Title	**“Cool office”: Assessing the effect of balcony greening on indoor temperatures**
Level	BSc
Prerequisites	Basic in statistics (R or equivalent); background in geography/meteorology/climatology; interest in urban climatology
Methods	Environmental measurements; statistical analyses and modelling
Description	Greening of balconies and terraces is viewed as an important measure to help mitigate the increasing risk for heat-stress in urban environments. Besides outdoor microclimate, the indoor environment might also been affected by greened balconies through the combined effects of shading and evapotranspiration. Knowledge about the cooling effect of balcony greening is crucial to determine indoor heat-stress, as this affects human well-being and productivity at work. Situated within the field of urban climatology, the goal of this bachelor thesis is to quantify the cooling potential of greened balconies on indoor air temperatures. By measuring and intercomparing atmospheric variables (e.g., air temperature, wet bulb globe temperature) retrieved from a quasi-experimental setting at the GIUB’s 5th floor (two offices with a greened balcony vs. two offices with a bare balcony in front) throughout summer season 2024, this thesis offers a combination of field work and basic statistical analyses. The potential candidate should be interested in microclimatic measurement techniques and motivated for interdisciplinary challenges.  *Balcony greening experiment at GIUB in summer 2023*
Supervisors	Prof. Dr. Stefan Brönnimann (Institute of Geography, Climatology group), stefan.broennimann@unibe.ch Dr. Moritz Gubler (Institute of Geography, Climatology group), moritz.gubler@unibe.ch

Title	**Intercomparison of Low-Cost Air Temperature Measurement Devices**
Level	BSc or MSc
Prerequisites	Basics skills in statistics (R or equivalent); interest in urban climatology and meteorological measurement techniques
Methods	Environmental measurements and sensor intercomparisons; statistical analyses
Description	Since 2018, the Climatology group maintains an urban heat monitoring network consisting of ca. 70 low-cost temperature sensors within and around the city of (more information: https://www.geography.unibe.ch/research/climatology_group/research_projects/urban_climate_bern/index_eng.html). Despite good performance during nocturnal conditions, daytime temperature data are subject to marked measurement bias due to the radiative heating and poor ventilation of the radiation shield used. To overcome these biases and reduce maintenance efforts for reading out the data manually, an improved type of measurement device has lately been developed including active ventilation, automated data transmission, solar energy supply, and relative humidity sensor. Since 2023, the entire monitoring network has been updated and equipped with the new measurement devices. This thesis seeks to evaluate the performance of the new measurement device under outdoor conditions by intercomparing it with automated, professional weather stations. Further analyses will include intercomparisons with data from the “old devices”, as multiple of these were placed next to new devices at ca. 25 locations of network throughout summer 2023. This bachelor or master thesis project includes statistical analyses of the air temperature data to depict the performance of the new devices. The potential candidate should bring a (basic) background in statistics, to have knowledge about meteorological processes at local scales, and to be interested in atmospheric measurement techniques.  *Prototypes of new measurement devices*
Supervisors	Prof. Dr. Stefan Brönnimann (Institute of Geography, Climatology group), stefan.broennimann@unibe.ch Dr. Moritz Gubler (Institute of Geography, Climatology group), moritz.gubler@unibe.ch
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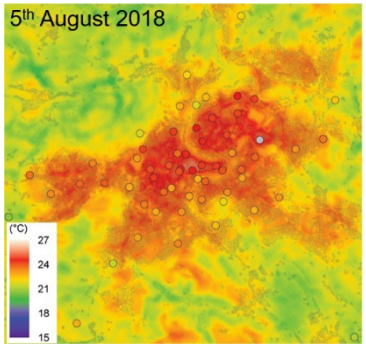
Title	**Assessing the effects of heat mitigation measures**
Level	BSc or MSc
Prerequisites	Basics skills in statistics (R or equivalent); interest in urban climatology and meteorological measurement techniques
Methods	Environmental measurements, statistical analyses, analysis of survey data
Description	To mitigate the adverse effects of urban heat stress, cities are increasingly implementing heat mitigation strategies such as unsealing or the installation of blue-green infrastructure, etc. To determine the effects of such strategies on microclimatic conditions, measurements of air and/or surface temperatures may give valuable insights for future heat mitigation projects. In Bern, multiple heat mitigation projects of differing size are being implemented in summer 2024. This thesis aims at assessing the effects of heat mitigation strategies implemented at Optingenstrasse and/or Postgasse by analyzing data retrieved from microclimatic measurements (e.g., air temperature, thermal images, relative humidity). Additional insights may be gained through surveys or interviews among people living next to the implementation sites. Here, mental maps have shown to be a valuable technique to assess the subjective thermal wellbeing. This bachelor or master thesis project includes thus statistical analyses of microclimatic and/or the analysis of qualitative data to depict the effects of the mitigation strategies in an integrative way. The potential candidate should bring a (basic) background in statistics, to have knowledge about meteorological processes at local scales, and to be interested in atmospheric measurement techniques and/or in the assessment and analysis of qualitative data.  *Visualization of Optingenstrasse after heat mitigation measures to be implemented (Stadt Bern)*
Supervisors	Prof. Dr. Stefan Brönnimann (Institute of Geography, Climatology group), stefan.broennimann@unibe.ch Dr. Moritz Gubler (Institute of Geography, Climatology group), moritz.gubler@unibe.ch
Advisor	Moritz Burger (Institute of Geography, Climatology group), moritz.burger@unibe.ch

Title	**Urban Heat Maps for Biel**
Level	BSc or MSc
Prerequisites	Basics skills in statistics (R or equivalent); basic skills in GIS; interest in urban climatology and meteorological measurement techniques
Methods	Geostatistical analyses, GIS
Description	In-depth knowledge about intra-urban air temperature variability is crucial for the planning and implementation of heat mitigation measures. Although state-of-the-art urban climate models can be used to calculate urban heat maps, high computational efforts require more resource-efficient ways of generating maps oo air temperature variabilities in cities. Here, the combination of measurement data and geostatistical land-use regression (LUR) mapping has shown great potential in predicting urban air temperatures and for generating urban heat maps. In summer 2023, air temperature measurements have been made at ca. 35 sites across the city of Biel/Bienne (and will be continued in summer 2024). To extrapolate the measurement data into areas without measurement sites, this bachelor or master thesis project aims at applying LUR-based mapping in the city of Biel. Based on measurement data (air temperatures) and a set of land cover variables derived from open-access GIS data bases, geostatistical analyses will be conducted to derive the variables needed for calculating the LUR-models. The generated maps shall be validated with measurement data and interpreted focussing on factors influencing the urban heat island of Biel. The potential candidate should bring a (basic) background in statistics and GIS and to have knowledge about meteorological processes at local scales.  *LUR-based heat map of Bern*
Supervisors	Prof. Dr. Stefan Brönnimann (Institute of Geography, Climatology group), stefan.broennimann@unibe.ch Moritz Burger (Institute of Geography, Climatology group), moritz.burger@unibe.ch
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If you have other ideas for a BSc or MSc thesis subject, do not hesitate to contact us!