Towards an IoT platform with long-range wireless communication for atmospheric sensing

Henning Rust (1), Christopher Böttcher (1), Stefan Rauch (2), Andreas Trojand (1), Christopher Kadow (1), and Daniel Molnar (1)

(1) Freie Universität Berlin, Institut für Meteorologie, Berlin, Germany (henning.rust@met.fu-berlin.de), (2) Humboldt Universität Berlin, Institut für Informatik, Berlin, Germany

We develop cheap autonomous devices for atmospheric sensing based on recent IoT platforms with long-range wireless communication and low power consumption. This communication is realized using LoRa-WAN and a bottom-up decentralized network for exchanging data between platforms and applications. Goal is a battery powered measurement device which can be placed anywhere in a few kilometers range of a gateway. The number of gateways is rapidly growing, particularly in the urban space. The resulting data passes through the decentralized network ending up on a central server where it can be prepared for visualization and archived. This infrastructure together with the cheap autonomous devices allows for quickly setting up a measurement campaign with high spatial resolution, e.g. as a reaction of the forecast of an extreme event. Furthermore, installing sensors in many more places than standard measurement devices (due to the low costs) is particularly interesting for measuring variables with high spatial variability, such as precipitation or aerosol concentration. We demonstrate the actual state of development with a modified drop-counting rain gauge with a data logger based on an IoT platform with LoRa communication.