Generalitat de Catalunya
Departament de Territori i Sostenibilitat

Servei Meteorològic de Catalunya
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Using Citizen Science in Meteorological Hazard Events. The snowfall event in Catalonia 26-28/02/2018

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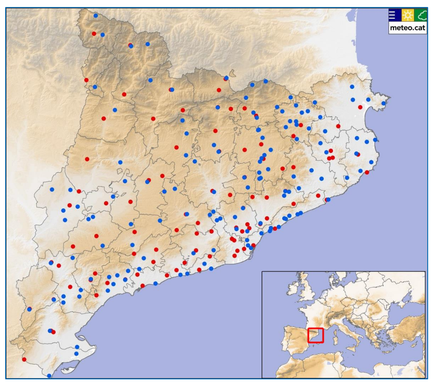
XOM Xarxa d'Observadors Meteorològics

OFICINA CIÈNCIA CIUTADANA BARCELONA

SITUATION

Catalonia (32 * 10³ km²) is located in north-east of the Iberian Peninsula, between the Pyrenees and the Mediterranean Sea. It has a complex topography and it's latitudinal position (polar and tropical influences) means that there are a variety of sub climes.

A total of 948 city councils in the territory, and the total estimated population in 2017 is around 7,5 million inhabitants.



In blue observers, in red spotters

THE NETWORK

The Weather Observers Network (in Catalan, Xarxa d'Observadors Meteorològics, XOM) is currently formed by a group of spotters. The group is divided in two classes, depending on the provided weather information, meteorological surveillance, and meteorological observation.

The network is one example of Citizen Science in Catalonia.

XOM currently has a total of 233 collaborators, 95 of them are uniquely observers, 96 exclusively spotters, and 42 collaborate in two modes.

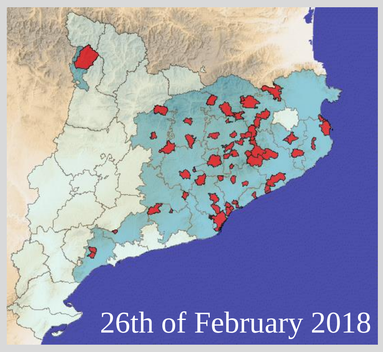
The meteorological surveillance is formed by a group of people distributed as uniform as possible throughout the territory, and they provide information about severe weather in real time.

The spotters must act if they observe a phenomenon that significates a weather situation of danger (**heavy rain, snow, wind, storm, sea state, hail, heavy hail, fog, freezing fog, freezing rain or tornado**).

They can also provide graphical information and pictures when they made the weather warming.

THE 26-28/02/2018 SNOWFALL IN CATALONIA

Last 26th to 28th of February 2018 a snowfall took place in Catalonia because a very cold air from European continent crashed with on Atlantic deep atmospheric depression. Monday 26th started with one first snowfall, Thursday 27th the cold air caused snowfall up to sea level, and Wednesday 28th it has the most important general snowfall since 2010. During these days 554 notifications were recorded in all counties of Catalonia. It has been the weather situation of danger that recorded more notifications in the Citizen Science of XOM.



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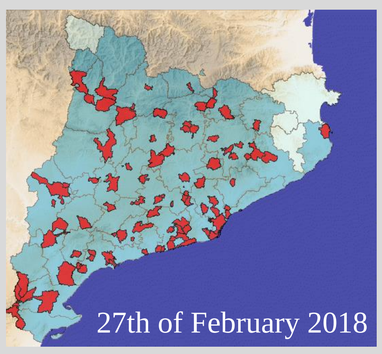

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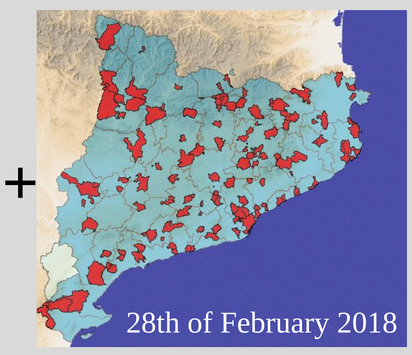

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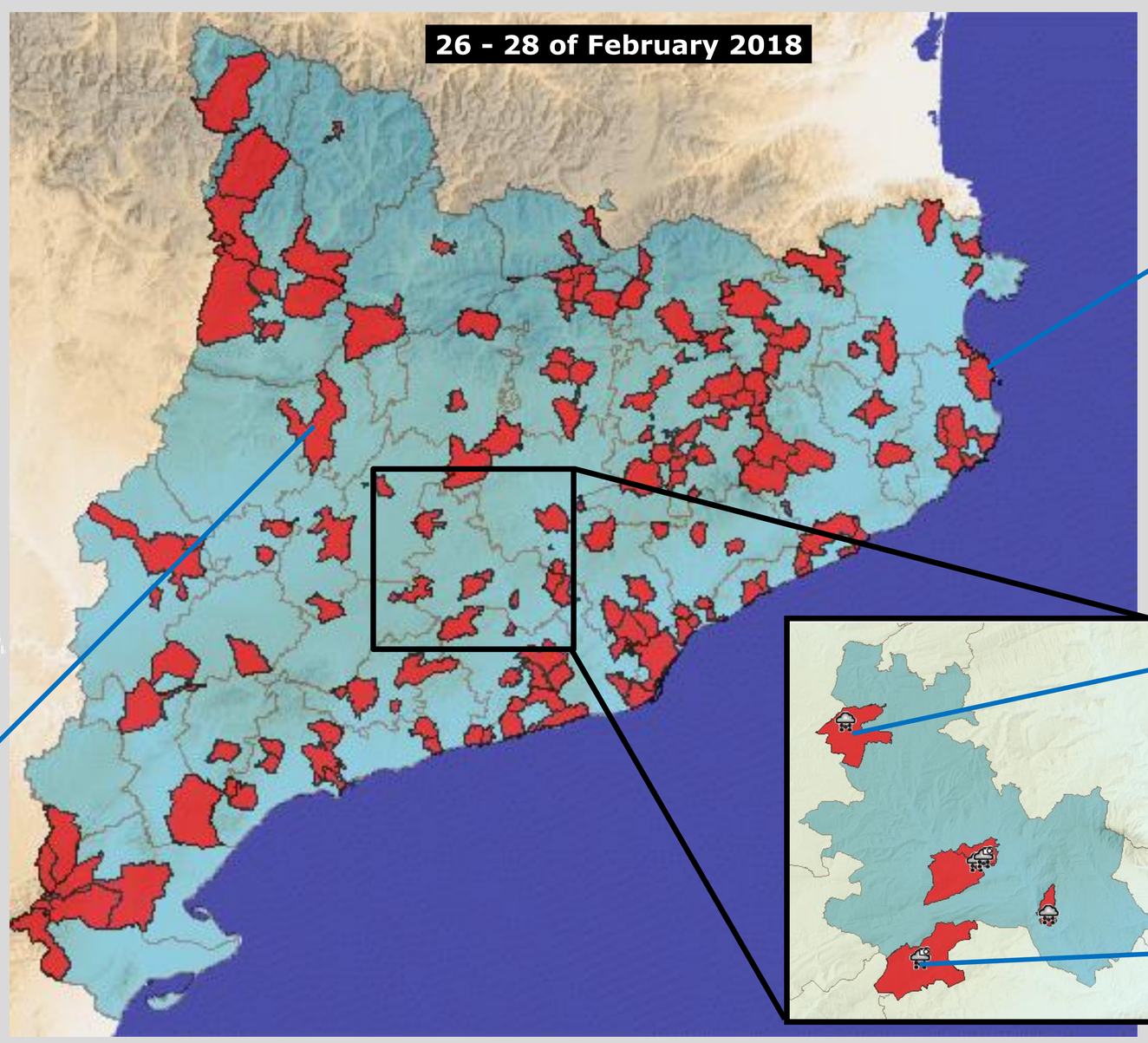
26-28 of February 2018	
Meteor	**Number of observations**
Snow	538
Sea state	6
Heavy rain	5
Fog	2
Hail	1
Others	2

Detail Notification

Observer Data:
- Observer
- Town
- Height above sea level
- Time

Notification data:
- Meteor (heavy rain, snow, wind, storm, sea state, hail, heavy hail, fog, freezing fog, freezing rain or tornado)
- Moment of snowfall (begins to snow, snowing, the snow covered the ground, or has stopped snowing)
- Intensity (weak, moderate, strong)
- Type (snow, rain and snow mixed granulated *snow*, "*calabruix*" soft hail)
- Snow depth (cm)
- Comment

Picture



Dades de l'observador/a

Observador/a:	Josep Pascual Massaguer
Municipi:	Torroella de Montgrí
Hora:	2018-02-26 09:49:00

Dades de l'observació

Meteor:	Estat de la mar
Alçada aproximada:	2 m

Comentari meteor:
Mal estat de la mar a l'Estartit aquest matí a causa de la mar de fons de llevant.

Fotografia

Cops de mar picant al Passeig del Molinet de l'Estartit.

Dades de l'observador/a

Observador/a:	Albert Borràs González
Municipi:	Pujalt
Altura:	750.00
Hora:	2018-02-27 15:17:00

Dades de l'observació

Meteor:	Neu
Estat de la nevada:	Comença a nevar
Intensitat:	Intensitat feble
Tipus de neu:	Neu
Gruix de neu:	0 cm

Comentari meteor:
Comença a nevar a Pujalt (750m) de forma feble. La temperatura és de -1,1ºC i va baixant.

Dades de l'observador/a

Observador/a:	Màrius Tomé i Covelo
Municipi:	Artesa de Segre
Altura:	530.00
Hora:	2018-02-28 11:06:00

Dades de l'observació

Meteor:	Neu
Estat de la nevada:	Neva
Intensitat:	Intensitat moderada
Tipus de neu:	Neu
Gruix de neu:	20 cm

Comentari meteor:
Segueix nevant a bon ritme a La Clua de Meià, i el gruix va creixent sense parar. Seguim amb temperatura sota zero i volves petites.

Fotografia

20 cm acumulats i de moment segueix

Dades de l'observador/a

Observador/a:	Abel Galisteo Busquet
Municipi:	la Llacuna
Altura:	616.00
Hora:	2018-02-26 23:43:00

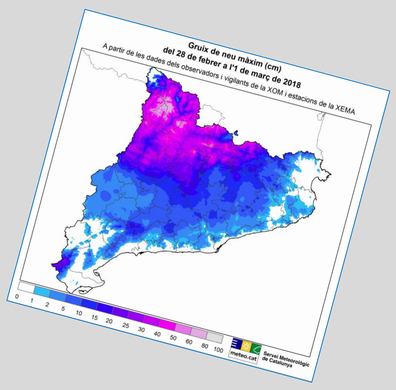
Dades de l'observació

Meteor:	Neu
Estat de la nevada:	Comença a nevar
Intensitat:	Intensitat feble
Tipus de neu:	Neu
Gruix de neu:	0 cm

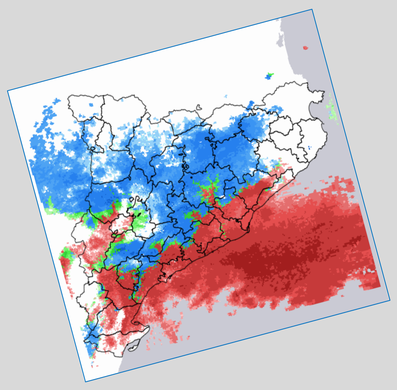
Comentari meteor:
Cauen flocs de neu amb una intensitat molt feble.

Fotografia

APLICATIONS OF THE DATA



- Support for surveillance and forecasting tasks *[ref01] [ref02]*
- Characterization of the climate (monthly and annual newsletters, press releases, maps) *[ref03]*
- Automatic data validation stations
- Validations of modeling and remote sensing products *[ref04]*



Strengths

- Good timely and spatial monitoring in meteorological hazard events
- Improves nowcasting
- Collect lots of snow depth
- Good graphic visualization (in red towns, in blue counties)
- Pictures improve the information
- The detail provides extra information
- Citizen Science allows you to have information that can not be obtained automatically

Weaknesses

- Areas little covered
- Encourage to introduce more pictures
- Measure the final snow depth
- More notifications in other hazard events (rain, fog, wind…)
- To validate the data we need to restrict the introduction data only to registered and formatted collaborators
- The notification details must be reported

ACKNOWLEDGEMENTS

All XOM observers and spotters from Meteorological Service of Catalonia. For constant and selfless collaboration that make it possible for the network works every day.

REFERENCES

[ref01]: Vilaclara, E.; Segalà, S.; Andrés, A.; Aran, M. (2010). "Operational warnings issued by the SMC in the 8th march snow event in Catalonia" 12th Plinius Conf. On Mediterranean Storms, Dassia, Greece, 2010

[ref02]: Álvarez, M.; Soler, X.; Figuerola, F.; Aran, M.; Gallego, M. (2017) "Towards an operational method to forecast snow events at low altitude in Catalonia" International Congress on Alpine Meteorology, Reykjavík, Iceland, 2017.

[ref03]: Ripoll, R.; Serra, A.; del Amo, X.; Barnolas, M. (2017). "Mapes de gruix de neu a Catalunya" V Jornades de neu i Allaus, Ordino, Andorra, 2017.

[ref04]: Rigo, T.; Aran, M.; Bech, J.; Farnell, C.; Mateo, J.; Pineda, N.; Ripoll, R.; Serra, A. (2015). "Discriminating downburst-producing and hail-bearing thunderstorms using total lightining and weather radar observations" Eur. Conf. On Severe Storms. Wiener Neustadt, Austria, 2015 ECSS2015-77-1