



Air Temperature Gradient Studies In Helsinki Metropolitan Area During 2002 - 2006

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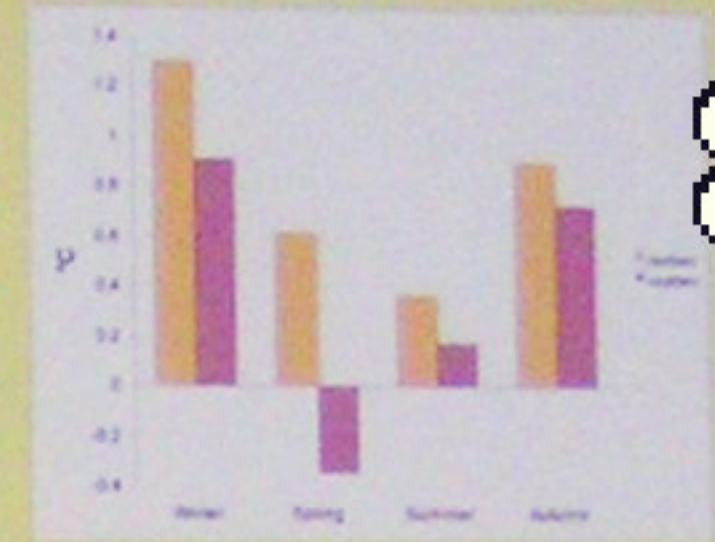
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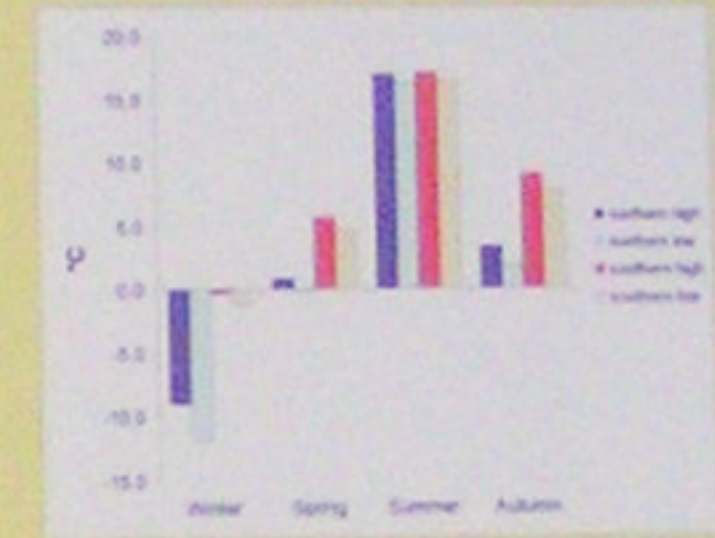
The Helsinki Metropolitan Network map
 red dots - observation points,
 black dots - synoptical weather stations,
 black circles - former observation points,
 the numbers on the dots refer to the
 observation point catalogue.

number	name	currently in operation = x
01	Helsinki Kaisaniemi	-
02	Helsinki Siltavuorenpengari	-
03	Helsinki Vuosaari	-
04	Espoo Otaniemi	-
05	Helsinki Viikki	-
06	Helsinki Pitäjämäki	x
07	Helsinki Iisa-Pakila	x
08	Helsinki Malminkartano	x
09	Helsinki Torppamäki	-
10	Vantaa Tammisto	-
11	Vantaa Riipilä Valley	x
12	Helsinki Hemesaari 1	-
13	Kirkkonummi Sundsberg	-
14	Helsinki Bulevardi	x
15	Helsinki Kruununhaka	x
16	Helsinki Tahlipuutarha	x
17	Helsinki Villinki	x
18	Sipoo Dagisverksberget	-
19	Helsinki Hemesaari 2	-
20	Vantaa Backas	x
21	Vantaa Riipilä Hill	x
22	Helsinki Harju	-
23	Helsinki Tammsalo	x
31	Vantaa Asola	-
32	Vantaa Malminlinna	x
33	Vantaa Westerkulla 1	x
34	Vantaa Westerkulla 2	x
	same location as number 33	
50	Helsinki-Vantaa airport, synoptical weather station, FMI	-
51	Helsinki Kaisaniemi, synoptical weather station, FMI, same location as number 01	-

The Helsinki Metropolitan Network observation point catalogue.



Daily mean air temperature differences for the synoptical weather stations Helsinki Kaisaniemi and Helsinki-Vantaa airport for northerly and southerly air circulation 08/2002 - 04/2006.



Highest and lowest seasonal daily mean temperatures for six HMA observation points for northerly and southerly air circulation 08/2002 - 04/2006

Due to the climatic control of the sea, the Helsinki Metropolitan Area (HMA) has special features of temperature variation moving from the coastline towards the inland. Since August 2002, a network of air temperature measurement points has been built up on a line from the coast of the Baltic Sea to approximately 25 km to the inland. Based on this network it is possible to monitor the spatial variation of temperature under different mesoscale air mass circulation patterns in densely built-up urban and in less dense suburban area. By comparing the 2-minute air temperature measured at the network points with air temperature, relative humidity, and wind speed and direction measured on two observations sites of the Finnish Meteorological Institute, FMI, we can define the local impacts into temperature patterns. With a highly structured coastline the downtown area lies on a peninsula with waterbodies not more faraway than one kilometer. The city of Helsinki has about 550.000 inhabitants and with its neighbour communities the number of inhabitants reaches one million. During spring and autumn the near-by water bodies may cause local scale differences in air temperature. These phenomena are intensified by the geomorphical structure of the Helsinki Metropolitan Area.

The air temperature gradient studies in the Helsinki Metropolitan Area pointed out that there is an urban heat island effect through out the year in spite of the general air mass circulation patterns. The size of the urban heat island effect, however, depends on the general air mass circulation.



02 Siltavuorenpengari



08 Malminkartano



11 Riipilä



13 Sundsberg



14 Bulevardi



16 Tahvipuutarha

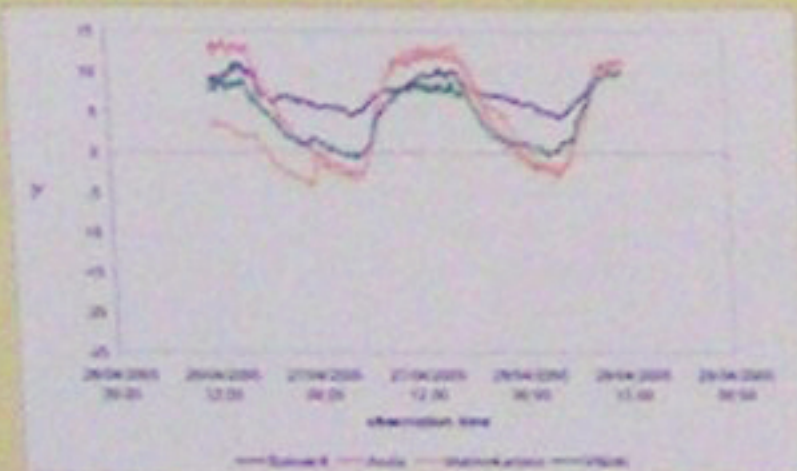


17 Villinki

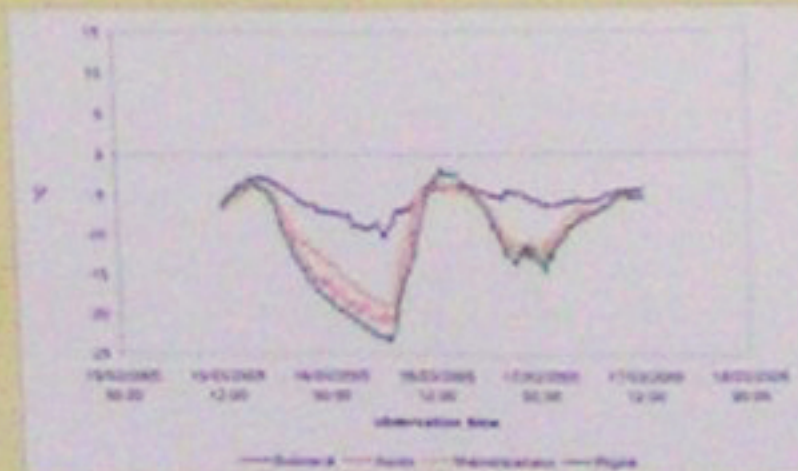


31 Asola

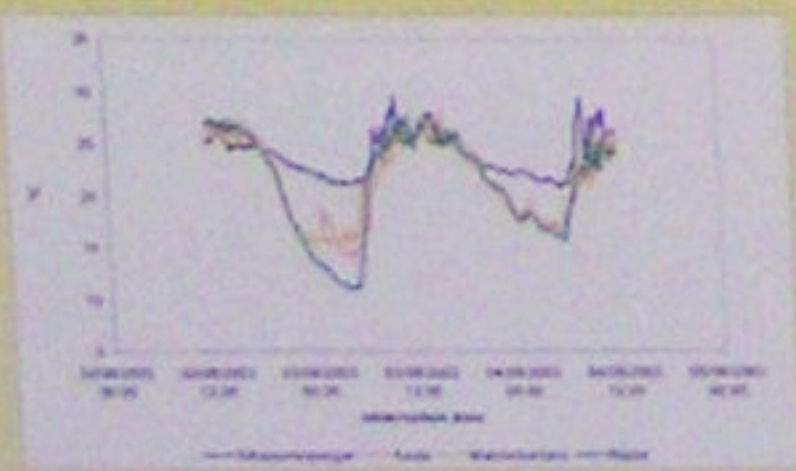
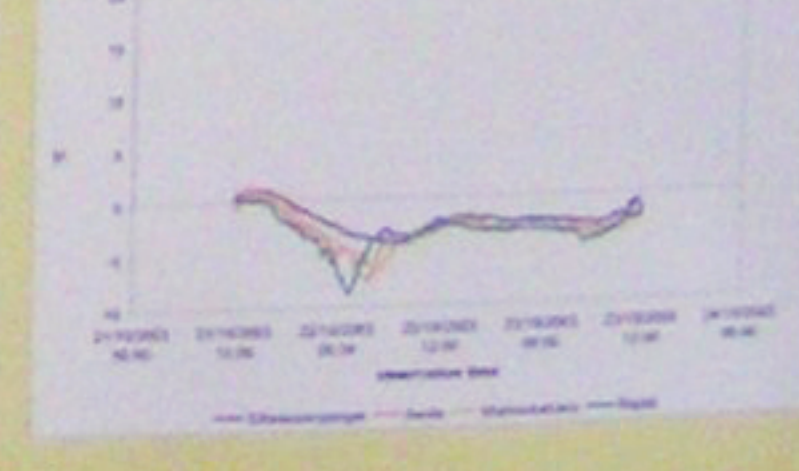
The Helsinki Metropolitan Network pictures of observation points used in the seasonal analyses below, the numbers refer to the observation point catalogue.



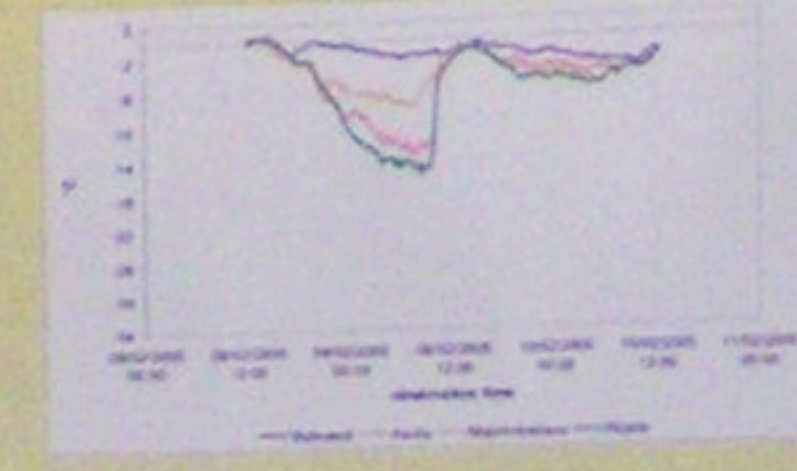
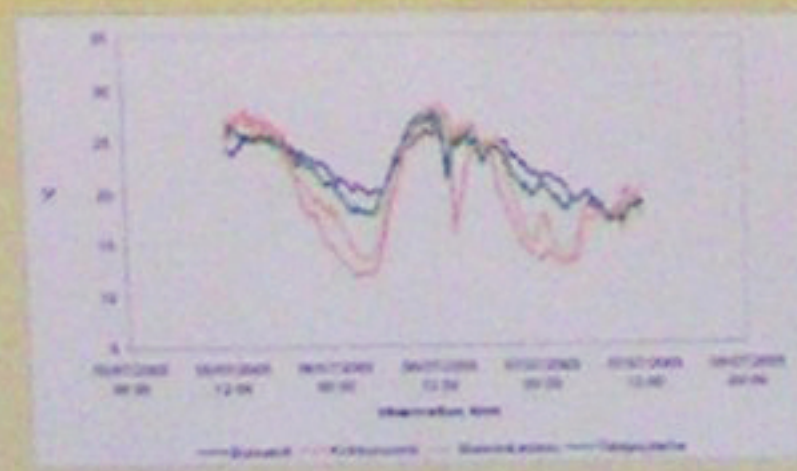
Spring
 left southern air circulation, right northern air circulation



Autumn
 left southern air circulation, right northern air circulation



Summer
 left southern air circulation, right northern air circulation



Winter
 left southern air circulation, right northern air circulation



Seasonal analyses of air temperature patterns for northern air mass circulation (330 - 30°) and for southern air mass circulation (150 - 210°).