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Big data for climate change actions and the paradox of citizen informedness

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Together

Big Data for Climate Action

The paradox of citizen informedness

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Advanced sensor technology, social media, and other information technologies have provided us with “big data” on climate change. Due to the World Meteorological Organization’s Global Climate Observing System, climate observations and records, as well as discussions on climate-related concerns such as measurement of air temperature, are widely available now (Figure 1).

The United Nations’ Global Pulse visualises public engagement on climate change globally, with data such as the volume of climate-related tweets (Figure 2). Big data, data analytics, and the sharing of scientific results in the popular press have created, as a result, an unprecedented level of citizen informedness—the degree to which citizens have the necessary information to make appropriate decisions to aid in the fight against climate change.

Information on climate change has become increasingly accessible for citizens over the past 10 years, through governmental information programs and reports, news and magazine articles, TV documentaries, and websites and blogs.

Yet citizen-level participation in climate change-related actions, rather paradoxically, has not gotten to the point where attention

has been galvanised, and there are few well-defined efforts that can be identified. This paradox is occurring in many places around the globe in spite of the availability of related “big data”, especially in Europe and North America, and in countries that have the most sensitivity to climate change, for example, through the rising sea levels in coastal and island nations.

Hypothetically, Singapore is no exception to this paradox. Despite having been exposed to the undesirable effects of climate change, the mass of citizens ready to take action in concert with government organizations such as the Ministry for the Environment and Water Resources (MEWR), the National Environment Agency (NEA), along with other non-governmental organizations (NGOs) in Singapore has yet to reach a groundswell. Meanwhile, MEWR, NEA and the NGOs have been working concurrently to inform and ensure broad understanding of the need to act on climate change.

Symptoms of the paradox

Despite the unequivocal evidence that has been shared through leading scientific

periodicals in recent years (including Science, Nature, Climatic Change, and Environmental Research Letters, among others), climate change is still viewed in many parts of the world as a subject of controversy, and debate as to whether it is true, false, or the scientific evidence has often been misinterpreted.

For instance, according to a survey conducted by researchers in the US from 2010 to 2015, more than half of the public has accepted that climate change is already happening. However, many remain unconvinced and constitute a “politically opposite minority” who believe that climate change is due to “natural causes.” The persistence of such public opinion has been heavily influenced by political rhetoric and the predispositions of leading politicians and candidates running for office.

In addition to these conflicting information, another recent phenomenon, commonly known as “fake news,” has been plaguing social media and influencing public opinion.

For example, a scientific article published

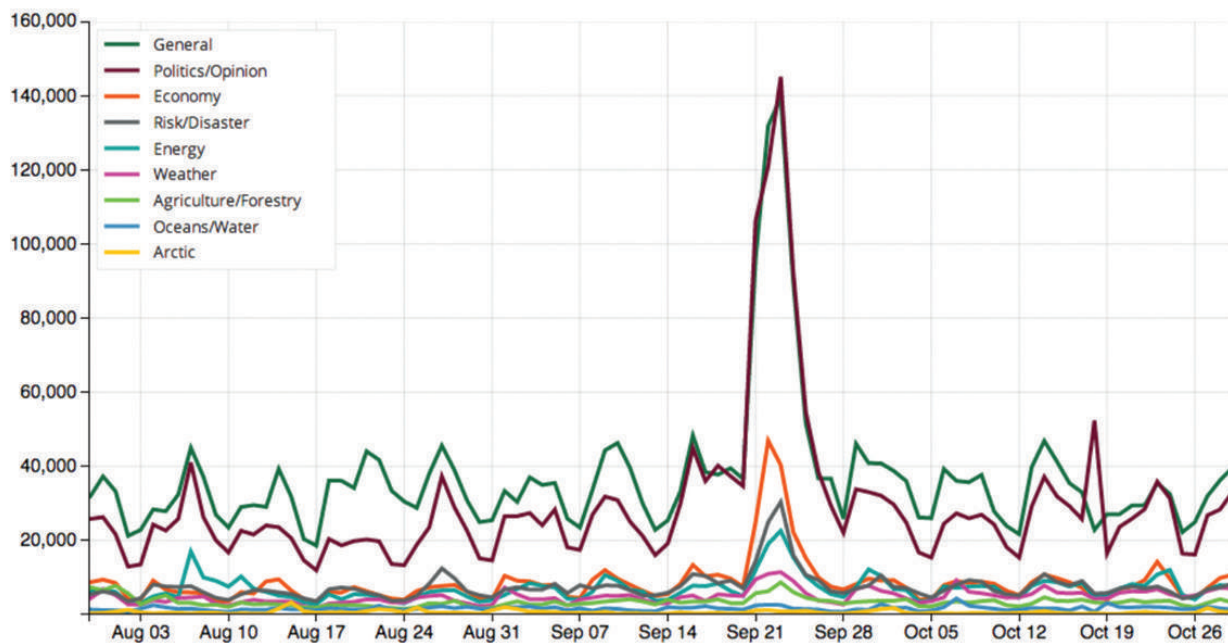
in the Nature Geoscience journal in September 2017 discussed the temperature goals associated with Paris Climate Agreement, developed in association with the United Nations’ Framework Convention on Climate Change. Unfortunately, the article was misrepresented in other media as a report on the technical fault and overestimation of the impact of carbon dioxide on the climate on the part of the scientists, and evidently misinformed many readers. Furthermore, as the story continued to circulate globally through social media, readers often fell short of verifying the information of the original article.

This demonstrates the potential for misinformation, or “fake news”, to constitute the confusion of the information society. However, there have been few scientific or scholarly findings regarding the regulations required to address this issue.

Possible solutions

Researchers in the US have found that strengthening the foundation for climate literacy through education is the first crucial step to helping audiences overcome the

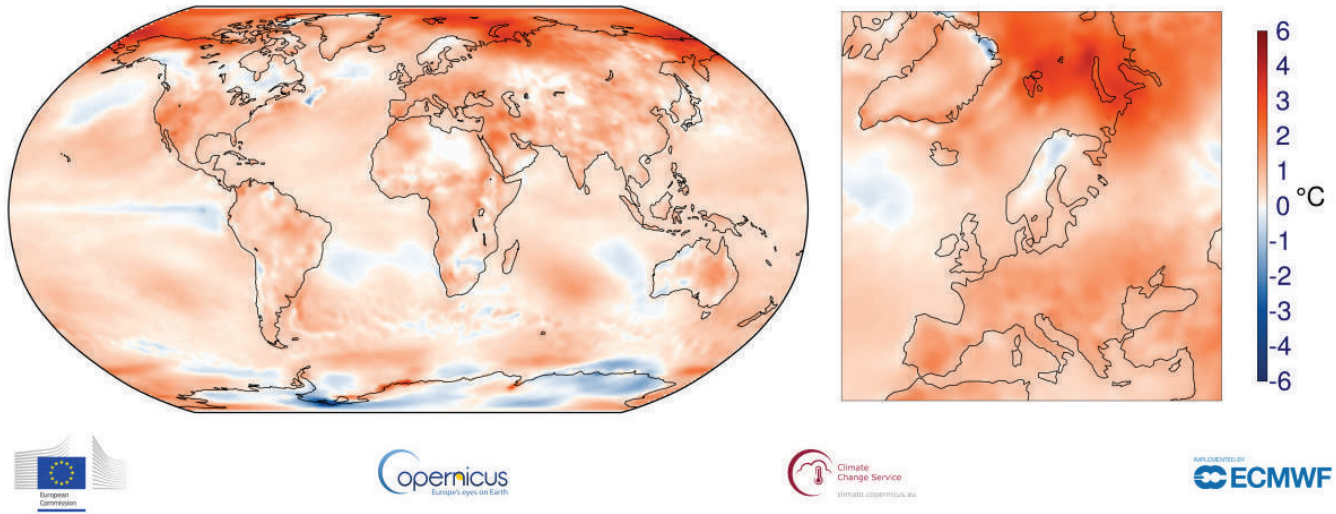
Figure 1 - Daily volume of tweets about climate change by sub-topic



Source: U.N. Global Pulse. Results from the daily volume of tweets about climate change by sub-topic, in English, from April to November 2014—the spike observed in September occurred during the People’s Climate March and the Climate Summit with the highest volume of tweets recorded on the sub-topic “Politics/Opinion.”

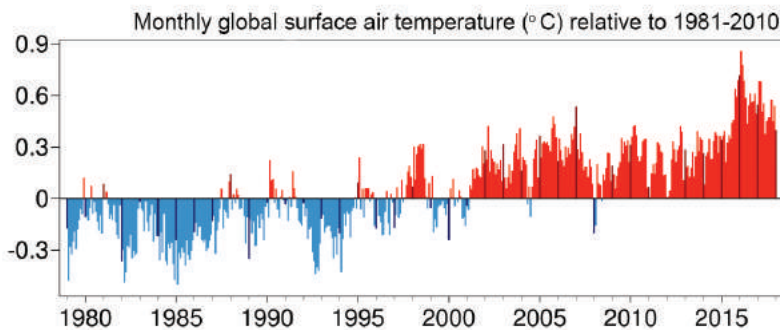
Figure 2 - A GCOS essential climate variable

Surface air temperature anomaly for February 2017 to January 2018 relative to 1981-2010



Source: Copernicus Climate Change Service. Measurements of air temperature demonstrate that the average temperature from February 2017 to January 2018 was well above average in the Arctic, the western USA, much of Europe and the Middle East, and offshore West Antarctica. The global temperature for January 2018 was well above average as well, and the warmest instance occurred in October 2015.

Figure 3 - A GCOS essential climate variable



Useful Resources

WMO Climate Change Observing System:
<http://bit.ly/2p6yJ2f>

UN Global Pulse:
<http://bit.ly/2Gm0Str>

MEWR'S Climate Action SG Pledge:
<http://bit.ly/2Da0X1W>

social residue of false news and information distortion. Additionally, a recent study involving semi-structured interviews in Singapore has shown that there is a considerable extent of misconception regarding climate change among Secondary 3, or Grade 9, students.

Studies have also highlighted the importance of bridging the gap between science and the society's understanding of climate change, through the implementation of systems-thinking approaches across interdisciplinary boundaries, where various social problems need to be addressed. There is ample opportunity today to transform climate, economic, and social data from trusted information sources into meaningful content through data science and visual analytics. While

appealing to the audience's emotional and intuitive functions may be effective in the presentation of this information, studies have found it to be counter-productive as well as daunting and disheartening to the audience, thereby discouraging their ability to act.

Instead, policymakers should measure the uptake from their information programmes and policies in measures such as citizen informedness, providing a strong foundation for formulating effective strategies to create the most impact in terms of improving environmentally sustainable actions.

Ultimately, transforming information on climate change to prompt impactful actions requires a coordinated effort amongst individuals, organisations, and policymakers.

Social media, mobile applications, and recent information technology innovations can aid in providing greater informedness to the citizens of a country in terms of what they are willing to commit to doing or have done thus far, thereby supporting the effort to deal with climate change, promoting urban sustainability, and understanding other environmental issues.

The MEWR's Climate Action SG Pledge is a good starting point for bringing people together to fight climate change in Singapore and the world. When citizens are informed about the actions that have been undertaken in their neighbourhoods and how they can participate, they are more likely to become involved and make a difference in achieving a critical mass of participation. ¹⁵