IAUC Newsletter

International Association for Urban Climate

www.urban-climate.org

Issue No. 10
April, 2005.

Applications for funding to attend the ICUC6 meeting: I am very pleased to announce that the WMO will support the attendance of scientists from developing countries at the ICUC6 conference in Goteborg (June 2006). Requests or nominations should be submitted by **June 10th, 2005**. The application/nomination should include: a curriculum vitae; a short statement (maximum 300 words) on research interests and rationale for attending the conference. The material may be submitted by email or regular mail to Prof. Sue Grimmond, Atmospheric Science Program, Geography, Student Building 104. 701 E. Kirkwood Ave, Indiana University, Bloomington, IN 47405-7100 USA. Complete contact details for the applicant must be provided.

News Editor: In this newsletter a new column entitled "Urban Climate News" appears. Dr Marshall Sheppard (NASA) will be collecting and editing items for this section. Please submit items that could be included in this column directly to him (marshall.shepherd@nasa.gov). News could include new grants; people cited in the media; environmental events; awards to urban climatologists; people with new positions or appointments etc. Images should be included as appropriate.

Nominations for Board Members: I urge you to consider standing for the Board of the IAUC or nominating a colleague**.** We seek diverse representation in terms of our members, their perspectives, and fields of study. Procedures to follow for nominations are presented in this issue of the Newsletter or can be found on the web (www.urban-climate.org). Nominations are due by Thursday, April 21st, 11:59 pm (UTC + 8 hrs). Nominations should be sent to the IAUC Secretary: Dr Matthias Roth (geomr@nus.edu.sg).

ICUC6 Brochures: A new brochure for the conference is now available for download from the web (www.gvc.gu.se/icuc6/). Please feel free to distirbute this at related conferences and/or to send out information on regional list-servs.

Submissions to the newsletter: Finally, I would like to encourage you to think about submitting an article or an item to the newsletter. In addition to the range of articles currently published in the newsletter, we are always open to new suggestions. Please contact me and/or Dr Gerald Mills (gerald.mills@ucd.ie).

Sue Grimmond
IAUC President.
(grimmon@indiana.edu)

Contents

Newsletter Contributions

The IAUC Newsletter is published bi-monthly. The next publication will occur in early June. Any items to be considered for the June edition should be received by **May 31, 2005.**

The following individuals compile submissions in various categories. Contributions should be sent to the relevant editor:

News:	Dr. J. Marshall Shepherd marshall.shepherd@nasa.gov
Conferences:	Jamie Voogt (javoogt@uwo.ca)
Websites:	Gerald Mills (gerald.mills@ucd.ie)
Bibliography:	Jennifer Salmond (j.salmond@bham.ac.uk)
Urban Projects:	Sue Grimmond (grimmon@indiana.edu)

General submissions should be relatively short (1-2 A4 pages of text), written in a manner that is accessible to a wide audience and incorporate figures and photographs where appropriate.

Urban Climate News

The NEWS section is designed to keep IAUC members aware of current items of interest within the broader urban climatology and related disciplines. We invite you to contribute to this section periodically. The following submissions represent the inaugural contributions to the NEWS section:

Developing a Gridded Building Morphological Statistics Database for the U.S. (pending approval to release)

Atmospheric transport and dispersion and mesoscale meteorological codes are increasingly being applied in urban areas. Representing urban terrain characteristics in these models is critical for accurate predictions of airflow, heating and cooling, and airborne contaminant concentrations in cities. A key component required to define the urban terrain is a description of building morphology (e.g., height, plan area, frontal area and sky view factor). As part of the U.S. Department of Homeland Security (DHS) Urban Database Project, a national dataset of building morphological statistics is being created in a collaborative effort led by Steven Burian at the University of Utah and Michael Brown at Los Alamos National Laboratory. The National Building Statistics Database (NBSD) is being created by processing building data for numerous U.S. cities and, where building data is not available, by correlating building statistics to population and land use.

The NBSD will contain gridded building morphological statistics at 250-meter horizontal resolution for most of the major metropolitan areas in the U.S. The first generation NBSD is scheduled to be released in June of 2005 and will include the following building statistics: mean building height, standard deviation of building height, plan-area-weighted mean building height, building surface-to-plan area ratio, complete aspect ratio, plan area fraction, frontal area index, height-to-width ratio, and sky view factor. In addition, height histograms, plan area density, roof area density, and frontal area density will be included at 1-m vertical resolution. Subsequent releases of the NBSD will include additional morphological parameters and urban–related surface cover parameters (e.g., impervious surface fraction). To obtain further information, to offer suggestions, or to be added to the NBSD distribution list please contact Steve Burian (burian@eng.utah.edu) or Mike Brown (mbrown@lanl.gov).

ATLAS Aids in Studying Tropical Urban Heat Islands

An ATLAS Users Workshop will be held in San Juan, Puerto Rico from June 30 – July 1, 2005. The San Juan, Puerto Rico, ATLAS mission was conducted during February 2004 to investigate the impact of the urban landscape and growth on the climate of this tropical city. The Airborne Thermal and Land Applications Sensor (ATLAS) operates in the visual and IR bands. ATLAS is able to sense 15 multi-spectral radiation channels across the thermal, near-infrared, and visible spectrums. The sensor also incorporates onboard, active calibration sources for all bands. The sensor is flown in a Lear 23 jet plane and captures about a 30-degree swath width to each side of the aircraft. The sensor also operates a 9-inch Zeiss camera for high-resolution photographic work. This ATLAS sensor has been used in other field campaigns to investigate UHI in large continental cities but, to date, there has been no major investigation of the UHI in a major tropical city (Fig. 1).

To support the Airborne Thermal and Land Applications Sensor (ATLAS) data, remote sensing observations were conducted, upper air soundings were launched, and a number of ground-based weather stations and temperature sensors were deployed. Upper air data show that during the days of the mission, the mid and high atmosphere in the Caribbean was relatively dry and highly stable, reflecting positive surface lifted index, a necessary condition to conduct this suborbital campaign. In consequence, only 8.4 mm of precipitation were reported during the entire mission. The weather stations and temperature sensors data show that heavily urbanized commercial areas have higher air temperatures than suburban residential areas, and much higher temperatures than rural areas. The data also shows that the urban heat island (UHI) peaks during the late morning to an average of 4.5ºC, a pattern not observed in similar studies of other cities. These results may be a reflection of large land use by low-rise buildings with an apparent absence of significant heat storage effects in the urban areas, and of the importance of the surrounding soil/vegetation moisture evapotranspiration in controlling the urban tropical climate. The ATLAS data was used to calibrate the spatial distribution of the surface temperature when using remote sensing images from the MODIS (Moderate Resolution Imaging Spectroradiometer). The information retrieved from MODIS for land surface temperatures reflected similar temporal and spa-

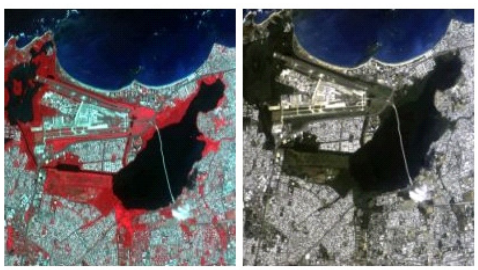


Fig. 1: Sample image from ATLAS over San Juan Airport.

tial variations as the weather stations and ATLAS measurements, with a highest absolute offset of about 5° C due to the differences between surface and air temperatures.

An analysis of the climatological data revealed that a UHI effect exists in the metropolitan area of San Juan, Puerto Rico. The mean temperature of the urban canopy air at 2 meters above ground level for the coastal and inland urban areas is over 1.84° C. The flight plan for the mission covered the San Juan metropolitan area, el Yunque National Forest, Mayagüez, and the Arecibo Observatory, for a total of 25 flight lines. The central area of San Juan was covered at 5 meters resolution in day and night flights. The remaining areas were covered at 10 meters resolution in day flights. The flights were conducted between February 11th and February 16th, 2004.

The Atlas Mission was completed with the direct collaboration of the NASA EPSCoR and NOAA-Crest programs of the University of Puerto Rico, NASA's GSPC and MSFC, the City University of New York, the University of New Mexico. For more information about this program, visit www.cmg.uprm.edu/atlas/index.html or contact Dr. Jorge Gonzalez.

Space-based Urban Thermometers and Aerosol-Cloud Detectors

NASA satellite observations have been used to identify urban heat island effects (UHI) in terms of skin temperature, the counterpart of near-surface air temperature that has been traditionally used in urban climate study. Jin et al. (2005) establishes that the UHI is more pronounced in skin temperature than air temperature in both daytime and nighttime. For example, in the daytime of July 2001, the Beijing urban region was 10° C warmer than surrounding non-urban regions. Meanwhile, at night, skin temperature over Beijing was 4° degree warmer than the surrounding regions. In addition, surface albedo and emissivity were decreased by urban canyon effect. Such understanding helps us to correctly simulate the surface processes related to the UHI. The study of Jin et al (2005) will appear in a forthcoming issue of the American Meteorological Society's Journal of Climate.

Additionally, urban modifications on the atmosphere layers are detected in aerosol and clouds fields, by using NASA MODIS observations. A recent study by Jin et al. (2005b) on urban aerosols-clouds-rainfall variations indicated that urban aerosols have distinct diurnal, seasonal, and inter-annual variations. Generally, urban aerosols have two sources: remote (e.g. aerosols transported from other regions) and local (e.g. related to human traffic and industry).

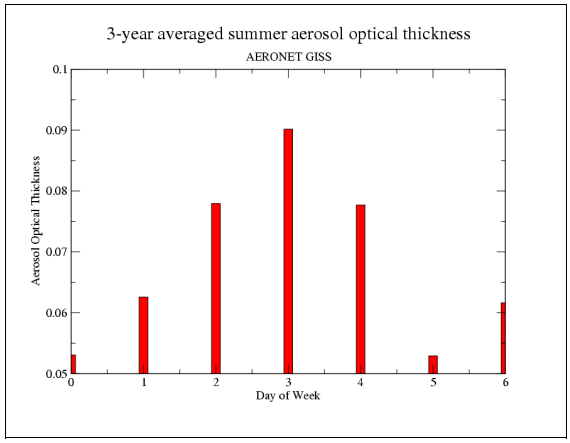
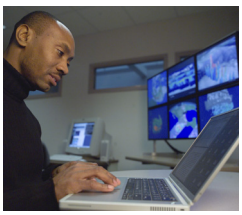


Fig 2. Averaged weekly distribution of aerosol optical thickness based on AERONET GISS station (41°N, 74°W). Data are from August-September 2000, June-Sept. 2001, and June-Sept 2002. To minimize the transport effect, for each day, only observations within nighttime hours 17:00pm-22:00pm are used to calculate the daily average. And only daily averages smaller than 0.15 are used to analyze the weekly variation. X-axis is day of the week, with "0" as Sunday, "1" as Monday, etc. (courtesy M. Jin/U of MD)

After carefully distinguishing regional and local sources for New York, Jin et al. (2005) showed that local aerosols have a weekly cycle, which is mostly likely related to human activities (Fig 2). Furthermore, on monthly scales, rainfall variations do not directly correspond to the aerosol variations, suggesting that aerosols may not be the primary reason for urban modifications on rainfall. Dynamic forcing caused by urban roughness-generated convergence or by a UHC-destabilized boundary layer, may be more important. Jin et al (2005) will appear in a forthcoming issue of the American Geophysical Union's Journal of Geophysical research.



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Jin, M., J. M. Shepherd, M. D. King, 2005: *Urban aerosols and their interaction with clouds and rainfall: A case study for New York and Houston*. In press by **Journal of Geophysical Research**.

Country Report

Urban climate research in Poland

As in many other countries, the earliest meteorological records in Poland come from the major cities. In this sense, the history of observations of urban meteorological parameters in Poland goes back to the late 18th century and even to the 16th century for some short records. However, the earliest analyses of this data (e.g. Jastrzębowski, 1828) focused on global characteristic of the climate of Poland; for example, the annual course of temperature, pressure and humidity (Kossowska-Cezak and Wawer, 2003), rather than on the modification of the local climate by urban areas.

The first information in the Polish literature on urban climates comes from the beginning of 20th century. Individual elements of the climate of Warsaw were discussed by Merecki (1915). Among other things, Merecki estimated the reduction of the annual sunshine duration in Warsaw (~100 hours per year; 6% of annual total). At the same time, it was estimated that Warsaw was approximately 1.5°C warmer in summer and 0.5°C in winter (Gorczyński and Kosińska, 1916). After World War II, investigations of the modification of local climate by urbanization continued. For example, in 1951 weather station based studies of urban climate were started in the center of Lublin. These led to the establishment of the Department of Meteorology and Climatology UMCS (Warakomski, 1998). However, up to 1960s there were few Polish publications explicitly on urban climates.

The first complex urban climate experiment was conducted in Łodź in the period 1954 –1957 (Różański et al. 1961, Zych, 1961). As part of this project, mobile measurements were used to investigate meteorological parameters at the scale of the city and air pollution dispersion was observed from a plane. The importance of topoclimate in urban planning was stressed in the final report. Other postwar publications on urban climatology in Poland considered classical problems like solar radiation (Podogrocki, 1964), precipitation (Lewińska, 1967, Schmuck, 1967) and temperature (Kossowska, 1970).

Growing interest of urban climate resulted in conferences on this subject. The first conference “Climate and bioclimate of towns” took place in Łódź in 1984. Subsequent conferences were organized in Łódź in 1992 and 1996, respectively. In 2003, Łódź had the honor of hosting the 5th International Conference on Urban Climate.

Today, all major academic and scientific centers in Poland (Universities, Agricultural and Technical Universities, Polish Academy of Science, Institute of Meteorology and Water Management) conduct research on the modification of local climate by urbanization. The majority of investigations compare records from two or more stations situated in urban and rural areas to study the influence of the town on meteorological variables. Less frequently the spatial distribution of variables is studied from mobile measurements. In recent years, satellite data also have been used to detect spatial distributions of temperature (Struzik, 1998, Caputa et al., 2003). Urban heat island studies are most common, but parameters such as precipitation (e.g. Lorenc 1978, 1991), wind, cloudiness, atmospheric phenomena, and many other variables have been analysed too.

The largest urban-rural temperature differences recorded in Poland are (fig. 1): 12°C in Łodź (Kłysik and Fortuniak 1999, Fortuniak, 2003), 10.4°C in Warsaw (Wawer 1992), 8.4°C in Wrocław (Szymanowski, 2004), 8.0°C in Lublin (Kaszewski, Siwek 1998), and 7°C in Cracow (Lewińska at al., 1982). These values significantly exceed what is expected based on regression relations between population and UHI intensity for European cities. Differences of this magnitude are also probable for Wrocław. However, the early Polish work on UHI used relatively infrequent manual observations. Thus it precluded detailed analysis of the temporal evolution of the

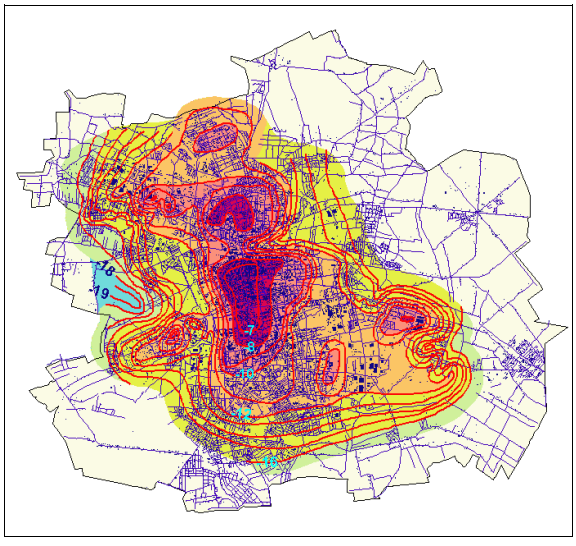


Fig. 1 Urban heat island of Łódź on the night 5.02.1996 – the highest urban-rural temperature differences recorded in Poland.

UHI. But, statistics of the phenomena, its seasonality, and relation to the synoptic situation were studied comprehensively (e.g. Kossowska-Cezak, 1977, Wawer, 1992). Since the 1990s, most of the urban weather stations in Poland have been automated giving high resolution temporal data and the diurnal course of the urban heat island has been studied in detail. Based on this data, the normalized course of urban-rural differences shown in Fig. 2 illustrates that the temporal evolution of UHI is similar in all seasons (Fortuniak at al., 2005). The high temporal resolution data also allow the detection of episodes of short lived thermal contrasts related to advection, the passing of fronts, thunderstorms etc. (Szymanowski, 2005).

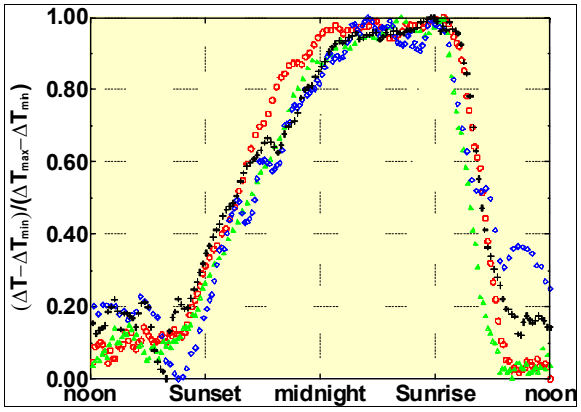


Fig. 2 Normalized course of the UHI intensity at two measurement points in Łodź. The average values from selected days from the period 1997-2002: à – 6 days from January, D – 35 days from May, o – 28 days from August, and + – 21 from September (Fortuniak et al., 2005).

Other work has been concerned with statistical models of the UHI. Most frequently, the maximum thermal contrast at night, ΔT_{max}, has been estimated with the aid of multiple linear regression, including variables such as the daily amplitude of temperature, wind speed, vertical gradient of temperature, cloudiness, and degree of urbanization (e.g. Lewińska et al., 1990). Nonlinear functions have also been tested. For example in Łódź, relations between UHI, wind (v) and cloudiness (N) have been shown to be estimated better by the function:

$$\Delta T_{mx}=a(N)\cdot e^{-b(N)\cdot v}$$

than by classical ones such as:

$$\Delta T_{mx}=c(N)\cdot v^{-0.5}$$

where a, b, c are linear function of N. In addition, high frequency measurements have allowed studies of the relations between the rate of nocturnal cooling at urban and rural sites. Statistical models of the temporal UHI evolution constructed from this work perform well and have been combined with land use data to generate spatial models (Fortuniak and Kłysik, 1998). Models informed by land use data extracted from high resolution satellite images, with the aid of GIS, in particular, provide effective tools to forecast the distribution of temperature field for urban areas (Szymanowski, 2003).

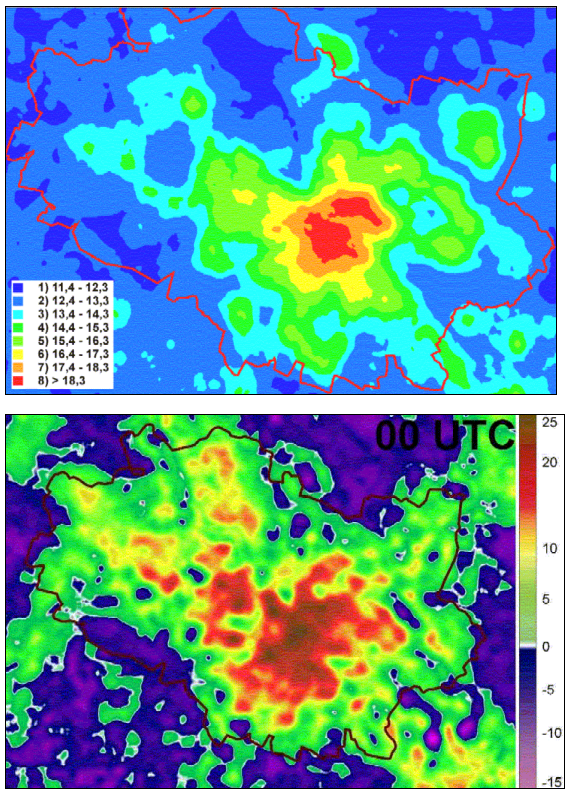
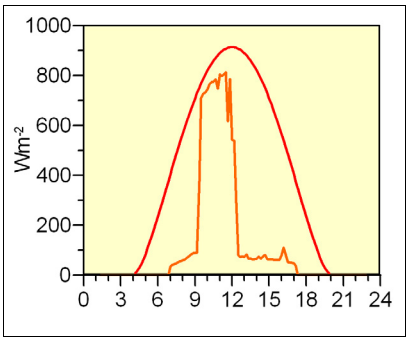


Fig.3 Temperature (upper) and relative humidity (lower) field in Wrocław at night 22/23.05.2001 – combination of measurements with land use GIS data. In the relative humidity case, the map shows differences to the reference station (M. Szymanowski – personal communication).

The same methodologies can be used to study humidity (Fig. 3). However, the influence of urbanization on humidity has been studied much less intensively than the UHI phenomenon (Tarajkowska, 1974, Dubicka et al., 2003). In comparison to rural areas, the highest urban water vapour pressure differences reaches -6.3 hPa in Wrocław and -4.4 hPa in Łodź. However, a humidity excess has also been observed in these cites, reaching 4.2 hPa and 5.2 hPa, respectively. This is due to the complex pattern of urban-rural humidity contrasts at night (Fortuniak et al., 2005).



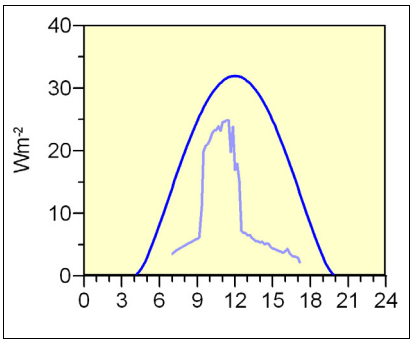


Fig. 4 Total (left) and UV (center) radiation measured on the roof level (with an unobstructed sky view) and in the urban canyon with a sky view factor of 0.424 and H/W ratio of 1.1 in Łódź. On the left is an upward bird eye picture from the canyon measurement point (Podstawczyńska, Pawlak, 2003).

Solar radiation has also been intensively studied by Polish researchers. As mentioned above, the history of investigation of solar climate in Polish towns goes back to the beginning of 20th century. In postwar years this subject was studied especially intensively in Warsaw (Podogrocki, 1964, 2002) and in Cracow (Hess et al., 1980, Olecki, 1986, 2002). Reduction of the sunshine duration in the center of Warsaw reaches 150 h per year. Daily totals of incoming shortwave radiation in this city are lower than in the surroundings by about 20-25% in winter and 5-10% in summer (Kozłowska-Szczęsna, Pdogrocki, 1995). Similar seasonality is observed in Łódź, but attenuation of the radiation by the city is slightly smaller: about 15-20% in winter and less than 5% in summer. In Cracow, global radiation in the city area is lower by 10-15%. It should be emphasized that these results derive from studies in different periods. Thus differences between the cities could be a result of reductions in air pollution which have taken place in recent years. Today, automated measurements of sunshine duration and solar radiation are conducted with field experiments on surface albedo and the radiation balance for different surfaces (Caputa 2001), solar radiation in urban canyon (Fig.4), or measurements of UV in city centers (Błażejczyk, Baranowski, 2003, Podstawczyńska, Pawlak 2003).

The radiation balance, especially for the shortwave fluxes, is the best known component of the energy balance of Polish towns. Also notable is the work that has been done on the emission of anthropogenic heat. At a large area of steel mills in the Silesia region (Huta Katowice), the anthropogenic heat flux reaches 350 W m^{-2} (Wiatrak, 1989). The built-up area of Łódź releases approximately 12 W m^{-2} in summer and 54 W m^{-2} in winter (Kłysik, 1996). In the heating season, the emission from the built-up area of Wrocław is at a level of 30 Wm^{-2}, but for the city center it rises up to 91 Wm^{-2} (Chudzia, Dubicka, 1998). Turbulent exchanges in Polish towns have only been studied to a limited extent. One exception is the ongoing measurements from Łodź.

The measurements of the all components of urban energy balance (including eddy covariances and the full radiation budget) started there in 2000 under cooperation between Department of Meteorology and Climatology, University of Łodź and the Department of Geography, Indiana University (Fig. 5). The results from the system operated in Łódź for the next three years are currently in press (Offerle et al., 2005a,b). Short, intensive observations in different parts of the Łódź in 2002 complemented this data and is providing insight into the urban energy balance in different types of urban arrangements (Offerle et al. 2005c). Investigations of this type continue in Łódź.

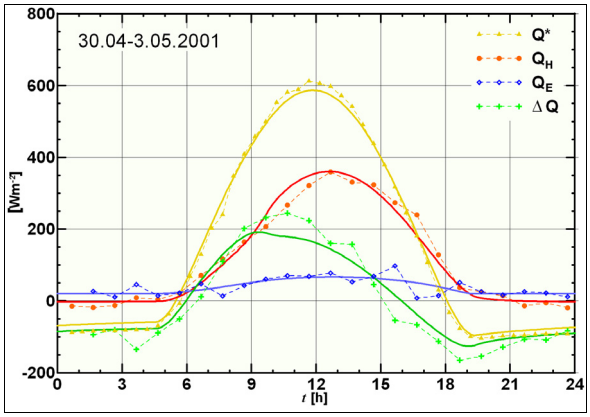


Fig. 5 Measured (dashed lines) and modelled (full lines) components of the urban energy balance in Łodź for days 30.04-3.05.2001. Turbulent fluxes (Q_H, Q_E) measured using eddy-covariance method, and a stored heat (ΔQ) calculated as a residual from the energy balance. A slab model used to model turbulent fluxes and ΔQ.

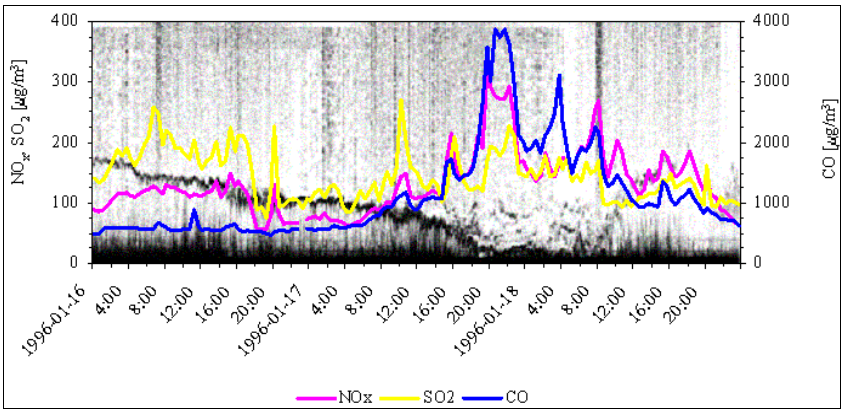


Fig. 6 Sodar echo and air pollution in Wrocław for days 16 – 19.01.1996 (M. Szymanowski – personal communication).

The vertical structure of the urban atmosphere in Poland has been studies with an array of classical methods (Kłysik, Tarajkowska, 1977), including aeroplane measurements (Morawska-Horawska, Cebulak, 1981), aerological soundings (Głowicki et al., 1980) and analyses of data from the sites at different altitudes (Trepińska, 1991). Since the 1980s different sensors have been used. The first Polish sodar started to work in 1979 in Cracow (Walczewski, 1980). The methods and techniques of collection and analysis of the sodar echo have since improved. Since 1984 acoustic soundings of the lower atmosphere have also been collected in Wrocław (Pyka, 1991). Sodar data (fig. 6) are usually used to get information on atmospheric stability and pollution concentration (Walczewski, 1994, Pyka et al., 2001).

Modeling studies of the climate of Polish towns concentrate mainly on statistical models of UHI (described above). Only a few examples of numerical models developed in Poland can be described. The first numerical simulations of dynamic structure of the urban boundary layer were in the late 1970s (Sorbjan, 1978). These were extended by Sorbjan, and Uliasz (1982). Recently, a slab urban energy model (Fig. 5) has been developed (Fortuniak, 2003) and the radiation absorption in the urban canyon after multiple (infinite) reflections has been studied using Monte Carlo simulation and a new analytical approach (Pawlak and Fortuniak, 2003). To verify these estimations a scale model of the urban canyon made from typical bricks has been used. Other activities in the field of numerical modeling relate to the application of different numerical packages to analyze air pollution in towns (e.g. Niedźwiedź and Olecki, 1995, Wyszkowski, 1998).

An important part of Polish studies on the modifications of the local climate by urbanization is the attention that has been focused on the bioclimate of towns (e.g. Niedźwiedź et al., 1996). Analyses of bioclimatic indexes have been made for many towns. The methods used in human bioclimatology were summarized in a special monograph (Kozlowska-Szczesna et al. 1997). Two computer packages oriented to bioclimatological investigations at regional and local scales, termed BioKlima (Błażejczyk, Błażejczyk, 1998), and studies of the outdoor human heat balance MENEX (Błażejczyk, 1995) have been developed. Their combination with GIS data gives spatial information on bioclimate indexes for urban areas (Fig. 7).

This brief review of research in Poland on urban climatology has focused largely on physical meteorology. Polish studies of air quality and air pollution have been extensive but are beyond the scope of this broad review.

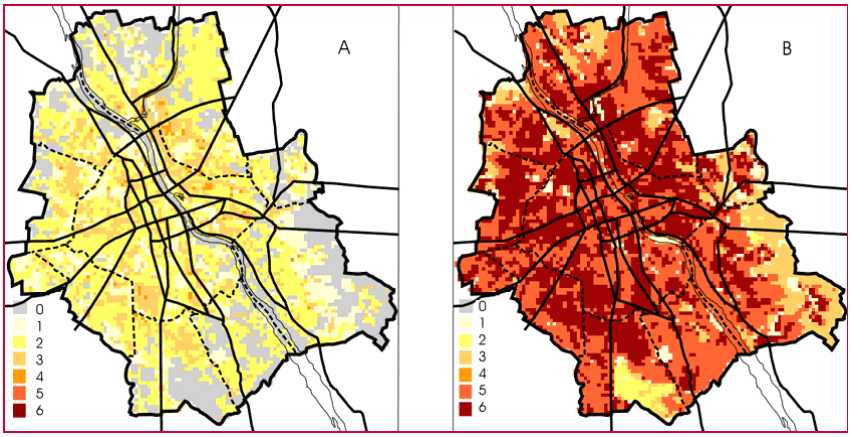


Fig. 7 Maps of heat load in Warsaw for air temperature of T=20°C, wind speed of v=4 ms^{-1} and cloudiness N<=50% (A) and for T=30°C, v=2 ms^{-1} and N<=50% (B). The values in the legend: 0 - thermoneutral conditions, 1-6 - warm stress: 1 - very small, 2 - slight, 3 - moderate, 4 - considerable, 5 - great, 6 - very great (K. Błażejczyk, www.igipz.pan.pl/geoekoklimat/Warszawy/english.html)

Country Report

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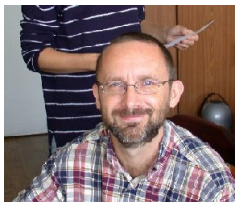

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Conferences

18th Symposium
Association Internationale de Climatologie (AIC)
Urban Climate.
The City and its Architecture

Genova, Italy, September, 7 -10, 2005,
(in memory of Roberto Rossetti,
co-founder of AIC).

The AIC conference will be devoted to the following topics: Urban climate and atmospheric pollution, Climate and erosion , Climate variations and topoclimatology, Climate and societies, General climatology.

Two excursions will take place on September 10 to the 'Cinqueterre' to study vineyard planning on steep slopes and on September 11 to Piana Crixia to visit the 'Fungo' (mushroom) at Piana Crixia and study the climatic monitoring of a géographical site. Registration for the conference should be completed by **1 May 2005**. The official language of AIC is French.

The local organizing committee is chaired by Prof. Gerardo Brancucci, Department POLIS, University of Genova, Italy.

For more information see: www.aiclim.info

Conference

PHYSMOD 2005

International Workshop on Physical Modelling of Flow and Dispersion Phenomena

This is the Call for Abstracts for PHYSMOD 2005 which will be held in the Faculty of Engineering at The University of Western Ontario (UWO), London, Ontario, Canada, from Wednesday 24th August to Friday 26th August 2005. The meeting is a forum for discussing all aspects of fluid flow and dispersion experimentation, including new results, experimental techniques and methods of analysis. It follows on from the successful PHYSMOD meetings held in Prato, Italy (2003), Hamburg, Germany (2001) and Prague, Czech Republic (1999).

For full details of the Workshop, including preparation and submission of the two page abstracts, registration and accommodation, please visit our web site: www.eng.uwo.ca/physmod

Deadline for Abstracts:	15th April
Notification of Acceptance:	1st May
Workshop Dates:	24th -26th August

The Workshop Proceedings will consist of the Book of Abstracts and a CD-ROM of the presentations.

Topics to be presented and discussed at PHYSMOD 2005 include:

- **Building effects on the flow characteristics in urban areas**
- **Wind comfort and wind reduction in urban areas**
- **Dispersion in urban areas, including concentration measurements**
- **Physical and mathematical modelling of plume rise and dispersion**
- **Validation of modelling methods**

UWO is home to the internationally renowned Davenport Boundary Layer Wind Tunnel Laboratory where both fundamental and applied wind engineering studies are carried out.

PHYSMOD 2005 is being held in memory of Robert Macdonald (1961 - 2004), a member of IAUC. It was his initiative to hold this meeting in Canada for the first time.

Conference Report

The 12th International Symposium on Acoustic Remote Sensing of the Atmosphere and Oceans.

ISARS

ISARS took place in Clare College, Cambridge (UK) from 11 - 16 July 2004. ISARS attracts specialists in acoustic remote sensing using sodars and other acoustic techniques for atmospheric investigations; as well as sonars for oceanic ones. Since 1981 ISARS meetings have taken place every two years. The 12th ISARS was organized by Dr. Phil Anderson (British Antarctic Service), Dr. Sabine von Hünerbein and Prof. Stuart Bradley (Salford University). Given their expertise and interests it is not a surprise that reports about use of sodars in Antarctica to study the Atmospheric Boundary Layer (ABL) made up one of the main sessions in Cambridge. In fact, sodars now represent a widely used tool to monitor wind profiles and atmospheric turbulence. Several hundreds of sodars are currently operational, including the Antarctic stations.

Almost fifty presentations were made in eight sessions of this symposium by participants from the United Kingdom, Russia, USA, Germany, India, Italy, Spain, People's Rep. of China, Greece, Czech Rep., Austria, and Ukraine.

Traditionally one of the ISARS sessions is devoted to work in complex and urban terrain. Urban climatology discussions in Cambridge included the influence of a city on the ABL turbulent structure based on sodar data. One of the parameters which can be measured by sodars is variance of the wind vertical component σ_W. Comparisons of σ_W vertical profiles over Hannover city and over flat rural zone were shown by Stefan Emeis (Germany). He found that values of σ_W above the city are nearly 30 % more than outside. More intense vertical motions in the ABL are seem to a feature of urban climate. He found the total intensity of the thermal turbulence above city to be twice that of the rural area nocturnally. Some specific parameters of the atmospheric turbulence have been studied with the help of sodars at several points in Oklahoma City (US) and its suburbs by Richard Coulter and his colleagues. The next 13th ISARS will be organized by Dr. Stefan Emeis in Garmisch-Partenkirchen (Germany) in July of 2006.

Dr. Mikhail A. Lokoshchenko
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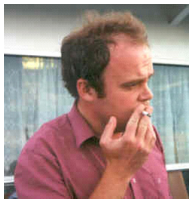
loko@meteo.msu.ru



Conference

Forum on Managing our Physical and Natural Resources: Successes and Challenges.

29 January–2 February 2006, Atlanta, Georgia

The *Forum on Managing our Physical and Natural Resources* will be held in conjunction with five of the scientific conferences sponsored by the American Meteorological Society, on 29 January–2 February 2006, as part of the 86th AMS Annual Meeting in Atlanta, Georgia. The five scientific conferences are: the 20th Conference on Hydrology; the 14th Conference on Interaction of the Sea and Atmosphere; the 14th Joint Conference on the Applications of Air Pollution Meteorology with the A&WMA; the 8th Conference on Atmospheric Chemistry and the 6th Symposium on the Urban Environment, Preliminary programs, registration, hotel, and general information will be posted on the AMS Web site (www.ametsoc.org/AMS) in mid-September 2005.

The 86th Annual Meeting is being organized around the broad theme of **Applications of Weather and Climate Data** with an emphasis on documenting success stories in the applications of atmospheric, hydrologic, and oceanic sciences, and the research needed to continue benefiting from new knowledge. The two integrating Forums that will be highlighted are *Managing Our Physical and Natural Resources: Successes and Challenges* and *Environmental Risks and Impacts on Society: Successes and Challenges*

Our forum within the Annual Meeting will have two components: 1) plenary sessions with invited speakers, and 2) joint technical sessions with the five scientific conferences. Papers are invited for the joint sessions which address the successes and challenges within the following areas:

- 20th Conference on Hydrology: Joint session A: Water conservation in deserts; Joint session B: Flood warning systems
- 14th Conference on Interaction of the Sea and Atmosphere: Fluxes of CO_2 to the ocean and implications for climate change
- 14th Joint Conference on the Applications of Air Pollution Meteorology with the A&WMA: New forecasts of regional ozone by the National Weather Service
- 8th Conference on Atmospheric Chemistry: Multi-media impacts that address studies of air pollutant cycling in ecosystems
- 6th Symposium on the Urban Environment: Joint session A: Development of tools to assist emergency responders in the case of releases of gases and small particles within urban areas; Joint session B: Mitigation of urban heat islands.

Please submit your abstract electronically via the Web by 1 August 2005 (refer to the AMS Web page at www.ametsoc.org/AMS for instructions). Papers intended for the joint sessions identified above should be submitted to the joint session as identified in the specific scientific conference. Do not submit them to the Forum. Those papers will then be reviewed by the technical chairs of the specific conference and by the chairs (S. Grimmond and S. Hanna) of the Forum. An abstract fee of $60 (payable by credit card or purchase order) is charged at the time of submission (refundable only if abstract is not accepted).

Authors of accepted presentations will be notified (via e-mail) by mid-September 2005. A preprint CD-ROM will be prepared, and authors of invited and accepted papers will be asked to contribute to this volume. All extended abstracts are to be submitted electronically and will be available on-line via the Web. Instructions for formatting extended manuscripts for the preprint CD-ROM will be posted on the AMS Web site. Manuscripts (up to 3MB) must be submitted electronically by 1 November 2005 to AMS Headquarters. A manuscript charge will be collected to defray to cost of the preprint CD-ROM, as well as Web posting of the manuscript and recorded meeting presentation. Registrants will receive a preprint CD-ROM at the conference.

For additional information about the Forum please contact the program chairpersons, Dr. Steven Hanna (shanna@hsph.harvard.edu) or Dr. Sue Grimmond (grimmon@indiana.edu).

Conference

Sixth Symposium on the Urban Environment

The Sixth Symposium on the Urban Environment, sponsored by the American Meteorological Society and co-sponsored by the International Association for Urban Climate and organized by the AMS Board of the Urban Environment, will be held 29 January – 2 February 2006 as part of the 86th AMS Annual Meeting in Atlanta, Georgia. Preliminary programs, registration, hotel, and general information will be posted on the AMS Web site (www.ametsoc.org/AMS) in mid-September 2005.

The 86th Annual Meeting is being organized around the broad theme of "Applications of Weather and Climate Data" with an emphasis on documenting success stories in the applications of atmospheric, hydrologic and oceanic sciences, and the research needed to continue benefiting from new knowledge. Two integrating sub-themes that will be highlighted are *Managing Our Air, Energy, and Water Resources* and *Environmental Risks and Impacts on Commerce*. The Symposium on the Urban Environment will participate in the former sub-theme along with the 20th Conf on Hydrology, 14th Conf on Interaction of the Sea and Atmosphere, 13th Joint Conference on the Applications of Air Pollution Meteorology with the A&WMA, and 8th Conf. on Atmospheric Chemistry. Themes for joint urban sessions include: *Development of tools to assist emergency responders in the case of gaseous releases within urban areas* and *Mitigation of urban heat islands*.

Papers and posters are invited on all subjects dealing with the urban atmosphere including: observational, modeling, theoretical, and applied studies. We particularly encourage papers in areas of common interest to the conferences within our broad theme such as: urban hydrology, urban air quality (including urban airshed modeling and urban air chemistry experiments), studies of coastal cities, risks and hazards associated with the urban atmosphere, and cities as agents of global change. Two special joint sessions will also be organized with the AMS Committee on Boundary Layers and Turbulence. Topics will include urban boundary layer structure and development, and turbulent transport and dispersion processes (in urban areas and around buildings.

Proposals for other sessions or for panel discussions are welcome; please contact the program chairs as soon as possible and certainly before the due date for abstracts. Awards will be given to students for the best papers and posters. In order to be considered for the competition, students should indicate their intent to participate in this competition when they submit their abstract.

In an effort to improve the formal poster viewing experience there will be two distinct poster series, each two days long. The first is Sunday evening through Tuesday morning and the second is Wednesday morning through Thursday evening. All posters must be removed at the end of the first series in order to set posters for the second series. More information will be available once the program has been finalized.

Please submit your abstract electronically via the Web by **1 August 2005** (refer to the AMS Web page at www.ametsoc.org/AMS for instructions.) An abstract fee of $60 (payable by credit card or purchase order) is charged at the time of submission (refundable only if abstract is not accepted).

Authors of accepted presentations will be notified (via e-mail) by **mid-September 2005**. A preprint CD-ROM is being prepared, authors of invited and accepted papers will be asked to contribute to this volume. All extended abstracts are to be submitted electronically and will be available on-line via the Web. Instructions for formatting extended manuscripts for the preprint CD-ROM will be posted on the AMS Web site. Manuscripts (up to 3MB) must be submitted electronically by **1 November 2005** to AMS Headquarters. A manuscript charge will be collected to defray to cost of the preprint CD-ROM, as well as Web posting of the manuscript and recorded meeting presentation. Registrants will receive a preprint CD-ROM at the conference.

For further information contact the program co-chairpersons: Steven R. Hanna (email: hannaconsult@adelphia.net), James Voogt (email: javoogt@uwo.ca) or Walter Dabberdt (email: Walter.Dabberdt@vaisala.com).

ICUC-6

ICUC-6
Sixth International
Conference on Urban Climate
Göteborg, Sweden
June 12th - 16th, 2006

The IAUC members have selected Göteborg (Gothenburg), Sweden as the site for the sixth International Conference on Urban Climate. Further details will become available at the conference website www.gvc.gu.se/icuc6, which is also accessible via the IAUC website (www.urban-climate.org).

Call for papers

ICUC-6 welcomes papers seeking to understand the nature of the atmosphere in urban environments or to the application of such knowledge to the better design and operation of settlements. Scales of interest range from individual built elements (roofs, walls, roads) through whole buildings, streets, factories, parks, clusters of buildings and neighborhoods, to whole cities and urban regions and their impacts on weather and climate at scales up to those of global change. The focus can be original research into the physical, biological and chemical atmospheric processes operating in built areas; the weather, climates and surface hydrology experienced in built areas; the design and testing of scale, statistical and numerical models of urban climates; or reports on the application of climatic understanding in architectural design or urban planning. Papers may relate to new concepts, methods, instruments, observations, applications, forecasting operations, scenario testing, projections of future climates, etc. Sessions that focus on major field studies or other projects or topics may be proposed. For further information please visit the website or email Professor Sven Lindqvist, chair of the local organizing committee (sven@gvc.gu.se) or Prof. Sue Grimmond (grimmon@indiana.edu), President IAUC.

The deadline for submission of abstracts is 10th November, 2005. Abstracts will be submitted via the web. Appropriate topics include, but are not restricted to:

- Airflow over cities, including turbulence, urban roughness and drag, changes of wind speed and direction, urban circulation systems, and wind engineering
- Anthropogenic Heat
- Building climates (interior and exterior) and the climatic performance of built features
- Carbon exchanges in urban areas
- Cities and global change
- Climate-sensitive urban design and planning
- Climates of paved surfaces such as roads, streets, highways, runways and parking lots
- Climatic performance of urban trees, lawns, gardens, parks, green roofs, irrigation, rivers, lakes and reservoirs
- Emergency response planning
- Exchanges of heat, mass and momentum between the urban surface and its boundary layer
- Forecasting urban weather, comfort, hazards, and air quality
- Interactions between urban climate and the emission, dispersion, transport, transformation and removal of air pollutants
- Models, and their evaluation, of the urban atmosphere at all scales and urban surface-atmosphere exchanges
- Remote sensing of cities and urban climate
- Road climatology in cities, including influence from traffic and other city related-objects
- Short- and long-wave radiation in polluted air and urban visibility
- Topoclimatology of cities, including the effects of coasts, valleys and other landforms
- Urban biometeorology relevant to the functioning of plants, wildlife and humans
- Urban climates in high latitude settings
- Urban heat islands, their nature, genesis and mitigation
- Urban impacts on surface moisture, dew, evaporation, humidity, fog, cloud and precipitation

IAUC Committee Reports

Bibliography

This has been a great year for urban climate publications. We have seen a wide range of interesting papers spanning the breadth of the subject from cities around the world. Thanks to everyone who has collected and sent in references. Look out for the complete 2003 and 2004 bibliographies on the IAUC website in the near future!

Please send any further papers published since January 1 2004 for inclusion in the next newsletter to j.salmond@bham.ac.uk. As before, please mark the header of your email with 'IAUC Publications 2004'. In order to facilitate entering the information into the data base please use the following format:
Author:
Title:
Journal:
Volume:
Pages:
Dates:
Keywords:
Language:

We look forward to hearing from you soon!

Jennifer Salmond
University of Birmingham
j.salmond@bham.ac.uk

Recent publications in Urban Climatology
(Languages are specified where the publication is known to be in a language other than in English.)

1. Agarwal, V. (2004). "Urban Climatology, Street Configurations and Thermal Comfort." Proceedings of the Solar Conference, pp. 1081-1086.

2. Best, M.J. (2005). "Representing urban areas within operational numerical weather prediction models." Boundary Layer Meteorology, 114(1): 91-109.

3. Bottyán, Z., Kircsi, A., Szegedi, S. and Unger, J. (2005). "The relationship between built-up areas and the spatial development of the mean maximum urban heat island in Debrecen, Hungary." International Journal of Climatology, 25(3): 405-418.

4. Brazel, A.J., Fernando, H.J.S., Hunt, J.C.R., Selover, N., Hedquist, B.C. and Pardyiak, E. (2005). "Evening Transition Observations in Phoenix, Arizona." Journal of Applied Meteorology, 44(1): 99-112.

5. Bugliarello, G. (2004). "Urban Sustainability: Science, Technology, and Policies." Journal of Urban Technology, 11(2): 1-12.

6. Chueinta, W., Bunprapob, S., Suksamran, C. and Sirinuntavid, A. (2004). "Study of Urban Air Pollution in Thailand." JAERI CONF, 2004-010(10): 187-194.

7. Coceal, O.B., S. E. (2005). "Mean Winds Through an Inhomogeneous Urban Canopy." Boundary Layer Meteorology, 115: 47-68.

8. Dupont, S., Otte, T. and Ching, J.K.S. (2004). "Simulation of meteorological fields within and above urban and rural canopies with a mesoscale model (MM5)." Boundary Layer Meteorology, 113: 111-158.

9. Fan, H. and Sailor, D.J. (2005). "Modeling the impacts of anthropogenic heating on the urban climate of Philadelphia: a comparison of implementations in two PBL schemes." Atmospheric Environment, 39(1): 73-84.

10. Fast, J.D., Torcolini, J.C. and Redman, R. (2005). "Pseudovertical Temperature Profiles and the Urban Heat Island Measured by a Temperature Data-logger Network in Phoenix. Arizona." Journal of Applied Meteorology, 44(1): 3-13.

11. Gorchakov, G.I., Anikin, P.P., Volokh, A.A., Emilenko, A.S., Isakov, A.A., Kopeikin, V.M., Ponomareva, T.Y., Semutnikova, E.G., Sviridenkov, M.A. and Shukurov, K.A. (2004). "Studies of the smoky atmosphere composition over Moscow during peatbog fires in the summer-fall season of 2002." Izvestiya Atmospheric and Oceanic Physics, 40(3): 323-336.

12. Guardani, R. (2004). "Neural network-based study for predicting ground-level ozone concentration in large urban areas, applied to the Sao Paulo metropolitan area." International Journal of Environment and Pollution, 22(4): 441-459.

13. Junk, J., Helbig, A. and Krein, A. (2004). "Air quality evaluation at Rhineland-Palatinate using different air quality indices." Umweltwissenschaften und Schadstoff-Forschung. Zeitschrift für Umweltchemie und Ökotoxikologie, 16, (3): 161-167. (In German)

14. Kusaka, H. and Kimura, F. (2004). "Thermal Effects of Urban Canyon Structure on the Nocturnal Heat Island: Numerical Experiment Using a Mesoscale Model Coupled with an Urban Canopy Model." Journal of Applied Meteorology, 43(12): 1899-1910.

15. Lehndorff, E. and Schwark, L. (2004). "Biomonitoring of air quality in the Cologne Conurbation using pine needles as a passive sampler-Part II: polycyclic aromatic hydrocarbons (PAH)." Atmospheric Environment, 38(NUMBER 23): 3793-3808.

16. Lien, F.S. and Yee, E. (2005). "Numerical model-

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Board Information

IAUC Board
Call for Nominations

As announced in the last newsletter (No 9, Feb 2005), the terms of two current members of the Board of the International Association for Urban Climate (Bob Bornstein, San José State University, USA and Yasuto Nakamura, Prefectural University of Kumamoto, Japan) will be ending shortly.

Accordingly, the Board is seeking nominations for two positions. The procedures for Board elections are available at the IAUC website (www.urban-climate.org: follow "Board Actions" on the main navigation menu and then the link to "IAUC Board Procedures and Terms"). To see the present composition of the IAUC board, follow the "Board Members" link from the same website.

The nomination process will be conducted as described below.

(1) If you are nominating another person, proceed as follows:

a. Email the IAUC Secretary indicating the name of your nominee.
b. Also name **TWO** other persons who support the nomination. They must also email the Secretary indicating their support of the nominee within the nomination period.
c. The nominee should also email the Secretary indicating her/his willingness to stand. The nominee should also provide his/her affiliation and country. Optionally, the nominee may supply a short statement that will be shared with the membership at the election (if there is one). That statement must not exceed 250 words, a limit that will be rigorously applied (longer statements will be truncated after the 250th word).

(2) If you are nominating yourself, proceed as follows:

a. Email the IAUC Secretary indicating that you are nominating yourself.
b. Also name **THREE** other persons who support your nomination. They must also email the Secretary indicating their support for your nomination within the nomination period.
c. You should also provide your affiliation and country. Optionally, you may supply a short statement that will be shared with the membership at the election. That statement must not exceed 250 words, a limit that will be rigorously applied (longer statements will be truncated after the 250th word).

Also please note the following:

- All nominees, nominators and persons supporting a nomination must be members of the IAUC as of this moment. New members will not be eligible to vote or be nominated in this round of elections.
- All required information, as outlined in (1) or (2) above, must be received by the Secretary within one month, i.e. by Thursday, April 21th, 11:59 pm (UTC + 8 hrs).
- E-mails should be sent to the Secretary at email address geomr@nus.edu.sg. **DO NOT** use the 'reply' function of your mailer to contact the Secretary. Receipt of nomination e-mails will be confirmed. No other method of communication will be accepted.
- It is the responsibility of the nominator and/or nominee to ensure that all necessary e-mails are sent to the Secretary within the nomination period. No reminders will be sent in the case of incomplete nominations.
- If more than one nomination is received, an election will be conducted via email or the web, with the candidate receiving the highest vote count being deemed to have been elected. If an election is necessary, the exact procedure will be described in an email to the current membership.

Please note that the Board is seeking diverse representation in terms of its members, their perspectives, and fields of study. We particularly welcome nominations from Asia, Australasia and Africa.

Matthias Roth
Secretary IAUC
(geomr@nus.edu.sg)

IAUC Information

Non-Voting members of the Board:
Past Secretary: John Arnfield, USA.
Past President: Tim Oke, Canada.
Local Organizer ICUC5: Kazimierz Klysik Poland.
Local Organizer ICUC6: Sven Lindqvist, Sweden.

IAUC Committee Chairs

Editor IAUC Newsletter: Gerald Mills
Chair Bibliography Committee: Jennifer Salmond
Chair Membership Committee: Janet Barlow
Chair Teaching Resources: Gerald Mills
Chair Awards Committee: Bob Bornstein
WebMasters: James Voogt

Board Members & Terms

President: Sue Grimmond (USA), 2007
Secretary: Matthias Roth (Singapore), 2007
Janet Barlow (UK), 2007
Ariel Bitan (Israel), 2006
Bob Bornstein (USA), 2005
Krzysztof Fortuniak (Poland), 2007
Wilhelm Kuttler (Germany), 2008
Gerald Mills (Ireland), 2007
Yasuto Nakamura (Japan), 2005
James Voogt (Canada), 2006