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## An overview of the use of Twitter in National Weather Services

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# Introduction

National Meteorological Services (NMS), use different "classical" tools for meteorological information dissemination, including television, 1.200.000 radio, newspaper, phone, e-mail and public/private web. In recent years, new technologies, and in particular the rapid expansion of Twitter, have 1.000.000 caused that the transmission of information can be virtually instantaneous and accessible to large segments of population.

We can consider Twitter as a micro blogging platform, a perfect place for quick and efficient communication with audience. As a 600.000 consequence many NMS have developed new communication strategies and incorporated this tool for different purposes. Some NMS, as in the 400.000 Basque Meteorology Service (Euskalmet) case, does not only provides forecast and other remarkable information routinely, but gives real-time 200.000 observed data, forecast and relevant information continuously before and during severe-weather episodes.

16.000 · In this paper we analyze different aspects related to the use of Twitter in different MMS worldwide. First we will review the 14.000 . general position of NMS worldwide regarding the use Twitter technology. Secondly we will focus on different practices of some 12.000 selected meteorological services. Thirdly we will deal specifically with Euskalmet case. Finally some conclusions are presented. 10.000

Twitter is a free social messaging service for sending and receiving short messages in real time. The messages are limited to 140 characters and they are called "tweets". It has many add-ons that make it powerful, but the basis are text messages.

- Considered a **social networking** service because people create profiles and connect with other people. The people who connect with you are called "followers". you develop a list of connections whose profiles you can browse and with whom you can swap messages.

- Also a microblogging service. Tweets are shorter but somewhat similar to blog posts in the sense that tweets are meant as information updates that people can subscribe to. Twitter by default publishes all of your tweets in a public timeline that anyone browse.

- Tweets can be sent to Twitter using computers and mobile phones. Since most people have frequent access to a computer or cell phone, Twitter makes it possible to provide others with frequent updates about pieces of information.

NEW ZEALAND (28/12/2008)

SWEDEN (04/03/2009)

BELGIUM (25/08/2011)

URUGUAY (16/09/201)

GERMANY (10/10/201

- SOUTH AFRICA (07/11/201)

- VENEZUELA (14/11/201)

TURKEY (07/02/201

BAHREIN (05/03/201

--- GUATEMALA (26/04/201

- KENYA (09/05/2012)

- PORTUGAL (06/06/2012)

--- FIJI (04/04/2012

2012 - USA (03/01/2012)

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--- LATVIA (20/09/2011)

UNITED KINGDOM (21/01/2009)

Met Office

Fig.6: Number of followers of NMS's Twitter accounts

## **Fwitter and meteorological services**

In the last years, most of the meteorological services have joined social networks (YouTube, Facebook, Twitter, etc.). The increasing availability of mobile phones with access to these networks is an opportunity not only to spread messages, but to real time interaction.

More than 30% of global NMS have an account on Twitter, although this percentage is reduced in Africa, Asia and Oceania (see Figure 1), due to the low diffusion of mobile technologies and the limited access to internet in these areas, among other Africa factors.

The first centre to join Twitter (in an active way) was the New Zealand Meteorological National Service, on 28th of December Asia 2008. The following years, the number of meteorological centres who joined Twitter progressively increased until the end of 2013, Europe when it almost stopped (see Figure 2 and Figure 3).

800

700

600

500

400

300

200

Euskalmet case

In Africa, there are five active accounts. It is worth noting South Africa case because of its number of followers, sent tweets and degree of influence. In Oceania, the most active account is the one of New Zealand (considering that Australia uses only Facebook). In Asia, there are thirteen active accounts. Indonesia and Philippines are remarkable because of its high activity. In the American continent, it is relevant the NOAA's activity, with 150 active accounts (the main one, the National Weather Service) of USA, is the most influential one). On the other hand, the Mexican service has almost 300.000 followers, whereas the Venezuelan centre has the largest number of tweets. In Europe, most of relevant centres have accounts on Twitter. MetOffice (UK) stands out for the large number of followers and its great activity.

In Figures 4 and 5, we show the number of tweets sent per day and the total ones for different meteorological services. In Figures 6 and 7, we represent the number of absolute followers and followers considering the potential influence (millions of inhabitants for the concerned country). In figure 8 we can see differences in growing rate.

# **Usual practices**

In this section, we focus on a selection of NMS and we analyze different Twitter practices (see table 1(. In general, NMS use Twitter for fast and efficient communication with users, including different kind of information, as routine weather forecast and observations, general weather, climate and scientific information, events communications and others. In some cases, this platform is used for real time severe weather data dissemination and warnings. At the end, NMS look for bidirectional communication and users fidelization, in some cases with a relatively high interaction with users (not usually).

Regarding sent tweets and followers, it is worth to mention the account of Mexico, with 91 tweets daily and 291.000 followers, well above the next one which is United Kingdom, with 55 tweets per day and 221.000 followers. Nonetheless, the Mexican account barely interacts with users, while the United Kingdom service is the one that more does it. The 85% of sent tweets mention another user (they usually answer questions or doubts of the users by direct mentions to them). They receive a mention of some user for almost every tweet (90%). Instead, most of tweets sent by the account of Mexico do not have any specific mention to any of its followers, they rarely receive mentions or mention other users.



Concerning the ratio of NWS information vs non-own content of posted tweets, users' tweets are not usually retweeted. It is important to mention the NWS of USA, because it is the one that retweet more (75% of sent tweets are retweeted of other users); however, in this case they do it of their own regional accounts (they have more than 140).

Talking about the hashtags (they ease the organization and the access to the information), most of the centres make a limited use of them, apart from German DWD (2.6 hashtags per tweet).

In relation to the use of links, most of the meteorological services use them. In the case of Hong Kong, most of tweets (90%) have a link to their own web page, where there is more detailed information.

In relation to the awaken interest among users by retweeted and favorited tweets (the higher number of retweets and favorited tweets, the more relevance of the tweet), it is noteworthy the Mexican account with a 96% of retweeted tweets and a 93% of favorited tweets. On the other hand, MetOffice has a 20% and 25%, respectively.

### **Summary and Conclusions**

New technologies and social networks have increased the available meteorological information and the opportunities to share it. In particular, Twitter is one of the most used social network and communication tool. For that reason, most of the leading meteorological centres have an active account.

The most influential TwitterNWS accounts are in Europe and North America, but the most followed in Asia. However, Twitter is not very widespread in Africa, the still low mobiles presence in this continent could be one of the main reasons.

The use of this tool is not homogenous in the different NWS. The operational routines are very different, with a variety of information content and different relationships with followers.

Attracting followers and maintaining them is a very complex task, considering that there is no direct relation between the number of sent tweets (effort) and the number of followers of an account (award).

This communication tool has a personal and direct character; therefore, locality character has a great importance, as we can see by the fact that big centres use regional accounts and the high number of followers that small centres with more local character have (Euskalmet, Meteocat, etc.).

Twitter is one of the most promising tool for information transmission in situations of severe weather, both for its rapid expansion (especially among young people of developed countries) and for its collaborative nature. Euskalmet is a good example at regional level, due to its high transmission capacity in severe weather situations, among other factors, because of the dense instrumentation present in Basque Country and its operational integration in the emergency department of the Basque Government.



#### Table1: Relevant data about Twitter usage in different NMS

In the case of Basque Meteorology Agency (Euskalmet), the most powerful reason to use Twitter is the fast and efficient communication in high impact weather scenarios, and especially in those associated with rapid development processes that occur in less than an hour (Storms, Coastal Trapped Disturbances, Flash floods...).

1.400.000

800.000

8.000

The first tweet was sent by Euskalmet on 24th of June 2011 dealing with a yellow warning due to a heat wave. Since that time, more than 22200 tweets have been sent (see figure 9). Nowadays, the number of followers is over 30800 (Basque Population 2.2 millions) (see figure 10). In yearly distribution, we can appreciate the increase of tweets during months with more severe weather events. In weekly distribution, it is homogenous. And in hourly distribution, effects of fixed hours routinely emission are reflected (see figure 11, 12 and 13).

The number of tweets per day is around 20, in this case retweets (15%) are used only for relevant and reliable information, especially if it is accompanied with photos or videos. One third of messages contain "attached" extra information, using links (graphs, maps, radar images, pdf documents, photos, web path, etc). The 24% of tweets are accompanied with photos or videos. The 63% of tweets deal with forecast aspects, the 31% with observations and the 5% with other subjects. We have done the 43% of communications related with high impact weather and the 52% related with routine weather. Direct messages suppose less than 2%, this private messages to followers are restricted to technical clarifications and to thank followers for providing useful information (see figures 14, 15, 16 and 17).



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