

VEGA 1/0202/15 Sustainable and Safe Water Management in Buildings of the 3rd. Millennium and
Slovak Cultural and Education Grant Agency (contract No. 073TUKÉ-4/2015)



MAP OF GREEN ROOFS OF KOŠICE CITY. A CASE STUDY.

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HEAT ISLAND

- ARTIFICIAL EXCESS OF HEAT IN THE CITY

- FORMATING:

- LACK OF VEGETATION
- USE OF IMPERMEABLE SURFACES
- URBAN GEOMETRY
 - THAT TRAP HEAT
 - THAT SLOW WIND SPEED
- INCREASED LEVELS OF AIR POLLUTION
- INCREASED ENERGY USE

- REDUCES EVAPORATION
- REDUCES EVAPORATION

- INCREASES NET RADIATION
- REDUCES CONVECTION
- INCREASES NET RADIATION
- INCREASES ANTHROPOGENIC HEAT

- COOLING:

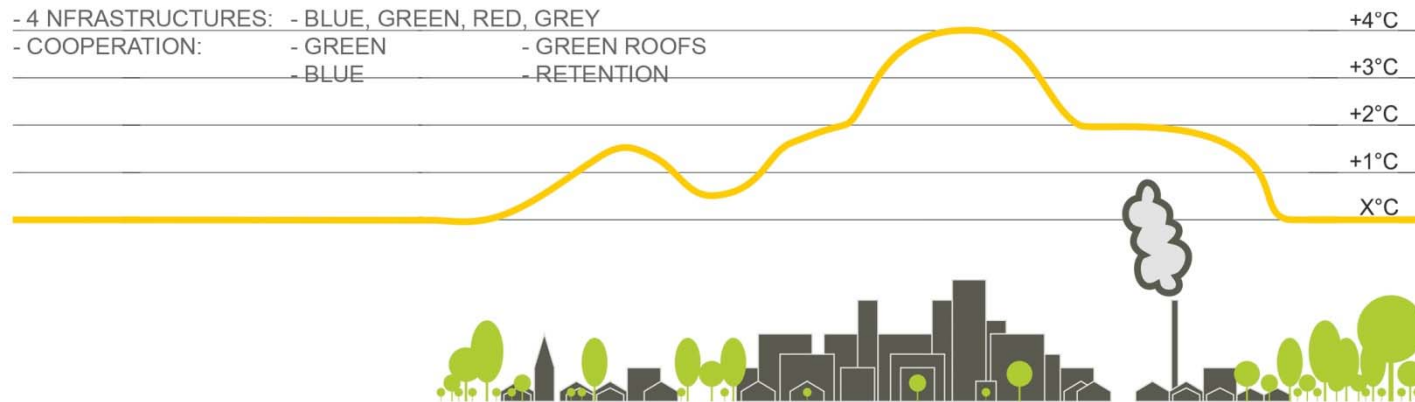
- THE USE OF COOL ROOFING
- THE USE OF COOL PAVING
- THE USE OF VEGETATION AND TREES
- THE USE OF GREEN ROOFS

COLORS

- 4 INFRASTRUCTURES: - BLUE, GREEN, RED, GREY

- COOPERATION:

- GREEN
- BLUE
- GREEN ROOFS
- RETENTION



HEAT ISLANDS

KOŠICE # HOUSING ESTATE	TYPE OF CONSTRUCTION	ROOF AREA (m ²)
1 BARCA	FAMILY HOUSES	
2 DŽUNGLA	FAMILY HOUSES, INDUSTRIAL AREA	
3 DARGOVSKÝCH HRDINOV	HOUSING ESTATE SUITABLE FOR CONSTRUCTION GREEN ROOF	85,121
4 KAVEČANY	FAMILY HOUSES	
5 KNV	FAMILY HOUSES	
6 KOŠICE STARÉ MESTO	SUITABLE FOR CONSTRUCTION GREEN ROOFS	62,850
7 KOŠICE SEVER	HOUSING ESTATE SUITABLE FOR CONSTRUCTION GREEN ROOF	85,762
8 KOŠICE JUH	HOUSING ESTATE SUITABLE FOR CONSTRUCTION GREEN ROOF	82,381
9 KOŠICE ZÁPAD	HOUSING ESTATE SUITABLE FOR CONSTRUCTION GREEN ROOF	186,400
10 KRÁSNA	FAMILY HOUSES	
11 KVP	HOUSING ESTATE SUITABLE FOR CONSTRUCTION GREEN ROOF	80,248
12 LORINČÍK	FAMILY HOUSES	
13 LUNÍK IX	HOUSING ESTATE WITH STATICS PROBLEMS	
14 MYSLAVA	FAMILY HOUSES	
15 NAD JAZEROM	HOUSING ESTATE SUITABLE FOR CONSTRUCTION GREEN ROOF	75,358
16 PEREŠ	FAMILY HOUSES	
17 POĽOV	FAMILY HOUSES	
18 ŠACA	HOUSING ESTATE SUITABLE FOR CONSTRUCTION GREEN ROOF	16,510
19 SÍDLISKO ŤAHANOVCE	HOUSING ESTATE SUITABLE FOR CONSTRUCTION GREEN ROOF	87,313
20 ŤAHANOVCE	FAMILY HOUSES	
21 ŠEBASTOVCE	FAMILY HOUSES	
22 VYŠNÉ OPÁTSKE	FAMILY HOUSES, INDUSTRIAL AREA	
TOTAL ROOF AREA		761,943
10% OF THE ROOF AREA IN M2 (ELEVATOR SHAFTS, ATTICS, AIR SHAFTS)		76,194
NET TOTAL ROOF AREA ON HOUSING ESTATES IN KOŠICE		685,749



KOŠICE - CASE STUDY

WORLD METEOROLOGICAL ORGANIZATION (WMO) ANNOUNCEMENT

JULY 2015

- 5 YEAR ANALYSIS
- PERIOD BETWEEN 2011 AND 2015
- THE WARMEST PERIOD OF A 5 YEARS LONG PERIOD IN THE HISTORY OF OBSERVATIONS
- EXTREME WEATHER
- HEAT WAVES

FIXED STATIONS

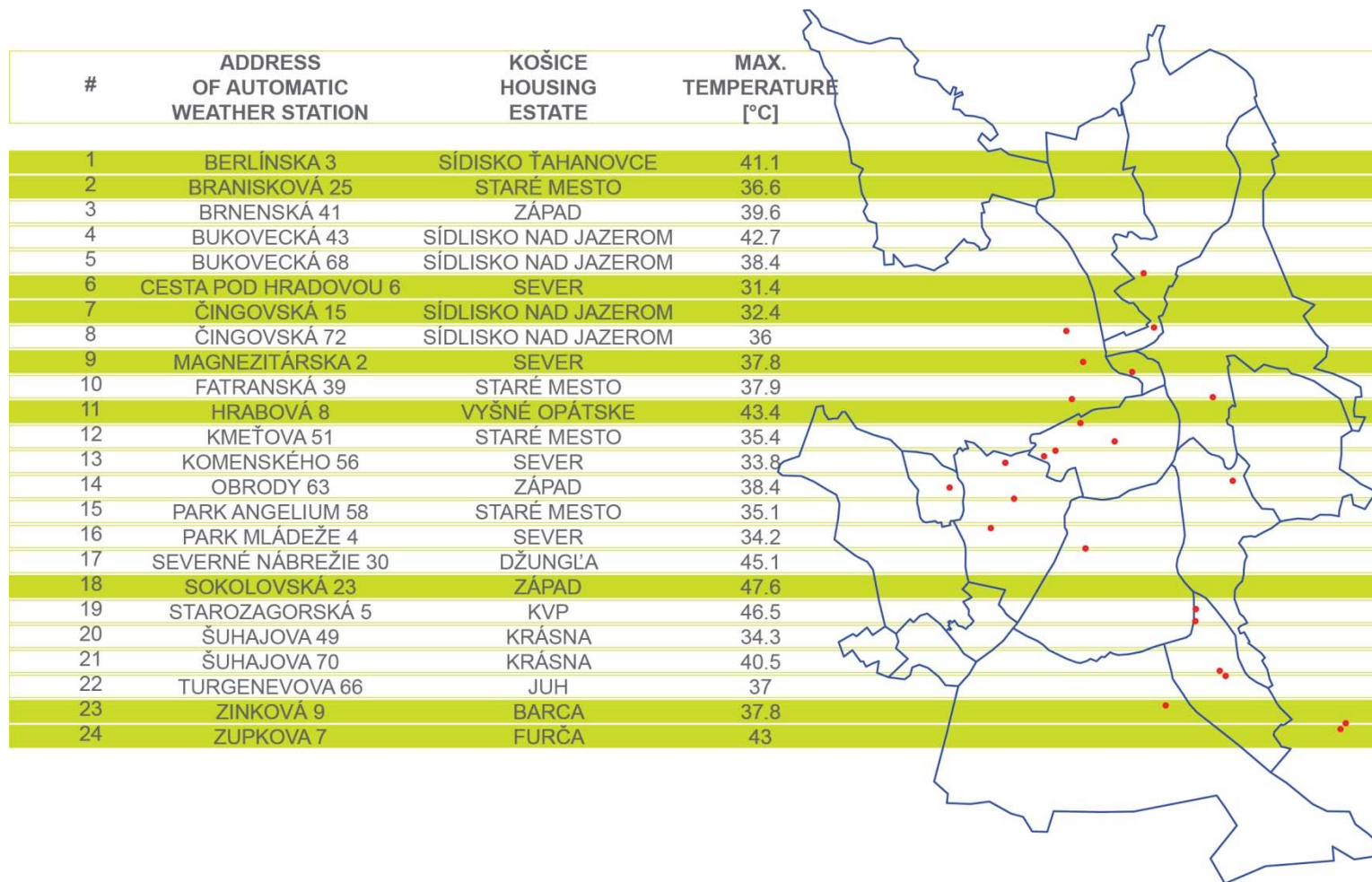
- AUTOMATIC WEATHER STATIONS
- INSTALLED ON ROOFS OF THE BUILDINGS IN KOŠICE
- **WEATHER UNDERGROUND'S WORLDWIDE PERSONAL WEATHER STATION NETWORK**
- DATA GENERATED FROM NATIONAL WEATHER SERVICE'S NATIONAL DIGITAL FORECAST DATABASE (NDFD)

- THE STUDY IS FOCUSING ON **INSTANTANEOUS MAX. AIR TEMPERATURE AND MINIMUM HUMIDITY**
- IT TAKES THE WORST CASE SCENARIO INTO ACCOUNT (MAX AND MIN)

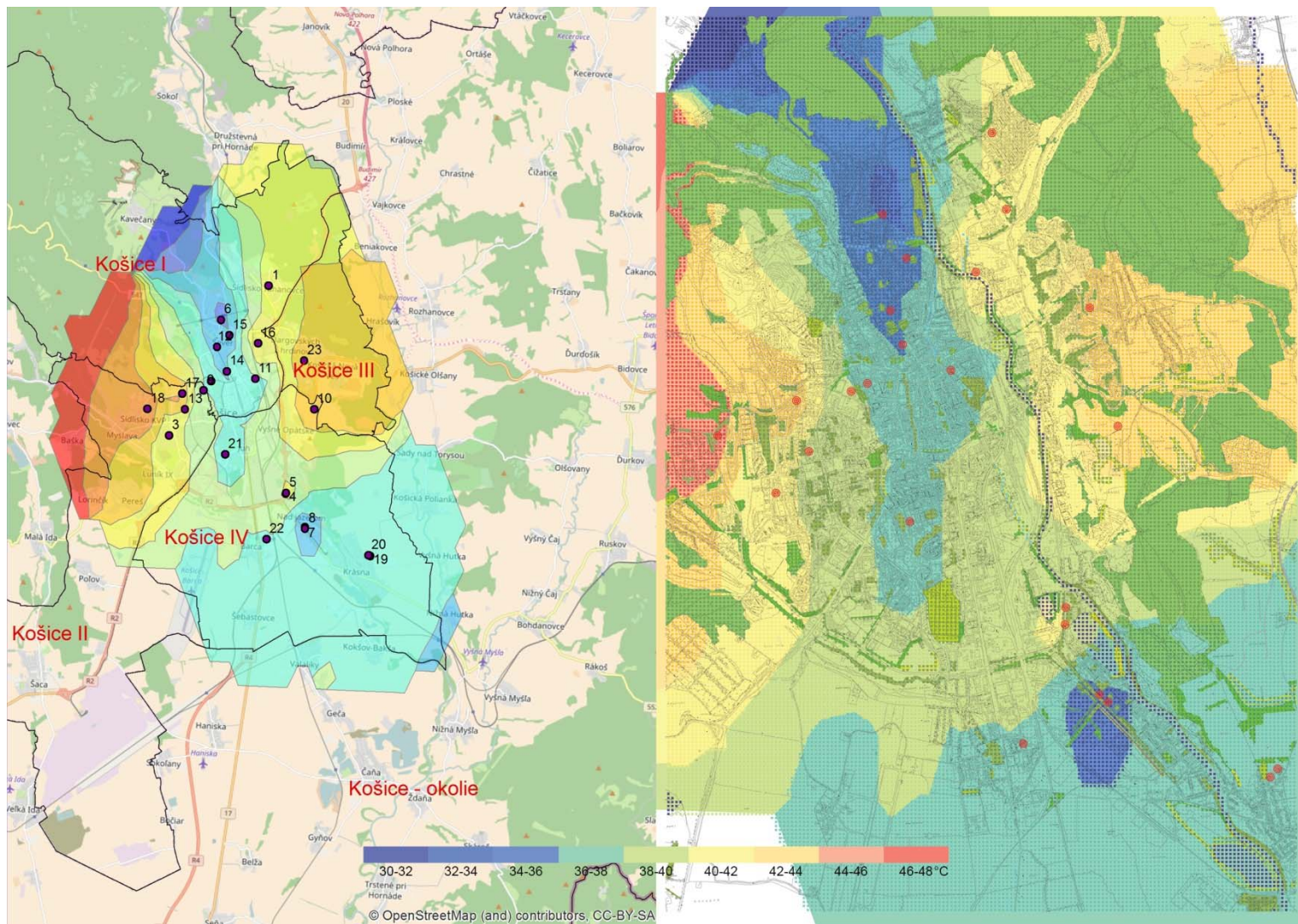
* KONASOVA METHOD, THE POSITIVE IMPACT OF GREEN ROOFS ON MITIGATION OF THE URBAN HEAT ISLAND EFFECT

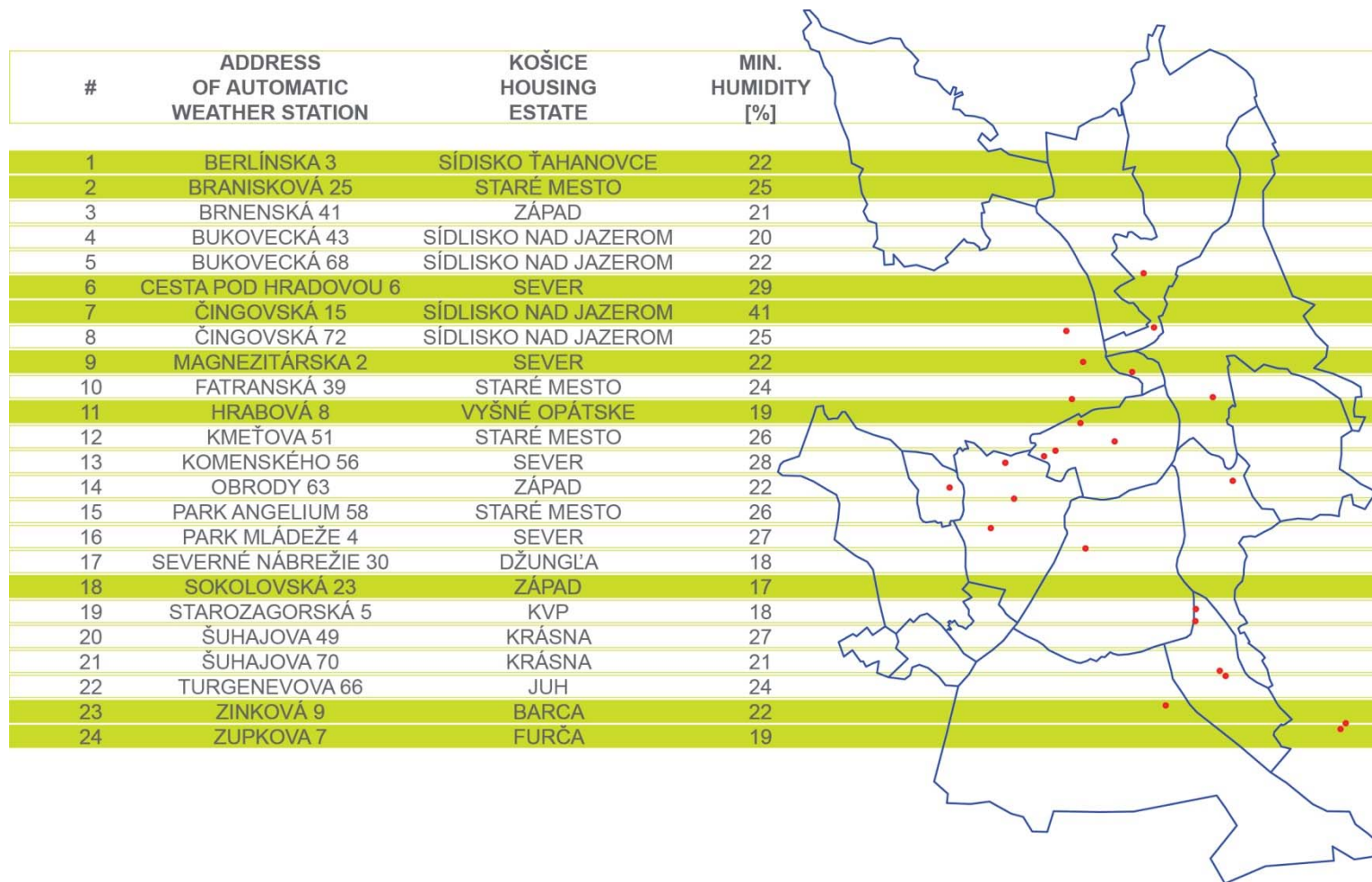


MODELING TEMPERATURE MAP

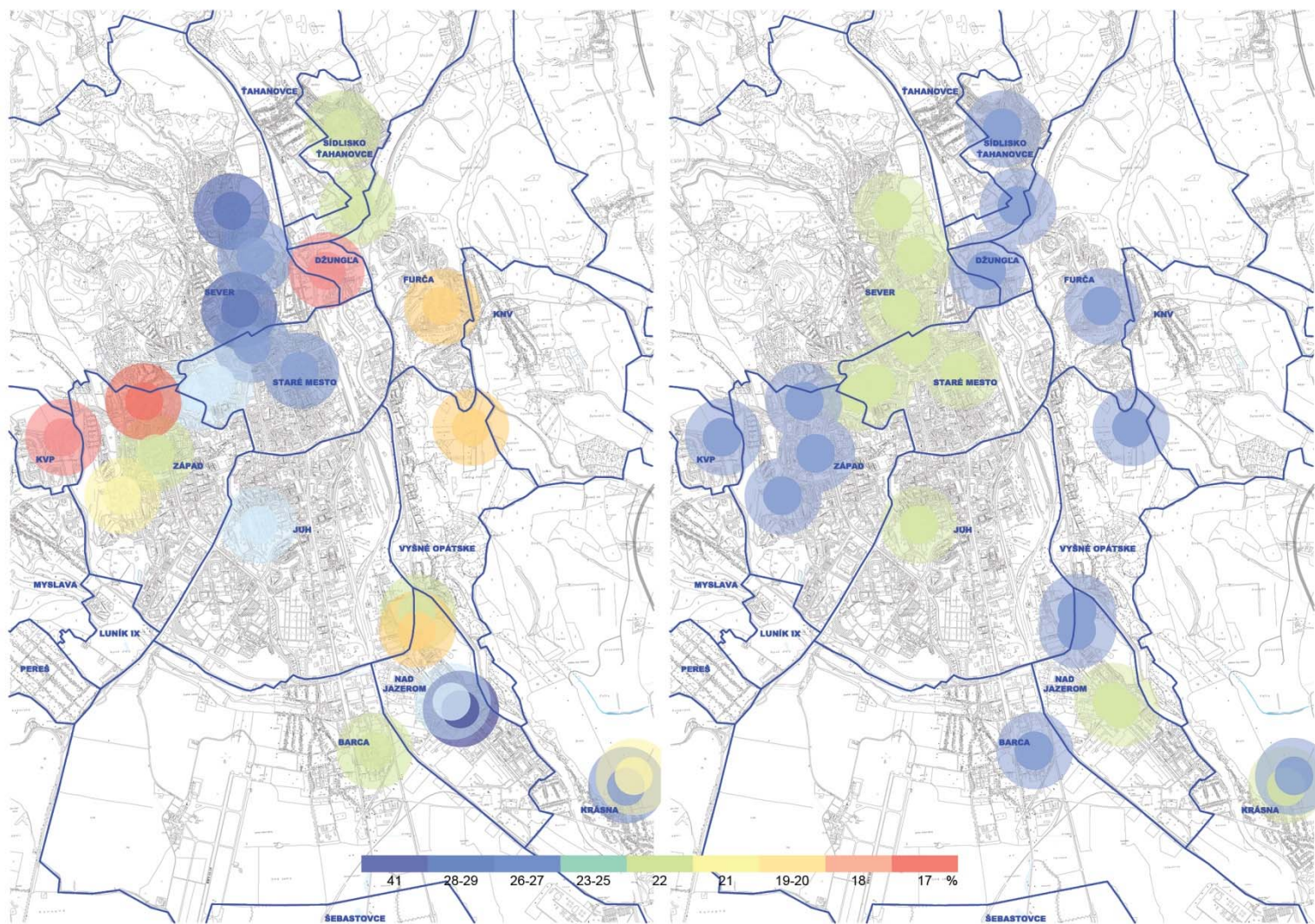


INSTANTANEOUS MAX. AIR TEMPERATURES IN 07/2015





INSTANTANEOUS MIN. HUMIDITY IN 07/2015



THANK YOU

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