webinar “Klima i mobilnost”

11. srpnja 2023.

Klima i promet u urbanim sredinama

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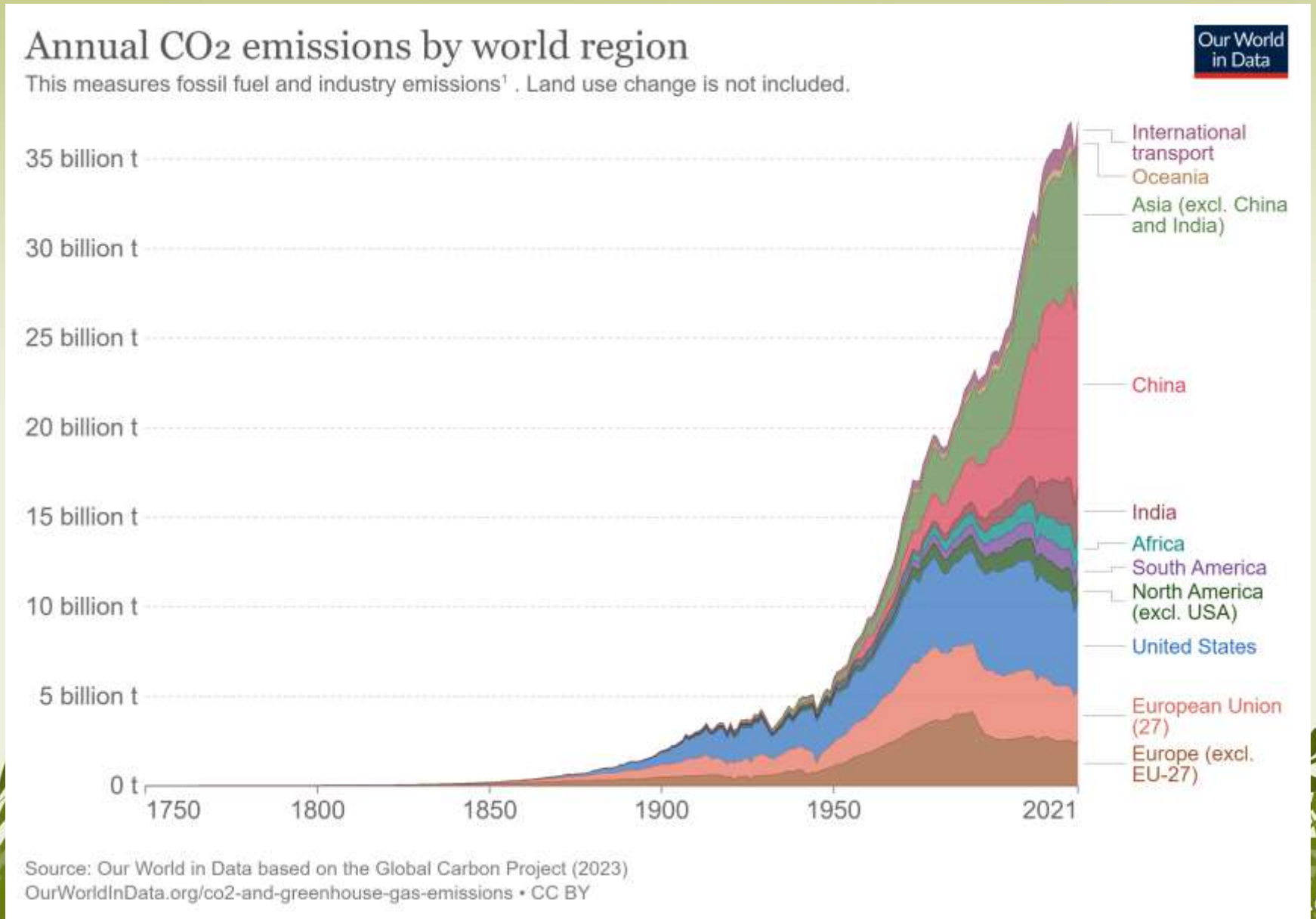
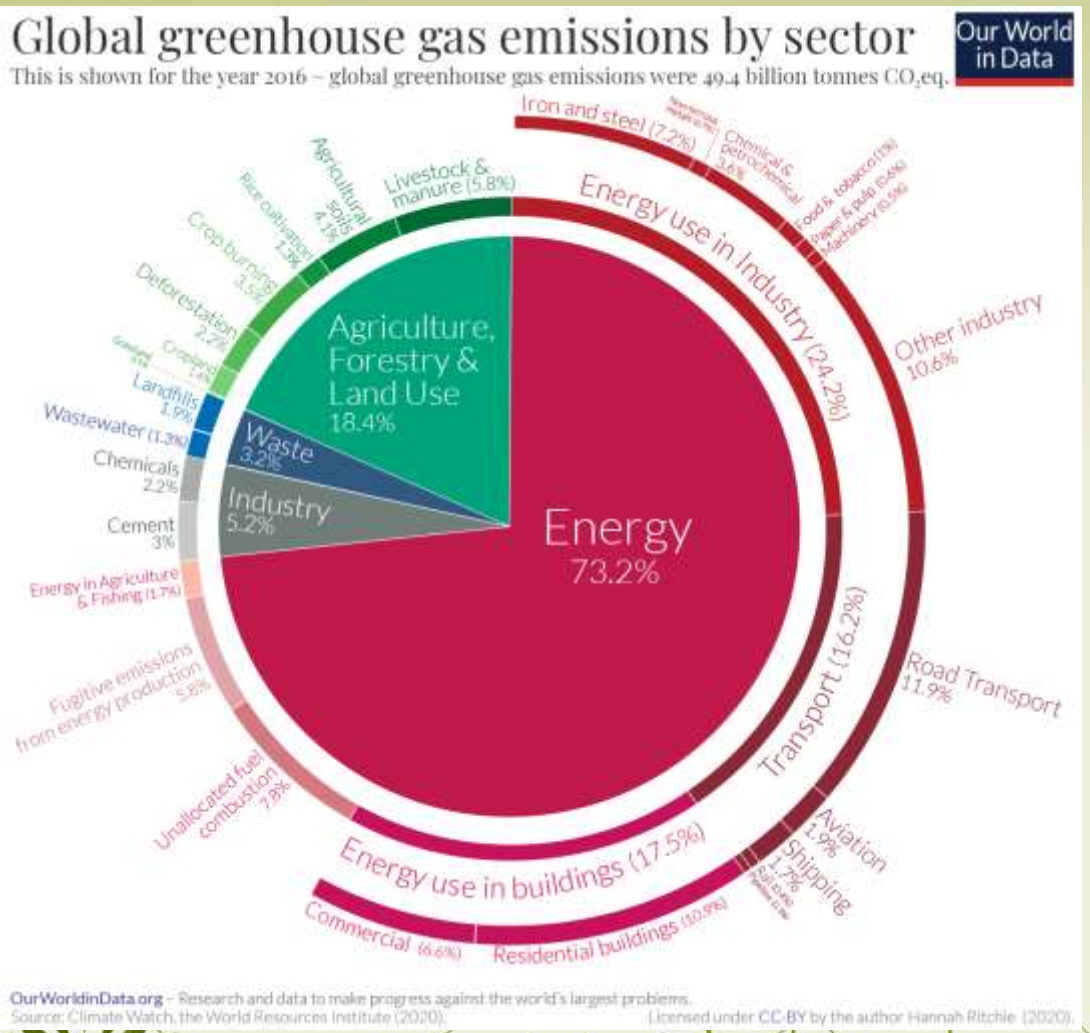
Klima i promet u urbanim sredinama

- aspekti utjecaja prometa (i prometnica) na klimatska obilježja urbanih sredina:
  - 1. klimatske promjene
  - 2. onečišćenje atmosfere
  - 3. utjecaj na toplinski otok grada

1. Klima i promet – klimatske promjene



1. Klima i promet – klimatske promjene



Emisija stakleničkih plinova u svijetu po sektorima 2016. god.
- direktno od prometa: 16,2 %

U gradovima nastaje 70 % antropogene emisije stakleničkih plinova
- trećina te emisije porijeklom je od prometa.
(izvor: ttps://www.c40.org/networks/mass-transit)

1. Klima i promet – klimatske promjene

(izvor: https://www.jutarnji.hr/autoklub/aktualno/sto-ceka-hrvatska-slovenci-uveli-sofisticirane-elektronske-vinjete-dostupne-na-mobitelu-15133018)

2. Klima i promet - onečišćenje atmosfere

- izvori onečišćenja u gradu
  - industrija
  - promet
  - kućna ložišta

Los Angeles – sekundarni onečišćivači

(izvor: http://www.localpin.com/los-angeles/)

Koji su uzroci onečišćenja zraka u Zagrebu: ‘Nije samo taj grad u opasnosti’

Autor: Poslovni.hr , 16. siječanj 2020. u 09:08 0 komentara

Foto: Jurica Galoic/PIXSELL

ONEČIŠĆENJE ZRAKA

EKOLOŠKA UZBUNA U ZAGREBU Otkrivamo uzrok zagađenja zraka u metropoli i povećanja lebdećih čestica PM10: 'Nažalost, nije problem samo u Dugavama...'

Piše: Matej Devčić Matej Mikašinović Komšo Objavljeno: 15. siječanj 2020. 23:35

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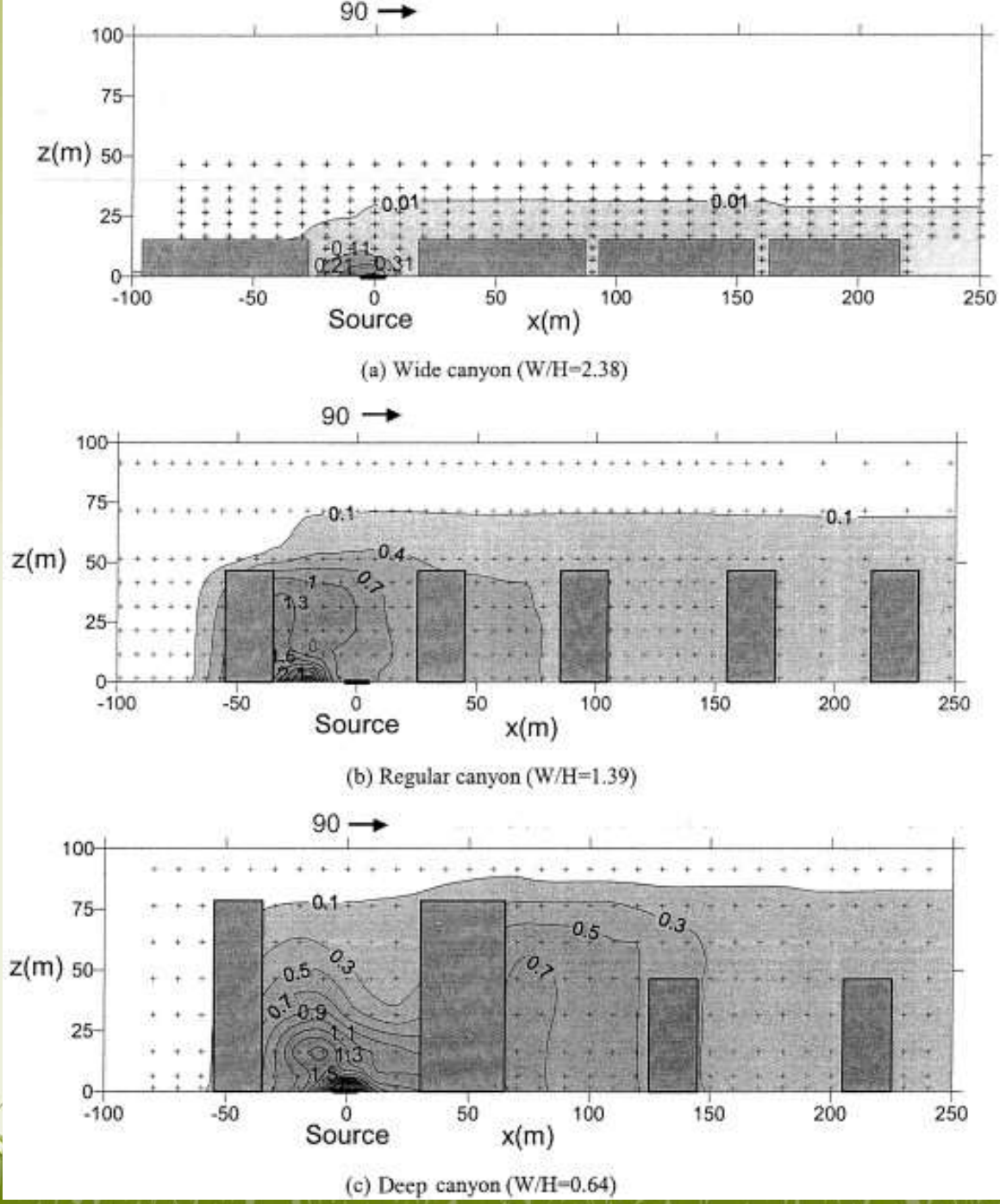
Dragan Matić / CROPIX

Utjecaj veličine i oblika zgrada na kvalitetu zraka u gradu

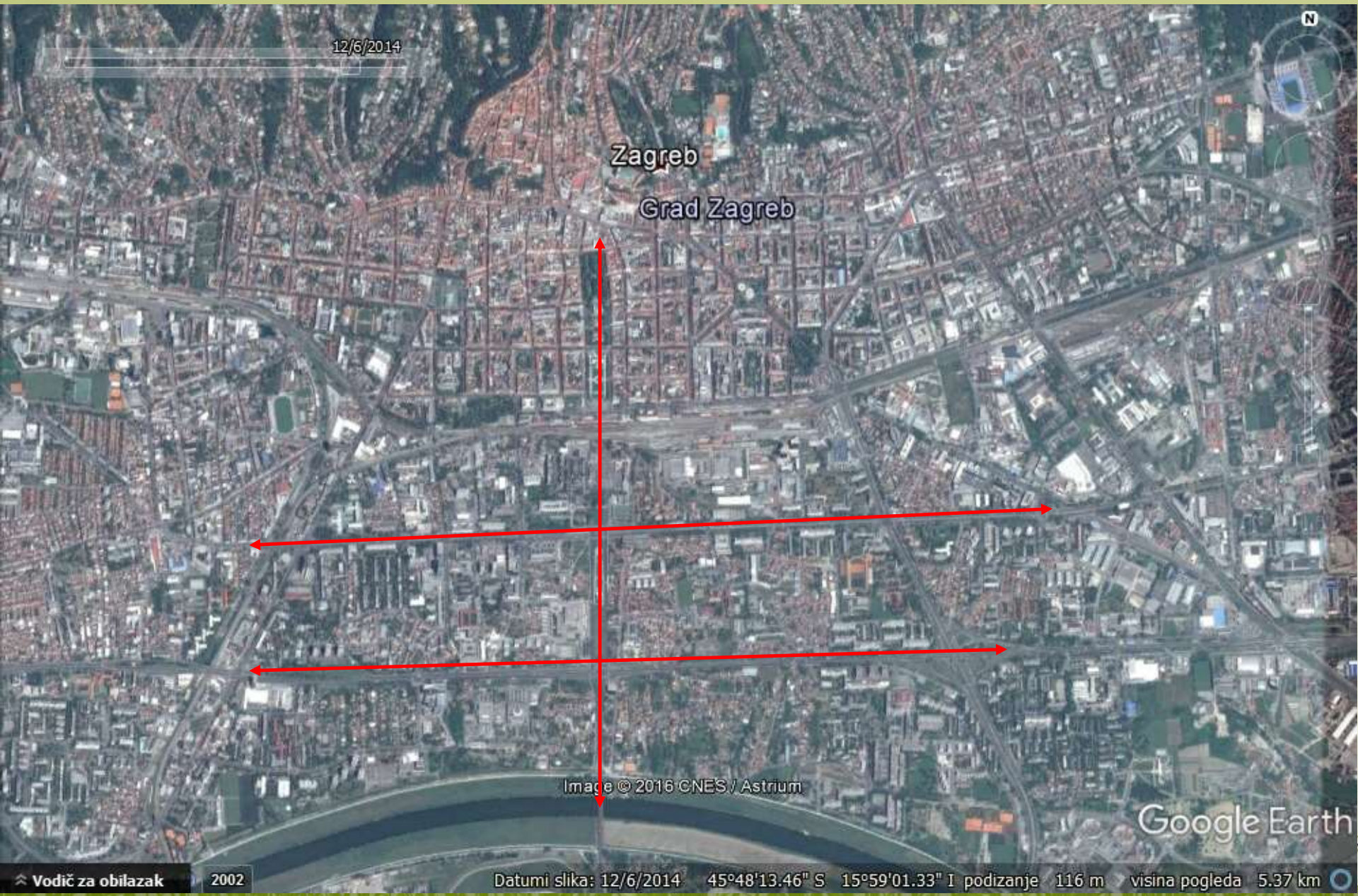


(a) Wide canyon (W/H=2.38)

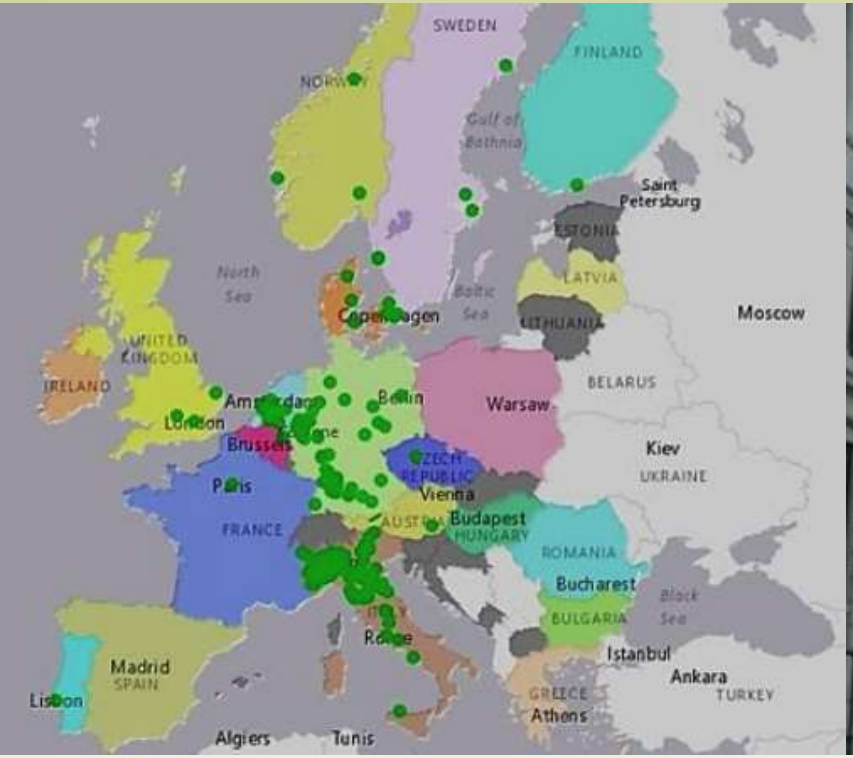
(b) Regular canyon (W/H=1.39)

(c) Deep canyon (W/H=0.64)

(izvor: http://www.sciencedirect.com/science/article/pii/S0048969703005837)


12/6/2014
Zagreb
Grad Zagreb
Image © 2016 CNES / Astrium
Google Earth
Vodič za obilazak
2002
Datumi slika: 12/6/2014 45°48'13.46" S 15°59'01.33" I podizanje 116 m visina pogleda 5.37 km

2. Klima i promet – onečišćenje atmosfere



Low emission zone – zone u kojima je ograničen pristup vozilima koja onečišćuju atmosferu

(izvori: https://euobserver.com/regions/135941 ;
Fuc, P., et al 2018 IOP Conf. Ser.: Mater. Sci. Eng. 421 042020)

3. Toplinski otok grada – važnost izgrađenih površina

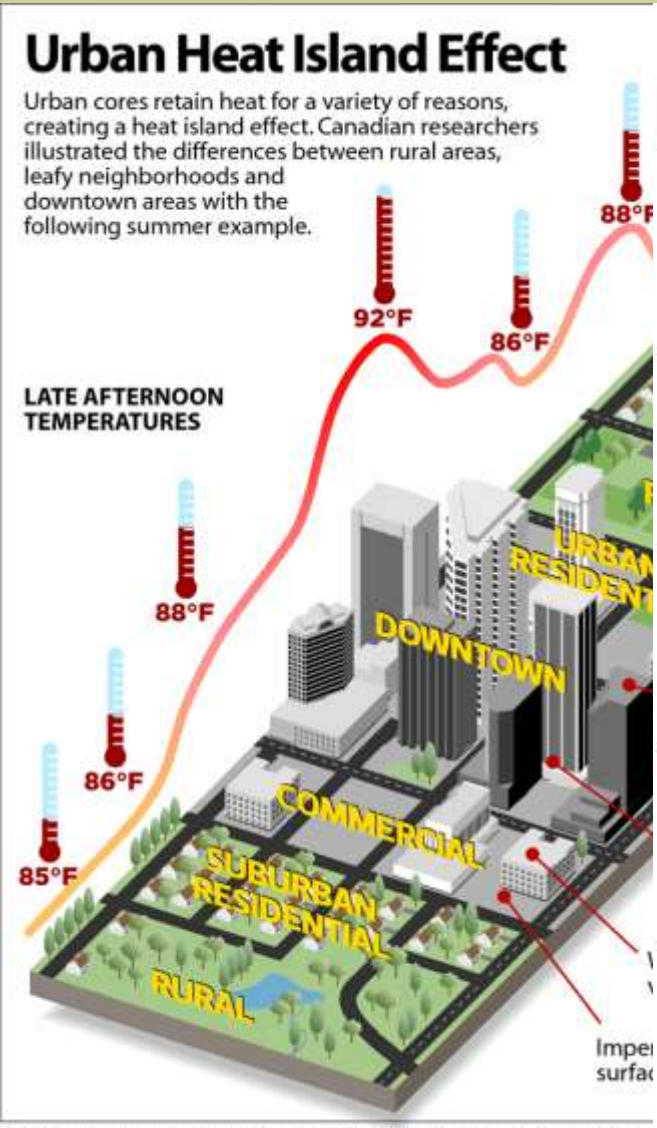
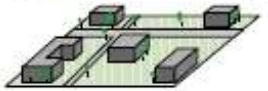


Table 1. Classification of "urban" and "rural" field sites by local climate zones.

Site Photographs (Eye Level / High Angle*)	Traditional Classification & Site Metadata	*Local Climate Zone* Classification
Tokyo (Yamashita 1990) 	Urban Weather observatory in central Tokyo, next to busy roads, expressways, and close-set concrete buildings 10–20 stories tall. SVF~0.65 Vegetation scarce. Built fraction ~90 %. Heavy traffic flow.	COMPACT HIGHRISE 
Goteborg (Eliasson 1994) 	Urban Narrow street canyon in central Goteborg. Compact brick buildings 5–8 stories tall. SVF=0.5 H/W=1.4 Z_H=20 m. Few trees or green surfaces. Built fraction ~75 %. Moderate traffic flow.	COMPACT MIDRISE 
Szeged (Unger et al. 2001) 	Urban Housing estate on the outskirts of Szeged. Concrete towers 5–11 stories tall, widely set, uniform in design and layout. Z_H=19 m. SVF=0.85 Abundant vegetation and open space. Built fraction 54 %. Low-moderate traffic flow.	OPEN-SET MIDRISE 
Tokyo (Yamashita 1990) 	Rural Residential site 60 km NW of Tokyo. Detached, open-set homes 1–2 stories tall, separated by green spaces and small trees. SVF~0.75 Built fraction ~70 %. Low traffic flow.	OPEN-SET LOWRISE 
Szeged (Unger et al. 2001) 	Rural Cultivated fields 4.5 km west of Szeged. Fields uniformly cropped. No trees. Dry soils. Crop canopy 1 m agl. SVF=1 Built fraction < 1 %. Traffic flow nil.	LOW PLANT COVER 

3. Toplinski otok grada

- važnost podloge za zagrijavanje zraka
  - zelene i vodene površine
  - *zelena i plava infrastruktura*

- uzroci toplinskog otoka:
  - veća dnevna apsorpcija Sunčevog zračenja zbog toplinskih svojstava materijala od koji je izgrađen grad i noćnog toplinskog zračenja
  - povećanje apsorpcije Sunčevog zračenja zbog albeda u uličnim kanjonima (engl. *street canyons)*
  - povećanje antropogenog zagrijavanja zbog grijanja i hlađenja, prometa i industrije
  - smanjene površine pod vegetacijom

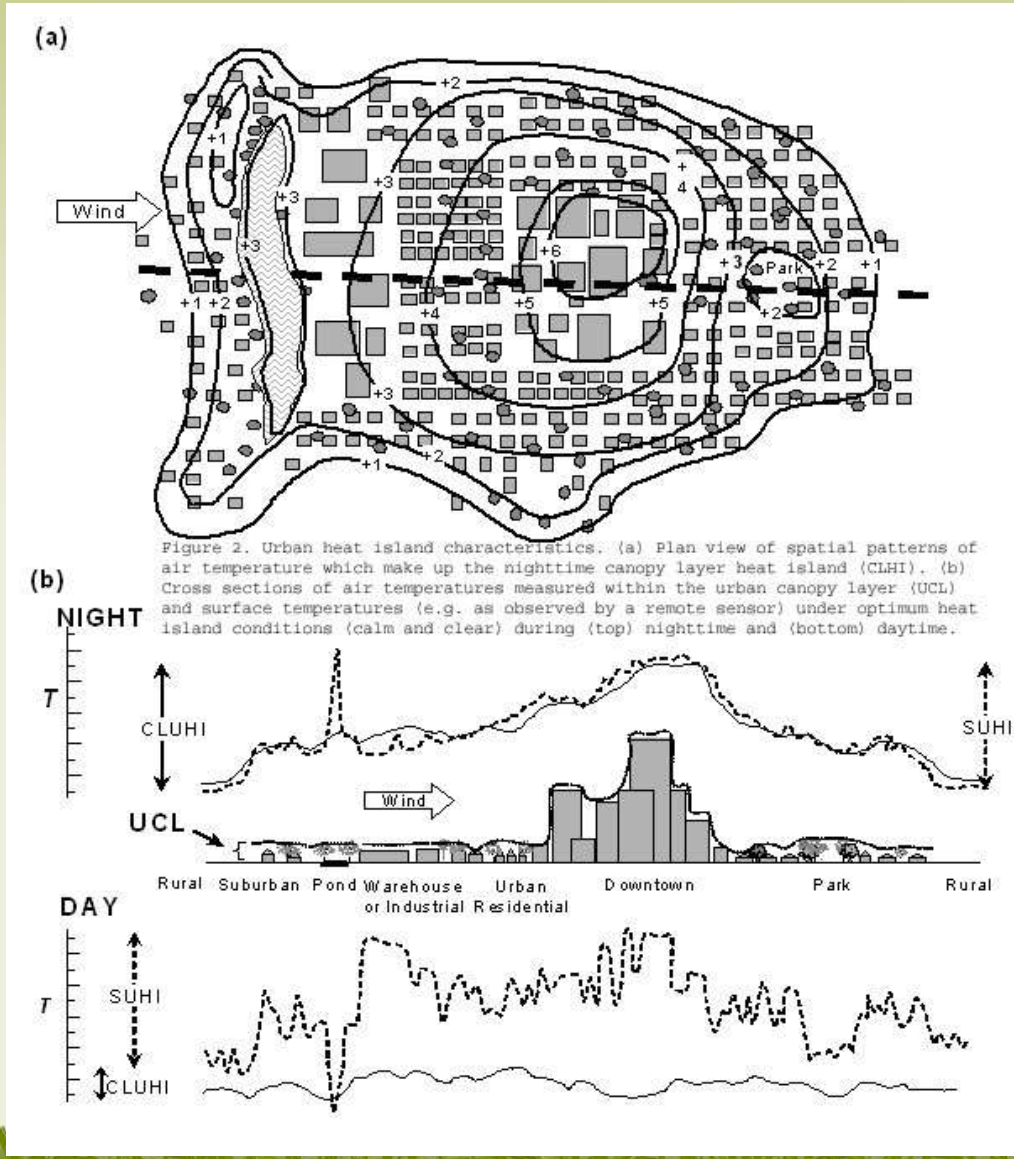
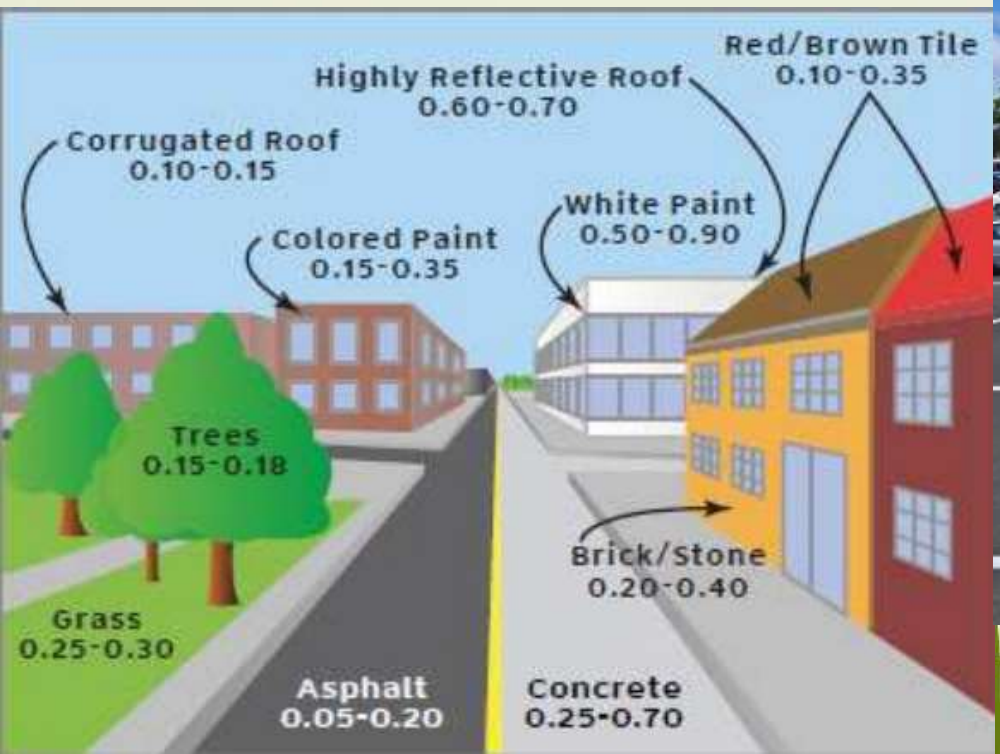


Figure 2. Urban heat island characteristics. (a) Plan view of spatial patterns of air temperature which make up the nighttime canopy layer heat island (CLHI). (b) Cross sections of air temperatures measured within the urban canopy layer (UCL) and surface temperatures (e.g. as observed by a remote sensor) under optimum heat island conditions (calm and clear) during (top) nighttime and (bottom) daytime.

(izvor: http://www.actionbioscience.org/environment/voogt.html)

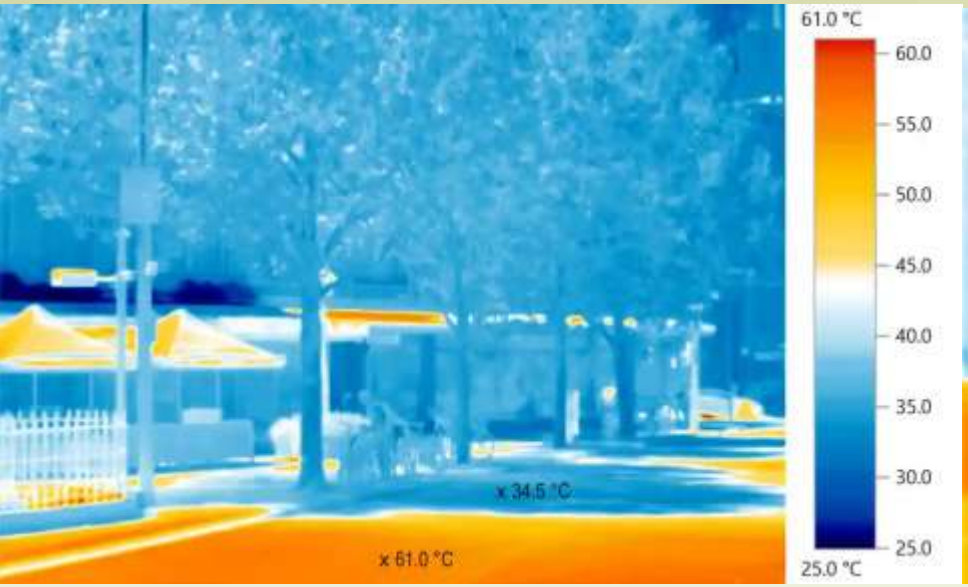
3. Toplinski otok grada – važnost izgrađenih površina

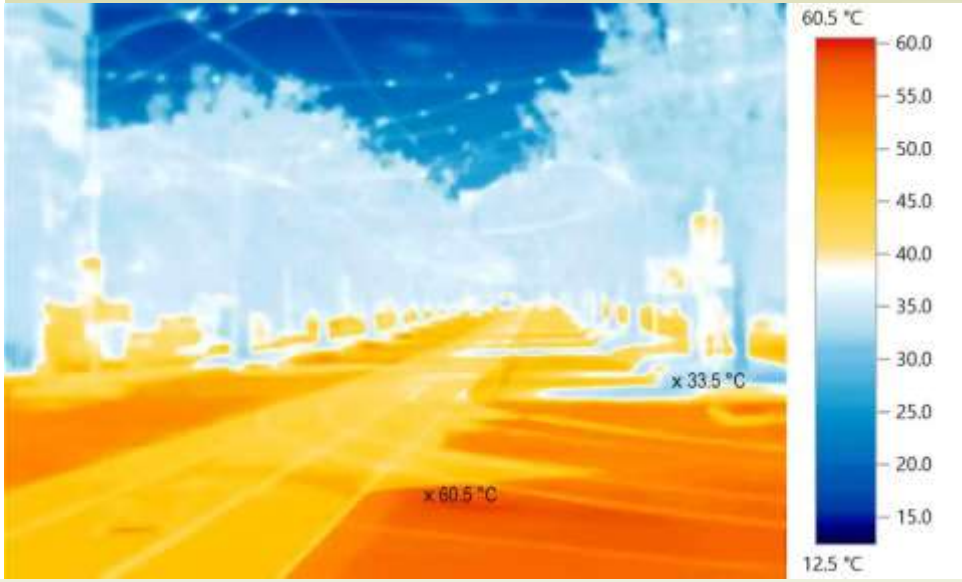
- albedo
  - koeficijent refleksije Sunčevog zračenja od podloge
  - velika uloga u zagrijavanju gradova



(izvor: http://www.ghcc.msfc.nasa.gov/urban/urban_heat_island.html)

3. Toplinski otok grada – prirodne vs. izgrađene površine

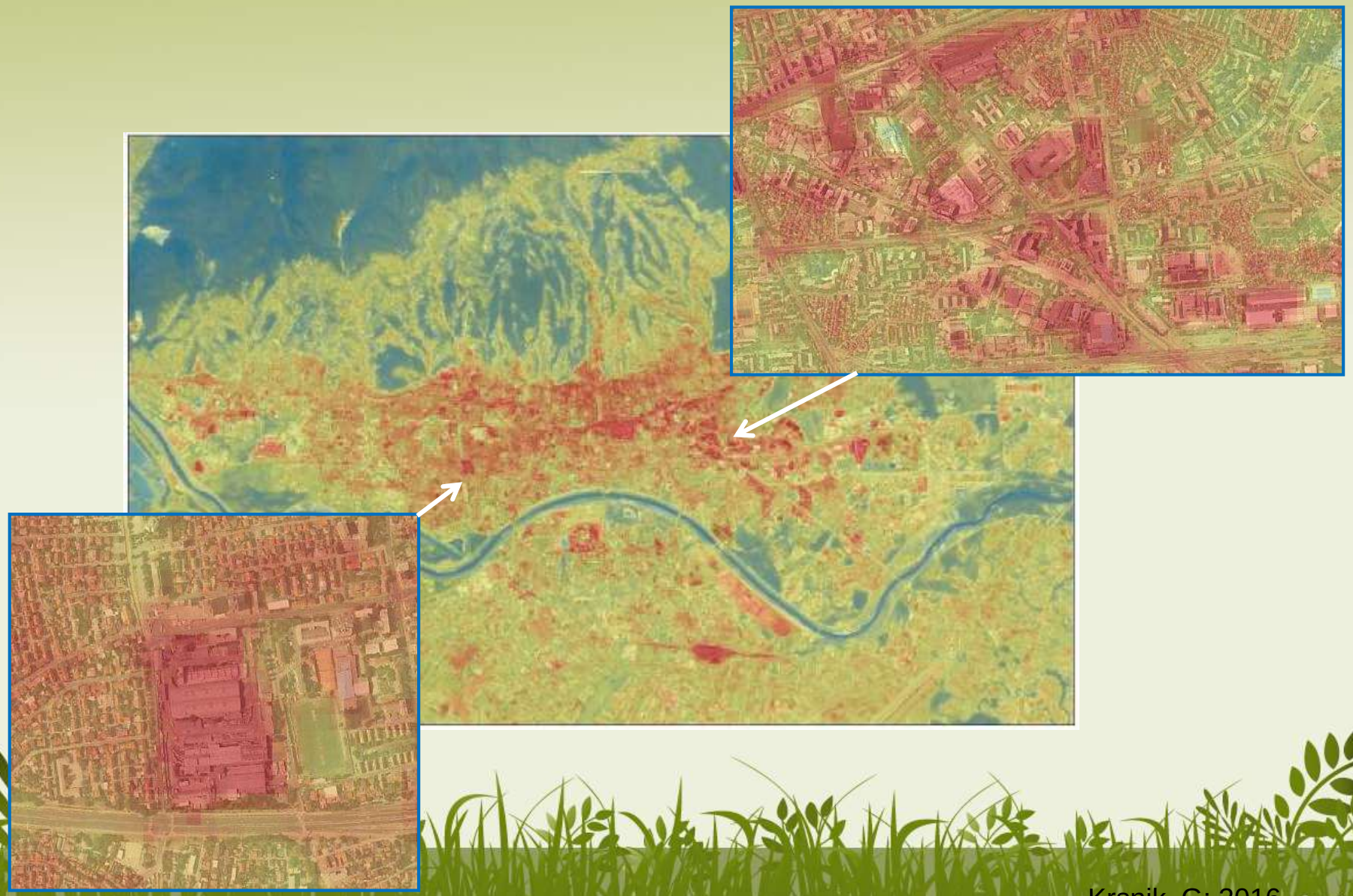




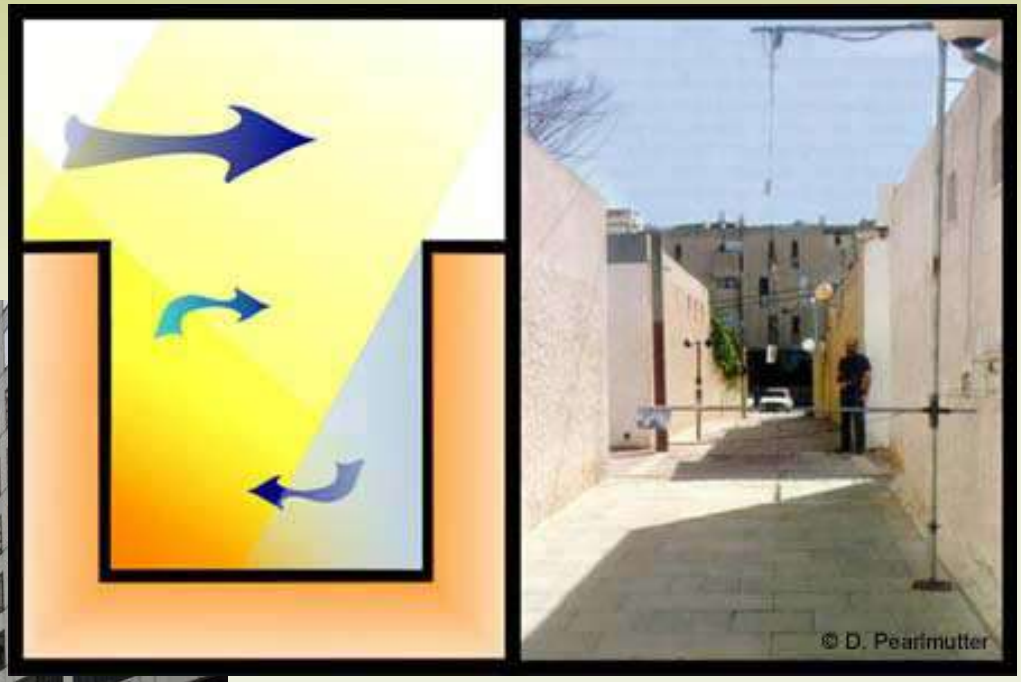
Snimke toplinskog zračenja odabranih dijelova Melbournea za vrijeme toplinskog vala, siječanj 2017. godine

(izvor: https://www.theguardian.com/sustainable-business/2017/feb/21/urban-heat-islands-cooling-things-down-with-trees-green-roads-and-fewer-cars)

3. Toplinski otok – Zagreb



3. Toplinski otok grada – ulični kanjoni



(izvor: http://ag.arizona.edu/oals/ALN/aln47/pm2.html)

(izvor: http://www.city-data.com/forum/city-vs-city/838157-photos-your-citys-urban-canyons.html)

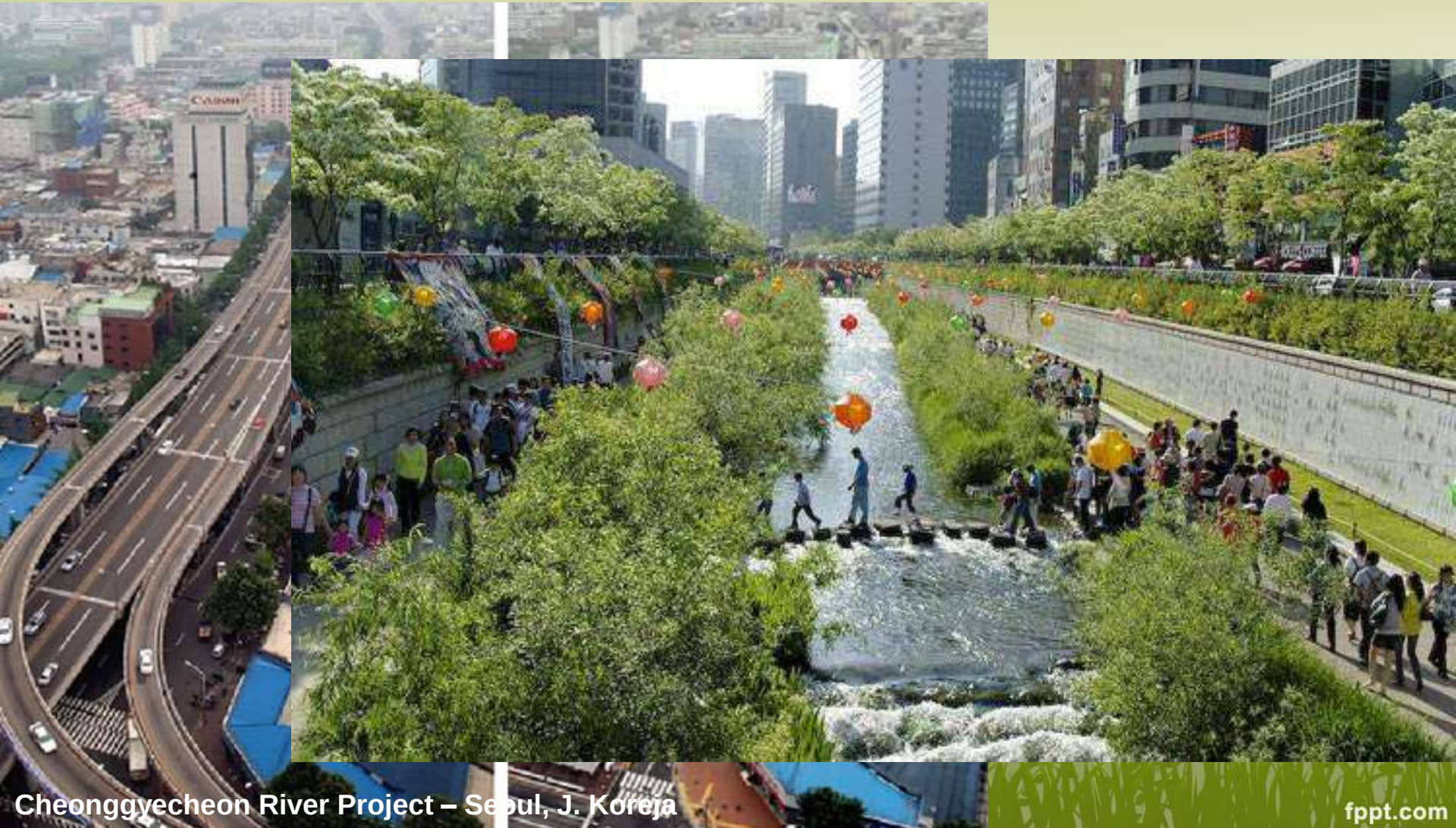
Utjecaj prometnica na ohlađujući učinak Botaničkog vrta

Odstupanja ljetne/srpanjske temperature u 14 sat od temperature meteorološke postaje Zagreb–Grič za razdoblje 1. 5. 2018. – 30. 4. 2019.

Rješenja?

(izvor: https://www.smartcitiesdive.com/ex/sustainablecitiescollective/greening-our-streets/1079821/)

Rješenja?



Cheonggyecheon River Project – Seoul, J. Koreja

Rješenja?

Projekt ozelenjavanja ulice u Melbourneu

(izvor: https://medium.com/dark-matter-and-trojan-horses/daylighting-melbourne-how-we-can-transform-our-cities-street-by-street-2345410741)