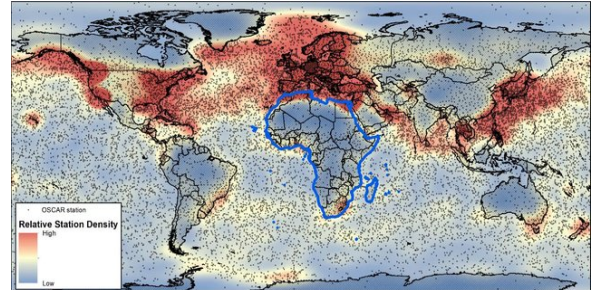


The value of citizen weather observations

Context: Citizen weather observations are valuable for scientific research because they provide a dense and widespread network of data points that can fill gaps in professional networks, especially in remote or less densely populated areas. Additionally, citizen scientists can capture unique and localized weather events, such as microclimates or extreme weather phenomena, which may be missed by automated systems.



Worldwide distribution of stations in the Observing Systems Capability Analysis and Review tool (OSCAR) of the World Meteorological Organization (WMO) (Source: López-Ballesteros et al., 2018).

Proposed topics:

1. How good are citizen stations at capturing extreme rain or wind events?
2. What innovative statistical methods can be used to merge citizen data with professional measurements, taking into account measurement uncertainty?
3. What are the global distribution and characteristics of citizen weather stations, and how have they changed over the last decade?
4. What are the most efficient quality control and quality assurance mechanisms for citizen data, depending on the availability and density of professional measurements?
5. Can citizen weather observations be used to improve local weather forecasts?

State of the art: Citizen weather data are increasingly being integrated into weather forecasting and climate models. The quality of the data is crucial for monitoring extremes and understanding climate trends and a lot of efforts have been devoted to implementing robust quality control measures. Thanks to AI, the integration of citizen data with other, professional networks and remote sensing estimates has also become more sophisticated. Communities and organizations have established their own networks, maintained by citizen scientists. These networks often focus on specific regions or weather-related challenges, such as tracking microclimates or monitoring local weather impacts on agriculture. But the rapid development of citizen science also means that no good overview of the number and distribution of stations at the global scale is available. This creates exciting new research opportunities that can be explored during the framework of a Msc thesis.

For more information about this topic, please contact:

Dr. Marc Schleiss, Assistant Professor
Dept. of Geoscience & Remote Sensing
m.a.schleiss@tudelft.nl