

Enhancing the public's ability to reduce exposure to air pollution and odour through smart dissemination of data and crowd sourcing

David Carruthers, CERC
EPUK, 16th October 2014

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Overview

- Dissemination of real-time air quality data and forecasts
 - Current modes
- Social media and crowd-sourcing
 - QCumber: an innovative map-based system for reporting and exchange of environmental information including crowd-sourced data and real-time monitored and modelled data
- The shape of things to come?

Air quality data and forecasts

- There are many air quality data and forecasting services worldwide.
- These are disseminated through websites, apps, social media, traditional media.
- Rapid evolution of services
- This presentation shows some examples

Air quality apps in China

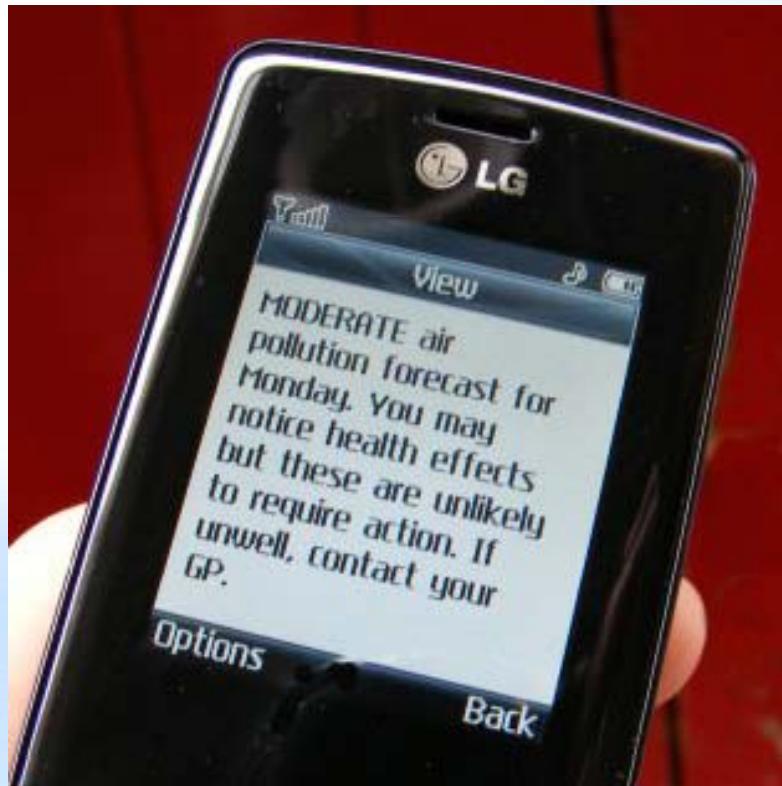
There are an increasing number of air quality apps in China



<http://air.fresh-ideas.cc>

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airTEXT: air quality forecasts for London



- System covers all of London
- Has been running since 2007
- Over 10,000 subscribers
- Street level pollution contours posted to web
- Alerts sent by email, text message or voice message
- Free smartphone app, Twitter feeds
- Forecast for three days
- Operated by CERC using ADMS-Urban and regional forecasts from Prev'Air (Ineris)
- Produced for the London boroughs, the Mayor of London and the GLA

airTEXT website

airTEXT
Free air pollution, UV, pollen and temperature forecasts for Greater London

Forecasts Health Bulletins Sign Up Health Advice News About [f](#) [t](#) [r](#) [i](#) [a](#)

Date Selection
Move the slider to the right to see tomorrow's forecast
Day: 28 Month: November < >
Click here to reset to today

Map Key
Selected day's forecast Following day's forecast
Favourite zone You are here

Zone Selection
Boroughs
 Barking and Dagenham Barnet Bexley Brent

Map Toggles
Activate pollution map: Pollution map Layer Opacity: 100% < >

Pollution Key
Low: 1 2 3 Moderate: 4 5 6 7 8 9 High: 10

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H Hackney Accessibility help Services A - Z Help Contact Search this site Search

Home Council Services Do it Online News and Events Mayor of Hackney Hackney the Place

You are here: > Home > Council Services > Environment and Planning > Pollution, noise and nuisance

airTEXT health warning campaign

airTEXT is a service that sends you a warning by text, voice mail or email if air pollution levels in London are expected to reach moderate, high or very high levels in your chosen area of the capital.

The airTEXT website also has a searchable and interactive map of London which allows you to view predicted air pollution levels anywhere in London (similar information is also available for Hertfordshire and Bedfordshire, Southampton and Sussex through airAlert).

Air pollution forecast map for London
Today: 1 / Tomorrow: 1

Boroughs

Environment show hide Planning

Building Control Conservation Environmental Enforcement Licensing Planning Pollution, noise and nuisance Regeneration Environmental Health

Pollution, noise show hide nuisance

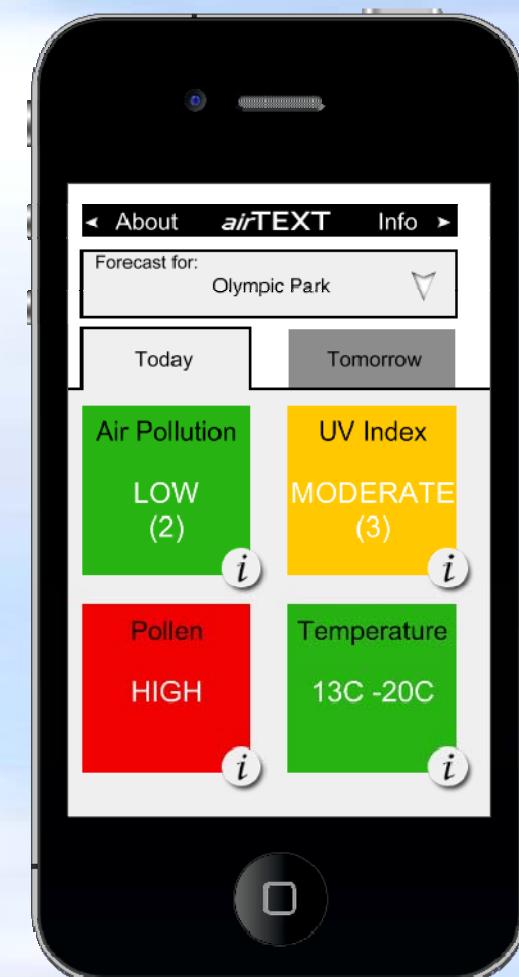
Environmental Permits for Pollution Prevention and Control Air Pollution

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Health Advice

airTEXT: phone apps

- Smartphone apps for iPhone, iPad and Android
- They provide air pollution, UV, pollen and temperatures for today and tomorrow across all London boroughs.
- They also provide explanations and health advice.



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airTEXT: health bulletins

- Health bulletins are produced for each London borough
- Forecasts of:
 - Air pollution
 - UV index
 - Pollen
 - Temperature
- PDF documents. Disseminated by web or email cascade and ultimately printed out for display on notice boards.
- Used at leisure centres, offices, doctor's surgeries, etc.

Daily Health Bulletin for Islington
Tuesday 14th June 2011

Air pollution
Moderate
Action may be required.
Health effects are unlikely to require action. If unwell, contact GP.
This is a daily air pollution forecast and may be LOW, MODERATE, HIGH or VERY HIGH.

UV Index
6 (HIGH)
Protection required.
Seek shade during midday hours, cover up and wear sunscreen.
This is a forecast of maximum hourly cloud-adjusted solar UV index over a 24-hr period. 1 to 2 is LOW, 3 to 5 is MODERATE, 6 to 7 is HIGH or 8+ is VERY HIGH

Pollen
VERY HIGH
This is a daily grass pollen forecast and may be LOW, MODERATE, HIGH or VERY HIGH.

Temperature
Max. Day 22°C/71°F
Min. Night 11°C/51°F
These are the minimum and maximum hourly temperatures predicted over a 24-hour period.

Forecasts produced under EU FP7 project PASODOBLE: <http://www.myair-eu.org/>

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Spare the Air (San Francisco)

- Spare the Air Alerts are issued when ozone pollution is forecast to reach unhealthy levels.
- Email alerts, forecast phone line, app, Facebook, Twitter
- The alerts urge residents to cut back on activities that cause pollution (driving, using petrol-powered lawn mowers...) People who are sensitive to unhealthy air are advised to limit their time outdoors, particularly in the afternoon hours.
- A similar service is being developed for London “Breathe Better Together”



CBS Local, 11 May 2014



mojado.com

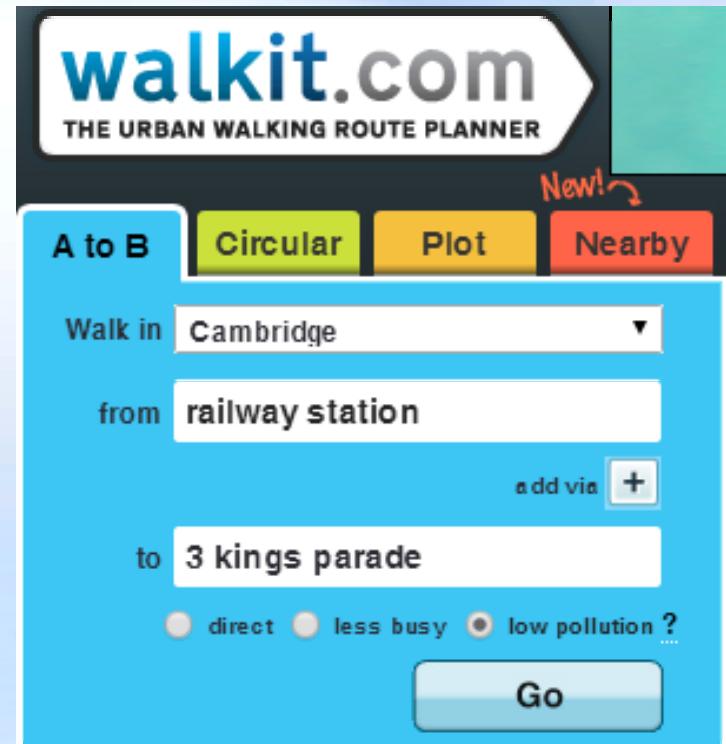
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Public appreciation for air quality forecasts and alerts

- For airTEXT: “[The alerts] help me immensely, especially as my heart and lung condition has worsened over the last 18 months and my exercise tolerance is very poor. So thank you for the continuing hard work”
- Boris Johnson: “I encourage all Londoners to sign up to this service [airTEXT]”
- For ChinaAirQualityIndex: “This app is helpful for preparing for the day if you live in a major Chinese city and are sensitive to pollution. It is also great for knowing what to expect when travelling around China. I use it every day.”
- For SpareTheAir: “This service is truly a life-saver. My daughter’s asthma is very sensitive to air pollution and we use these alerts to avoid outdoor exercise on bad days.”

Walkit – reducing exposure

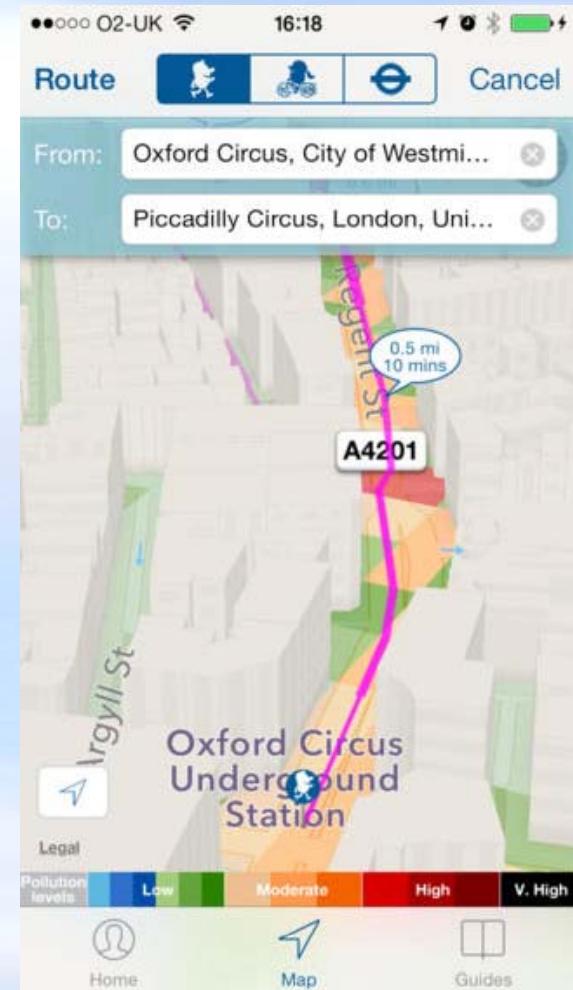
- Walkit.com provide walking directions via web and smartphone apps.
- They offer air pollution-aware walking routes in Cambridge and London.
- Choosing a route away from busy roads will reduce the user's exposure to harmful pollutants and consequently have a beneficial effect on health.
- Based on annual average NO₂ maps



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CityAir: reducing exposure

- Smartphone app to help Londoners lower their emissions and exposure to air pollution.
- Users can sign up for air pollution alerts and find low air pollution routes (based on annual averages).
- Available on iPhone, iPad and iPod touch and Android.
- From The City of London Corporation and King's College London



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QCumber

- QCumber is a web/mobile platform for monitoring and promoting sustainability of the local environment.
 - Integrated environmental data and tools
 - Social media and crowd-sourcing features
- Adopted by many institutions in Italy



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Crowd-sourcing in Qcumber

- Citizens can post and share information and report and discuss issues.
- Companies and regulators can join the conversation

Post environmental problems

Citizens can post directly on the map any problems and environmental disruption (e.g. a fire)



"Red QPost"

Post documents and data

With Qcumber citizens can post documents or link related to an area.



"Grey QPost"

Odour Qalert

With Qcumber citizens can post odour problems (levels, time, date, ecc..)



"Odour Qalert"

Report situations to protect

With Qcumber citizens can post directly on the map places and situations to protect.



"Green QPost"

Post news

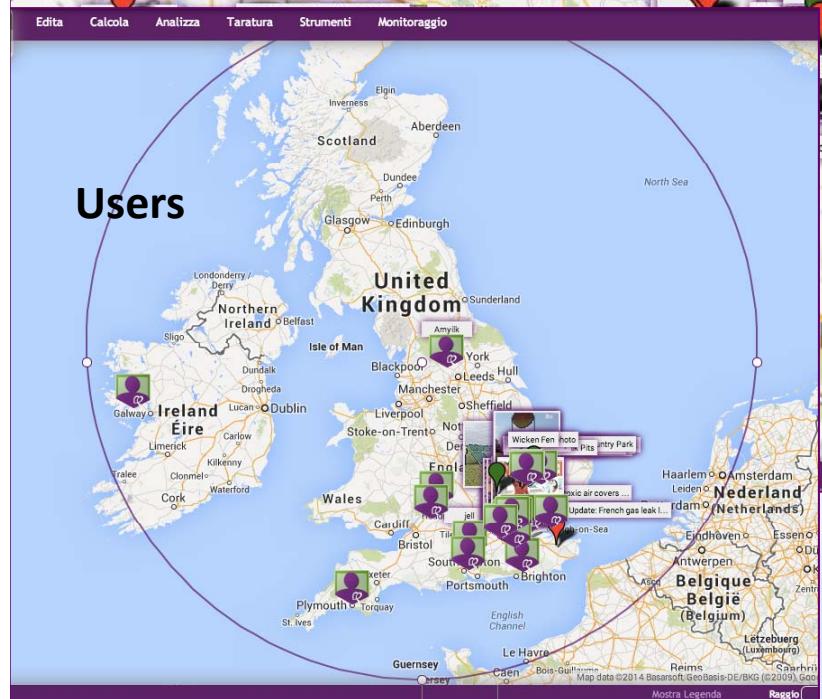
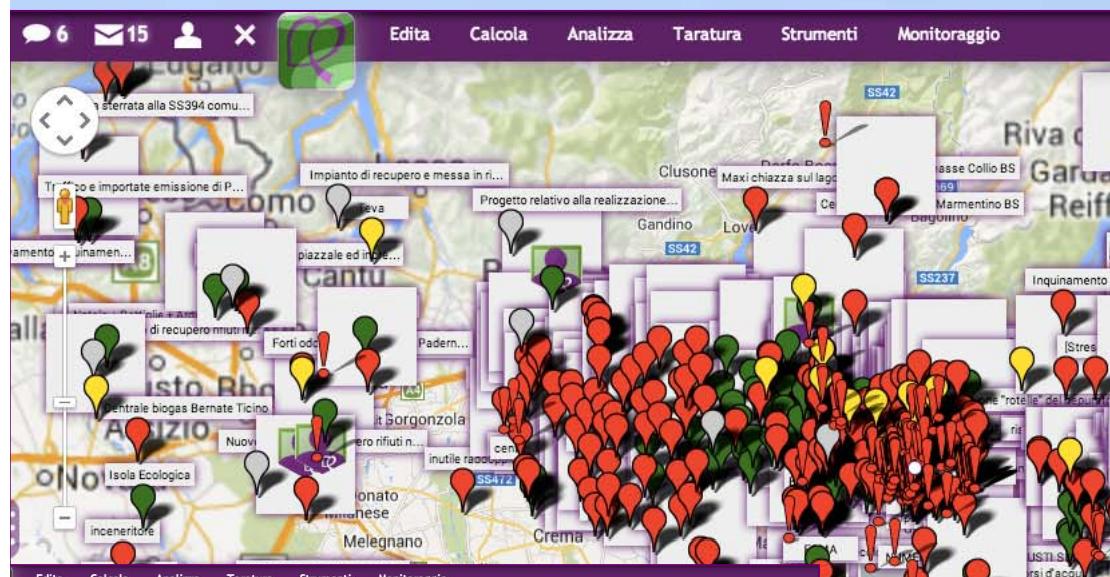
With Qcumber citizens can post newspaper articles related to an area.



"Yellow QPost"

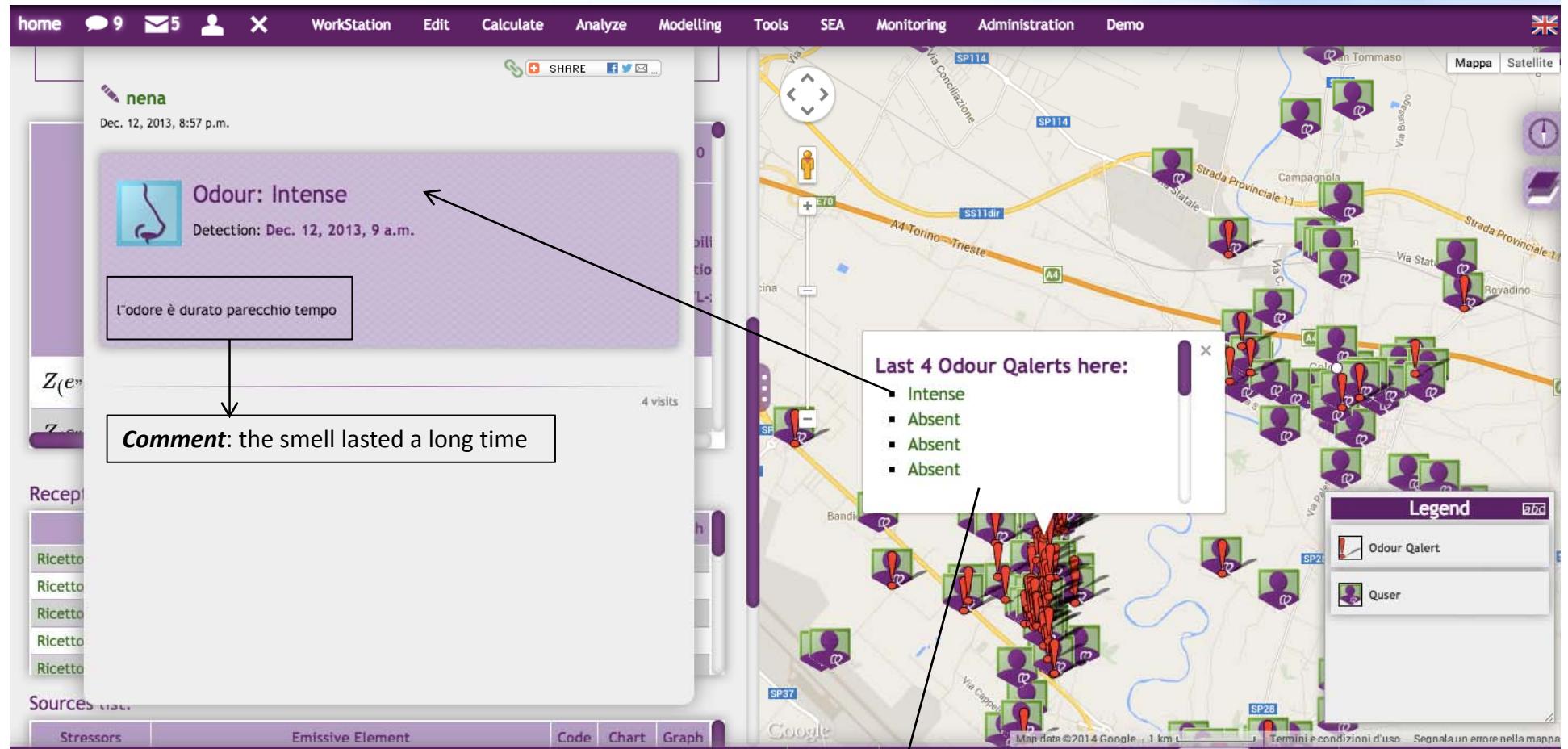
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Q-Posts



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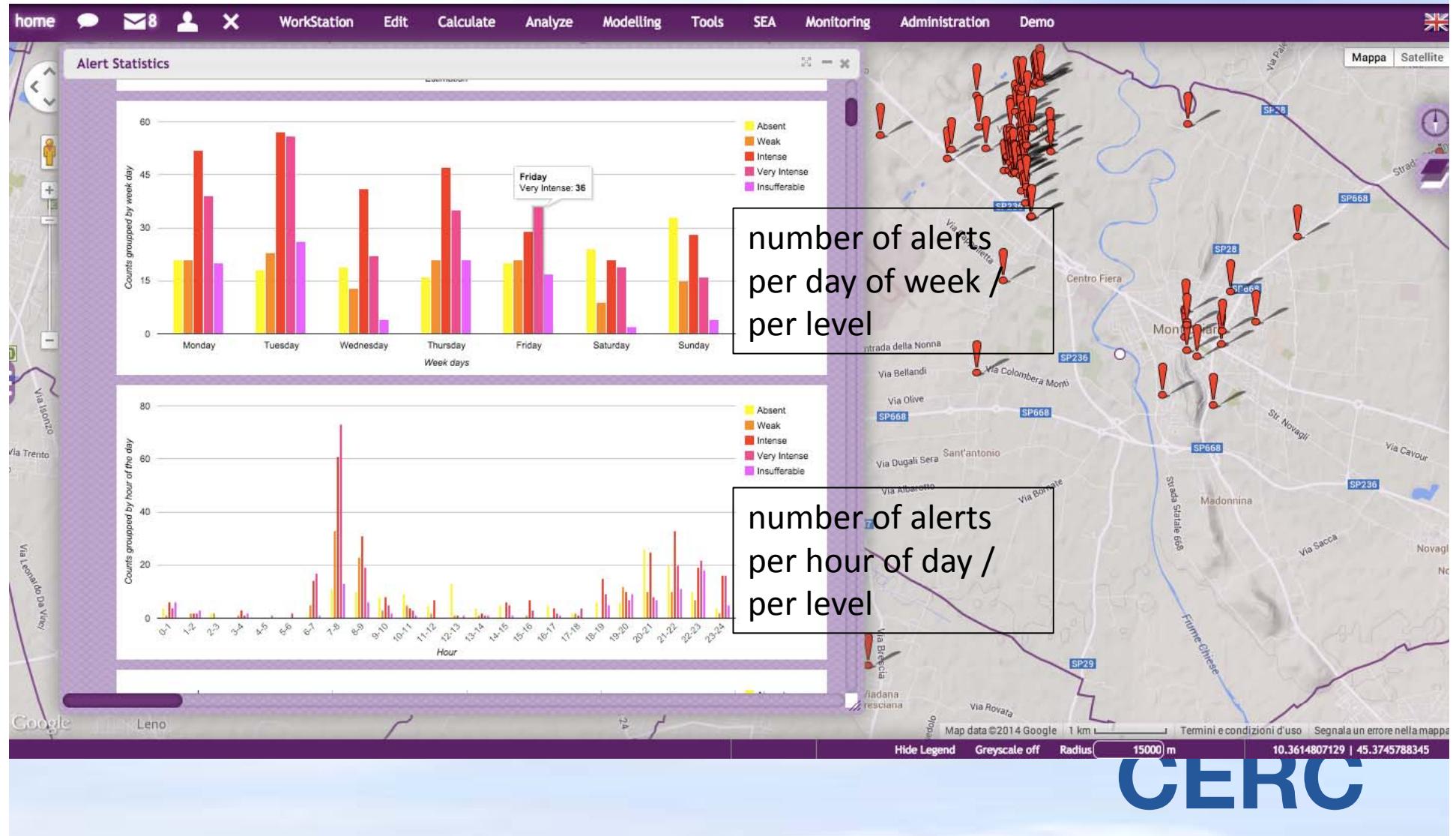
QCumber crowd-sourcing: odour



4 odour reports with dates and times and different ratings
(insufferable, very intense intense,weak, absent etc)

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QCumber: mining crowd-sourced data through statistics



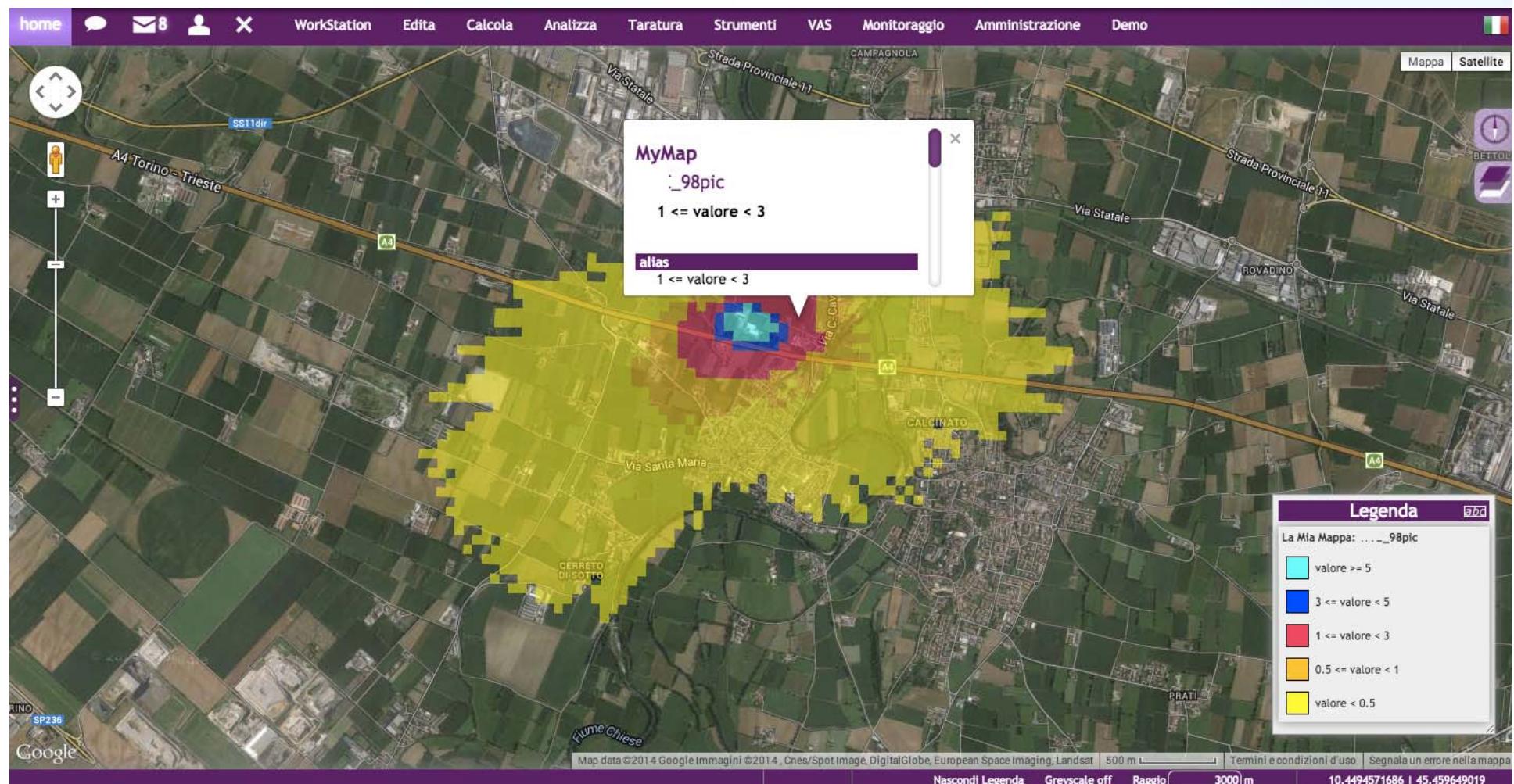
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Crowd-sourcing, modelling and near-real-time data for odour

- QCumber combines
 - Crowd-sourced data on odour nuisance
 - Official data on possible sources of odour
 - Near-real-time official data (meteorology)
 - Modelling (ADMS)
- These can identify likely sources of odour nuisance
- Modelling can be used for odour source apportionment

Odour contour plot

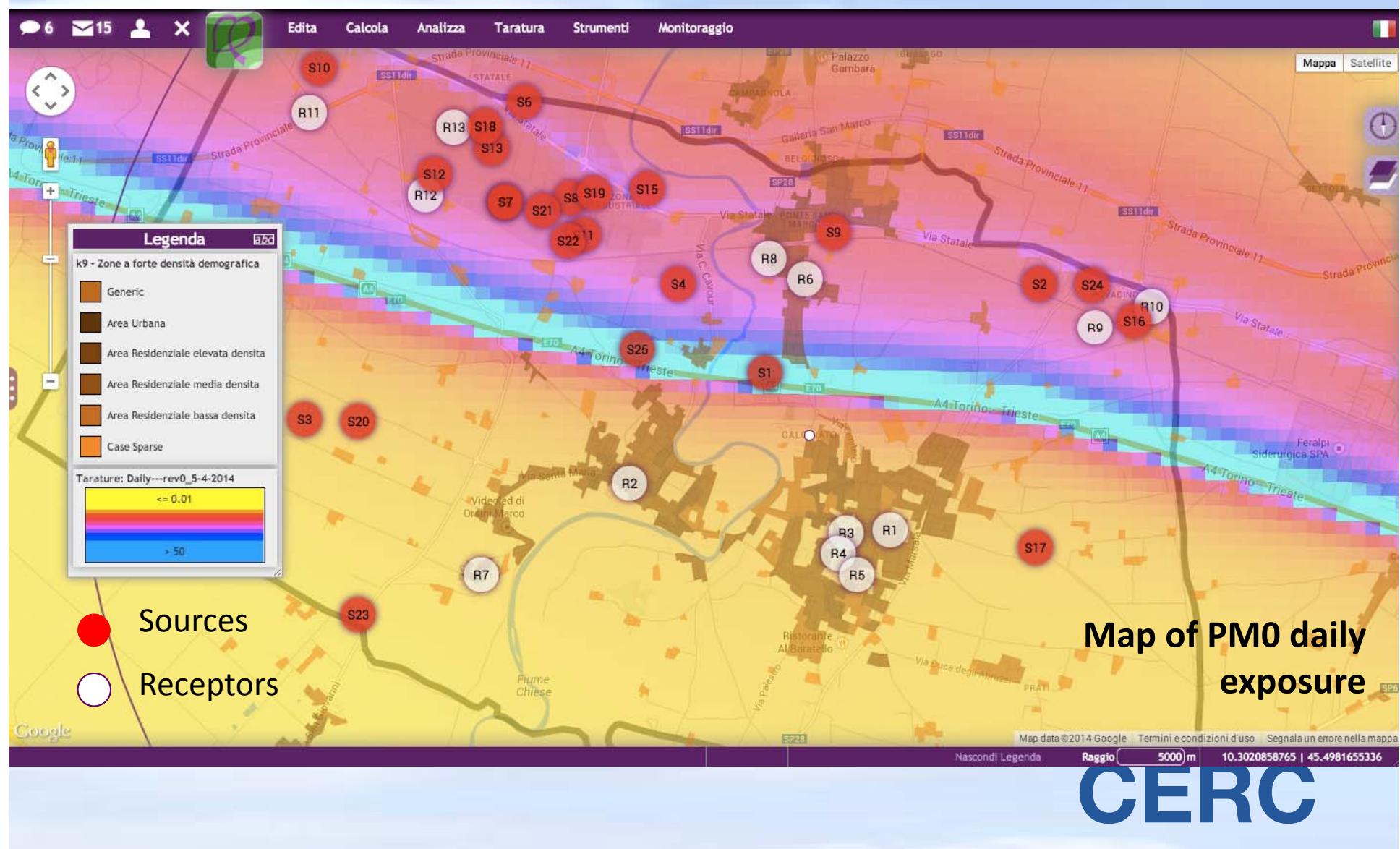
98th percentile



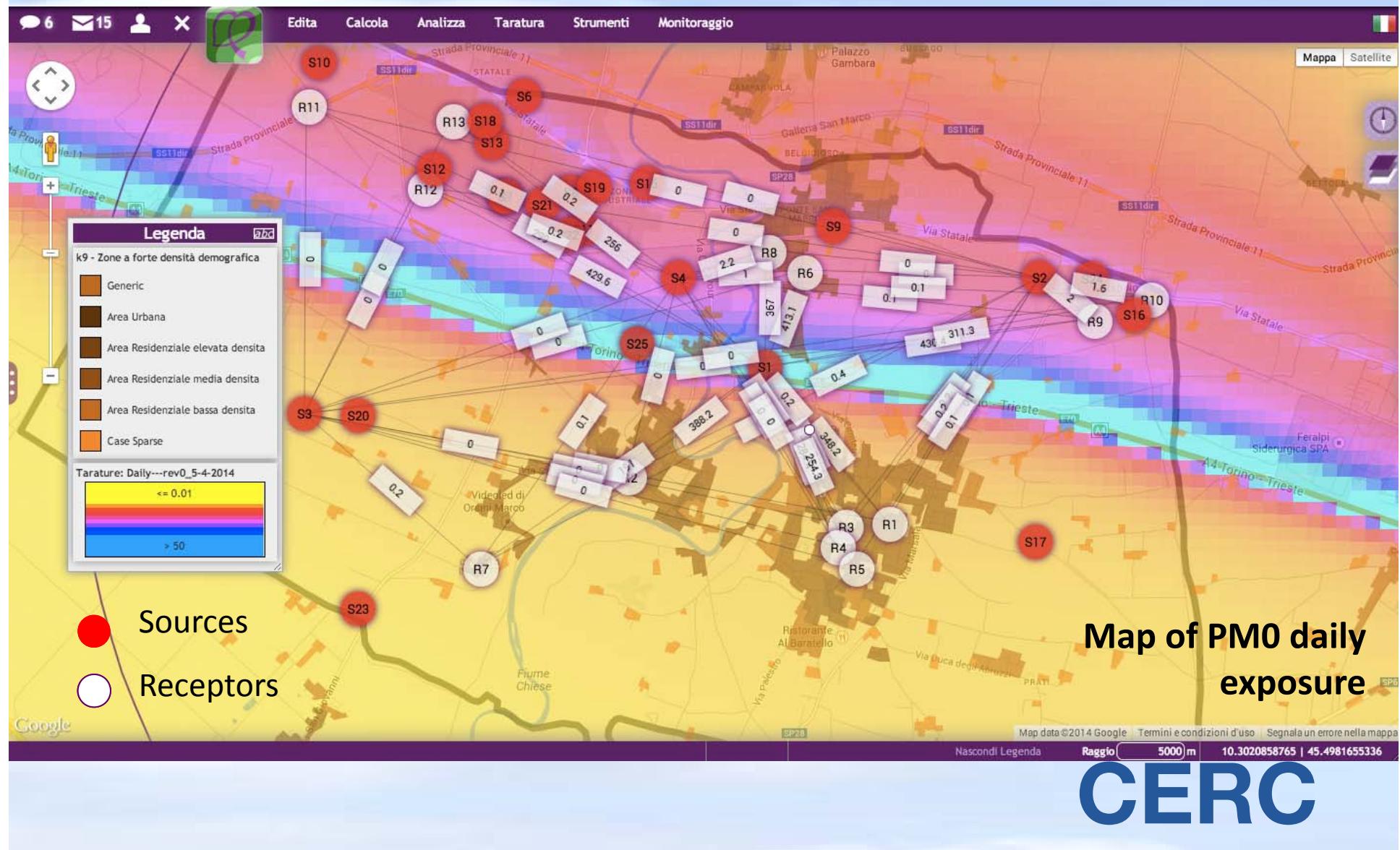
Modelling and near-real-time data for air quality source apportionment

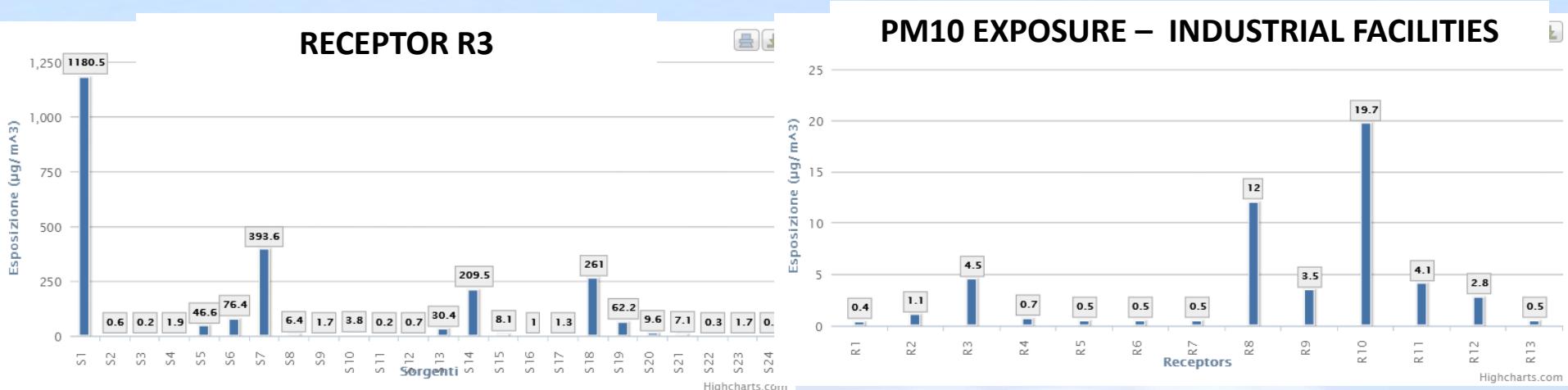
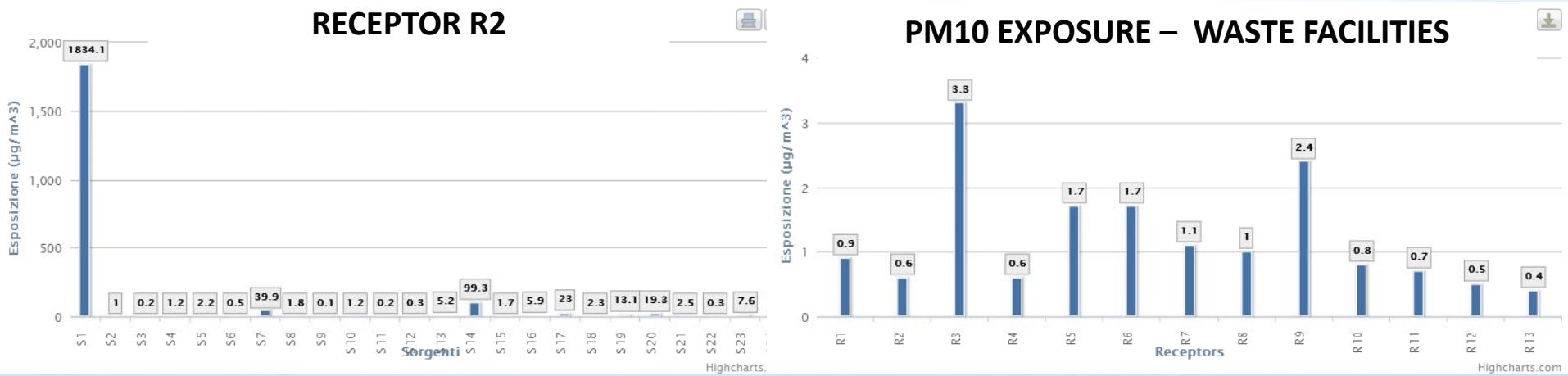
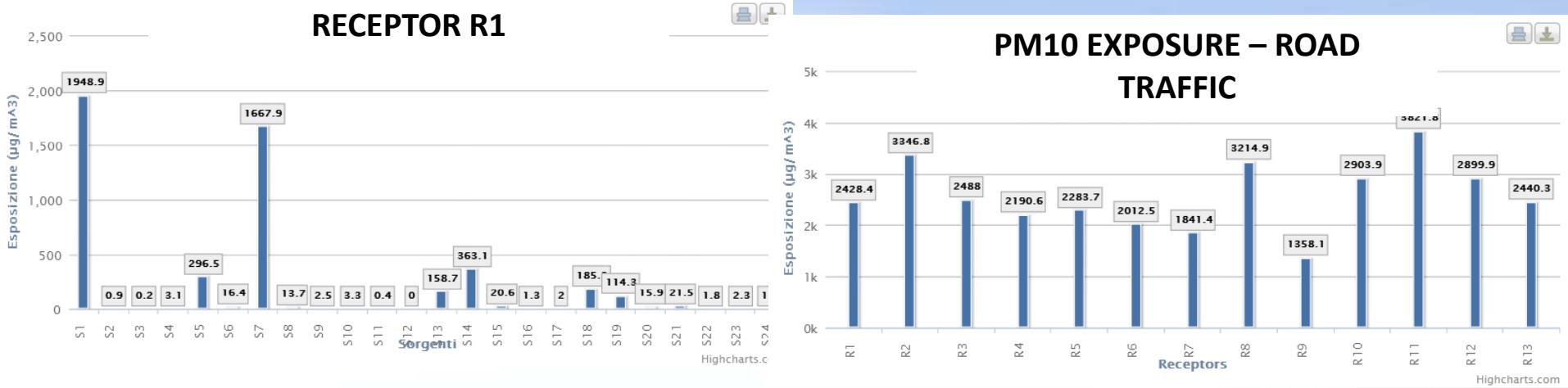
- QCumber combines
 - Official data on sources of air pollution (activity data)
 - Emissions calculations
 - Near-real-time official data (meteorology)
 - Near-real-time emissions for some sources
 - Modelling (ADMS)
- To calculate the exposure due to local sources

Air pollution source apportionment

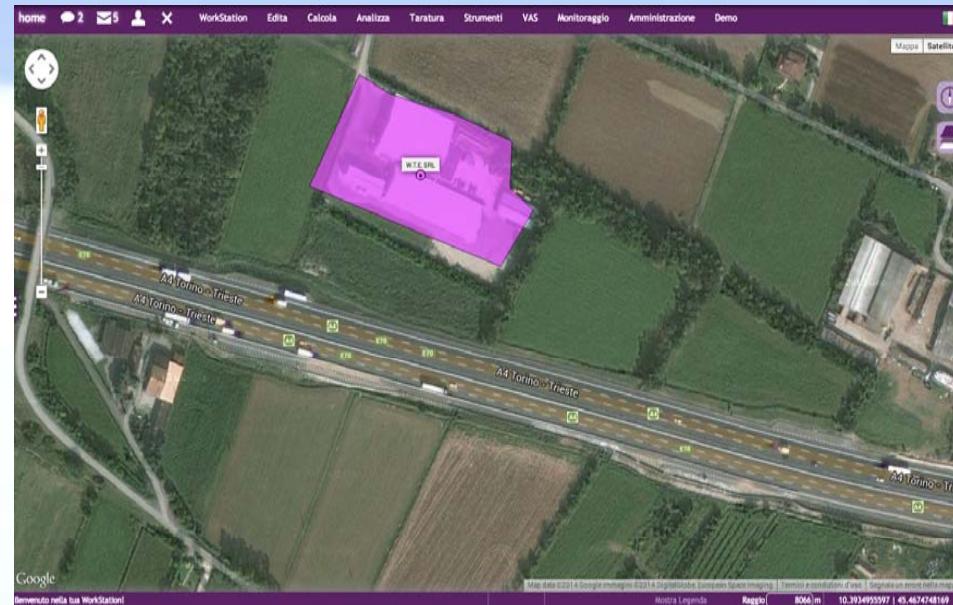


Air pollution source apportionment





QCumber Social media in action



THE EVENT: a fire in a composting plant in the province of Brescia (Italy)

On December 23, 2013, from 20.00 to 21.00, a fire occurred in a composting plant in the province of Brescia (Italy); the fire lasted 1 hour and involved three work vehicles (tractors, excavators and telescopic) and the local sewage.

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QCumber social media in action

REACTION: citizens report and discuss the incident on QCumber

The screenshot shows the QCumber platform interface. At the top, there is a navigation bar with links like 'home', 'WorkStation', 'Edita', 'Calcola', 'Analizza', 'Strumenti', 'VAS', 'Monitoraggio', 'Amministrazione', and 'Demo'. On the left, there is a sidebar with user icons and sections for 'Qpost' and 'Qalert nel mondo'. A central post by user 'momala66' dated 'Martedì 24 dicembre 2013 09:48:39' reports a fire at a waste treatment plant ('Brucia la Wte: fiamme e fumo dalla discarica di Calcinatello') with a purple location pin. Below the post, there is a detailed description of the event and several comments from other users. To the right, a map shows the location of the waste treatment plant ('Wte') in Calcinato, Italy, with a red marker indicating the exact spot. A callout box contains a quote: "At the beginning the booms and the flames, the fire blazes up in the waste treatment plant in Calcinato. A first black and then white smoke surrounds the residential area, and afterwards it is carried away by wind and rain". The map also shows surrounding streets and fields.

momala66 Martedì 24 dicembre 2013 09:48:39

Brucia la Wte: fiamme e fumo dalla discarica di Calcinatello

Prima i boati e poi le fiamme, divampa l'incendio nell'impianto di trattamento rifiuti speciali di Calcinato. Un fumo prima nero e poi bianco che avvolge l'abitato, e poi viene trasportato via dal vento e dalla pioggia.

8 commenti

luigi Martedì 24 dicembre 2013 13:31:28

nessuna foto? e articoli di giornali? sarebbe utile pubblicarli in questa sezione.

momala66 Giovedì 26 dicembre 2013 16:26:44

Questo è il link

http://www.brescioggi.it/stories/dalla_home/613887_prima_i_botti_poi_le_fiamme

In realtà alla notizia la stampa ufficiale ha dato pochissima importanza

Ciao.

luigi Giovedì 26 dicembre 2013 17:29:05

orario

Qalert nel mondo

Quser nel mondo

Benvenuto nella tua WorkStation!

SHARE

At the beginning the booms and the flames, the fire blazes up in the waste treatment plant in Calcinato. A first black and then white smoke surrounds the residential area, and afterwards it is carried away by wind and rain".

Mappa Satellite

Google Earth

Dati mappa | Termini e condizioni d'uso | Segnalare un errore nella mappa

Raggio 8066 m | 10.3901910782 | 45.4666170421

QCumber social media in action

SOLUTION: the plant operator participated on QCumber

The screenshot shows the QCumber software interface with a purple header bar containing various menu items like 'WorkStation', 'Edita', 'Calcola', etc. Below the header, there's a sidebar with user information and navigation links. The main area displays two comments from 'W.T.E. srl'.

1° company comment:

Buongiorno,
Vi segnaliamo che è possibile leggere una sintetica relazione inviata dalla ditta scrivente al Comune di Calcinato e alla Provincia di Brescia in seguito all'incendio del 23 dicembre al seguente link:
http://www.qcumber.org/WorkStation/_rgT__WS/vediContenuto/Document/188/

Saluti
WTE srl

2° company comment:

è molto importante quando le imprese comunicano con il territorio che le ospita, io personalmente ringrazio della risposta augurandovi di riprendere le normali funzionalità dell'impianto e sperando che tale trasparenza la si possa trovare anche quando gli imprevisti non siano contenibili, dandoci modo di essere informati di eventuali rischi e pericoli. grazie.

Saluti
WTE srl

A right-hand side panel contains a map showing a road network with labels like 'A4 Torino-Trieste', 'E70', and 'Viale Brescia'. A callout box points to the map from the first company comment, stating: "The company made available (by specific link) to all citizens a report on the ongoing event forwarded to the institutions (City and Province)". Another callout box points to the second company comment, containing the quote: "[...] We believe that the Q-cumber is a very useful tool to communicate with people who live in the area and that's why we were one of the first to join [...]".

At the bottom of the interface, there are buttons for 'Qalert nel mondo' and 'Quser nel mondo', and a status bar with 'Benvenuto nella tua WorkStation!', 'Mostra Legenda', 'Raggio 8066 m | 10.3901910782 | 45.4666170421', and a 'Google Earth' icon.

The shape of things to come?

- Combining official data with crowd-sourced data creates new possibilities for analysing and improving air quality and reducing other environmental stressors
- Air quality forecasts could be improved through better real-time data (e.g. traffic information from ANPR data or from crowd-sourced data such as personal journey tracking).
- Forecasts could become more person-centred, e.g. using mobile phone GPS trajectories to provide a tailored exposure forecast with recommendations about routes and travel modes.
- Forecasts could help reduce the sources of pollution, by raising awareness of the problem and encouraging behaviour change, and to trigger interventions such as changes in traffic signals, bus time table etc.

Thanks for your attention

- Any questions?