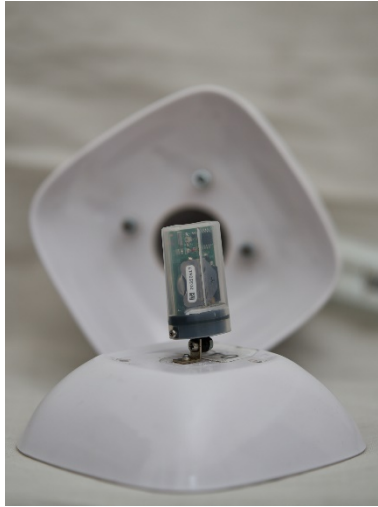
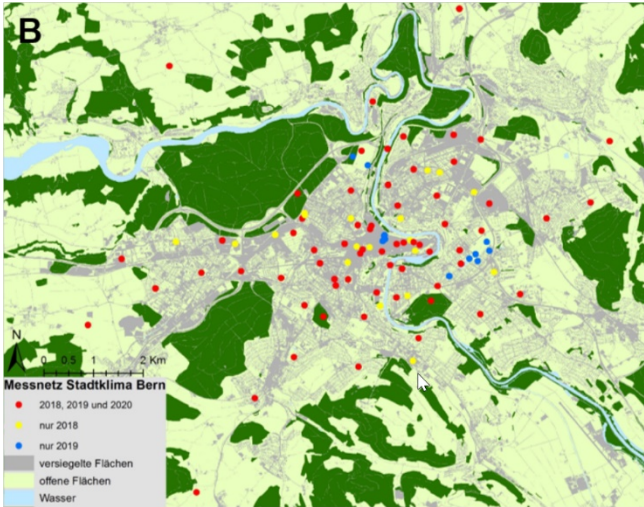


Title	Development and evaluation of a low-cost, LoRa-based measurement device for microclimatic assessments in urban environments
Level	BSc or MSc
Prerequisites	Statistics; R (basics); interest in micro-electronics, programming, and environmental/climatological data
Methods	Micro-electronical development and programming, fieldwork, statistical analyses
Description	<p>Since 2018, the Climatology Group of the Institute of Geography maintains an urban heat monitoring network consisting of 65 – 85 low-cost temperature sensors (Fig. 1) within and around the city of Bern (Fig. 2; see here for more information). With urban heat stress and related consequences becoming an increasingly relevant topic for urban planning, infrastructure, and health services, the monitoring network of the urban heat load of Bern will be continued over the next years. In order to enhance the quality of the data (i.e. radiative biases) and reduce maintenance efforts (i.e. reading out the data manually), this BSc or MSc thesis focusses 1) on the further development of the sensor and radiation shield and 2) on the evaluation of the performance of the developed prototype based on inter-comparisons with automated weather station data. In detail, the task will be to design a solar-driven measurement device consisting of a low-cost temperature and relative humidity sensor and an actively ventilated radiation shield that is capable of automatically transmitting data via LoRa-Wan. Profiting from a close collaboration between the Institutes of Geography (Climatology Group) and Computer Science (Communication and Distributed Systems), the potential candidate is sought to have experience in (statistical) programming (e.g. R, python, or equivalent), an affinity for environmental/climatological data and processes, as well as an interest in micro-electronical challenges.</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>Fig. 1: Low-cost sensor with radiation shield being currently in use (© P. Duschletta 2019).</p> </div> <div style="text-align: center;">  <p>Fig. 2: Urban heat monitoring network with sensors installed during summers 2018 – 2020 (red), only in 2018 (yellow), and only in 2019 (blue; Burger & Gubler 2020).</p> </div> </div>
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