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Keywords

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2. Literature review

3. Materials and methods

4. Results

5. Discussion and conclusion

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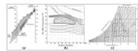
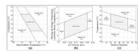


Table 1

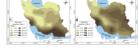
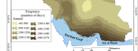
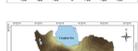


Table 2



Building and Environment

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Defining thermal comfort boundaries for heating and cooling demand estimation in Iran's urban settlements

GhR. Roshan^a, M. Farrokhzad^b, S. Attia^c[Show more](#)<https://doi.org/10.1016/j.buildenv.2017.05.023>[Get rights and content](#)

Highlights

- Spatial distribution of cooling and heating days are identified in Iran.
- New temperatures and humidity threshold for cooling/heating degrees were determined.
- 14 representative weather stations for the period of 1995–2014 were used.
- Using Givoni chart we defined and visualized bioclimatic conditions in buildings.
- 18% of the 148 station days fall in the bioclimatic thermal comfort conditions.

Abstract

Iran has diverse climate variability, comfort boundaries for each geographic region must be defined in order to present current architectural design recommendations and proper mechanical systems design to meet building's heating and cooling energy demand. Therefore, two components of the temperature and relative humidity of 148 stations with the longest common statistical period of twenty years (1994–2014), which have been in daily scale were selected to calibrate and redefine the thermal boundary conditions in Iran. Givoni chart was used to define and visualize the bioclimatic conditions in buildings. The results of this study indicate that only 18% of the 148 stations days, falls in the thermal comfort bioclimatic conditions. After calibration of the base comfort temperature, we found that the upper threshold of this component varies from at least 22.62 °C for Ardebil to 25.94 °C for Dorudzan station and the low threshold of this component belongs to Ardebil with at least 20.13 °C up to its maximum value with 22 °C which belongs to Dorudzan. Spatial distribution of cooling and heating days show that their maximum threshold has been for cores in Northeastern half of Iran, Iran's Western half and some Central parts of Iran and the minimum threshold of these two components belongs to the beaches of north and south of the country. The findings present updated thermal comfort boundaries that can be used by architects, engineers and policy makers to achieve, in turn, more energy efficient homes and high quality indoor and outdoor living environments.

Keywords

Climate diversity; Bioclimatic chart; Heating and cooling degree days; Weather stations; Climate responsive design; Iran

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