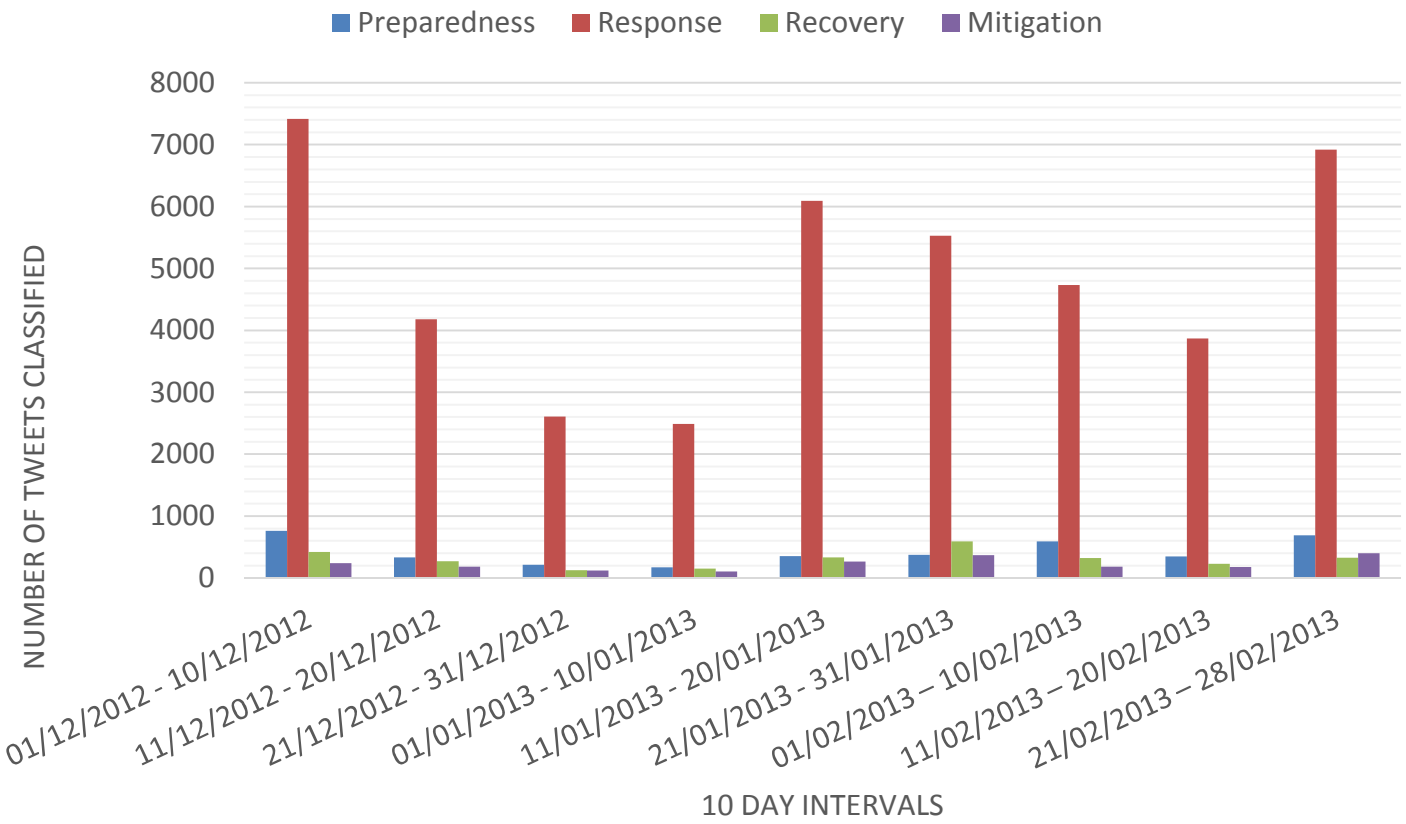
Volumes: over 40 million posts.

Topics: identifies bottom-up from the analysis of buzz

- Where (response)
- Alert (response)
- Consequences (response)
- Responsibilities (mitigation)
- Roads (response)
- Warning (preparedness)
- Post-emergency (recovery)

Preliminary analysis – topics and phases

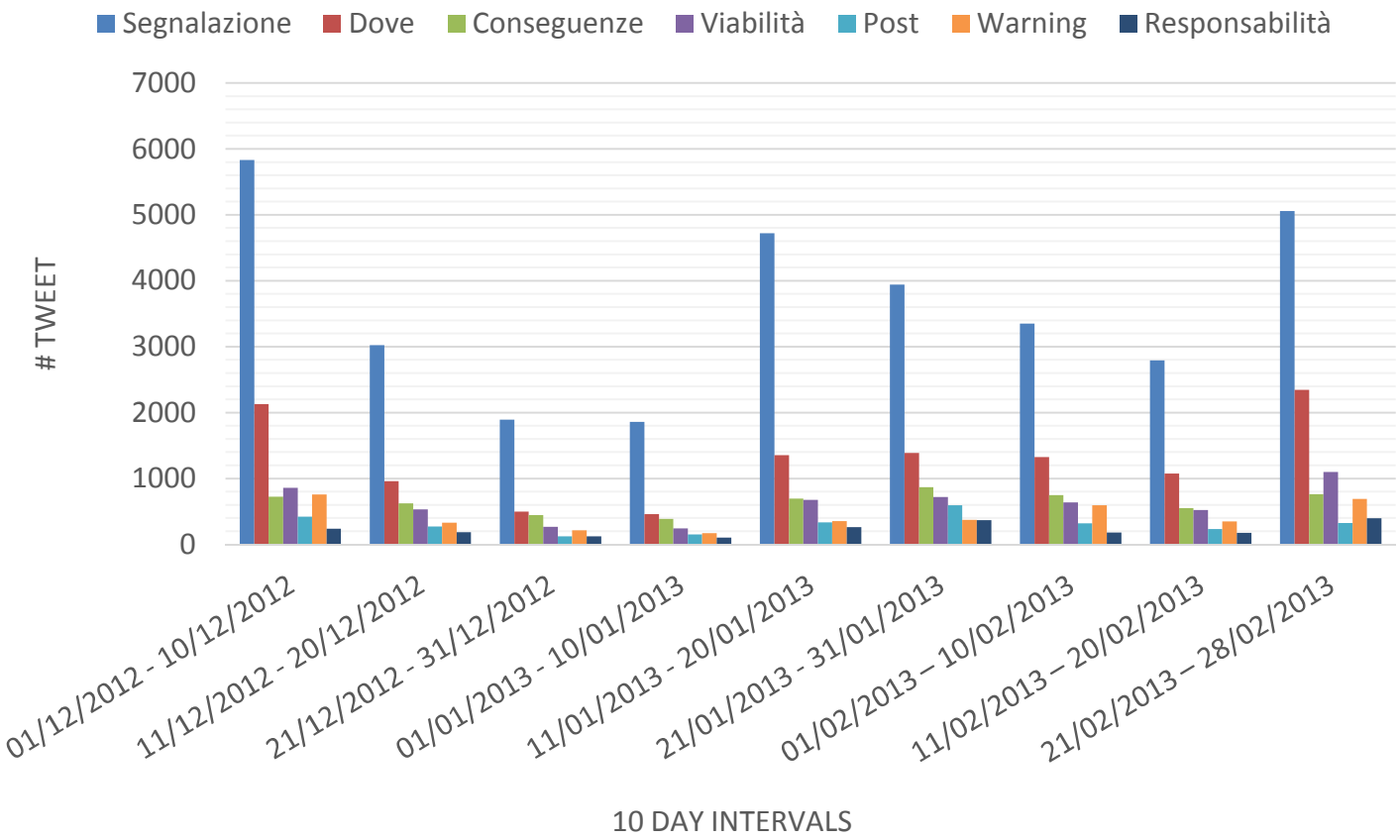
Posts useful during the response phase are predominant



Preliminary analysis – most popular topics

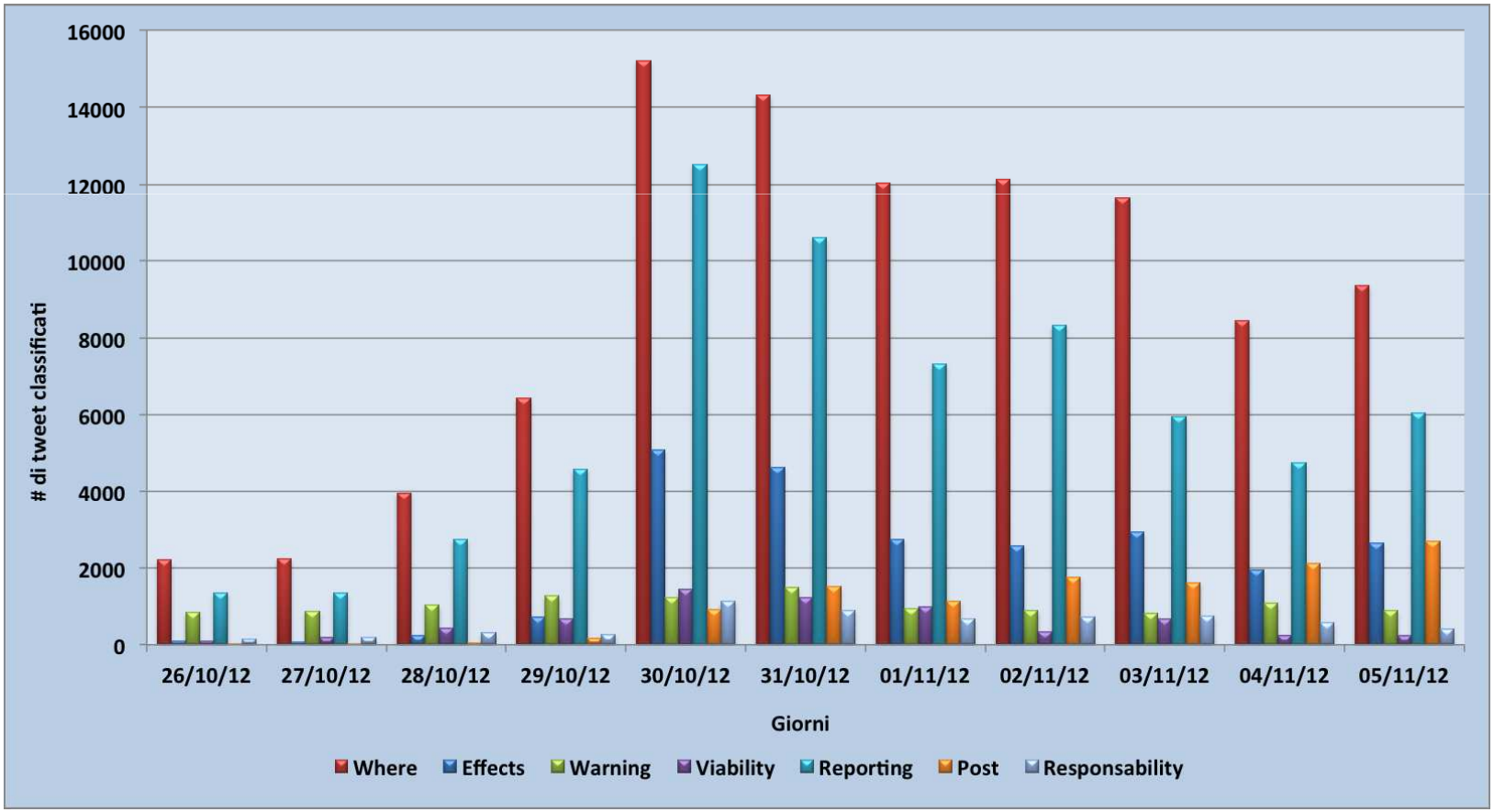
The most popular topics are:

- **Signals**, i.e. posts useful to understand the characteristics of the emergency
- **Where**, i.e. posts useful to identify the geographical area involved in the emergency
- **Roads**, i.e. posts that provide indications on the roads and points of interest involved in the emergency



Preliminary analyses – Sandy hurricane

Tweets on the Sandy hurricane are more evenly distributed on different topics and US authorities are more active compared to Italian authorities both during and after the emergency.



Preliminary analysis – observations

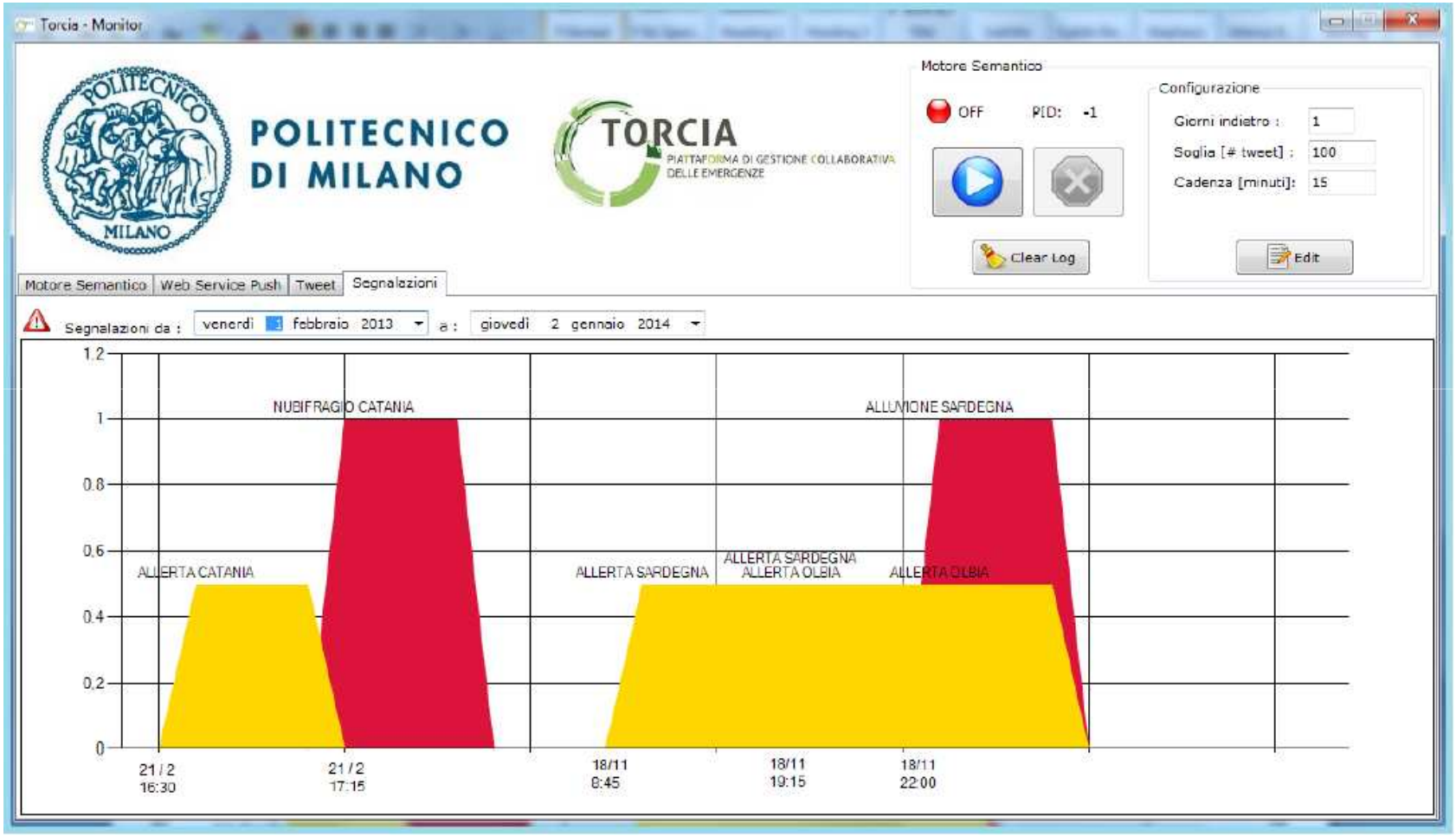
- Very few tweets are associated with GPS coordinates, nevertheless…
- … some 20% of tweets can be geotagged with the semantic analysis of the tweet content
- Pre and post emergency phases get very little attention, partly due to a non systematic activity of institutions on Twitter
- Not all social information is dependable. Authorities and institutions should play a role in improving the quality of social information by actively participating in online discussions
- Online buzz cannot be used unless it is cleaned, analyzed and geotagged

Testing

- Data from Jan. 1st, 2013 to Dec. 31st, 2013
  - Day by day analysis
  - Blacklist of places difficult to disambiguate

- Detailed analyses of the emergencies that have been identified in the test period:
  - Identification of the time when the Torcia system has raised early warnings and alerts
  - Comparison with actual time of alerts raised by local authorities

Torcia Monitor – Graphs

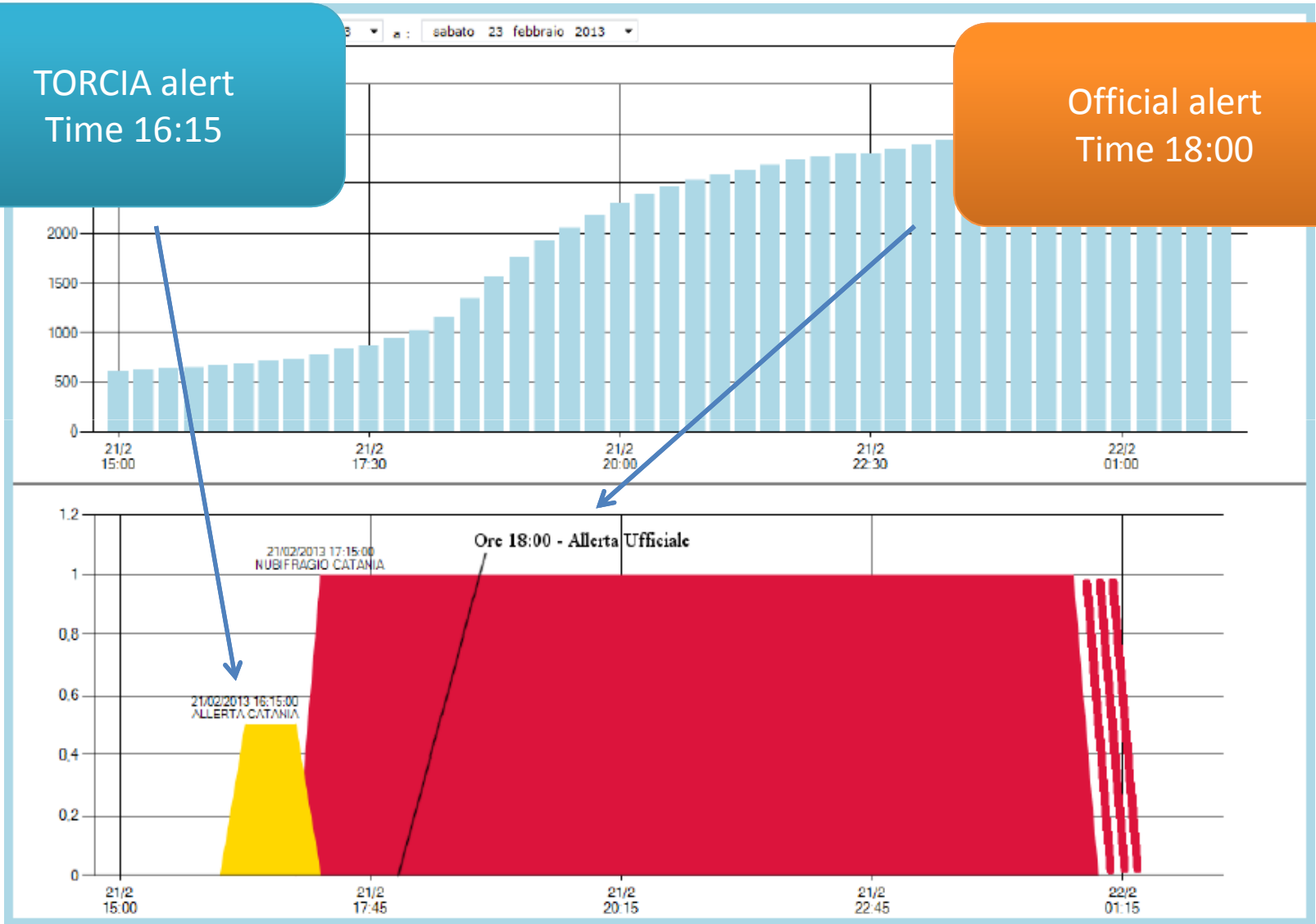


Yellow = warning
Red = alert

Testing – Catania flooding 2/21/2013

TORCIA alert
Time 16:15

Official alert
Time 18:00



Testing – Catania flood 2/21/2013

- 2013/02/21 15:59:09 - 'RT @viaetneacatania: Live #Catania #nubifragio e in pochi minuti **#ViaEtnea** è il solito pericoloso fiume! #meteo http://t.co/c9UDTXVdnG'

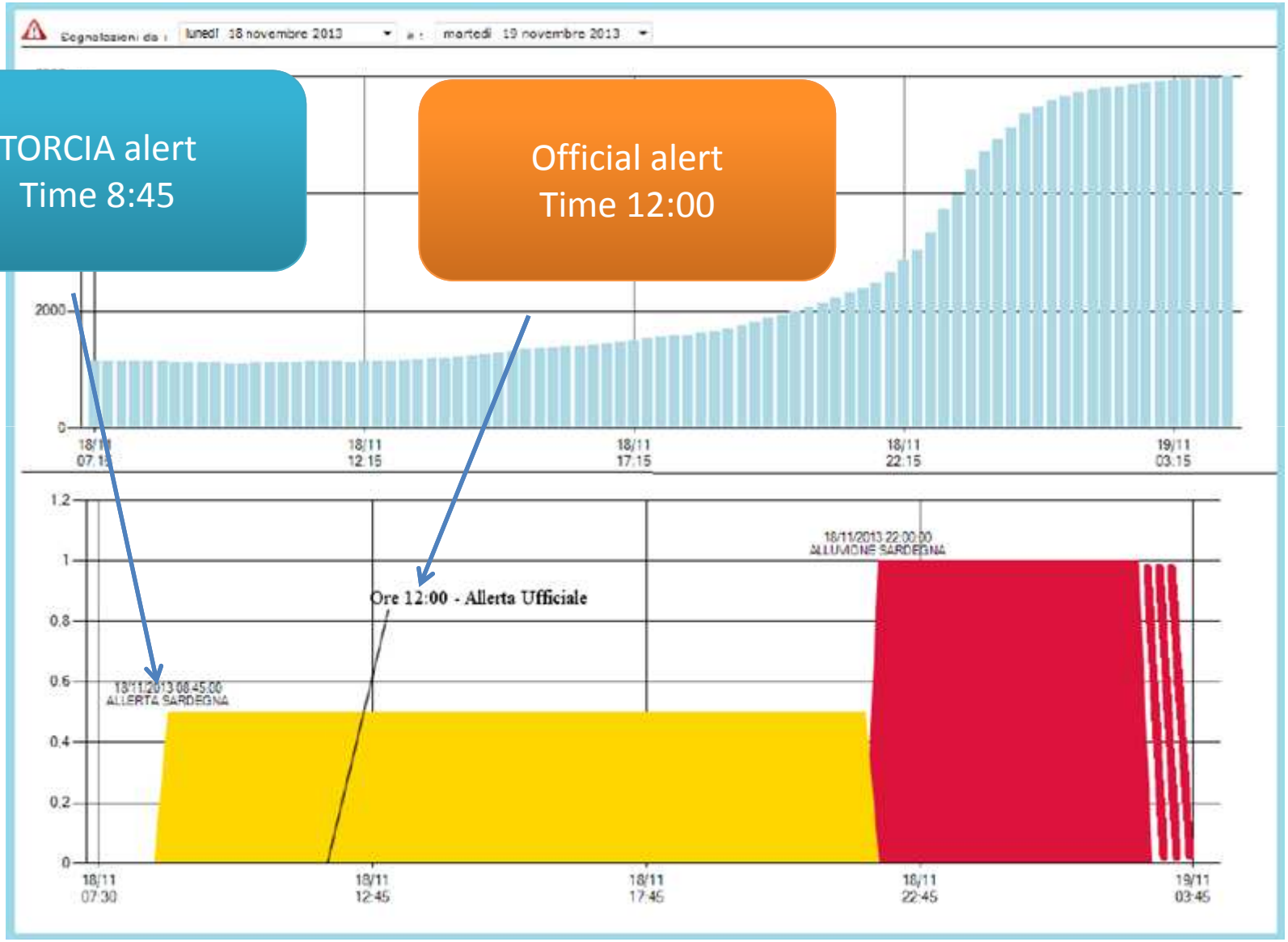
- 2013/02/21 16:13:52 - 'RT @Gabrymalvagia: Nubifragio a Catania DIRETTA VIDEO **Via Etnea** invasa dall\'acqua, negozianti in pericolo - LiveSicilia Catania: http://t.co/IGvZ1KUvcx'

- 2013/02/21 16:14:53 - 'RT @ChiaraBorzi: #Nubifragio a #Catania. Su via Passo Gravina auto cade nella corsia in discesa dal ponte e fango sulla strada verso gli Obelischi‘

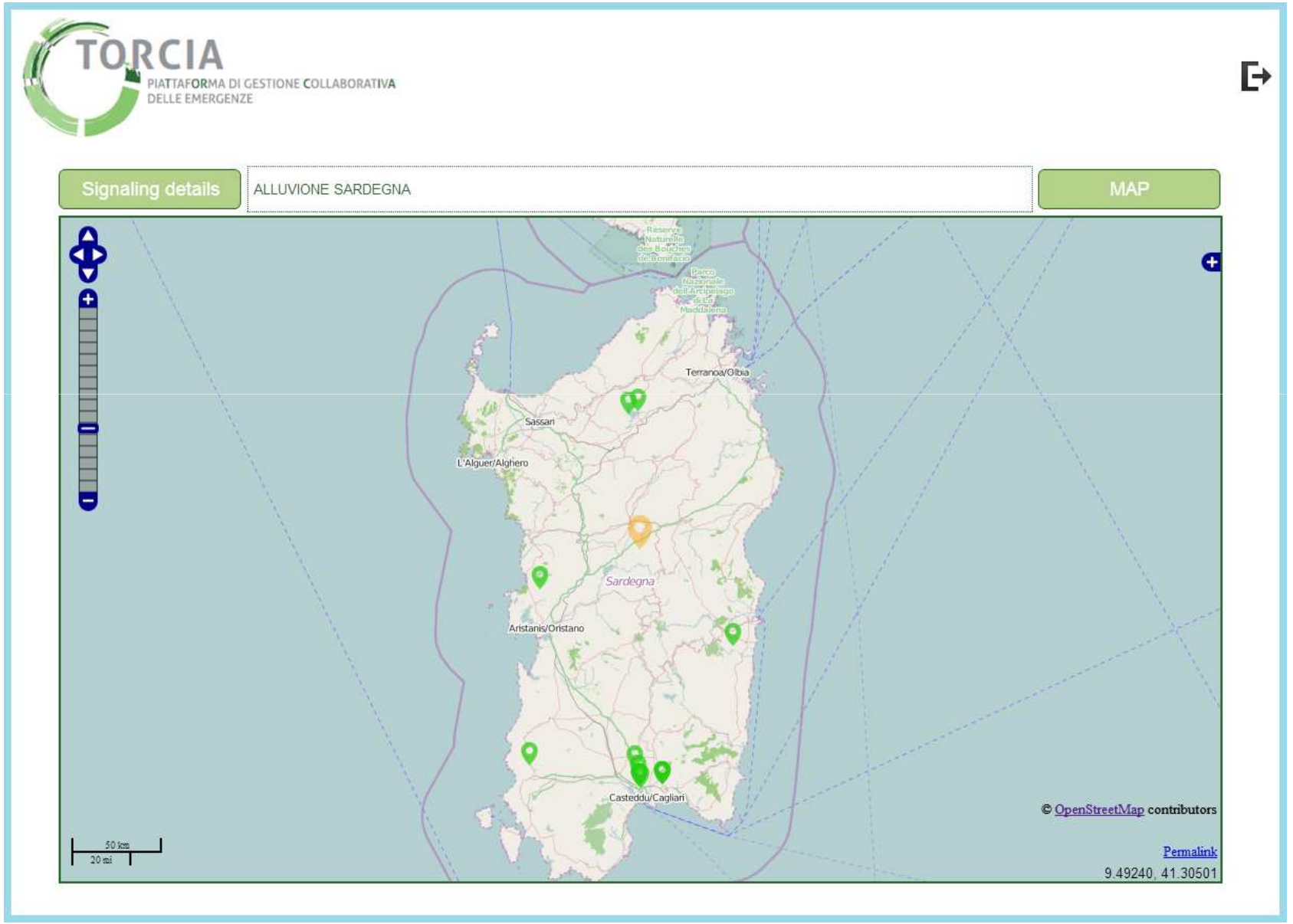
- 2013/02/21 18:33:28 - 'nubifragio a Catania 21-02-2013 **via etnea** allagata: http://t.co/1vAgjK1ORK via @youtube'

129 tweet containing the address «**Via Etnea**» in less than an hour

Testing – Sardinia flooding 11/18/2013



Testing – Sardinia flood 11/18/2013



@emma_beta80

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