

# Challenges in Applied Human Biometeorology

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Facing the impacts of climate change and urbanization, adaptation and resilience to climate extremes have become important issues of global concern. A better understanding of the interaction between environmental changes and human health are particularly critical in both improving the built environment in urban areas, and establishing appropriate strategies on behalf of living quality and human welfare.

To discuss recent advances and future directions in applied human biometeorology, the “Symposium on Challenges in Applied Human Biometeorology”, organized by the Chair of Environmental Meteorology, Albert-Ludwigs-University Freiburg, in collaboration with Research Centre Human Biometeorology, German Meteorological Service, Freiburg, and the Society for the Promotion of Human Biometeorological Research in Germany was held at Albert-Ludwigs-University Freiburg on 2–3 March 2020. More than 90 experts, researchers, and science officers from over 35 nations participated in this symposium and gave keynote speeches, presenting the latest research results, and sharing their experiences in communicating science. The symposium demonstrated that to succeed in delivering services to society, we need an interdisciplinary scientific diagnosis, and the establishment of universal criteria to assist and guide more concrete implementations and professional communication, in order to boost the participation of young and junior research fellows. The symposium was supported with travel grants available for participants from less developed countries. The Tromp Foundation and International Association for Urban Climate supported several awards. The symposium was supported in addition by MDPI and the Society for the Promotion of Human–Biometeorological Research in Germany.

The symposium gathered not only international experts and researchers in different fields, but was well attended by young/junior generations interested in becoming more involved. As Andreas Matzarakis (it was his 60th birthday on that day) mentioned in his closing remarked, “Bringing in and helping more young people to join the field of human biometeorology is the most important challenge”. This addressed the inheritance of research ambitions, and also indicated the fact that research fellows are working diligently in different positions/organizations, and still keep within the circle of close academic connection.

This Special Issues addresses several aspects in human biometeorology, from basic research and questions, to complex and specific applications in human biometeorology.

The general aspects, which include the development of analysis methods, with different tools such as the R programming language, are presented [1], as are the emotional associations that people have to common weather words and to selected terms that appear in weather communications [2].



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Since the middle of the 20th century, it has been very common to analyze the effects of weather and climate on humans based on simple and complex indices in the context of heat and cold. Therefore, many indices exist, and can be applied for the general analysis of historical data, [3], recent climate [4,5], and climate change scenarios [6], but also for specific phenomena and cases [7], or specific events such as heat [8] or sport events [9]. New methods of quantification for the input data and the development of new methods (resp. new indices) show the necessity and importance of these kinds of research and studies [10,11].

The complex interactions between temperature and respiratory and ischemic heart mortalities, and their relationship to the thermal environment, are shown for Germany [12]. The heat exposure at screen-level, for an impact-based forecasting and warning service for heat-wave disasters, is also of interest [13]. Long-term temperature-related mortality in Helsinki in the urban and rural context was studied [14].

The connection of Lisbon's urban climate and the local weather types by thermal period are worthy of investigation [15], as are spatial patterns of heat exposure in Tel Aviv [16]. A more complex approach for the combination of thermal environment and air quality conditions during running events is shown for southern Taiwan [17].

The development of information for UV radiation, specifically for a UV-Index in Europe based on satellite data in the context of climate application in health and behavior, is shown [18].

Finally, artificial intelligence methods are applied in "Importance Evaluation Based on Random Forest Algorithms: Insights into the Relationship between Negative Air Ions Variability and Environmental Factors in Urban Green Spaces" [19].

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