



Università di Roma
"La Sapienza"
DAU
Dottorato di Ricerca in
Tecnica Urbanistica

SIGEA Società Italiana di
Geologia Ambientale



L'AMBIENTE NEL GOVERNO DELLA CITTA'

6 Luglio 2007, Aula chiostro, DAU - Dipartimento di Architettura e Urbanistica per l'Ingegneria
Via Eudossiana, 18 - S. Pietro in Vincoli - Roma

Programma:

9.30 Apertura dei lavori

On. Paolo Cento, Sottosegretario di
Stato al Ministero dell'Economia e
delle Finanze

On. Walter Tocci, deputato DS

10.00-10.30 L'approccio di un
naturalista ai problemi della città
Giuseppe Gisotti, autore del libro
"Ambiente Urbano", Dario Flaccovio
editore, 2007

10.30-10.45 Il progetto della città
sostenibile
Prof. Enzo Scandurra, Università La
Sapienza, Roma

10.45-11.00 Mobilità urbana: miti,
alibi, ostacoli
Dr. Alessandro Ferri, Studio
INFOTRAF, Roma

11.00-11.15 Fonti energetiche al-
ternative e risparmio energetico
Arch. Francesca Sartogo, Presidente
di Eurosolar Italia

11.15-11.30 Il progetto della
sostenibilità urbana nell'era della
globalizzazione: questioni di
governance
Prof.ssa Silvia Macchi, Università
La Sapienza, Roma

11.30-12.30 COFFEE BREAK

12.30-12.45 Ruolo delle piante nel
controllo dell'isola di calore
urbana e nella mitigazione
dell'inquinamento atmosferico
Dott.ssa Rita Baraldi, CNR-IBIMET
sezione Bologna

12.45-13.00 Clima urbano, flussi
energetici, inquinamento
atmosferico urbano
Dott. Teodoro Georgiadis,
CNR-IBIMET sezione Bologna

13.00-13.15 L'agricoltura urbana:
utopia o progetto?
Dott. Valerio Merlo, autore del libro
"Voglia di campagna. Neoruralismo e
città", ed. Città Aperta, 2006

13.15-13.30 Centralità della
questione ambientale per il
governo delle città
Prof. Elio Piroddi, Università
La Sapienza, Roma

13.30 OPEN DISCUSSION

Moderatori:

Silvia Rossi, Enzo Scandurra

Per informazioni:

Silvia Rossi, tel. 347 45 03 560,
e-mail: silviarossi@alice.it

A cura di:

Silvia Rossi, Enzo Scandurra,
Giuseppe Gisotti, Federico Margelli

Con il patrocinio di:

CATAP - Coordinamento associazioni tecniche
per l'ambiente e il paesaggio - AAA, AIAPP, AIP,
APIH, SISP-IALE, SIGEA
AII - Associazione Idrotecnica Italiana
FIDAF - Federazione Italiana Dottori in Agraria e
Forestali



La Sintesi

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R.le Roberto Ardigò 31 - 00142 Roma
phone 06-5104961 - fax 06 232219782
http://www.lasintesi.eu

Studio condotto nell'ambito
del Laboratorio **LARIA** della
Rete Alta tecnologia della
Regione Emilia-Romagna

Linee Trasversali

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Task Trasversali
CNR, Università, SIGEA, ENI
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ISTITUTO DI BIOMETEOROLOGIA
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Clima urbano, flussi energetici ed inquinamento

teodoro georgiadis & many al.

istituto ibimet cnr bologna

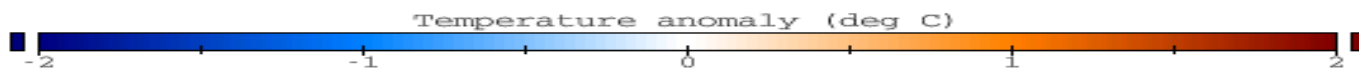
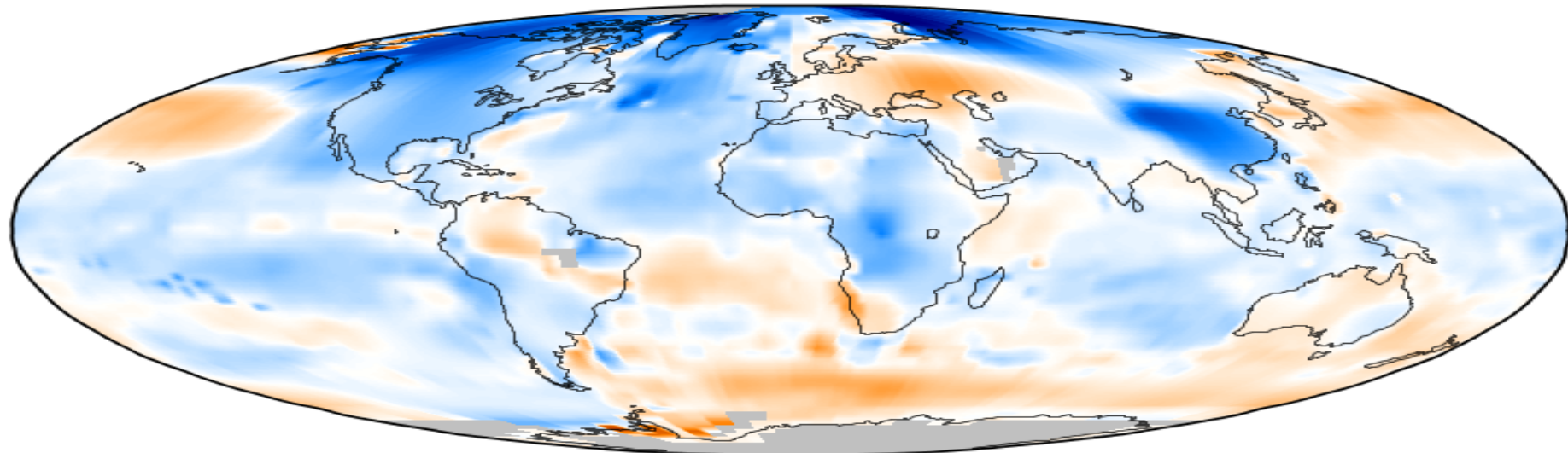


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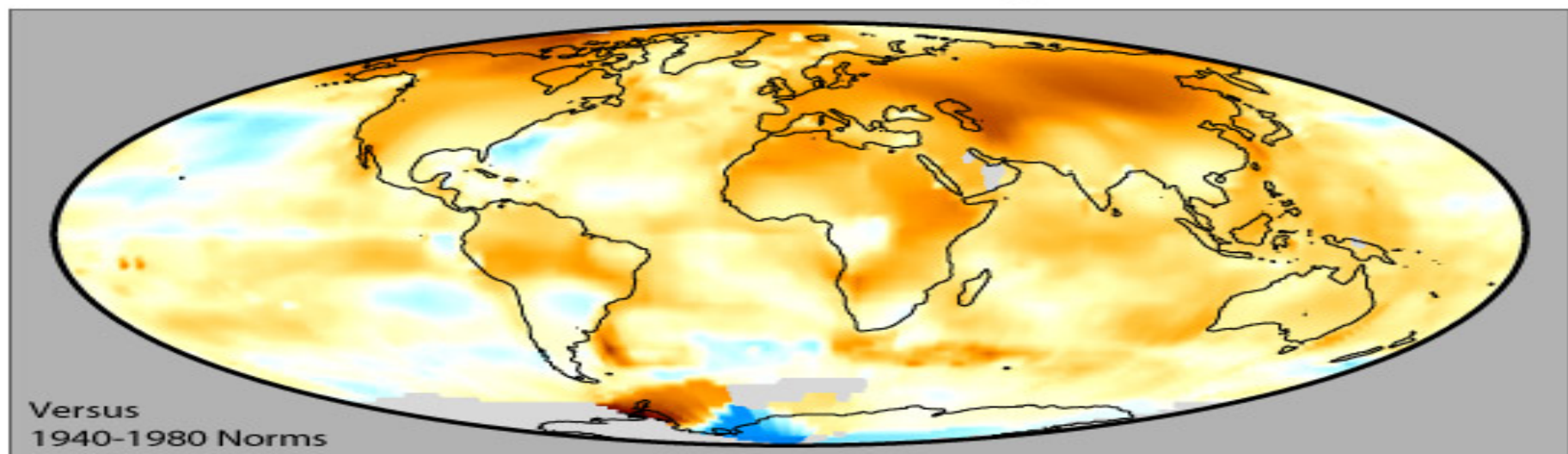


1965-1975 Mean Temperatures vs 1937-1946



Mollweide projection centered on 0.0°E

Data Min = -2.05549, Max = 1.4341

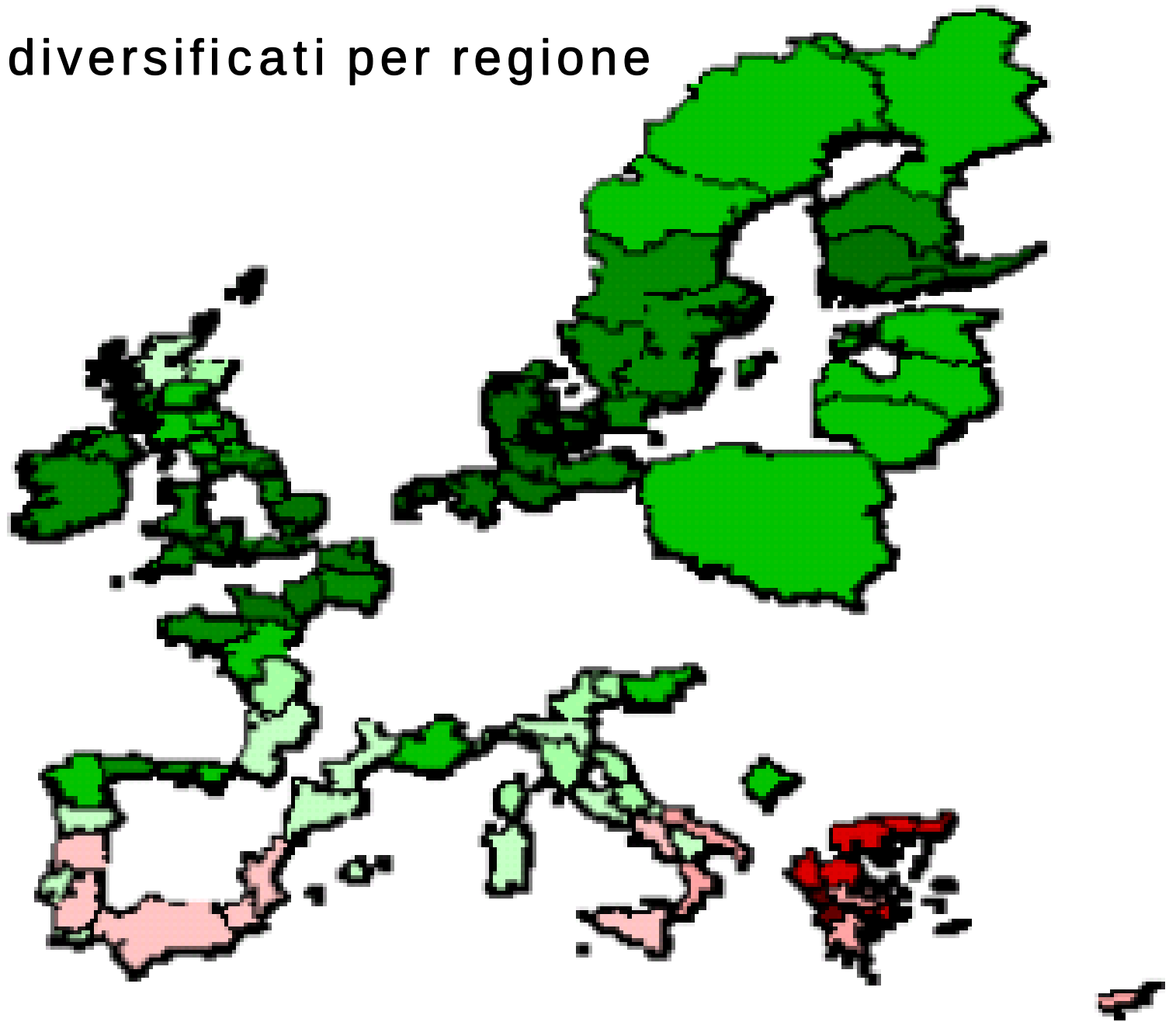


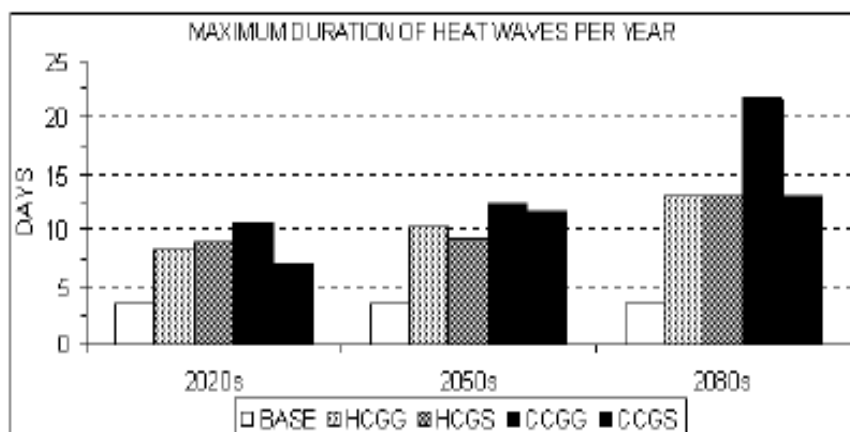
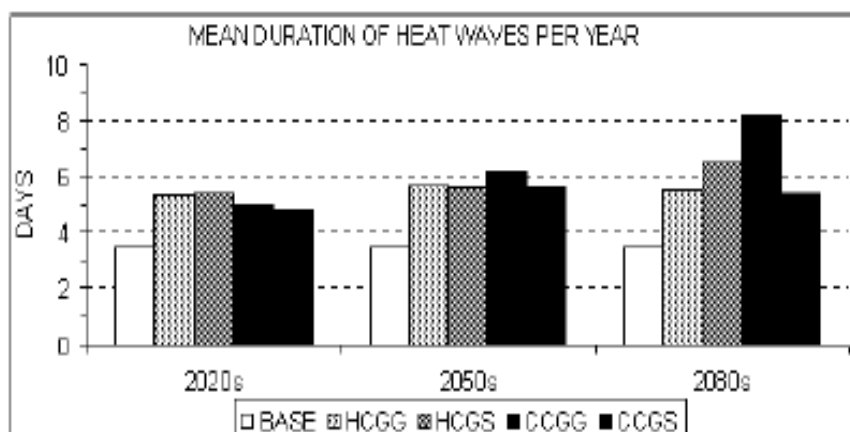
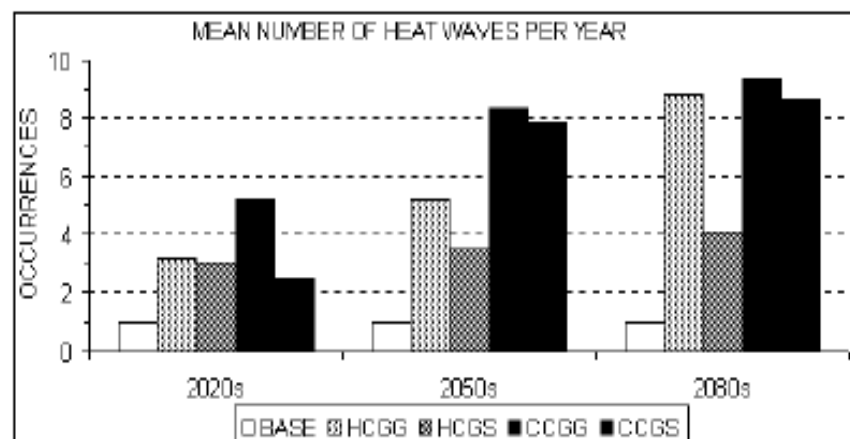
Versus
1940-1980 Norms



Temperature Anomaly (°C)

Impatti diversificati per regione





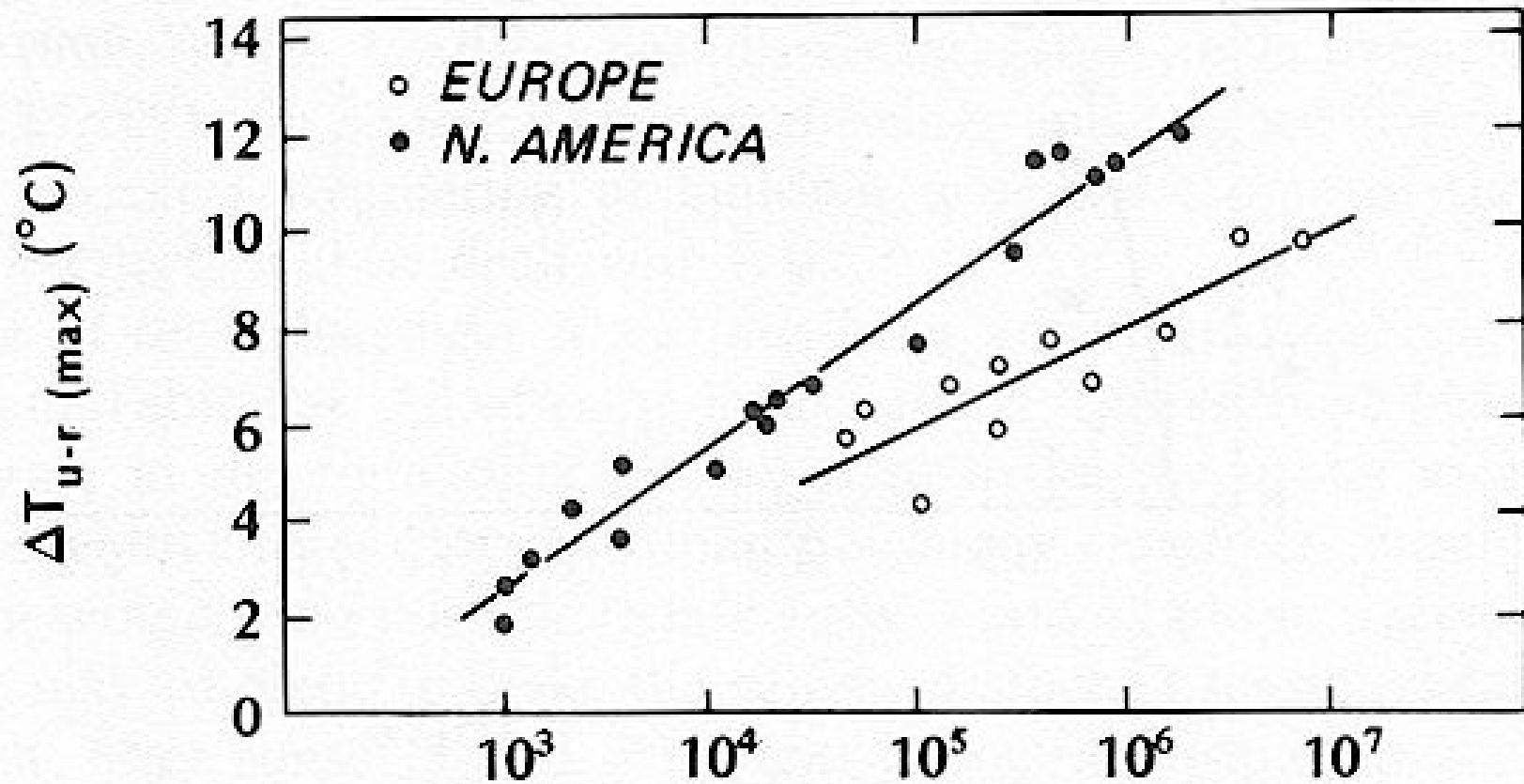


Figure 8.15 Relation between maximum observed heat island intensity ($\Delta T_{u-r(max)}$) and population (P) for North American and European settlements (modified after Oke, 1973).

L'AMBIENTE URBANO

proprietà' fisico-chimiche

- L'ambiente urbano è un sistema complesso nel quale gli scambi energetici sono governati dalla radiazione incidente e dalle proprietà ottiche-geometriche delle superfici e di conduzione termica dei materiali.

$$R_n = H + LE + G + M + C_{ant}$$

$$R_n = (1-\alpha)R_{Si} + (R_{Li}-R_{Lo})$$

- Questi scambi influenzeranno anche le proprietà locali della turbolenza e conseguentemente anche le caratteristiche della 'urban pollution bubble'.

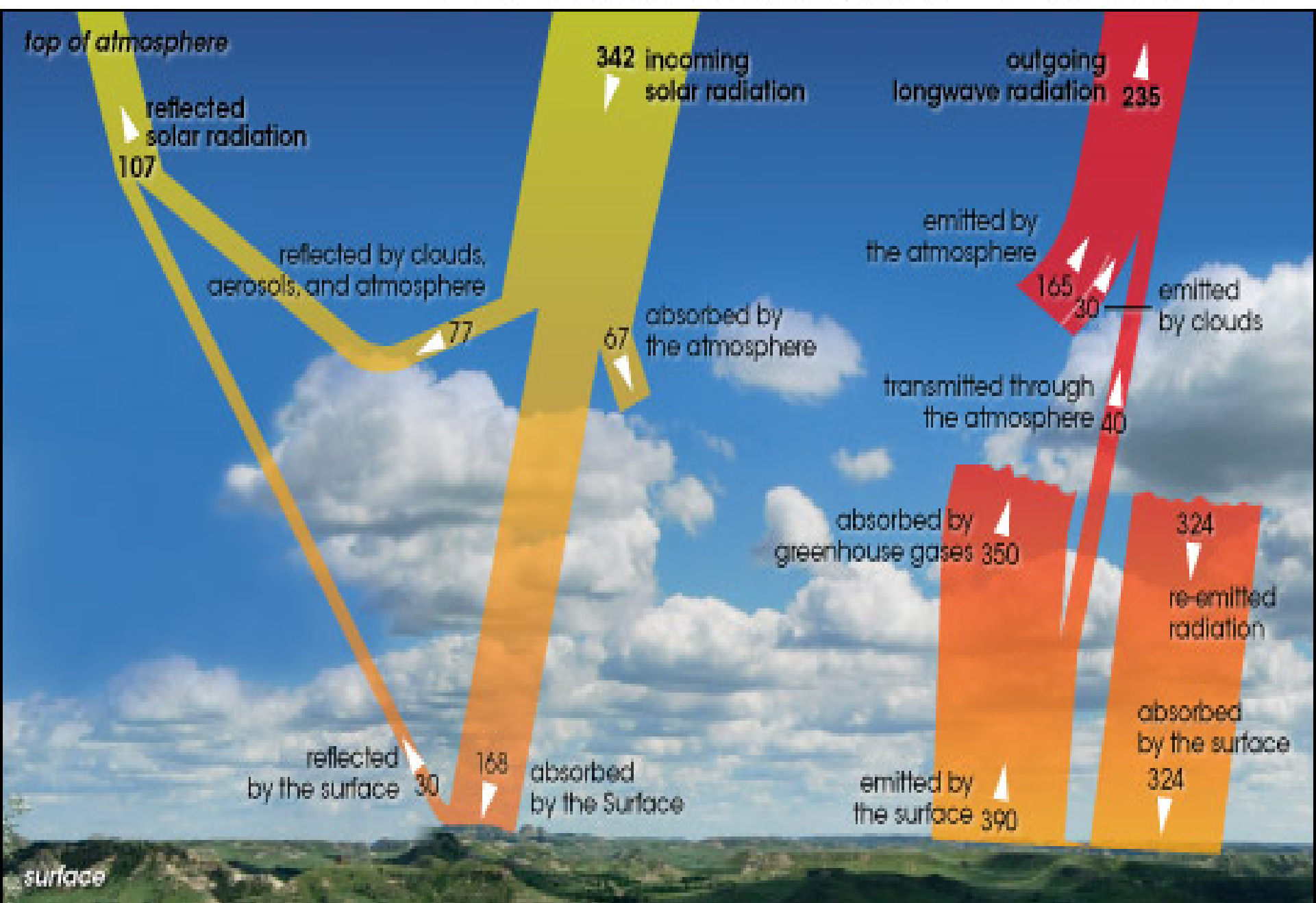


Figure 3a: Typical Daily Summer Rural Energy Balance

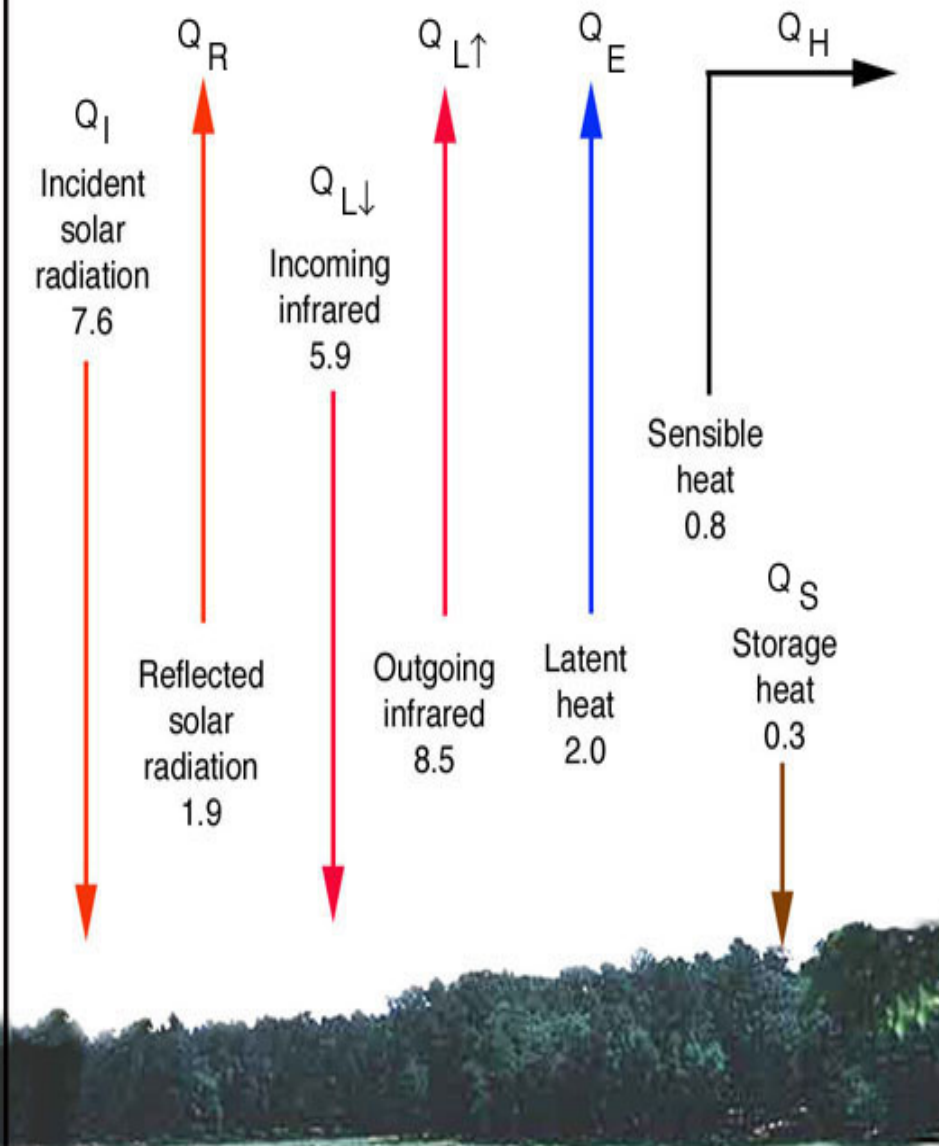
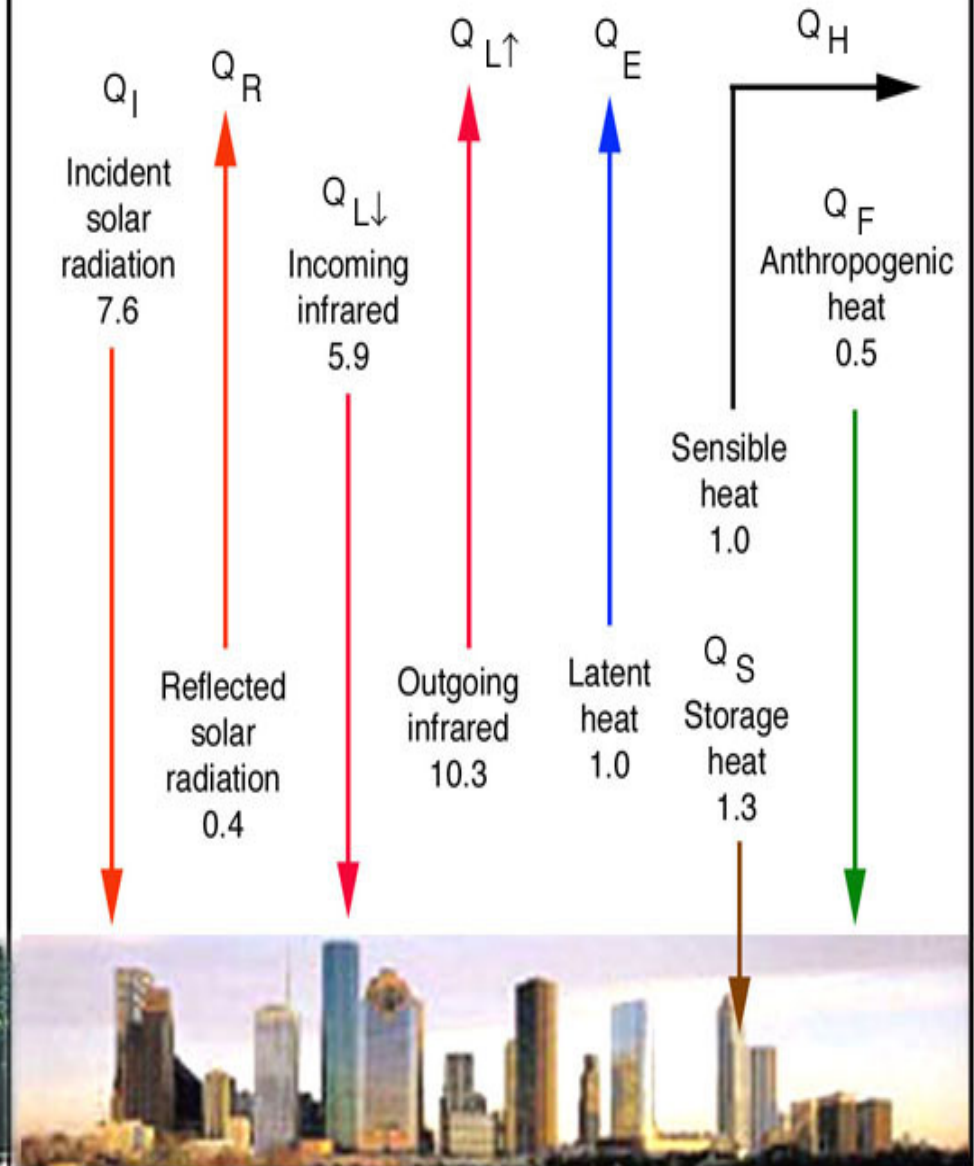
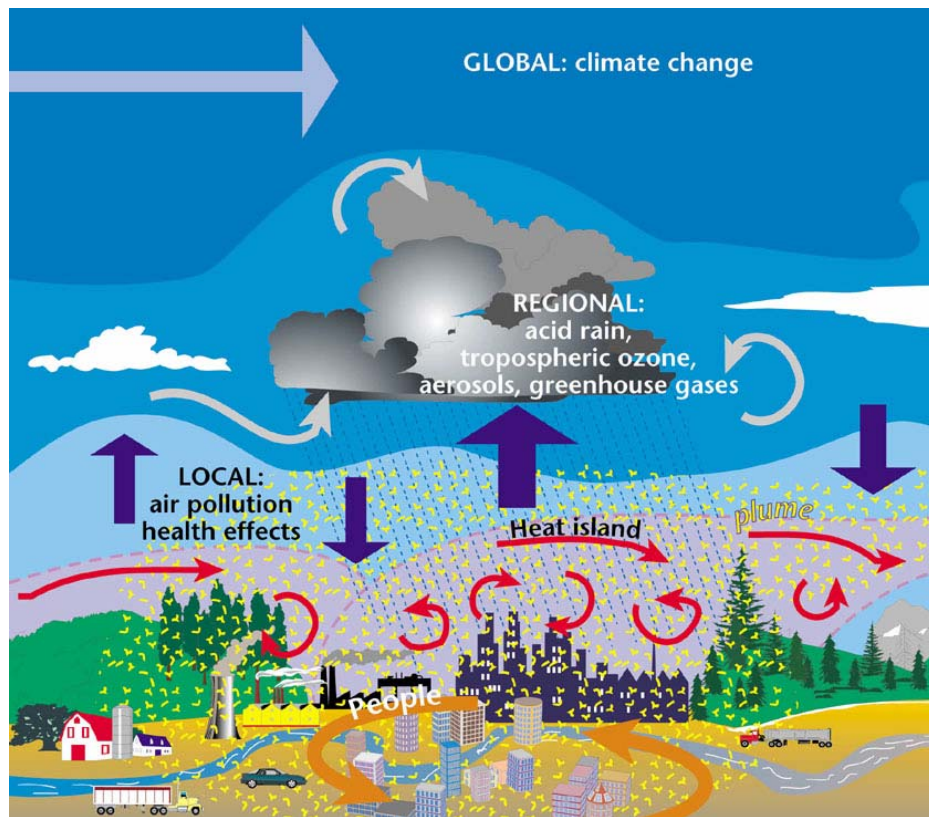


Figure 3b: Typical Daily Summer Urban Energy Balance

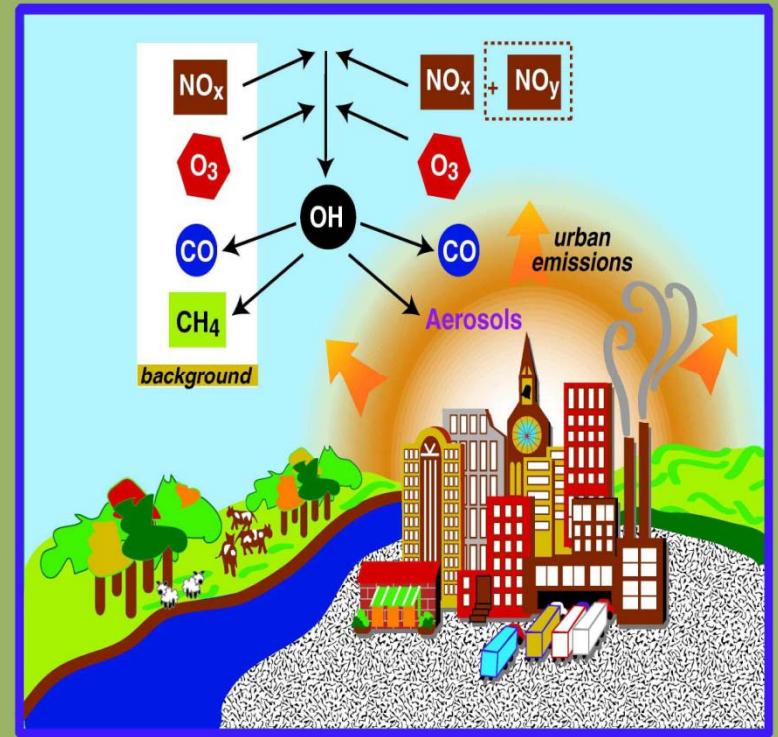
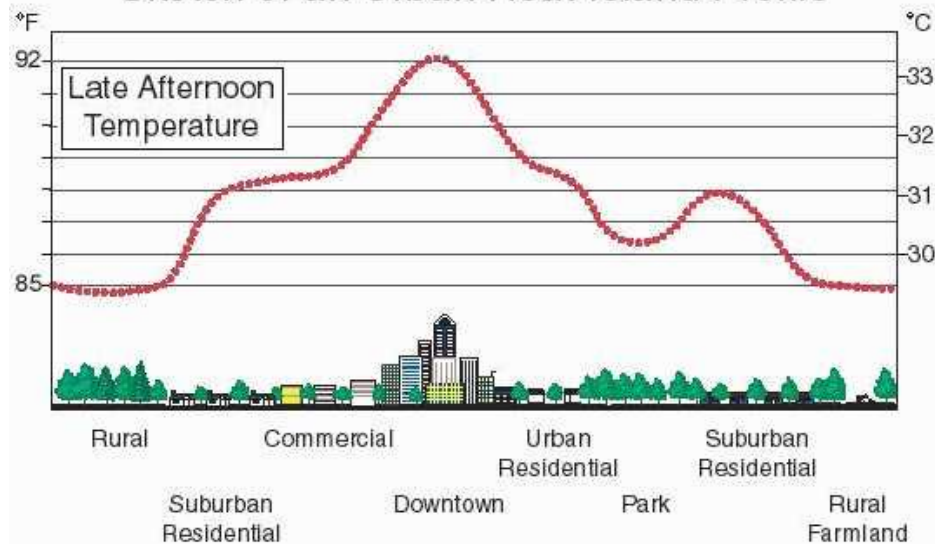


Proprieta' e conseguenze

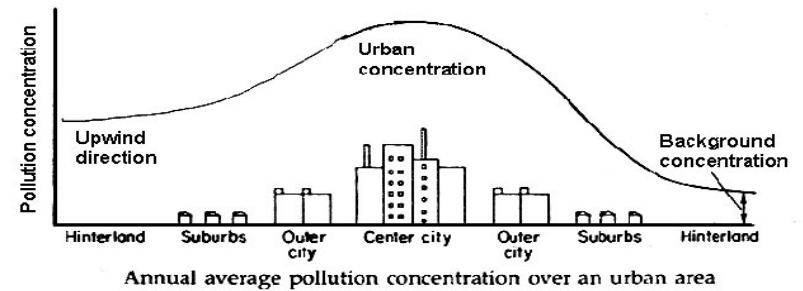
Per sua natura l'architettura dell'ambiente e' complessa e gli scambi energetici avranno andamenti regolati dalla 'tessitura' ambientale intendendo con questa tutte le caratteristiche chimico-fisiche funzionali quali: morfologia, proprieta' superficiali, topologia e uso antropico del territorio.



Sketch of an Urban Heat-Island Profile



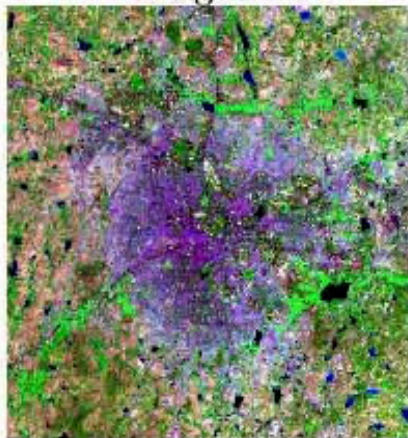
Urban Pollution Bubble



Factors that increase urban air pollution:

- High concentration of vehicles, factories, homes.
- Lower wind speeds due to greater surface roughness.
- Basin drainage (many cities located in valleys).
- Temperature inversions common from heat island effect.

Bangalore



Damascus



New York



Shanghai



Beirut



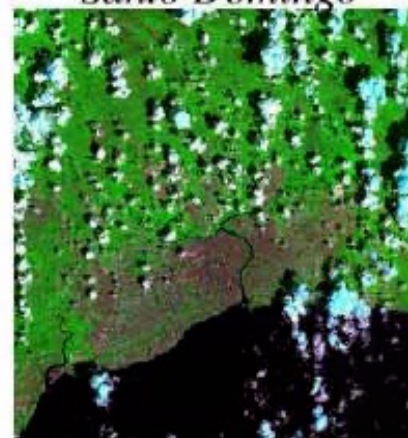
Guangzhou



Port au Prince



Santo Domingo



Budapest



Hanoi



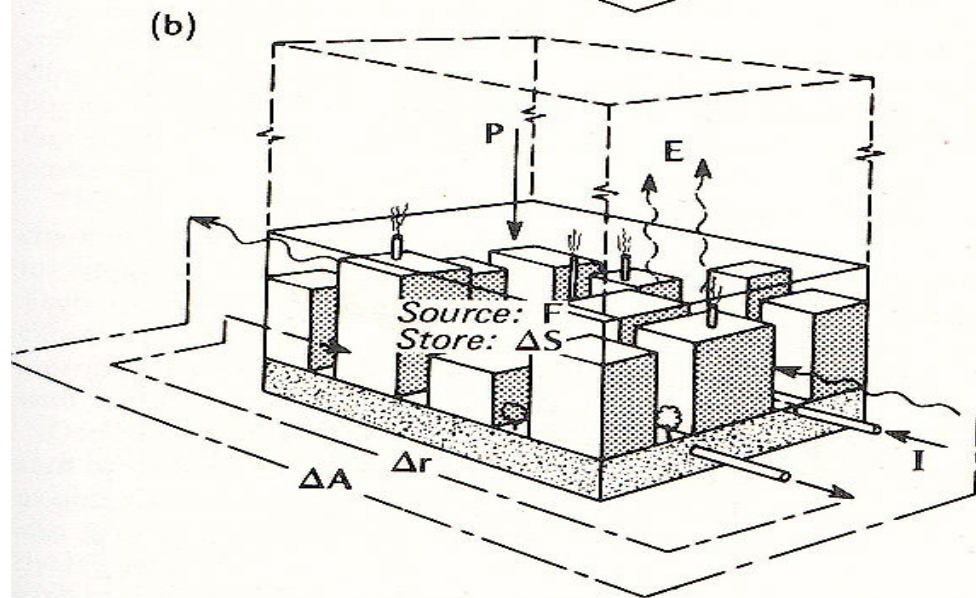
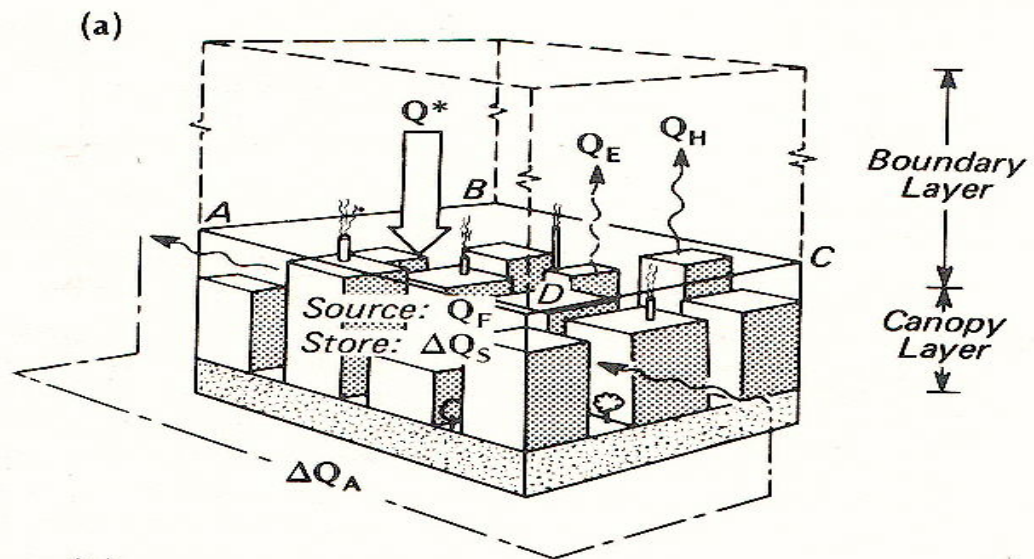
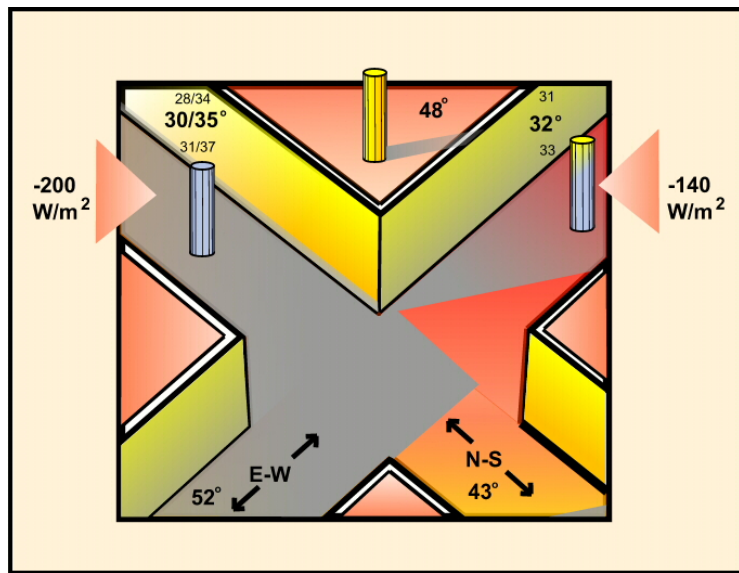
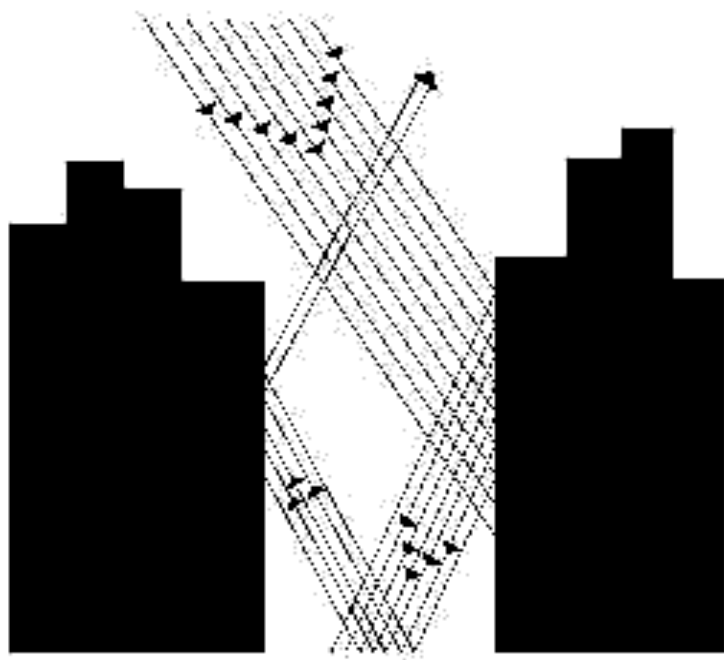
Pyongyang



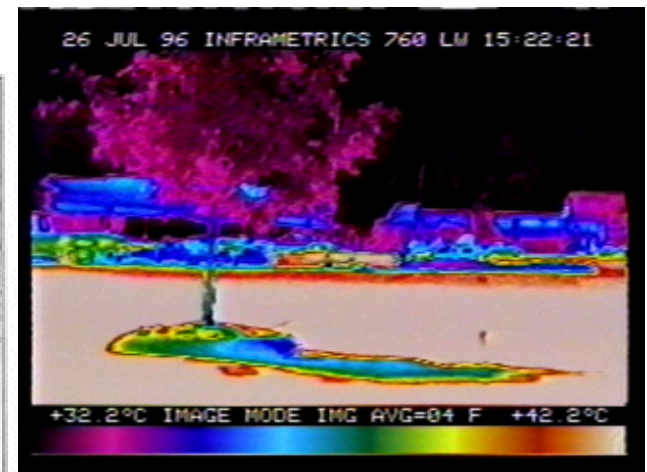
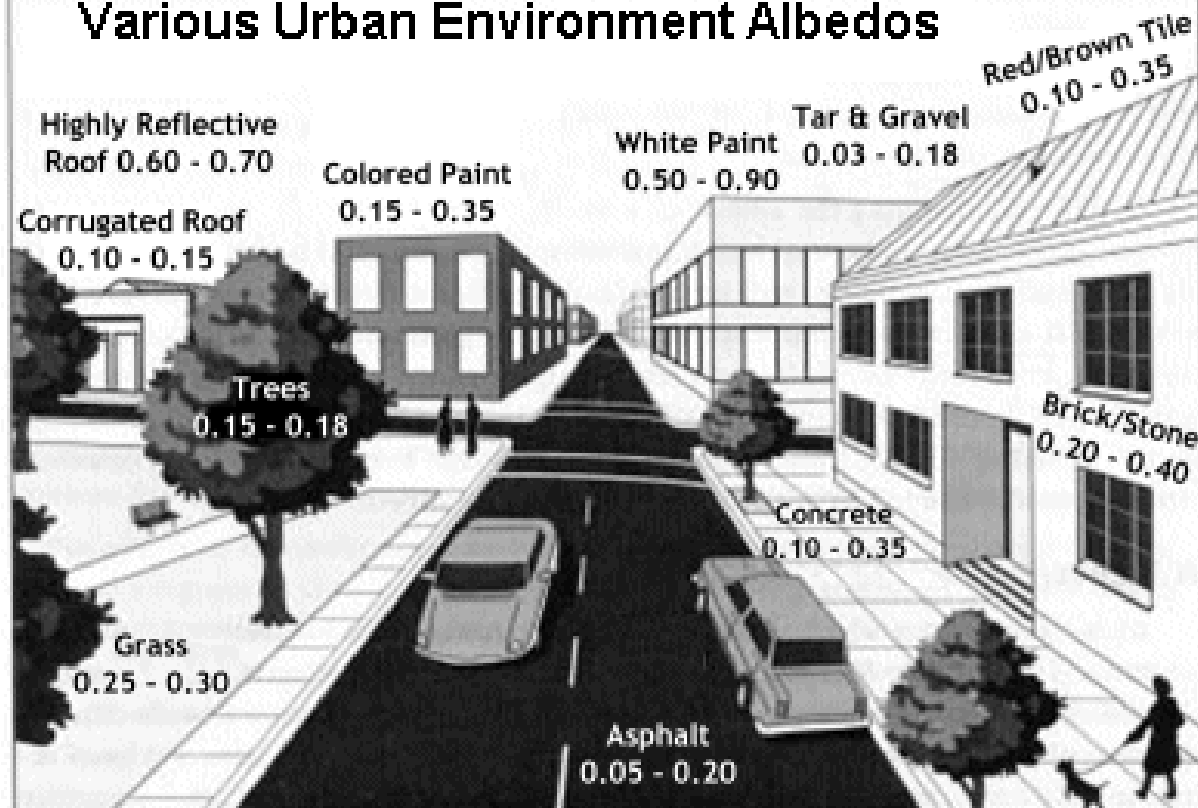
St. Petersburg





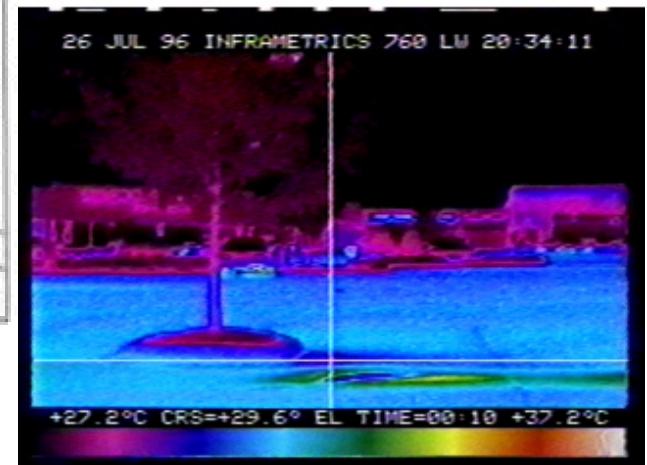


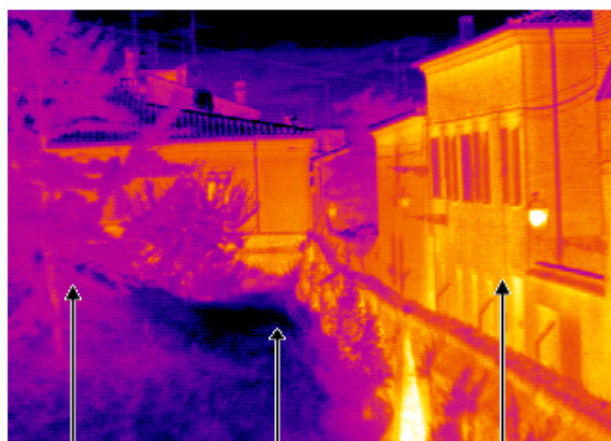
Various Urban Environment Albedos



Day

Night

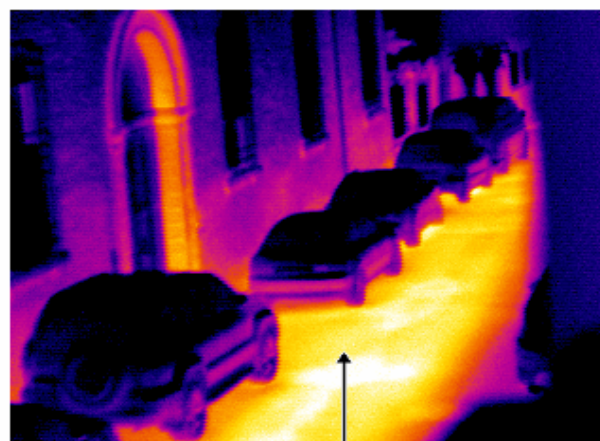
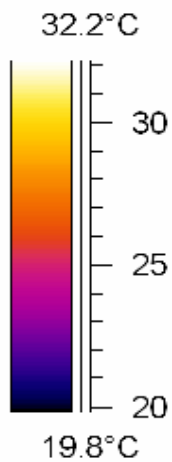




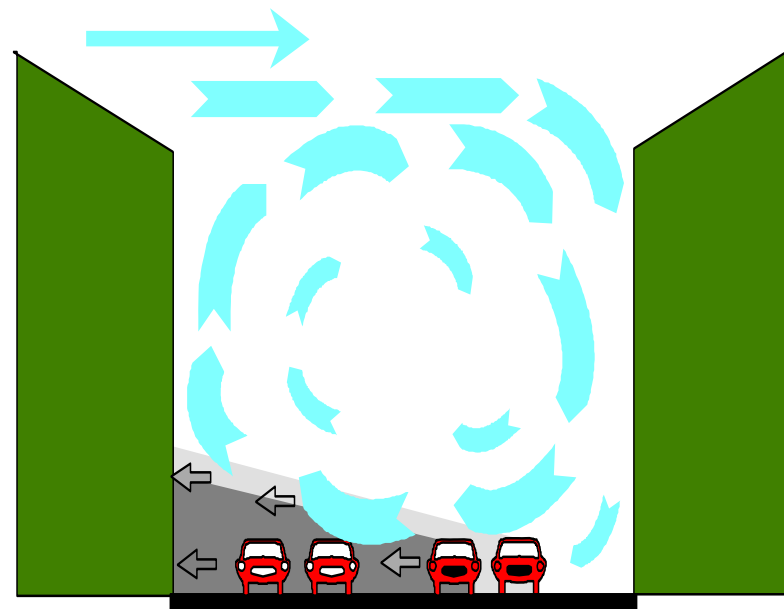
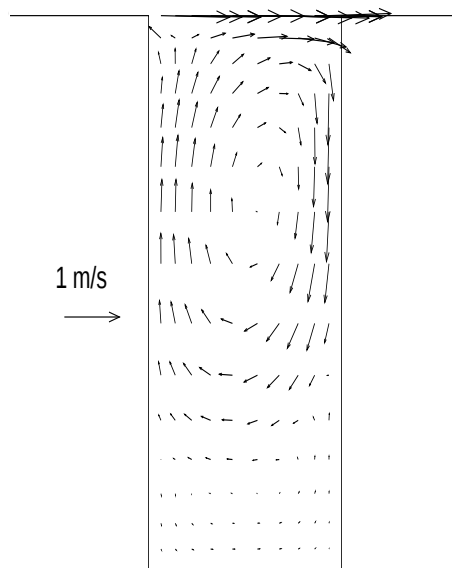
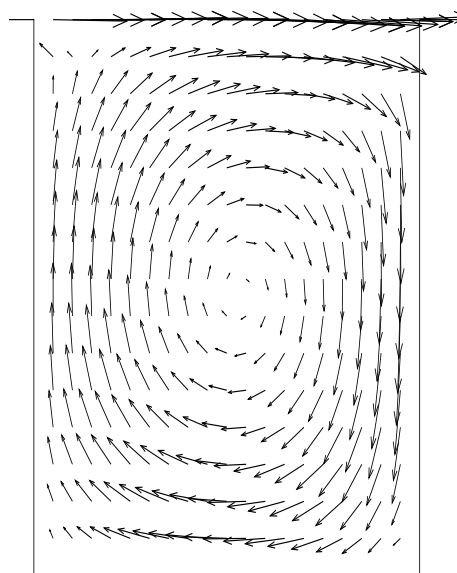
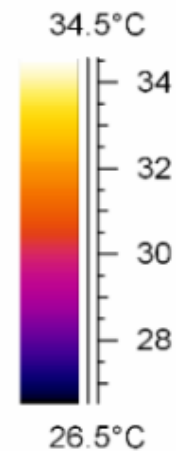
Albero
ad alto fusto

Prato

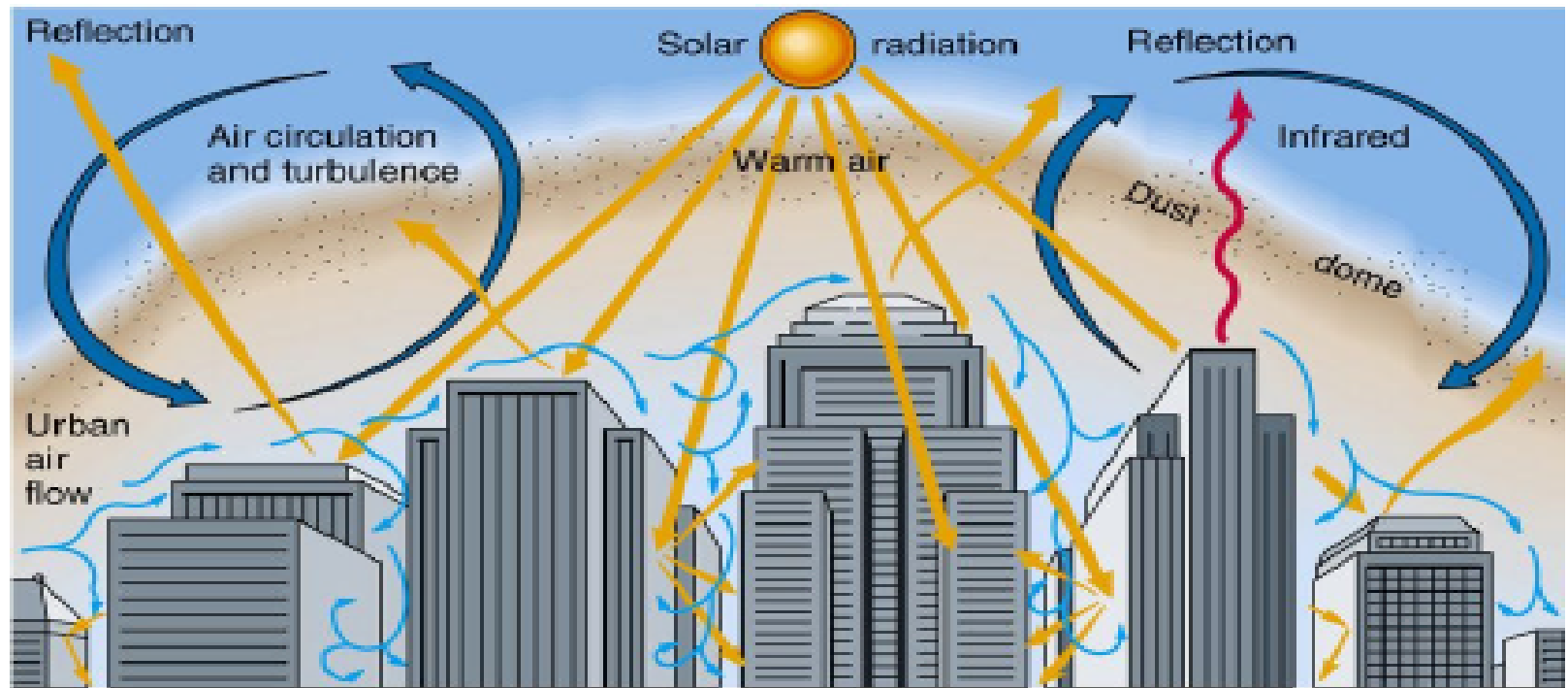
Facciata
in mattoni

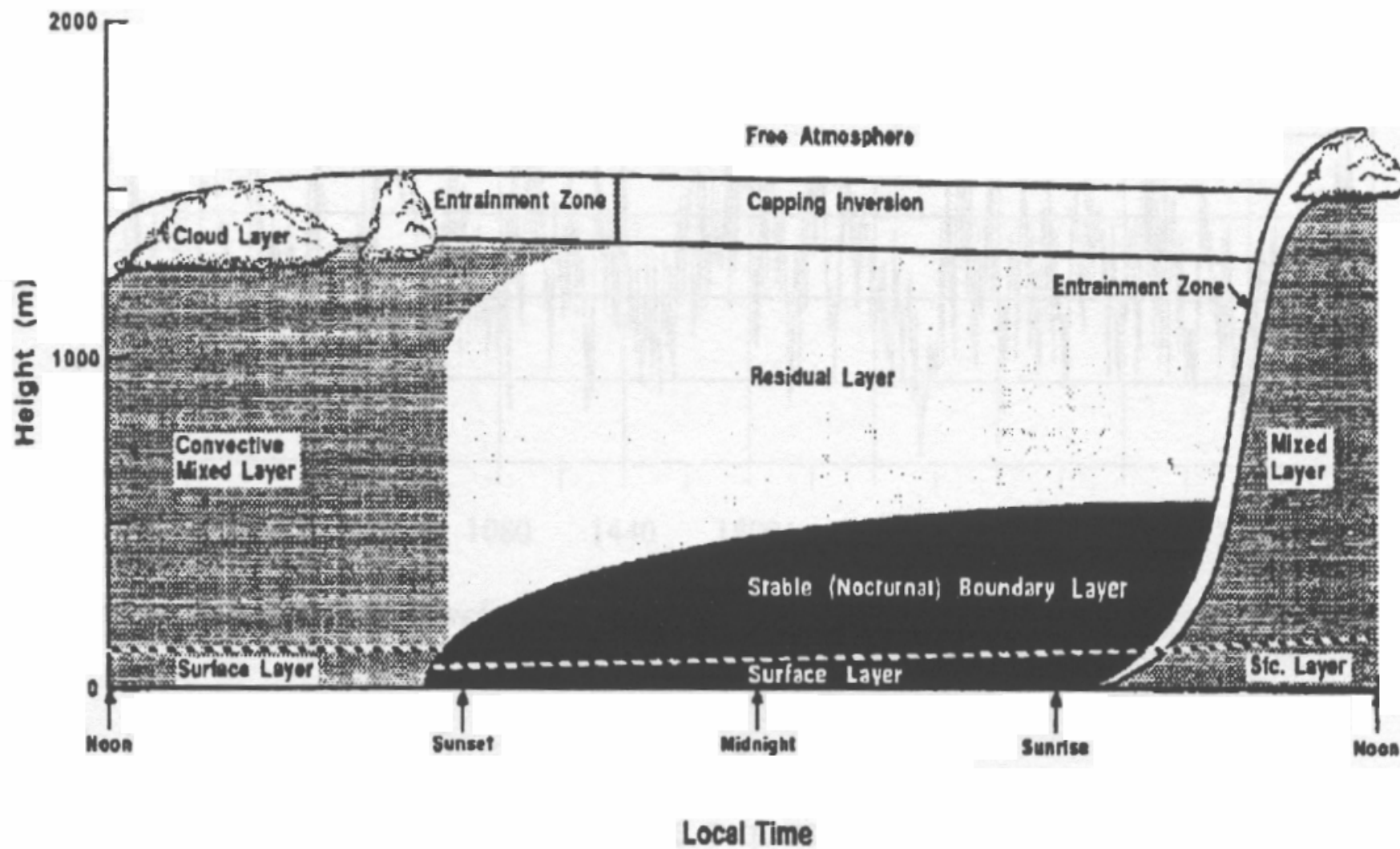


Asfalto

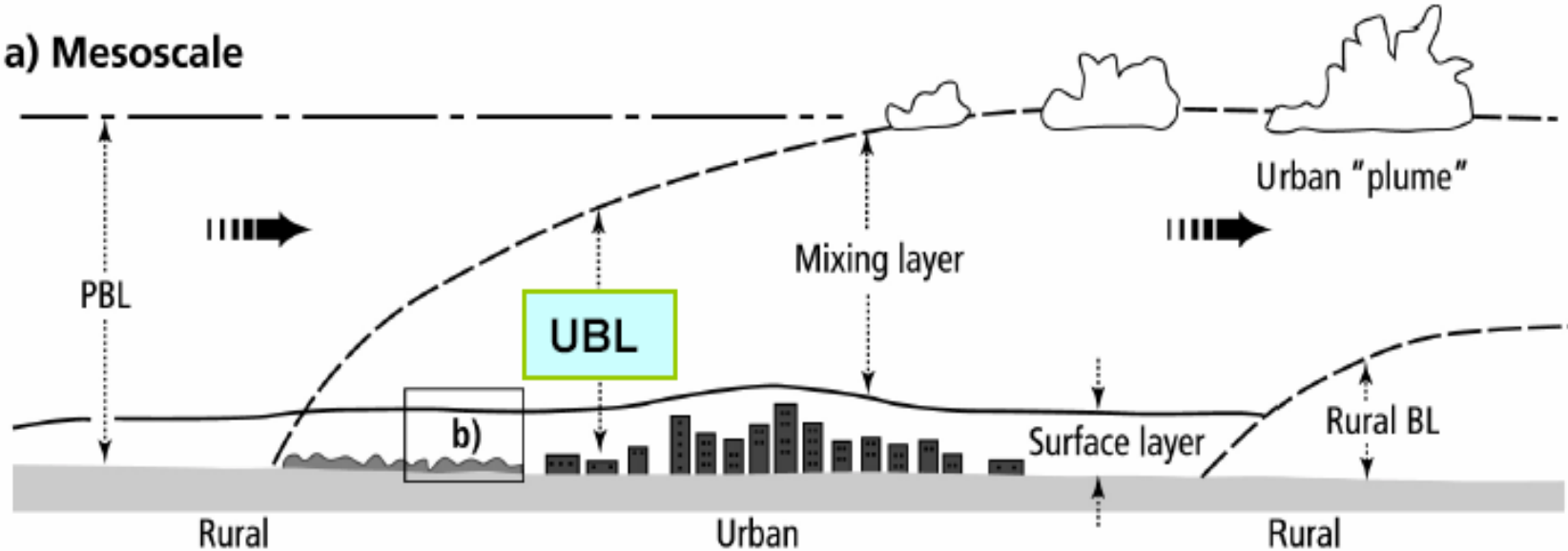


Properties of the urban environment

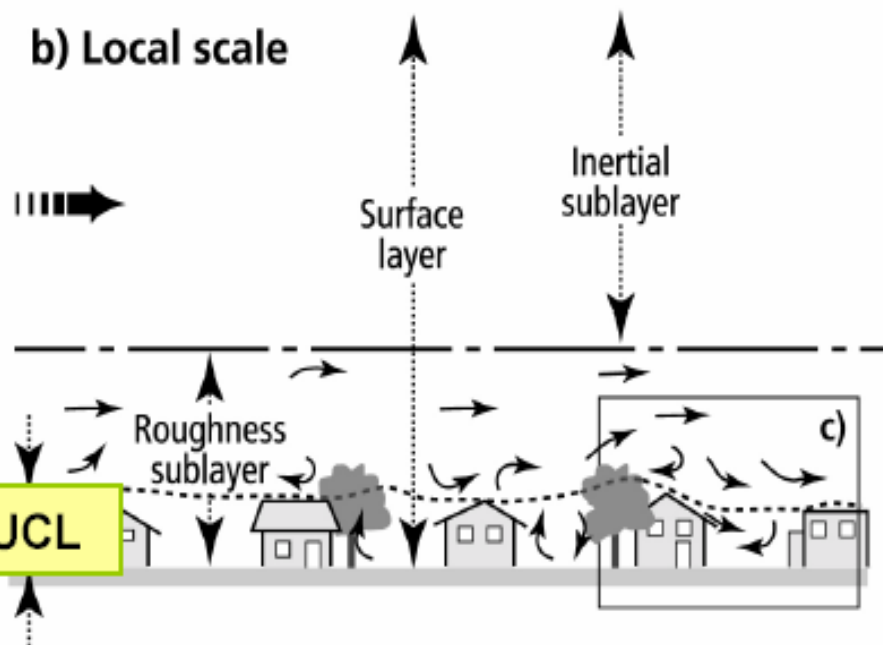




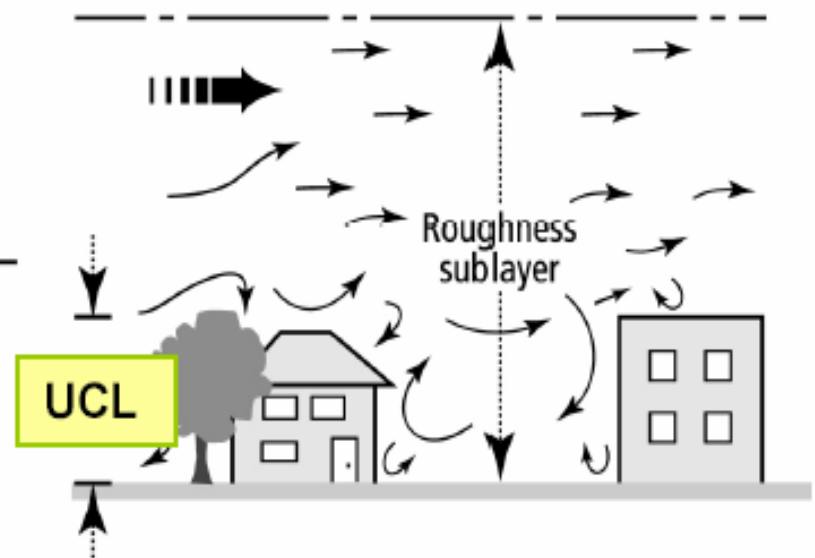
a) Mesoscale



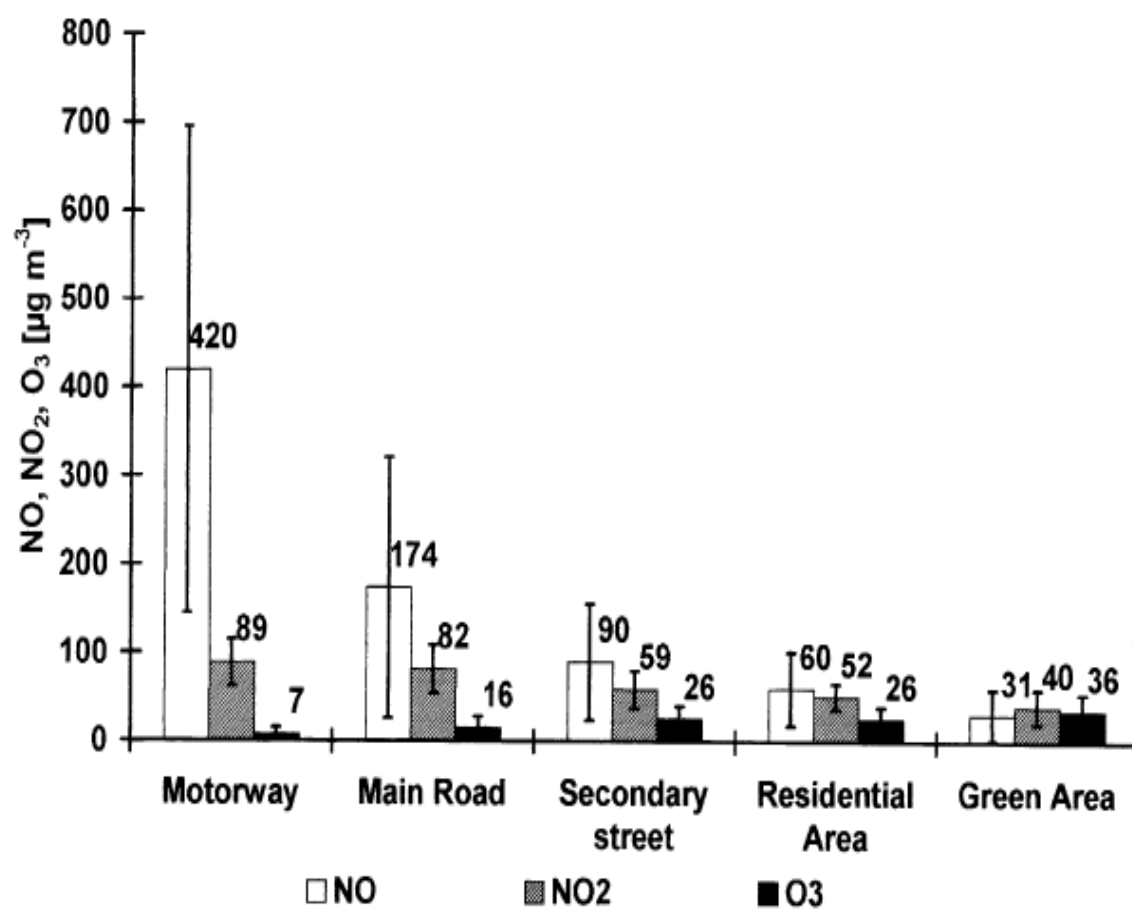
b) Local scale



c) Microscale



Modified after Oke (1997)



**E' del 1924 la denuncia di Le Corbusier:
Le città non
assolvono più
la loro
funzione.
Sono
inefficienti,
ci logorano il
fisico,
ci mortificano
lo spirito. ...
Non sono
degne del
nostro tempo,
non sono più
degne di noi.**

Low



Medium

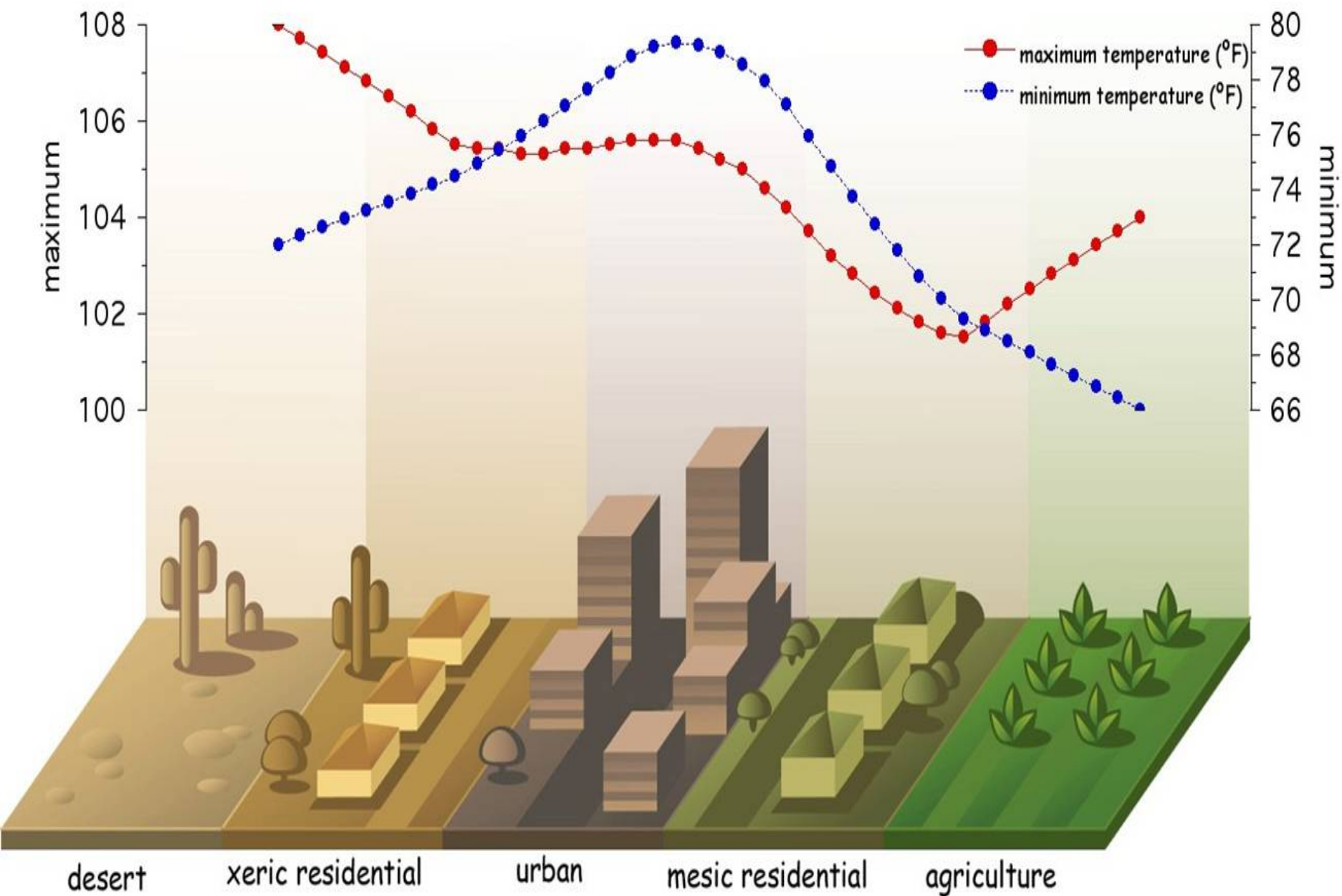


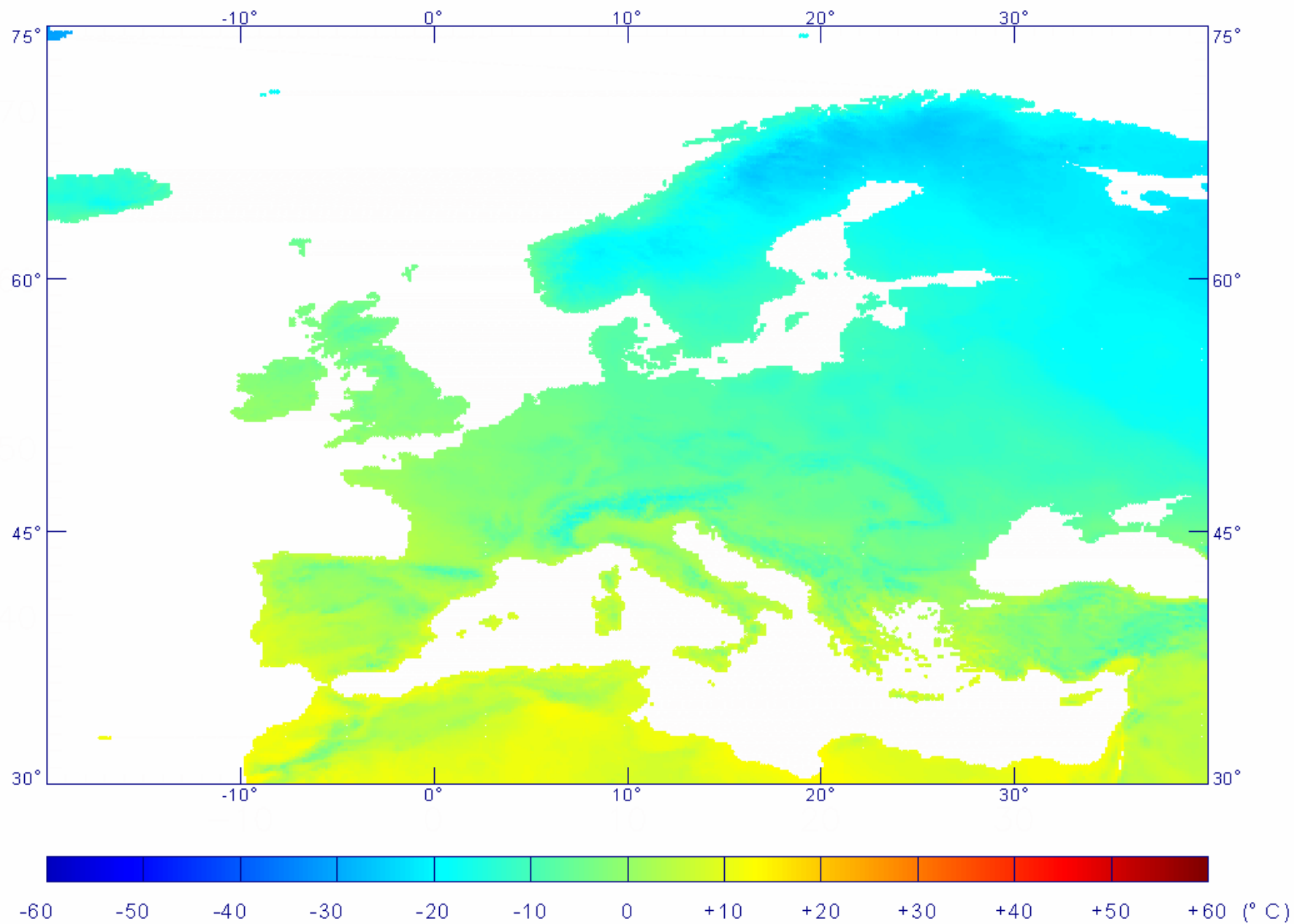
High

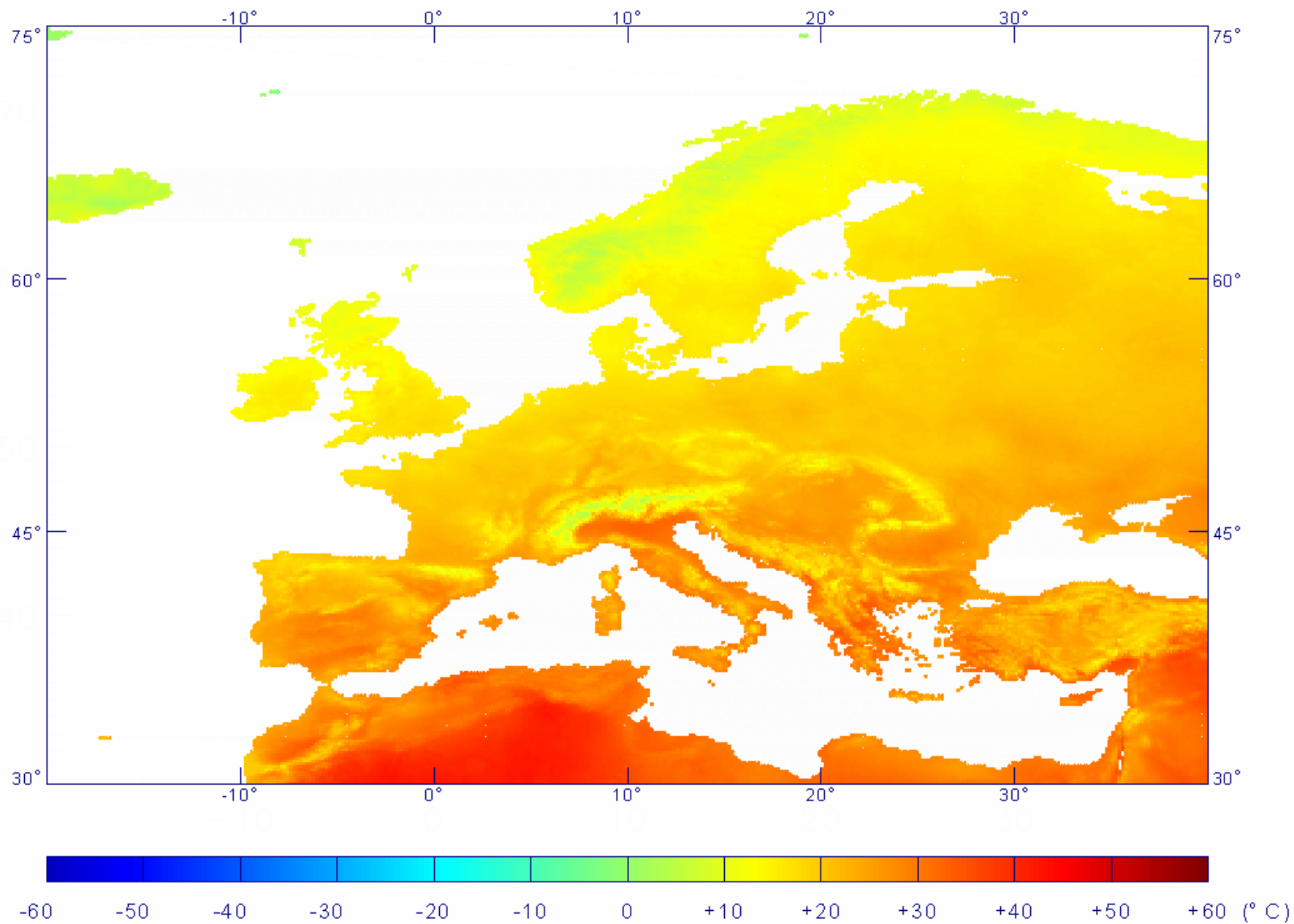


High-rise



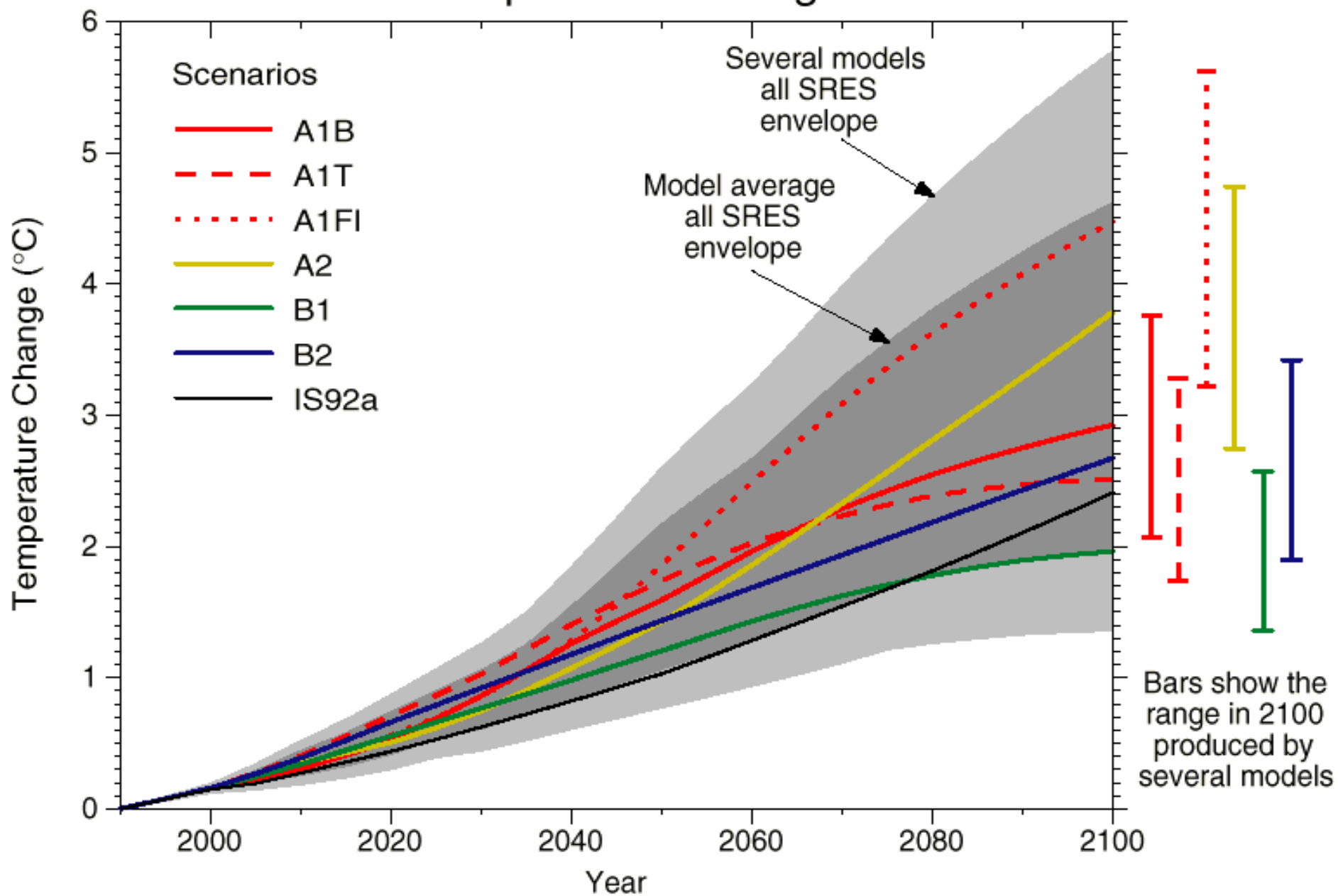






(b)

Temperature change



Seasonal values of PET for different IPCC-Scenarios for 1960-1990 and 2070-2100 for Europe

		Winter	Spring	Summer	Autumn
Base	Max	16.0	27.2	43.1	29.8
	Min	-27.6	-15.0	1.2	-13.9
A1F	Max	21.2	34.7	51.6	37.9
	Min	-17.9	-6.9	5.7	-7.0
A2A	Max	20.3	33.4	51.5	36.4
	Min	-19.4	-8.6	5.4	-8.1
B1A	Max	18.4	30.7	48.3	33.8
	Min	-20.8	-10.4	3.8	-10.5
B2A	Max	19.2	31.6	49.5	34.7
	Min	-22.1	-10.7	4.2	-9.2

Seasonal values of PET for different IPCC-Scenarios for 1960-1990 and 2070-2100 for Italy

		Winter	Spring	Summer	Autumn
Base	Max	10.0	16.4	30.3	21.4
	Min	-14.9	-7.7	3.2	-4.6
A1F	Max	15.2	23.8	40.9	30.2
	Min	-9.9	-3.4	10	1.8
A2A	Max	14.1	22.2	40.2	28.2
	Min	-10.9	-4.3	8.2	0.4
B1A	Max	12.3	19.7	36.6	26
	Min	-11.9	-5.9	6.4	-1.8
B2A	Max	13.1	20.7	37.9	26.3
	Min	-12.4	-5.2	6.7	-1.1

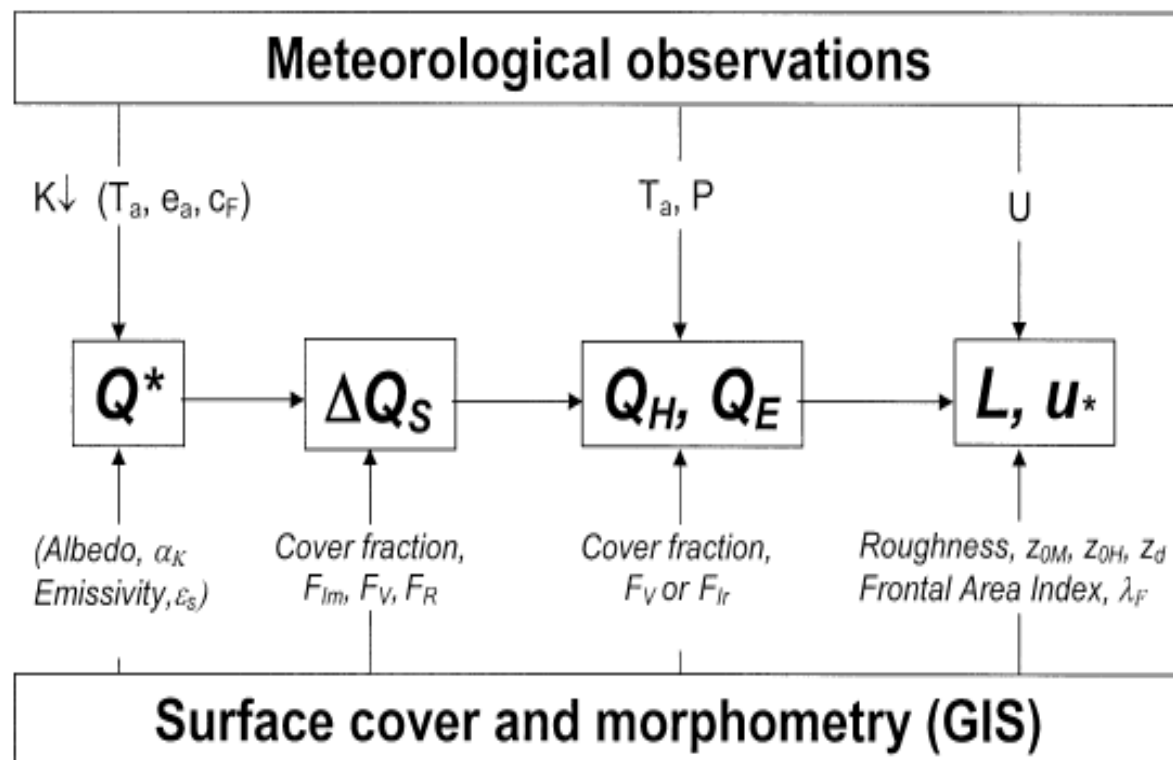
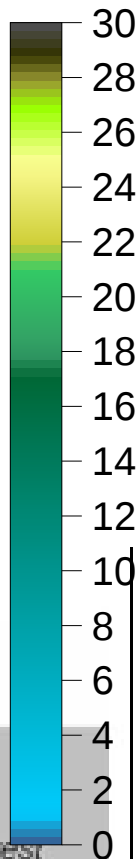
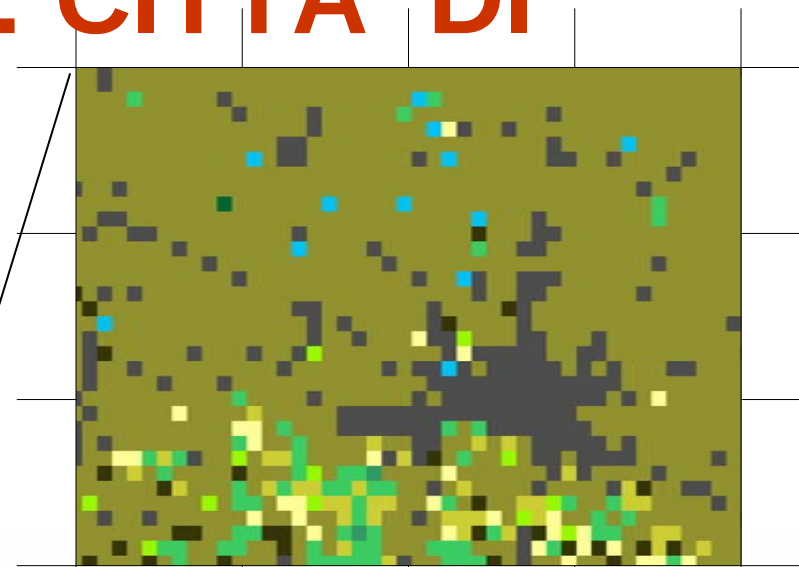
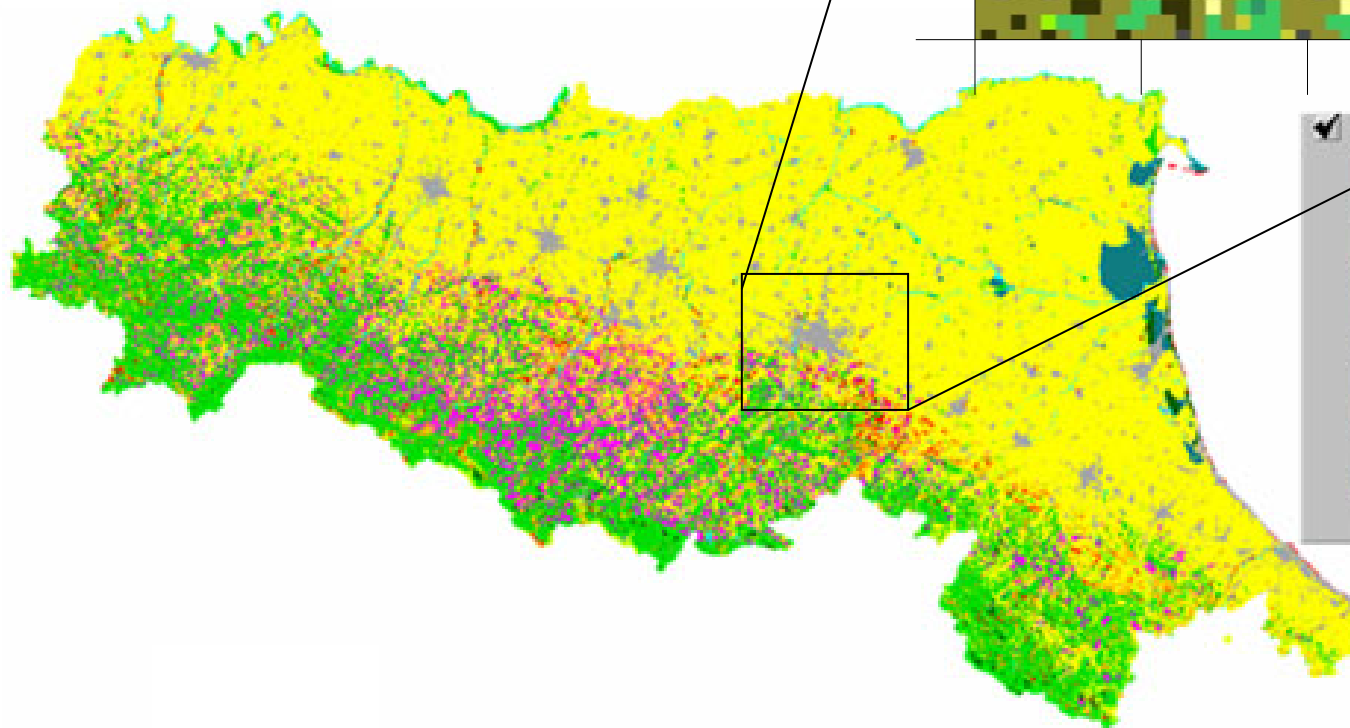


FIG. 1. Flow chart of the structure of LUMPS. Quantities in parentheses are needed only if net all-wave radiation Q^* or incoming shortwave radiation $K\downarrow$ are not measured: T_a is air temperature, e_a is actual vapor pressure, c_F is cloud fraction, P is pressure, U is wind speed, ΔQ_S is storage heat flux, Q_H is turbulent sensible heat flux density, Q_E is latent heat flux density, L is Obukhov length, and u^* is friction velocity.

USO DEL SUOLO: CITTA' DI BOLOGNA



$$H = c_p \rho C_H U_a (T_H - T_a)$$

where C_H and T_H are the ‘surface-layer’ bulk transfer coefficient and effective surface temperature, respectively. From the identical equation in terms of T_a produced by Equations (18), (19), and (20), C_H and T_H can be described as,

$$C_H = \left[\sum_{i=1}^6 C_H(i) A(i) \right] / A_{\text{lot}}, \quad (21)$$

$$T_H = \left[\sum_{i=1}^6 T_S(i) C_H(i) A(i) \right] / C_H A_{\text{lot}}. \quad (22)$$

Equation (22) suggests that the ‘effective surface temperature’, an alternative representation of urban surface temperature, can be derived from the average of the surface temperatures weighted by the local bulk transfer coefficient times the area. Equations (17) and (22) show that the radiative and effective surface temperatures are different.

(M. Kanda et al., 2004)

$$u(z) = u_H \exp\left(a\left(\frac{z}{H} - 1\right)\right),$$

