Ambiences in the City: Longitudinal surveys in the dynamic representation of built environments to observe, measure and speculate. Strolling in Panama City, Panama

André Potvin, Claude Demers

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Strolling in Panama City, Panama

André POTVIN[1], Claude DEMERS[1]

1. Groupe de recherche en ambiances physiques, Université Laval, Québec City, Canada, andre.potvin@arc.ulaval.ca, claude.demers@arc.ulaval.ca

Abstract. *Dynamic representations of ambiences are unique means of expressing complexity and the experience of environmental diversity in an urban environment. Longitudinal surveys have the potential to disclose some of the complex parameters that link the human apprehension of the city with comfort parameters. A strategically designed 'promenade architecturale' should constitute an essential basis to observe, measure, and analyse ambiences in a multisensorial manner to meaningfully speculate on the possible extent of new ambiences. The graphical synthesis of dynamic qualitative and quantitative in situ measurements enable conclusions that are connected to the reality of the tangible built environments.*

Keywords: urban, ambience, microclimate, survey, representation

Context

Favourable microclimates are essential conditions for the conviviality of the city fostering environmental, social and economic transactions. Recent researches confirm that microclimatic parameters are of premium importance for activities taking place on a site, and up to a certain extent, the very success of a place (Potvin, Demers, DuMontier, 2012). The experience of urban space is dynamic with periodic or constant movement between areas or between inside and outside. When moving from a space where the environmental condition is inadequate to a space where it is greater in intensity, a sensation of comfort is felt. If in successive steps or in a steep change the stimuli increases too much, the positive sensation wanes and becomes negative. A '*flâneur*' is therefore momentarily conscious of a positive change in his environmental conditions, followed by a neutral step where the comfort range is attained and then a negative change. When the environmental conditions change very slowly, below the threshold of sensation, the change may be subliminal. This phenomenon of adaptation occurs both in increasing and decreasing of a stimulus and is the basis for a convivial urban space. Gibson (1966) first recognised that all five senses are working together in actively seeking information but he postulated that the basic-orienting and haptic systems are particularly relevant to the perception of the third dimension since they encompass the entire body. By placing the entire body at the centre of the perceptual experience, he affirms that no other

sense deals as directly with space as the haptic-orienting system, engaging simultaneously feelings of temperature and movement. Thus, urban environments, depending on their density, porosity and rugosity offer a multitude of thermal transitions that can either be perceived as subliminal or difficult by the users of the public realm (Ouameur et al., 2009).

Methodology

Between 26–30 November 2015, 24 graduate students from South-America surveyed the urban microclimates of Panama City to discover the rich environmental transitions stemming from its numerous urban typologies varying from dense tower blocks to low and sparse urban fabric. Although located in a very isotropic tropical climate, Panama City offers surprising microclimatic differentials. Figure 1 illustrates a three hour stroll in downtown Panama starting at Via Espana in a low commercial fabric (01, 02) to a very tall and mineral district (03 to 07), then progressing towards an hectic urban fabric made of eleveted slip roads and shopping malls (08 to 10) to end up in Punta Paitilla, a more vegetalised pavilionnary urban fabric (11, 12).

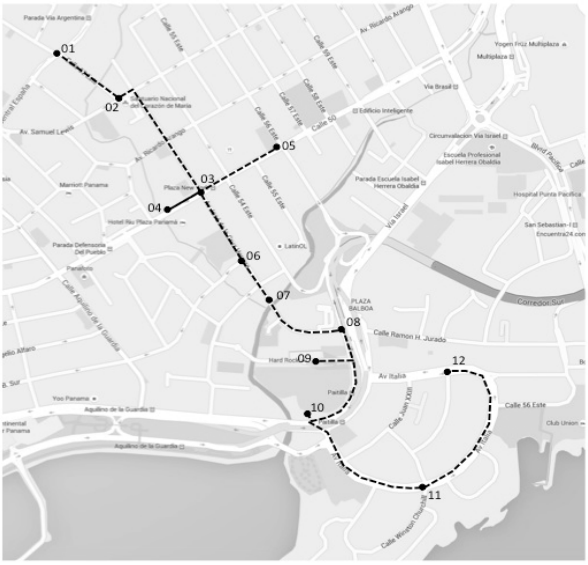


Figure 1. Strolling in Downtown Panama City

Students proceeded in the quantitative measurement of the luminous, thermal and acoustical ambiences using various hand-held measuring equipments such as Extech EN100 multienvironmental meter, IR surface temperature sensor, sonometer application for iphone and thermal camera. The post-survey analysis allowed them to develop a more critical view at the fundamental urban specificities defining microclimates and to translate their findings in an architectural langage suited to future speculation on possible urban spaces. Figure 2 illustrates four important

survey points (01, 03, 08, 11) synthesising the complexity and diversity of their respective scales and their perceived mineral/green cover ratios.

Figure 2. Photographs of survey points P01, P06, P08, and P11

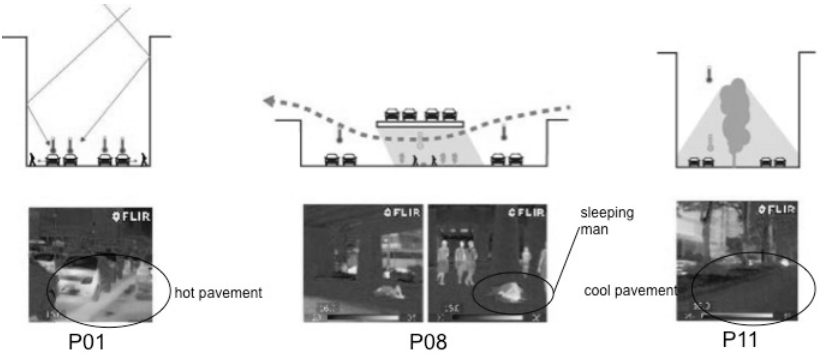


Figure 3. Cross sections and thermal images of survey stops 01, 03, 08, and 11

Figure 3 depicts three street to façade aspect ratios and their corresponding digital thermal photos. The first part of the stroll was characterised by small street to façade ratios, high minerality and high vehicle density, leading to an important heat stress factor. The middle part of the stroll encountered a very hectic urban fabric

made of elevated slip roads that surprisingly made for very comfortable and breezy outdoor spaces in addition to being protected from mid afternoon heatstorms. Thermal images depict a snoozing man in the shade surrounded by pedestrians and the cacophonic vehicle trafic. The final stretch of the survey led to a calm, fresh and breezy neighbourhood characterised by a similar street to facade ratio to Point 01 but with luxurious plantations. Thermal images clearly illlustrate the coolness of the shaded pavement of Point 11 compared to the very hot pavement of Point 01. These practical observations were corroborated with theoretical knowledge of the cooling effect according to envelope ratios of the built form and vegetation. In Figure 4, participants were able to show that several points of the survey closely match the theoretical nomograms from the reference book Sun, Wind and Light by Brown and Dekay (2014) and therefore confirm theory by practical observations. Surveys can therefore transform a nontangible theory into hands-on tactile reality. Morever, surveys may be the only mean to highlight that ubiguitous urban spaces such as elevated slip roads can actually perform much better than any other planned space.

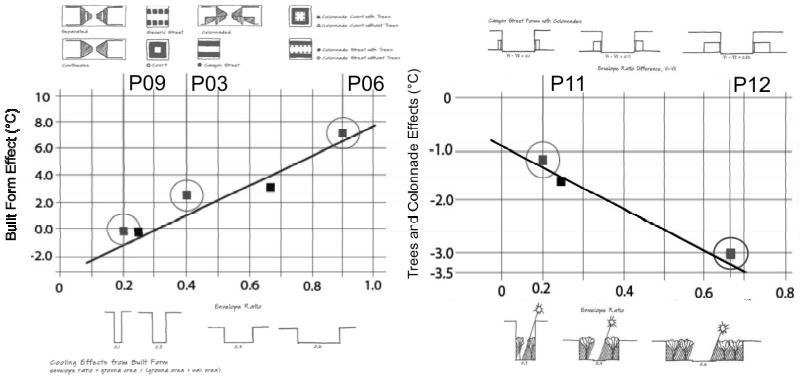
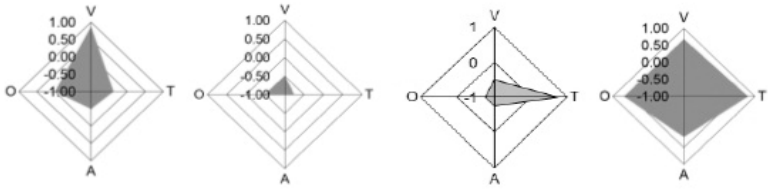


Figure 4. Correlation between actual versus theoretical cooling effects (adapted from Brown and DeKay, 2014, pp. 126–127)



PAR for survey stops 01, 03, 08, and 11

Participants also recorded their own environmental perceptions using an innovative Physical Ambience Rose (PAR) developed by Demers and Potvin (2009). A PAR integrates all senses commonly at play in spatial perception namely thermal, visual, acoustical and olfactory. Each environmental stimulus can be qualified by the user to provide a representation of the perceived environmental satisfaction.

Figure 4 illustrates that the larger the grey zone, the more satisfactory is the space. P01 expresses that the only positive satisfaction in this context is due to the visualpresence of a nearby significant historic cathedral. P06, also called by the team 'the purgatory', represents the epitome of discomfort due to traffic noise, poor air quality, poor easthetics and overheating of non pervious surfaces and cars. P08 clearly shows the positive thermal sensation due to the shading and coolness under the concrete slip roads at the expense of the visual, olfactory and acoustical satisfactions. Finally, P11 represents the epitome of a very satisfying microclimate under a tropical climate where only acoustics could be improved which is predictable in such an urban context.

Figure 5 synthesises the quantitative longitudinal survey of the thermal, visual and acoustic environmental stimuli. P06 and P07, highlighted in mediuem gray, show a major heat stress (3rd line from top) due to high relative humidity (2nd from top) and very low wind speeds (dotted lines). P08 to P12 clearly appear as good microclimates with the lowest heat stress index and radiant temperature at the expense of low daylighting. High wind peaks at P08, P09 and P12 correspond respectively to local wind acceleration under slip roads, downwind flow due to the Wise effect and wind penetration in a low-rise urban fabric as illustrated in the points cross-sections at the top.

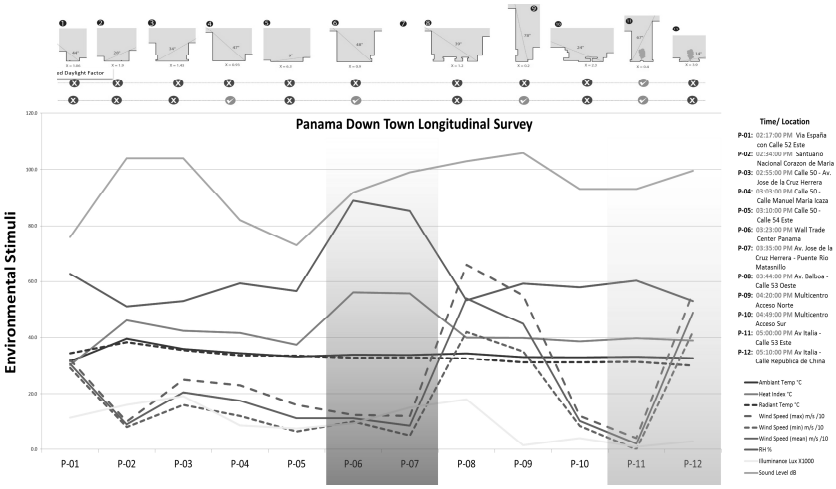


Figure 5. Downtown Panama longitudinal survey graph.

Conclusion

This paper presented the results of an in-situ longitudinal survey of a *'promenade architecturale'* in downtown Panama City. By using quantitative and qualitative tools to depict the actual environmental conditions versus perceived environmental satisfaction, this dynamic representation of the city enhances the users' reflexive thinking about the complexity of the urban realm in terms of its morphology and

minerality and its impact on environmental comfort. The systematic measurement of environmental stimulis and perceptions of the moving urbanite also confirms the systemic nature of comfort. The five senses really overlap one another and are not exclusive so that the study of a particular comfort conditions cannot exclude the incidence of the four others. The survey also suggests that comfort can be achieved, in a seemingly isotropic climate such as Panama, in curious or unexpected ways. The discovery of a genuine thermal oasis under downtown Panama City hectic elevated slip roads stands out as a clear witness to the importance of in-situ surveys.

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Authors

Dr André POTVIN is Professor at Laval University School of Architecture, Quebec City, Canada, Cofounder of the GRAP (Groupe de recherche en ambiances physiques) dedicated to the study of passive environmental controls in architecture through bioclimatic design, urban microclimatology and adaptive architecture.

Dr Claude DEMERS is Professor at Laval University School of Architecture, Quebec City, Canada, Cofounder of the GRAP and actively engaged into teaching and research of passive environmental controls in architecture. She developed innovative approaches to qualitative and quantitative study of daylighting in architecture.