

Erasmus+ lecture at the Department of Geography,
Masaryk University (Brno, Czech Republic)
March, 27-31, 2017

HUMAN THERMAL COMFORT RESEARCH IN NOVI SAD (SERBIA)

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Brno, Czech Republic, 2017














D-1 ↑

Danube - Tisza - Danube

A-1

Legend

LCZ

-  2 - Compact midrise
-  3 - Compact low-rise
-  5 - Open midrise
-  6 - Open low-rise
-  8 - Large low-rise
-  9 - Sparsely built
-  10 - Heavy industry
-  Excluded area
-  Stations locations

6-2

9-2

6-6

6-5

8-1

10-1

6-1

2-1

2-3

5-1

5-2

5-5

PMF-1

6-3

3-1

2-2

5-6

9-1

6-4

3-2

5-4

9-3

6-9

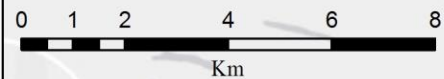
6-7

6-8

Нови Сад Novi Sad

Danube

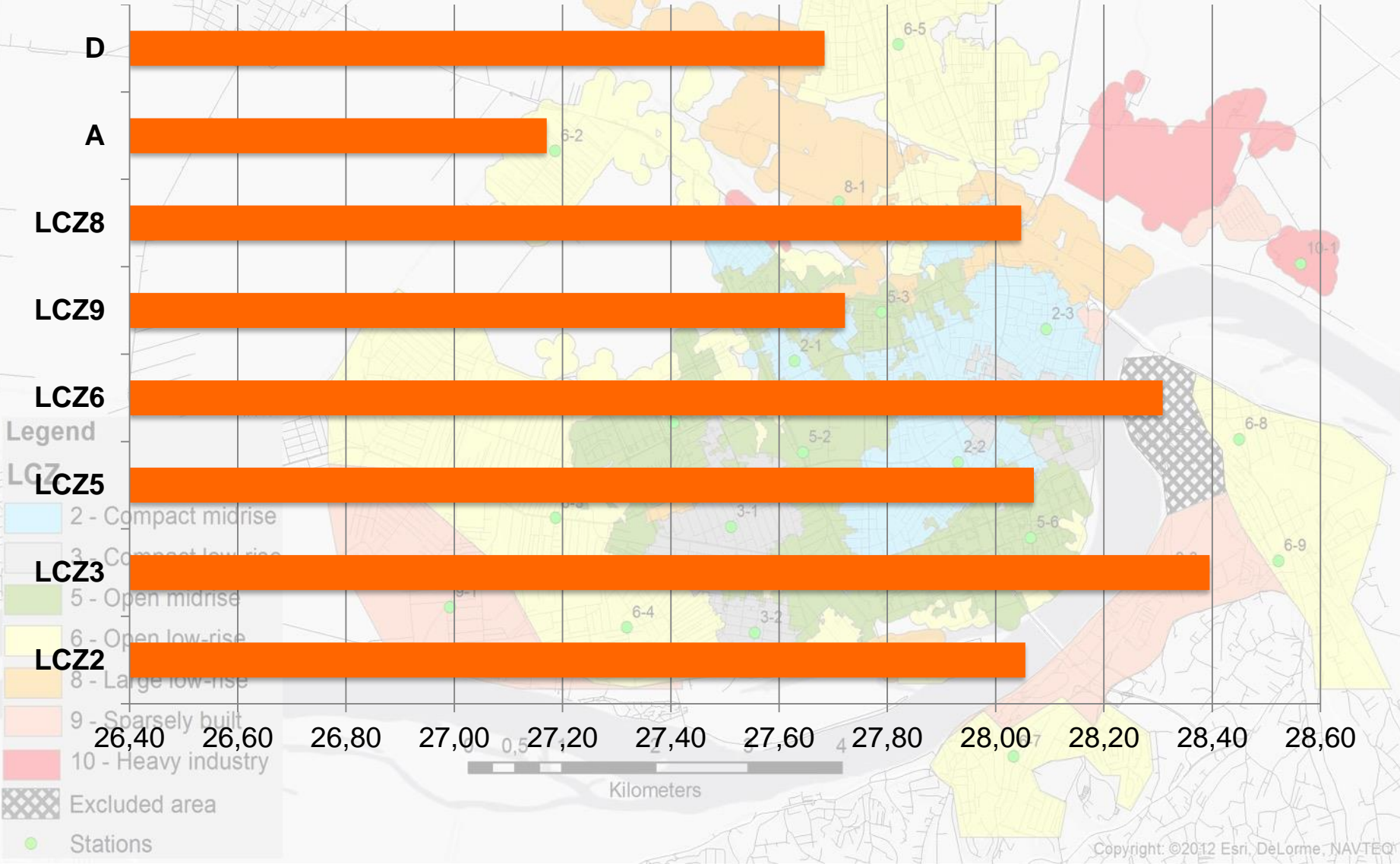
Петровадин Petrova





T

threshold: 90th perc. → $\geq 24.9^\circ$ C (01.07.2014-30.06.2015) ^{A-1}





T

threshold: 10th perc. → ≤ 2.3° C (01.07.2014-30.06.2015)

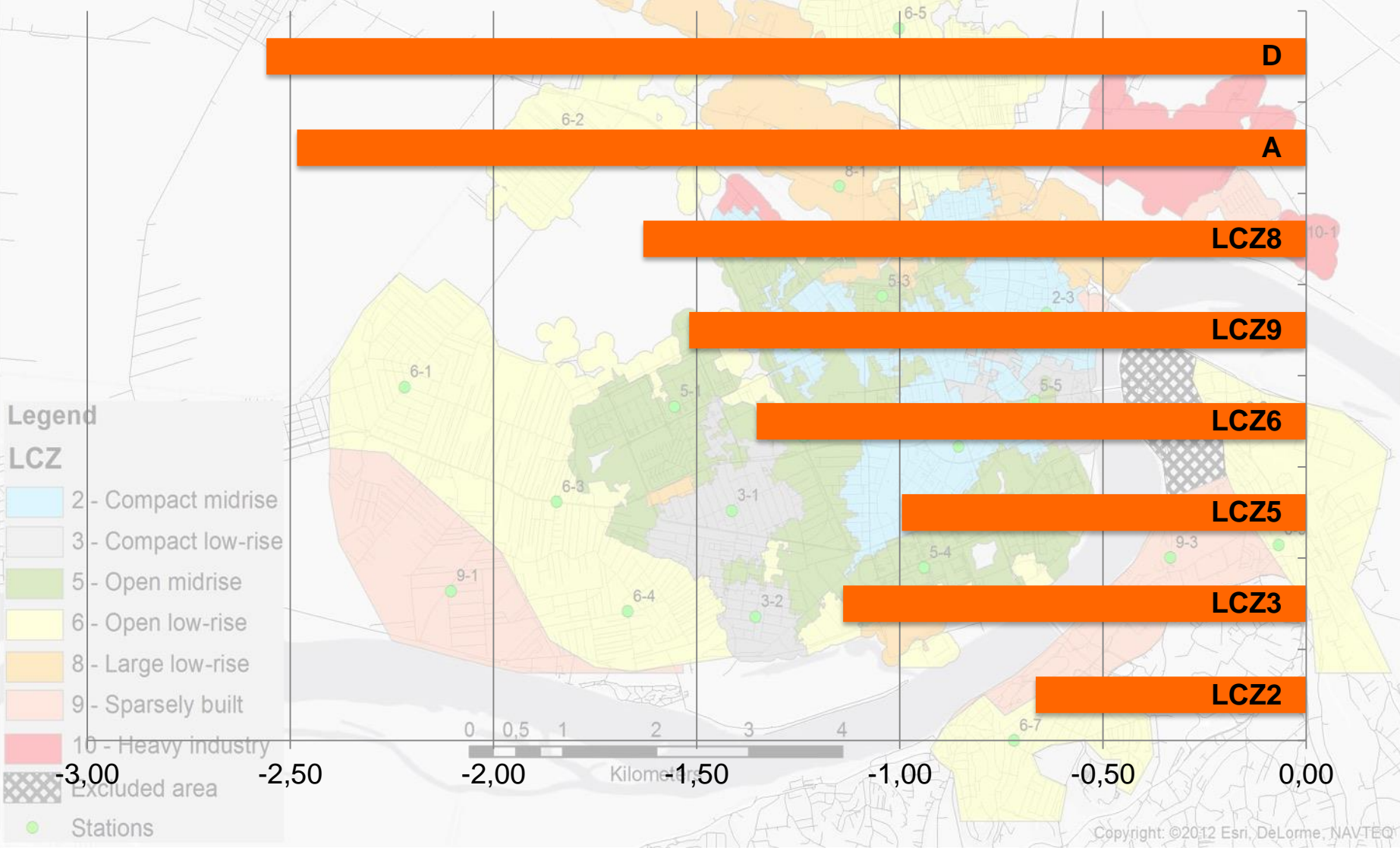
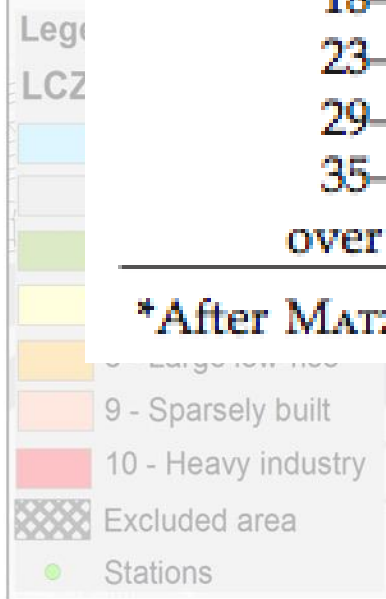




Table 1. PET index threshold values for thermal sensation and the physiological stress level of human beings*

PET, °C	Thermal sensation	Physiological stress level
under 4	Very cold	Extreme cold stress
4– 8	Cold	Strong cold stress
8–13	Cool	Moderate cool stress
13–18	Slightly cool	Slight cold stress
18–23	Comfortable	No thermal stress
23–29	Slightly warm	Slight heat stress
29–35	Warm	Moderate heat stress
35–41	Hot	Strong heat stress
over 41	Very hot	Extreme heat stress

*After MATZARAKIS, A. and MAYER, H. 1996.



HUMAN THERMAL COMFORT RESEARCH IN NOVI SAD

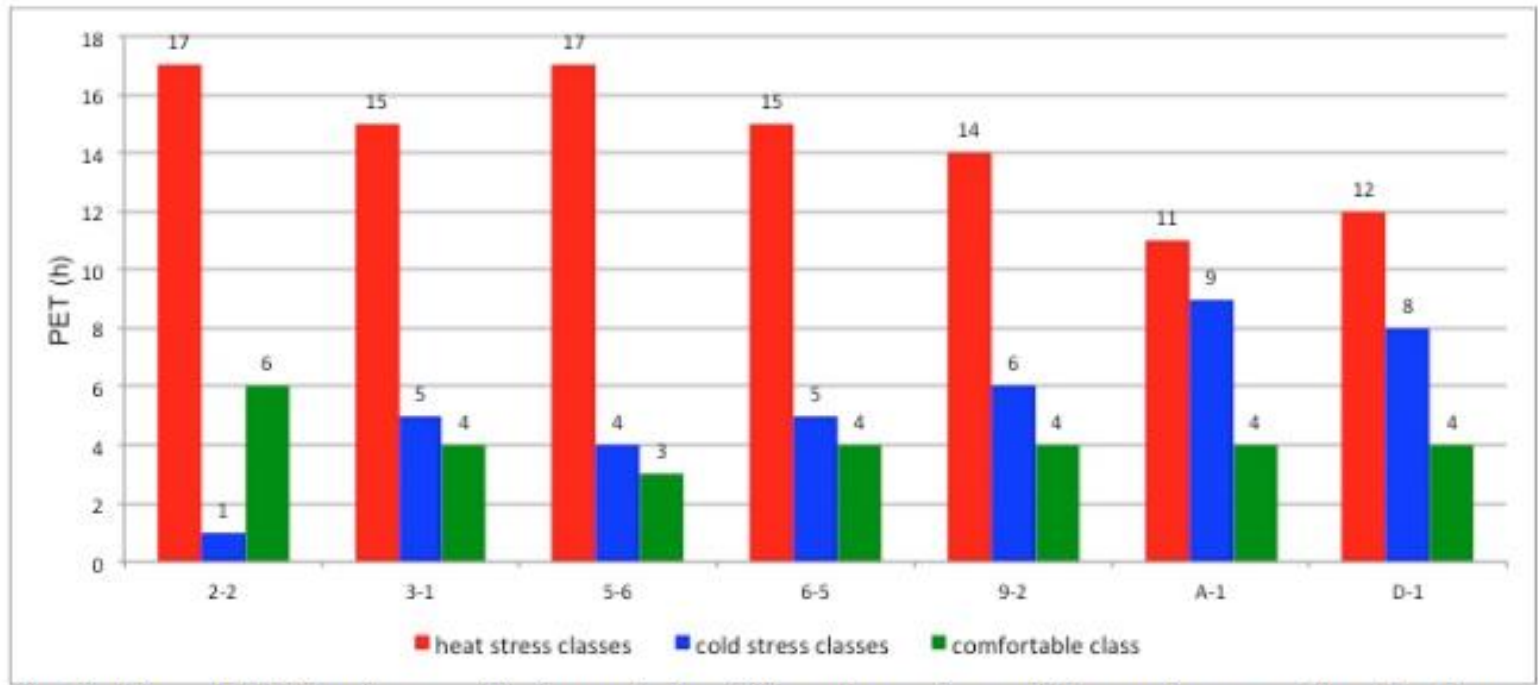
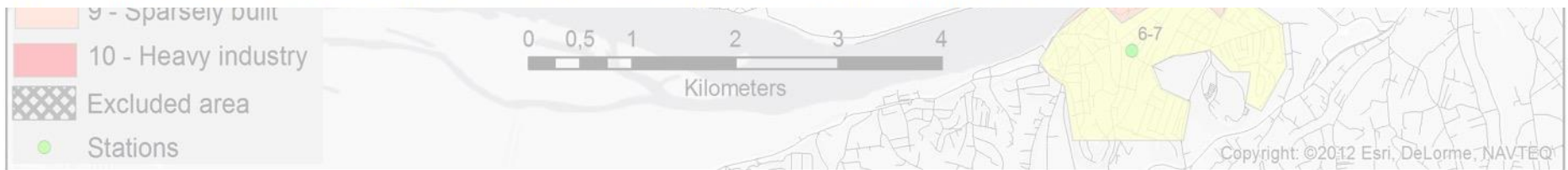


Fig. 3. Distribution of PET classes (in hours) for different grades of thermal perception by human beings (According to Matzarakis & Mayer 1996) in LCZs of Novi Sad on August 13th, 2014.



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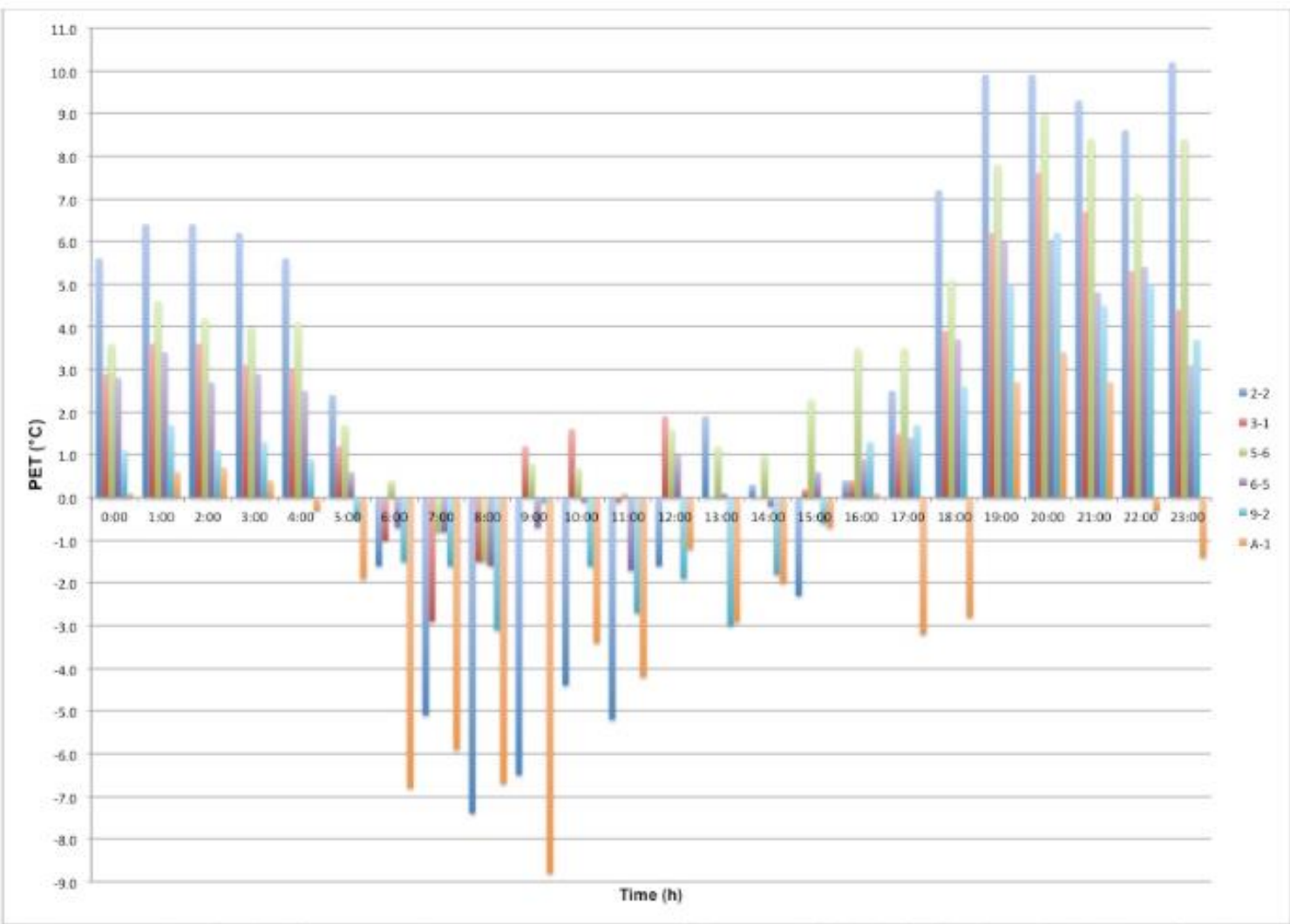


Fig. 4. Mean hourly PET differences between selected LCZs and LCZ D (ΔPET_{LCZx-D}) in Novi Sad during the tropical day (August 13th, 2014).

Legend

LCZ

- 2-2
- 3-1
- 5-6
- 6-5
- 9-2
- A-1

Stations

HUMAN THERMAL COMFORT RESEARCH IN NOVI SAD

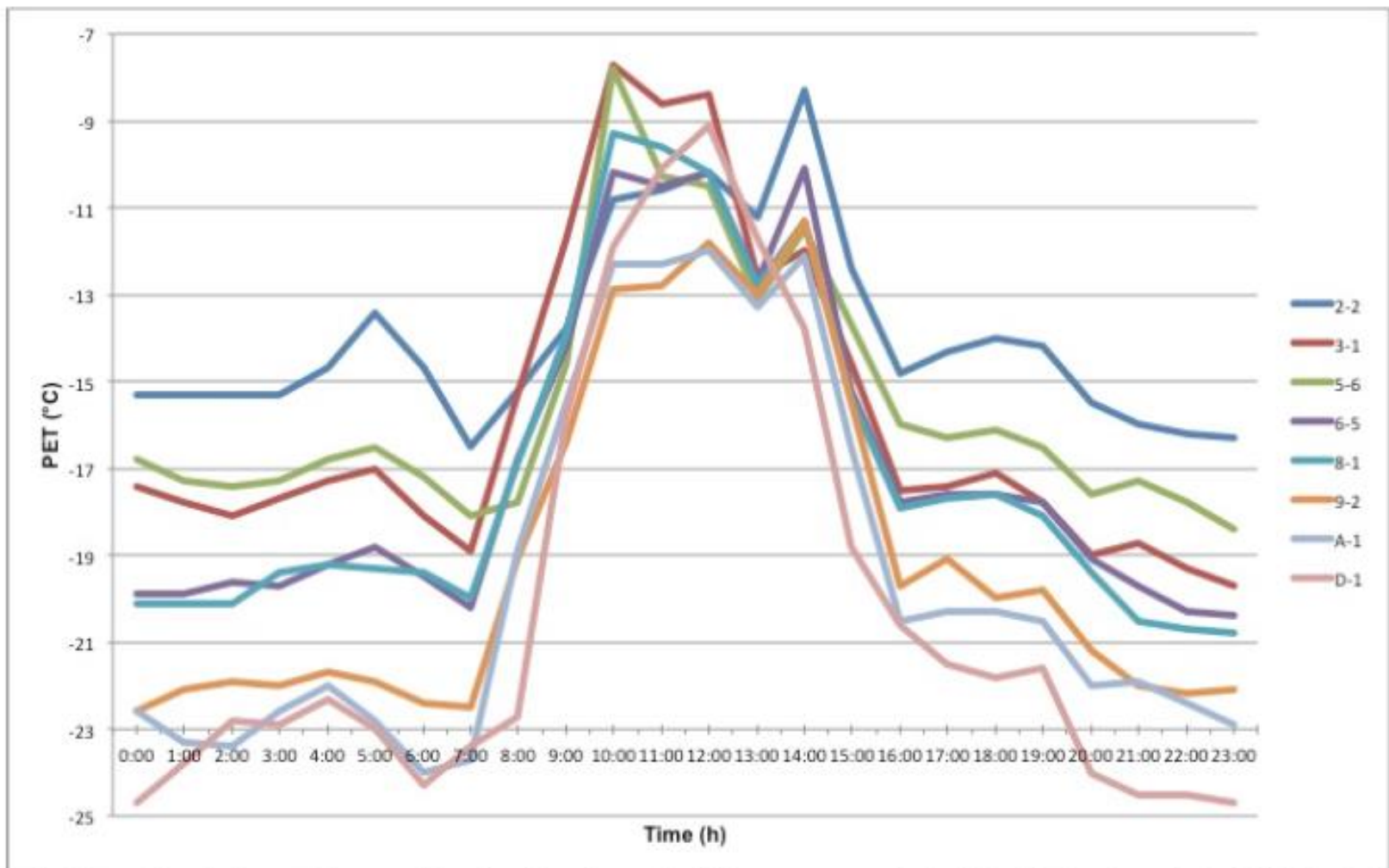


Fig. 5. Diurnal variation of human bioclimatic characteristics expressed via PET index in selected LCZs in Novi Sad on icy day (December 31st, 2014).

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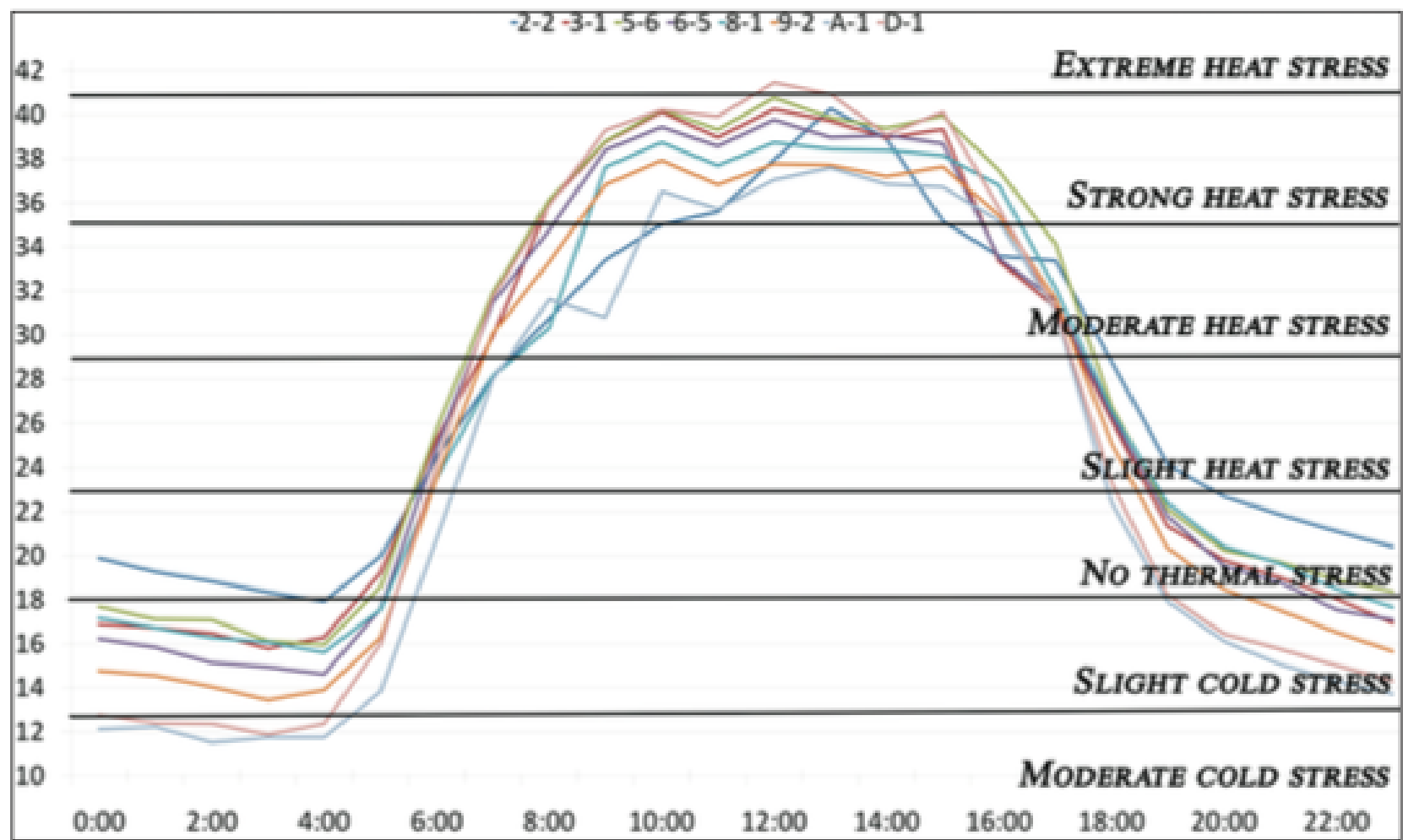


Fig. 3. Average hourly PET at measurements sites of the urban climate monitoring network in Novi Sad during HW (from 5th to 8th July 2014)

Stations

HUMAN THERMAL COMFORT RESEARCH IN NOVI SAD

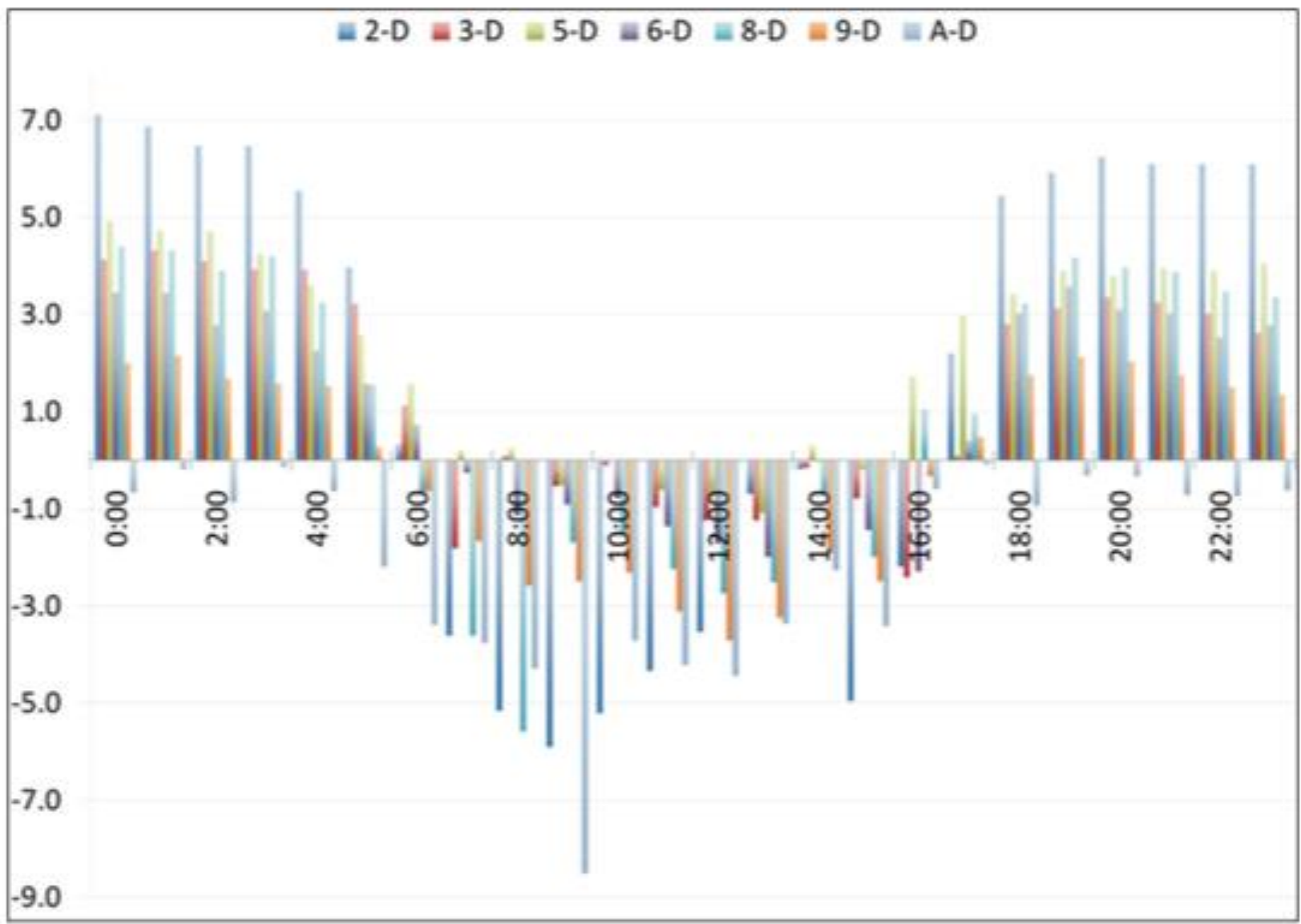


Fig. 4. Hourly PET magnitude ($\Delta PET_{LCZ \times D}$) in Novi Sad during HW (from 5th to 8th July 2014)

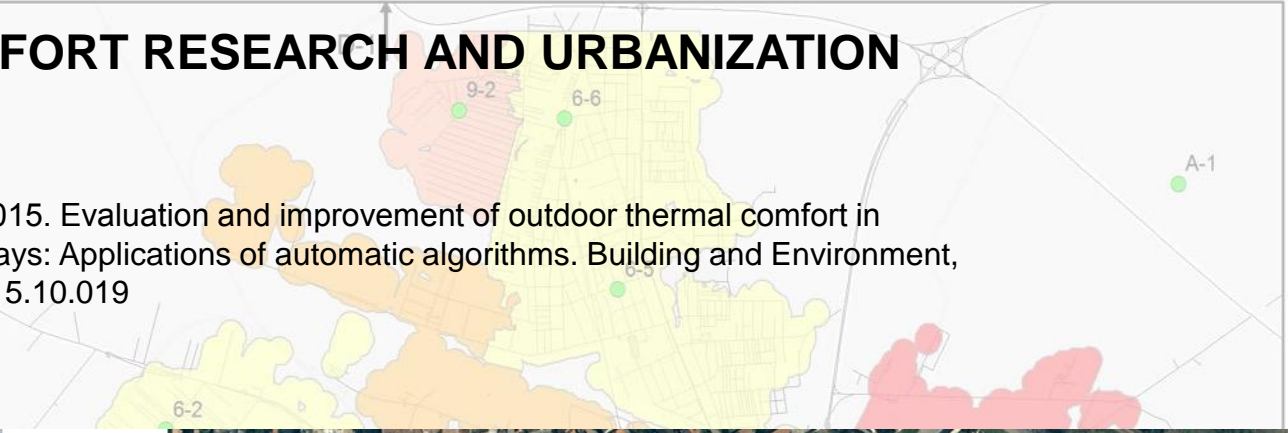
Legend

LCZ

-
-
-
-
-
-
-
-

HUMAN THERMAL COMFORT RESEARCH AND URBANIZATION IN NOVI SAD

Bajšanski, I., Milošević, D., Savić, S. 2015. Evaluation and improvement of outdoor thermal comfort in urban areas on extreme temperature days: Applications of automatic algorithms. Building and Environment, 94: 632-643. doi:10.1016/j.buildenv.2015.10.019

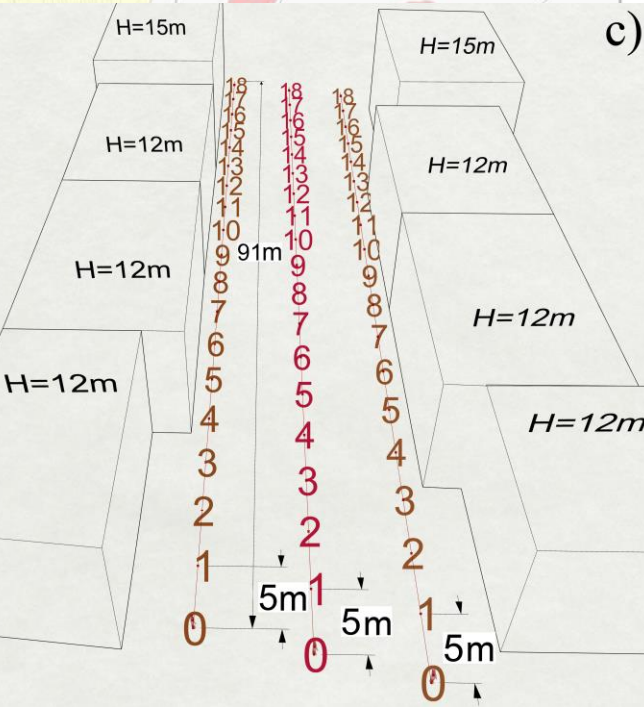
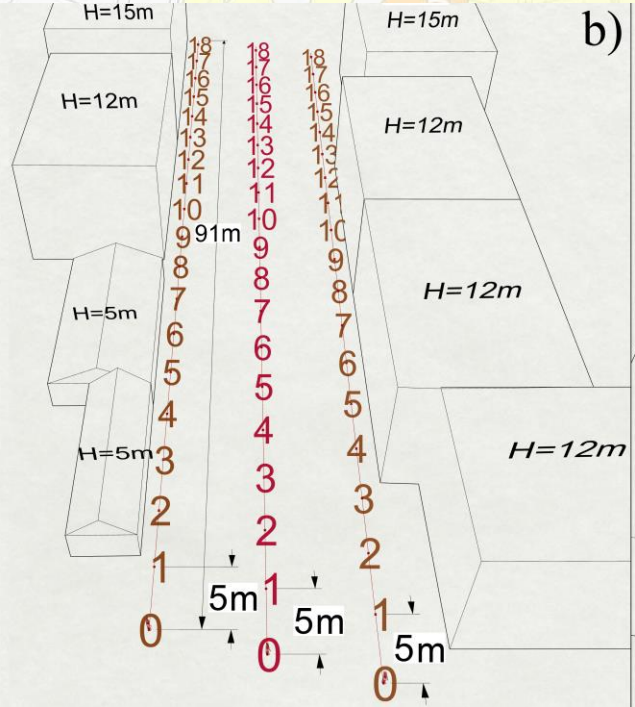
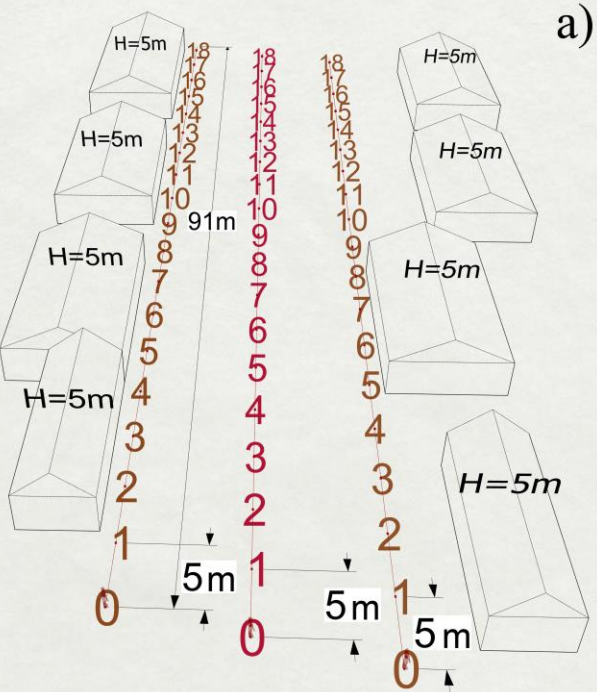
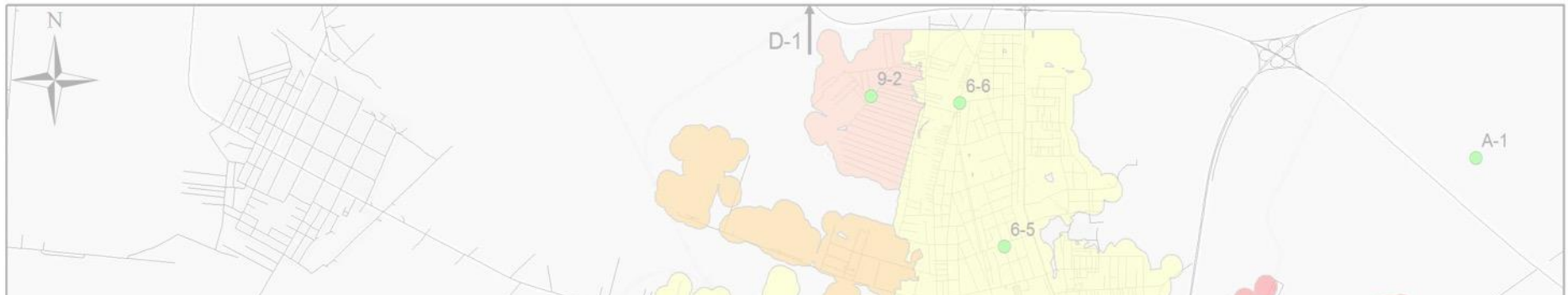


a)



b)





- 6 - Open low-rise
- 8 - Large low-rise
- 9 - Sparsely built
- 10 - Heavy industry
- Excluded area
- Stations

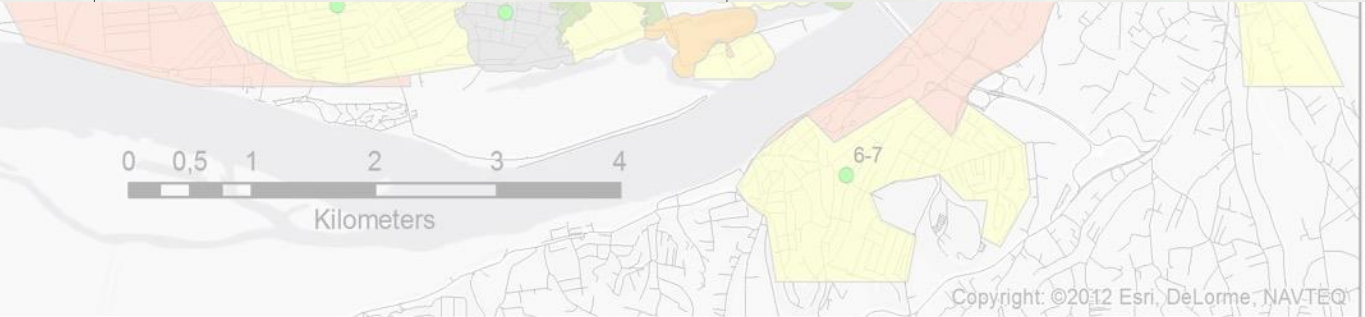


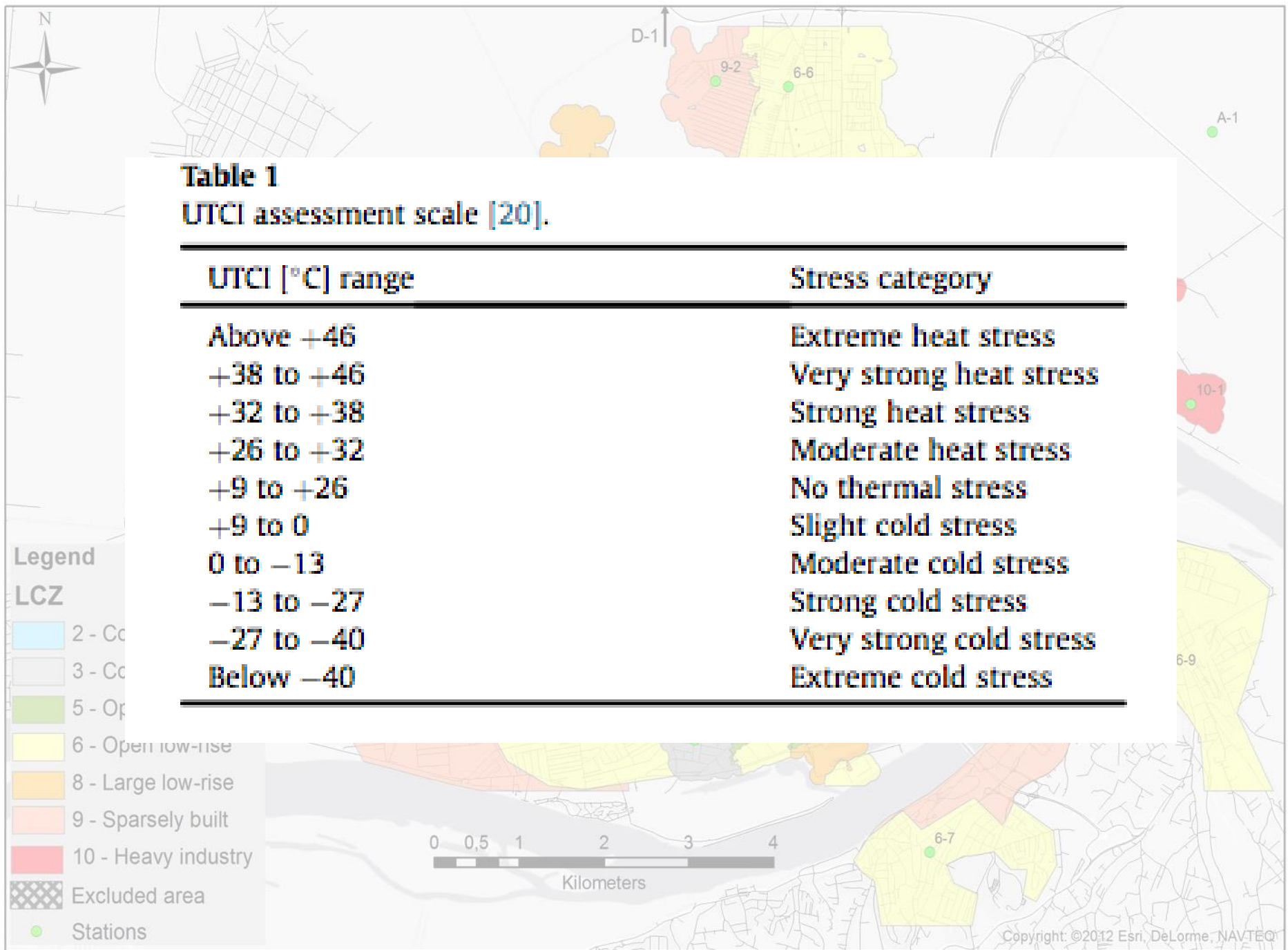
Table 1
UTCI assessment scale [20].

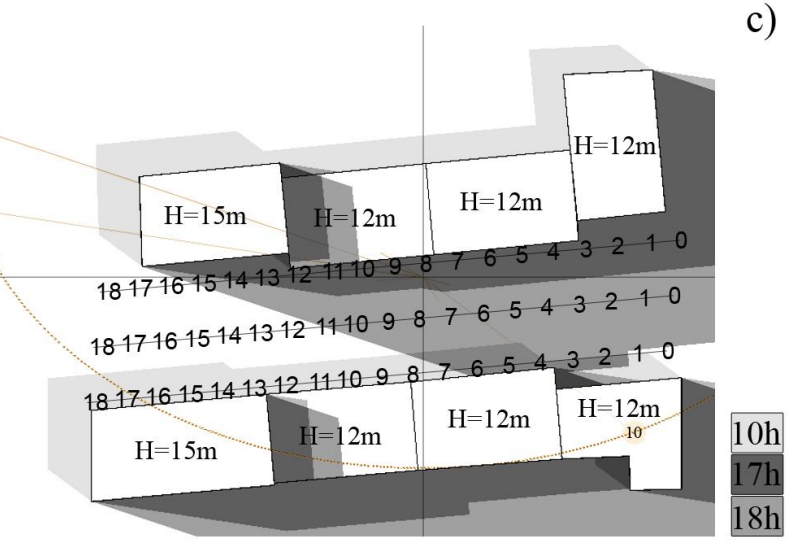
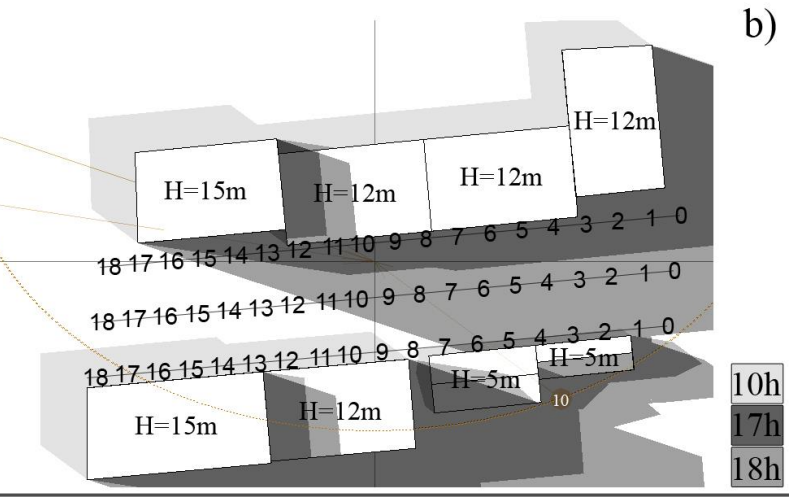
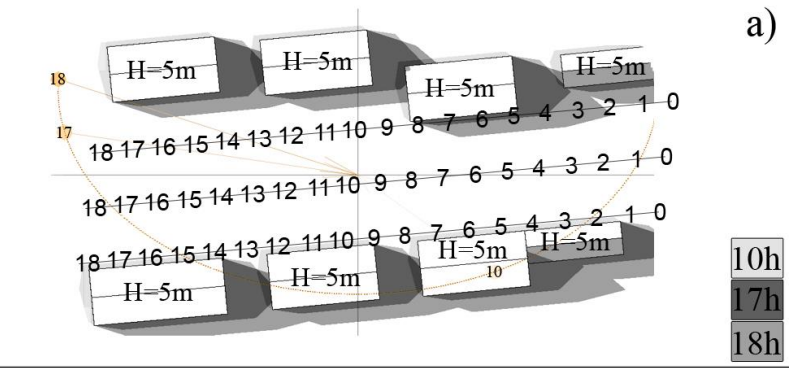
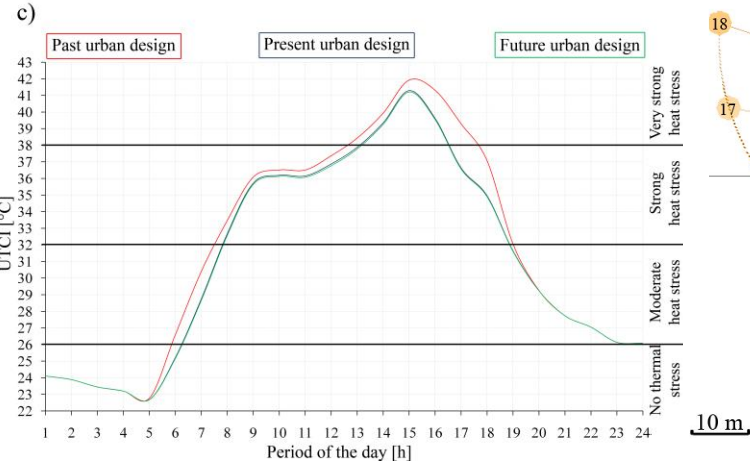
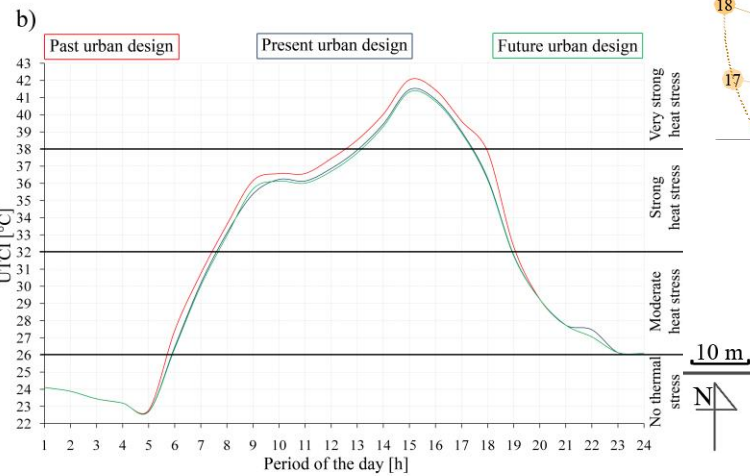
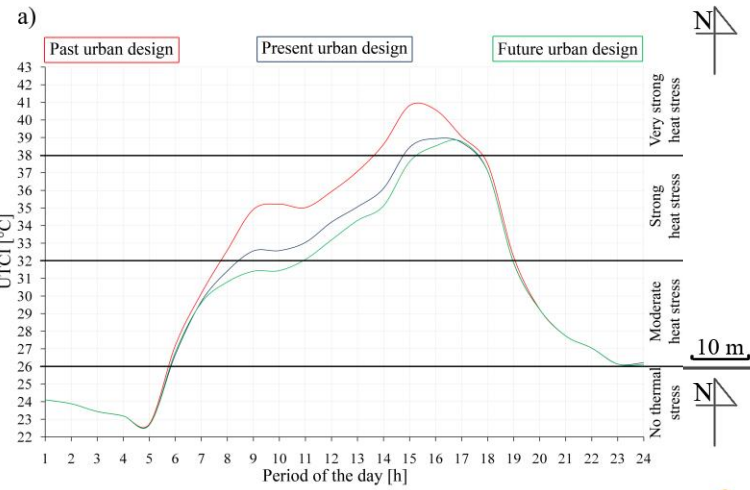
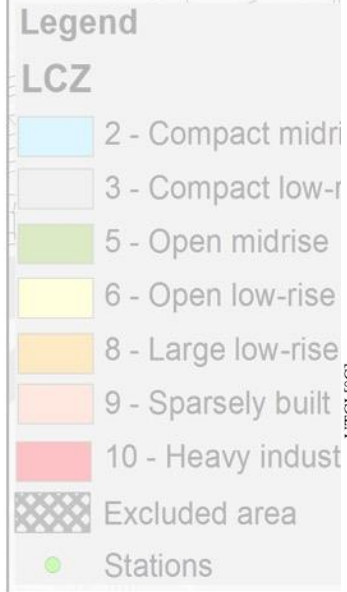
UTCI [°C] range	Stress category
Above +46	Extreme heat stress
+38 to +46	Very strong heat stress
+32 to +38	Strong heat stress
+26 to +32	Moderate heat stress
+9 to +26	No thermal stress
+9 to 0	Slight cold stress
0 to -13	Moderate cold stress
-13 to -27	Strong cold stress
-27 to -40	Very strong cold stress
Below -40	Extreme cold stress

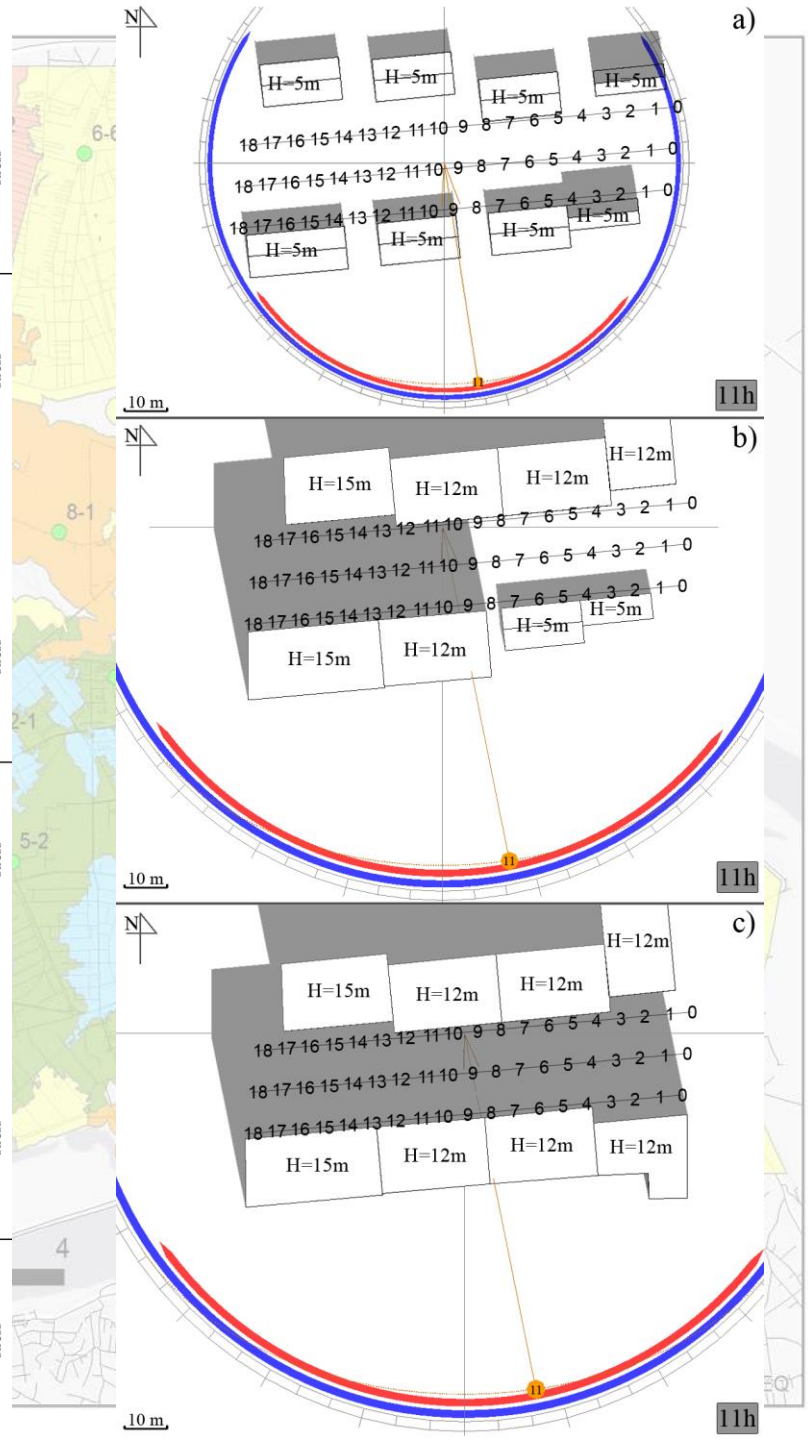
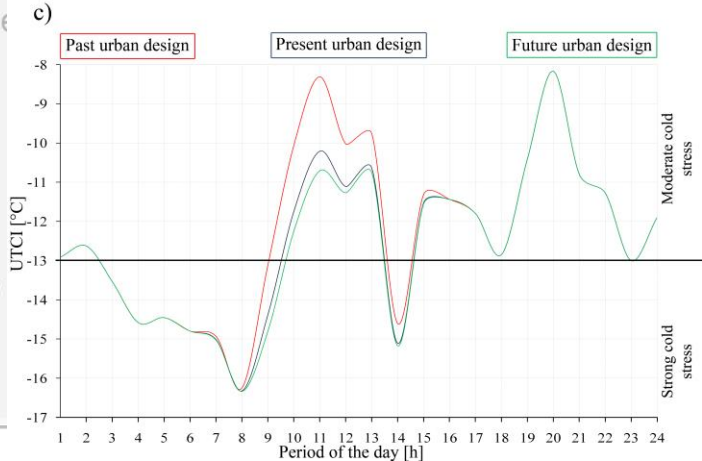
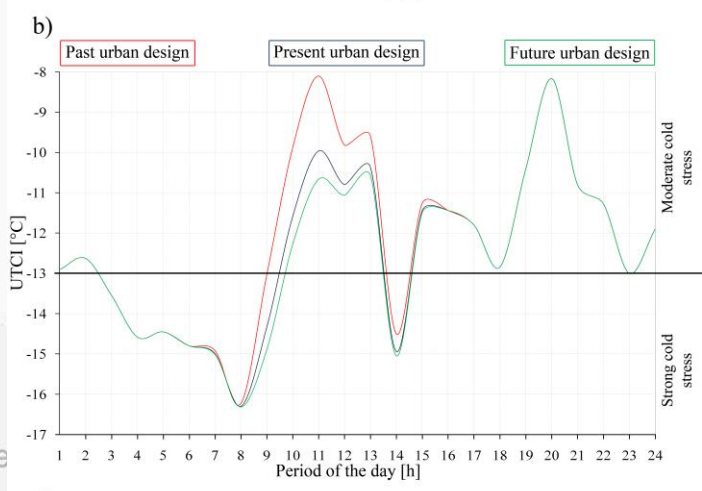
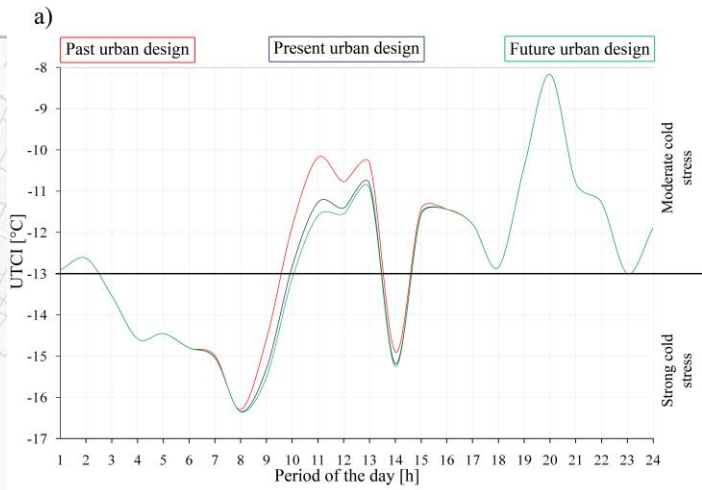
Legend

LCZ

- 2 - Coastal
- 3 - Compact high-rise
- 5 - Open high-rise
- 6 - Open low-rise
- 8 - Large low-rise
- 9 - Sparsely built
- 10 - Heavy industry
- Excluded area
- Stations







CLIMATOLOGY AND HYDROLOGY RESEARCH CENTRE



NEWS & EVENTS



NOVEMBER 12 2016



Legend
LCZ

- 2 - Compact
- 3 - Compact
- 5 - Open
- 6 - Open
- 8 - Large
- 9 - Sparse
- 10 - Heavy
- Excluded
- Stations

A-1
10-1
6-8
6-9

Esri, DeLorme, NAVTEQ



CLIMATE RESEARCH

TO DISCOVER AND EXPLAIN THE IMPACTS OF CLIMATE ON SOCIETY

RESEARCH TOPICS

- The climatology and meteorology of urban areas -
- Outdoor human comfort -
- Climate and urban planning -
- Climatic changes in Europe -
- Climate impacts on agriculture -
- etc. -

PROJECTS

- Evaluations and public display of urban patterns of human thermal conditions (URBAN-PATH Project) -

PUBLICATIONS

A list of relevant scientific papers can be downloaded:

[Download](#)

Legend

LCZ

- 2 - Compact
- 3 - Compact
- 5 - Open n
- 6 - Open l
- 8 - Large l
- 9 - Sparse
- 10 - Heavy
- Excluded a
- Stations

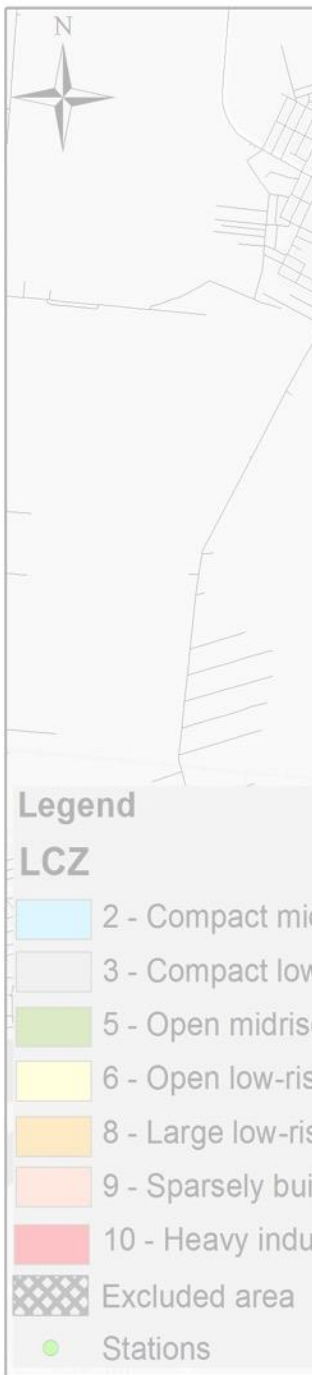
A-1

10-1

6-8

6-9

Esri, DeLorme, NAVTEQ



NSUNET-Weather

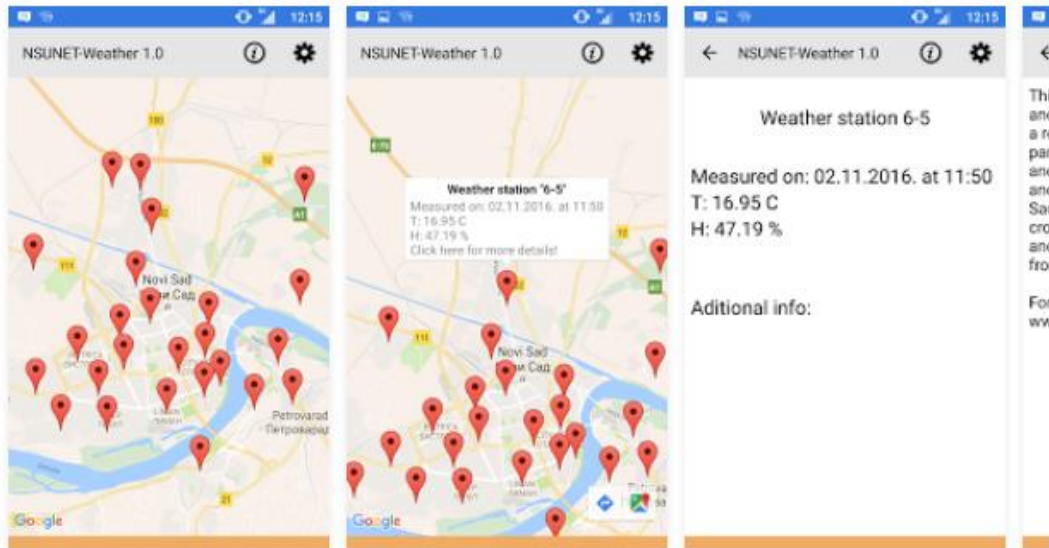
PMF informatika Weather

★★★★★ 45

PEGI 3

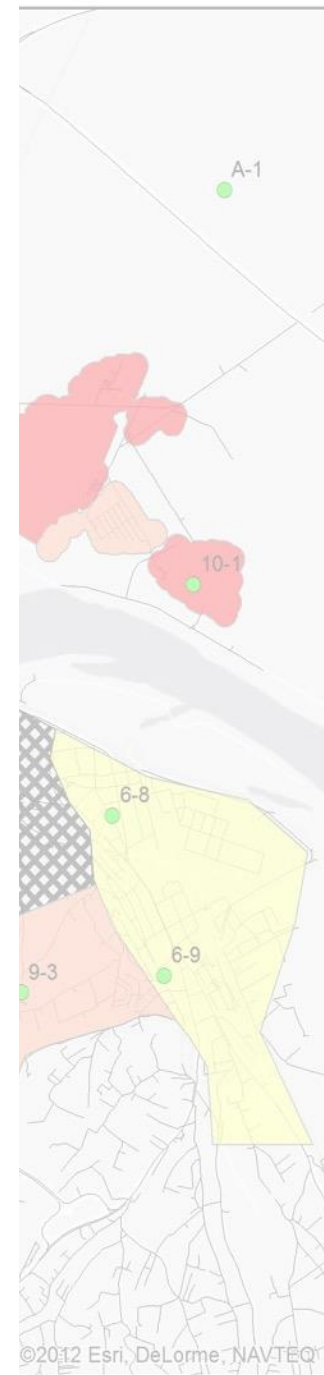
Add to Wishlist

Install



NSUNET-Weather presents hourly air temperature and relative humidity measurements from 28 meteorological stations within NSUNET system, installed in urban area of Novi Sad (Serbia). The NSUNET system is result of the project Evaluation and public display of URBAN PATterns of Human thermal conditions – URBAN-PATH, financed by IPA HU-SRB cross-border program. The URBAN-PATH project is realised by Department of Climatology and Landscape Ecology, Faculty of Sciences (University of Szeged, Hungary) and Climatology and Hydrology Research Centre, Faculty of

[READ MORE](#)





www.clihyd.com

Legend

LCZ

- 2 - Compact midrise
- 3 - Compact low-rise
- 5 - Open midrise
- 6 - Open low-rise
- 8 - Large low-rise
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