

Ramos, Blanca Arellano; Roca, Josep

Conference Paper

Megalopolis: An essay for the identification of the world urban mega-structures

55th Congress of the European Regional Science Association: "World Renaissance: Changing roles for people and places", 25-28 August 2015, Lisbon, Portugal

Provided in Cooperation with:

European Regional Science Association (ERSA)

Suggested Citation: Ramos, Blanca Arellano; Roca, Josep (2015) : Megalopolis: An essay for the identification of the world urban mega-structures, 55th Congress of the European Regional Science Association: "World Renaissance: Changing roles for people and places", 25-28 August 2015, Lisbon, Portugal, European Regional Science Association (ERSA), Louvain-la-Neuve

This Version is available at:

<https://hdl.handle.net/10419/124709>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

Megalopolis: An Essay for the Identification of the World Urban Mega-structures

ARELLANO, Blanca¹ & ROCA, Josep²

Keywords: Urban sprawl; megalopolis; urban regions; metropolis

Abstract

The urban development of the twentieth century can be characterized by the rise of the metropolitanization process. However, since 1950, it has occurred a real change of scale in this growth: the infinite growth of metropolitan peripheries, encouraged by the process of urban sprawl, has increased the urbanization of rural environments in the interstices between cities and metropolitan areas. Previously isolated urban systems have been caught in the web of urbanization and generated new urban spaces characterized by increasing complexity. Megacities, intuited in the early twentieth century by precursors of contemporary urbanism (Geddes, 1915; Mumford, 1938), have come true (Gottmann, 1961).

The objective of this paper is to perform an analysis for the identification and preliminary characterization of megalopolis in the early twenty-first century. The recent publication by NASA of planetary image of night lights gives the opportunity to proceed with the development of methodologies for image analysis to identify susceptible urban mega-structures on a planetary scale.

Literature review

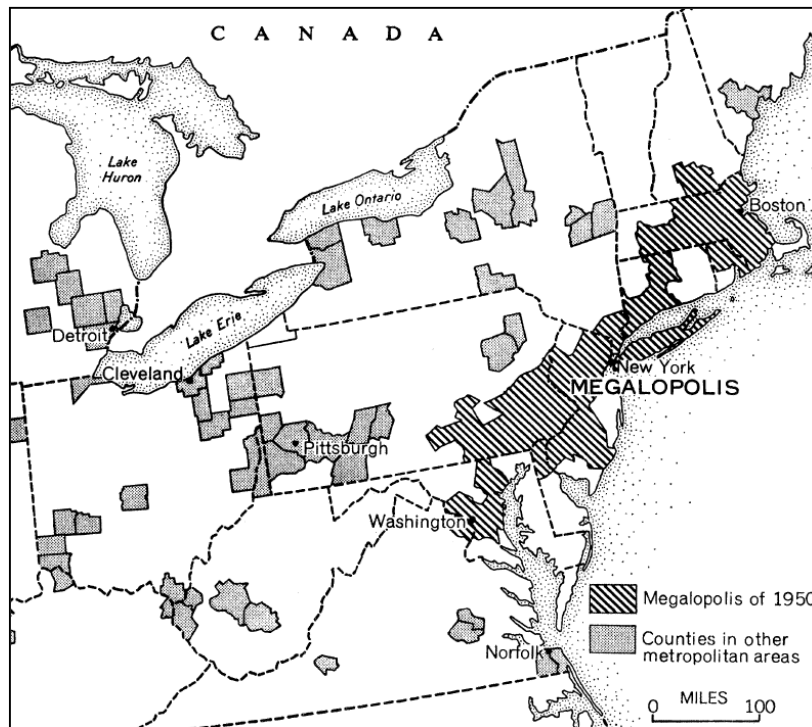
Although most of the work oriented to identifying the megalopolitan agglomerations agrees to use hybrid methodologies for delimitation, that combine understanding of the regional megacities as places space as well as spaces of flows (Taylor, 2004; Lang and Dhavale, 2005), the true is that few efforts (Hall et al, 1973) have been made in this sense, prevailing in the literature the sectoral work. In this regard the main contributions have focused on four key methodologies, depending on the determinant of analysis: functional relationships; the density of human settlements; the morpholog of urban development, especially the contiguity of urbanization; and, more diffuse, what we might be called local knowledge.

Gottmann's seminal work (1957 and 1961) is the first of these methodologies, with a geographical and functional approach. Although Gottmann characterized the megalopolis of the Northeast of USA as an almost continuous stretch of urban and suburban areas, see Figure 1, it didn't define precisely the conurbation from a physical point of view. His approach was functional, qualitative, as juxtaposition of metropolitan areas (which was defined by the Census functional areas of daily commuting of residence / work). So, the notion of contact, coalescence and overlap (Clawson, 1971; Hall et al, 1973) of functional metropolitan areas is the primary factor that allows the identification of Megalopolis.

¹Blanca Arellano. MSc. in Urban Management and Valuations. Researcher at the Center of Land Policy and Valuations (CPSV) Technical University of Catalonia (UPC). Email: blanca.arellano@upc.edu

²Jospe Roca. PhD Director of the Center of Land Policy and Valuations (CPSV), Technical University of Catalonia (UPC). Email: josep.roca@upc.edu

Figure 1. The *Megalopolis* of Gottmann (1957)



That geographical and functional approach is adopted also for other jobs like the America 2050 or the European project POLYNET (Hall and Pain, 2006). In the words of Peter Hall:

“The Mega-City Region is then defined in terms of contiguous FURs³, and is thus similar to the so-called Consolidated Metropolitan Statistical Area (CMSA) used in the United States. Contiguity is the sole criterion. There may be functional relations (cross-commuting) between the constituent FURs, or there may not; this would emerge only in the course of the analysis.” (Hall, 2009: 807)

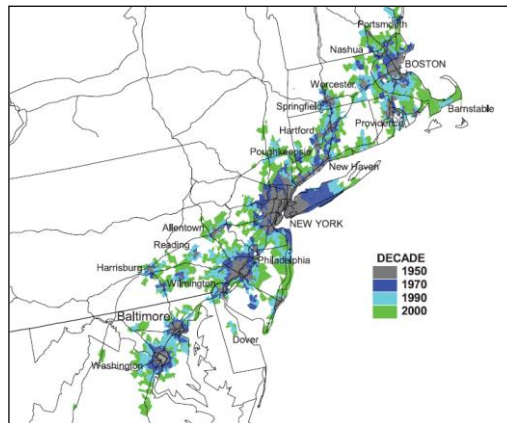
The second approach to the definition of megalopolis is the analysis of the spatial patterns of density of human settlements.

For Gottmann (1976) a superior average density to 250 inhabitants per sq km mark the border to the delimitation of large urban regional agglomerations. However, megacities would be characterized mainly by its polynuclear character, appearing between different urban centers large undeveloped areas, making it difficult to use a predetermined standard density.

Morrill (2006), updated the work of Gottmann through the consideration of the Urbanized Areas of the USA Census Bureau, which shows the evolution of the megalopolis of Boston-Washington between 1950 and 2000 (Figure 2). The work of Morrill allows to see how the criterion density is not an efficient mechanism for defining megacities. Not only because of the discontinuity of densely populated areas, but the proliferation from the 70's of the phenomenon of ex-urban sprawl.

³ Functional Urban Regions (FUR) were established since the late 60s, in the UK, as an application of the methodology of the US Census Bureau adapted to the European reality (Royal Commission on Local Government in England, 1968; Hall et al, 1973; Hall y Hay, 1980; Cheshire y Hay, 1989).

Figure 2. **Urbanized Areas in Boston-Washington Megalopolis**



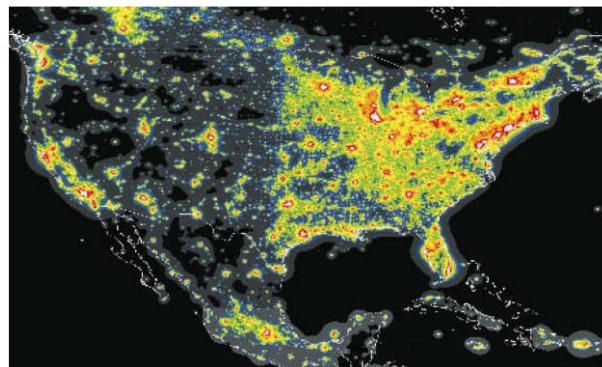
Source: Morrill (2006).

The third of the methodologies developed in the literature is the morphological approach, which emphasizes continuity of development, materialized mainly from structural axes of communication. This methodology is inspired by the first criteria that were developed for the definition of the urban phenomenon in the era of metropolitan growth. Conurbations, once gone beyond the administrative borders of the central city, came to be defined under strictly physical criteria. Contiguity of urban growth is presented as well as the decisive factor for the distinction between the city and its rural surroundings.

Currently, remote sensing technology allows information about ground covers sufficiently precise, and therefore map the artificialised land. But they do not facilitate the detection of complex structures such as the megalopolis, where tissues with very different degrees of urbanization are interspersed with open spaces of rural character.

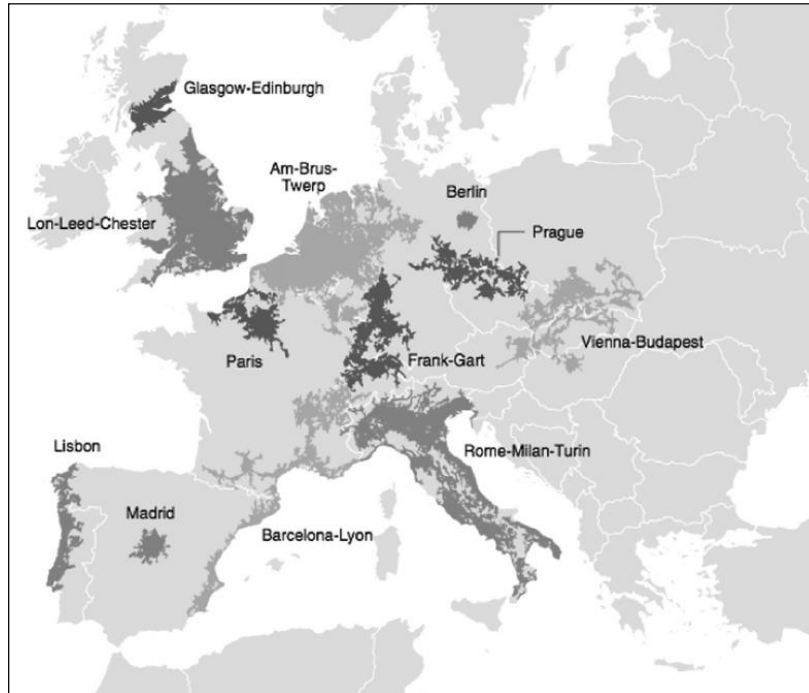
In parallel way, nocturnal images obtained by remote sensing, have represented an alternative way to define megacities, and overall urban and metropolitan systems. From the pioneering work of Elvidge et al (2001) it has been developed a number of studies, based on the information generated with the nocturnal images. This approach has allowed not only to build an atlas of artificial night lights as shown in Figure 3 (Cinzano et al, 2001), but has resulted in a consistent literature that has generated the construction of indices for analysis human development (Elvidge et al, 2012), the global distribution of economic activity (Ghosh et al, 2010), mapping of GDP and CO2 emissions on a regional scale (Doll et al, 2000 and 2006) and very particularly, the delimitation and characterization of urban agglomerations as shown in Figure 4 (Florida et al, 2008).

Figure 3. **Nighttime lights and the urbanization in Nor**



Source: Cinzano et al (2001).

Figure 4. European Megalopolis



Source: Florida et al (2008).

It can be concluded that the morphological methodology, from satellite imagery, are a useful approach for identifying megalopolitan structures. However, given the extraordinary complexity and plurality of forms of urban settlement along different continents, resulting from physical settings (relief, hydrography, etc.) as well as different historical and cultural processes, it seems inappropriate to use a criterion of continuity of urbanization such as the 200 meters usually used to define urban agglomerations. Night lights represent a significant information for understanding the megalopolitan phenomenon, although its implementation is still under debate.

Finally, the fourth approach is a qualitative approach based on local knowledge. This approach, which is certainly the most used in the literature, does not respond to specific quantitative methodology, but responds to an intuitive vision, based on the professional knowledge of urban planners. From this approach, the Lincoln Institute of Land Policy, together with the Regional Planning Association and the Pennsylvania School of Design, developed in 2004, the proposal called *Toward an America Spatial Development Perspective*, which proposed a qualitative change in the territorial management of United States that exceeds the merely local (place, county), and even metropolitan proposing megalopolis as basic territorial scope of planning.

Methodology

The present paper is part of the line that satellite images, especially those derived from the night lights, represents the most useful contribution to the delimitation of megalopolis. So the delimitation of the megalopolis on a global scale has been made by analyzing the image of night lights that in 2013 NASA has published and called *black marble*, which has come to represent a qualitative leap in our vision, from space, of urbanization phenomenon (Figure 5).

Figura 5. **Black Marble, 2013**

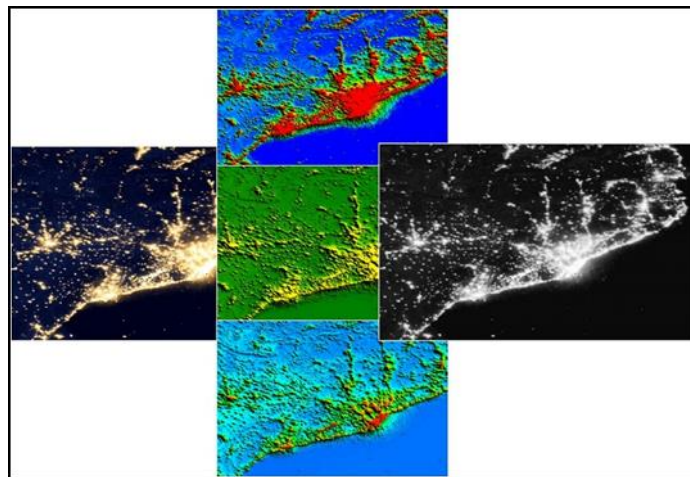


Source: NASA, Google Earth.

The methodology can be summarized in the following aspects:

- First we analyzed the file supplied by NASA, which offers, in the visible spectrum, three images (RGB) differentiated from night lights. In this sense it has to proceed to the composition of a single image in conventional greyscale palette (0-255), as can be seen in Figure 6.

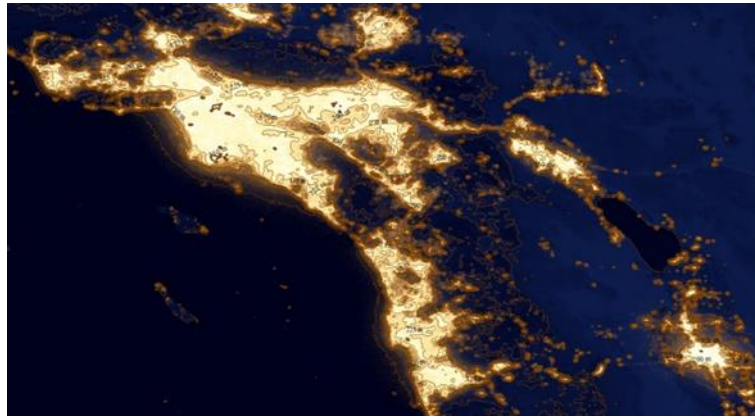
Figure 6. **Nighttime Lights 2012**



Source: Self prepared from NASA (2012).

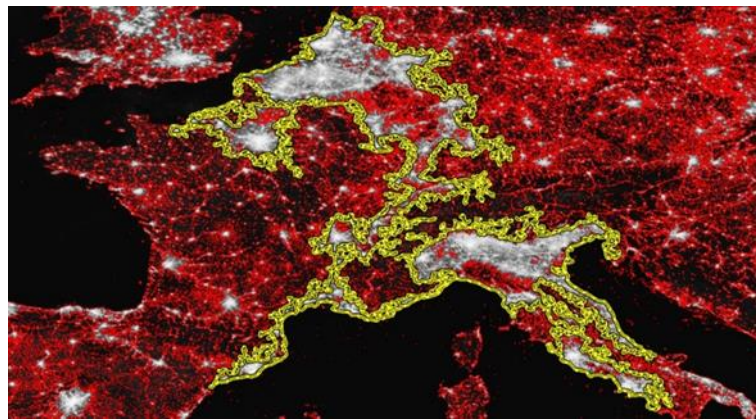
- The image conversion from grayscale to elevations allows developing contours at different intensity levels, capable of identifying different hypothesis of global cities. In this regard have been tried different alternatives (see Figures 7 and following), which have led to adopt, at first, the level curve on the intensity 64 (on $\frac{1}{4}$ of the light intensities analyzed 256).

Figure 7: **Nighttime light intensity outline. Los Angeles-San Diego-Tijuana Area**



Source: Self prepared from NASA (2012).

Figure 8. **Nighttime light contours with intensity 50 for Europe**



Source: Self prepared from NASA (2012).

This light intensity (64 of 256) allows better identify megalopolitan structures than alternative thresholds. For example, the intensity of light reflected by the ice at the poles is around 40, and very close to the light intensity of 38 is the reflection of the sandy deserts. For its part, the intensity 50, in which the development effect begins to be clearly identifiable respect to the lights of rural origin, generates hardly acceptable Megalopolitans contours, from the perspective of local knowledge, and the existing mega-structure in Central Europe (see Figure 13) covering the agglomerations of Brussels - Randstad - Rhine Ruhr, Stuttgart - Strasbourg, Zurich - Bern, Geneva - Lion - Marseille, Barcelona -Tarragona - Girona, Torino - Milan - Veneto, and Rome - Naples, with an area of 373,000 sq. km. The analysis of these results, contrasted from the intuition of local knowledge has led to consider the threshold of 64 for the demarcation of the global megalopolis. Figure 9 identifies, for the same view as the previous figure, aforementioned contours of light, which seem better adapted to reality.

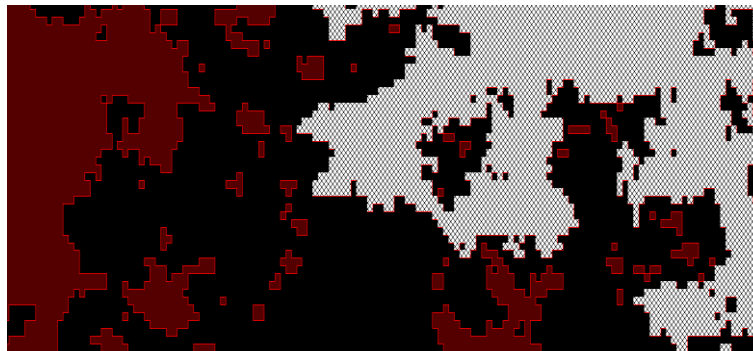
Figure 9. **Nighttime light contours with intensity 64 in Europe**



Source: Self prepared from NASA (2012).

- The contours of light (2012) with intensity equal to or greater than 64 have allowed to identify the lighted urban continuum, which have been aggregated into larger structures when there contiguity per vertex, or separation of one pixel at most, as it can be seen from Figure 10, where the agglomerations are shown, Boston (in white) and New York (in red).

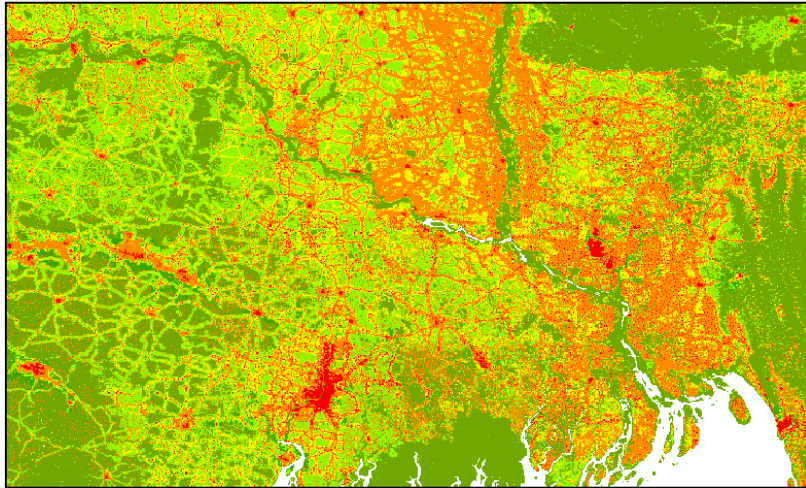
Figure 10. **Detail of the lighted contours with intensity 64 of New York and Boston**



Source: Self prepared from NASA (2012).

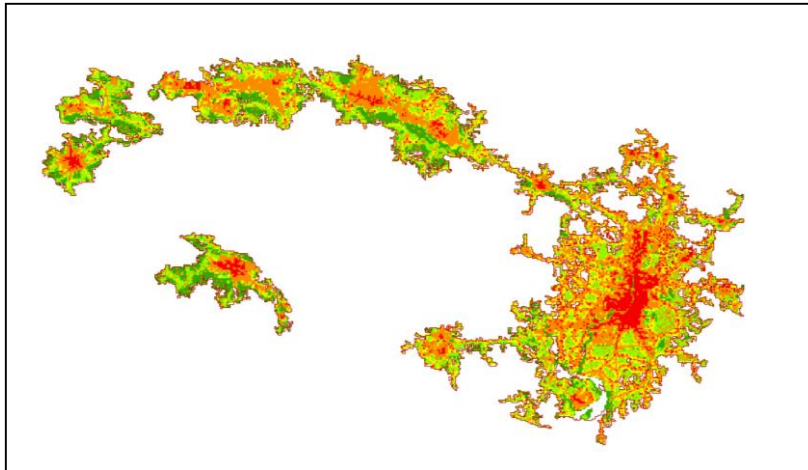
- Finally, we have estimated the population of the continuing intensity contours 64 or higher by overlapping information on population (2008) of the LandScan data base developed by the Oak Ridge National Laboratory, USA. LandScan allows to analyze the population structure of different environments in the urbanized planet, with a close approximation to the reality, as can be seen in Figure 11 refers to the area of Calcutta. Overlapping the lighted contours with intensity 64 and the LandScan database (see Figure 12) has allowed to calculate the population of the same area, identifying planetary megalopolis (2008-12).

Figure 11. **Spatial distribution of the human population by LandScan database**



Source: Self prepared from LandScan (2012).

Figure 12. **Overlapping of the illuminated contours (64) and LandScan database**



Source: Self prepared from LandScan (2012).

The calculation of the population has been made for all the illuminated urban continuous from the previous methodology. This approach has allowed us to identify and characterize from a demographic point of view the different types of human settlement on the planet, from the villages, small towns and intermediate cities to the metropolitan and megalopolitan agglomerations. In this sense, the megalopolitan proto-structures have been differentiated (understood as the continuous illuminated with a population of over 5 million inhabitants), of megacities themselves, identified from threshold population of 20 million.

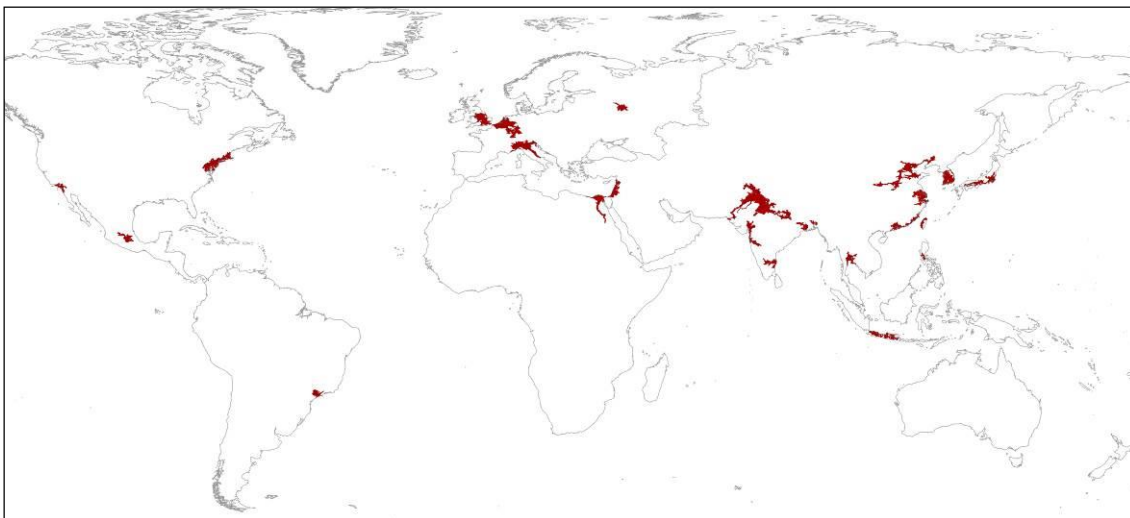
Following the work begun by Florida et al (2008), using the methodology of nighttime satellite images as a method for the delimitation of the megalopolis our analysis allows the worldwide identification of 444,502 populated areas illuminated with sufficient intensity (64 on a scale of 256) for consideration of urban nature. 433 of these illuminated areas reach a population of over one million inhabitants, concentrating 2,537 million inhabitants, 37.8% of the population of the planet. 92 over 5 million represent the seeds of megalopolitan structures. And 30 structures, that we call proto-megas, exceed 15 million, reaching a population of 1,298,757,300 inhabitants, placing as strong candidates to be characterized as megalopolis.

Table 1. Distribution of the population of the illuminated areas (intensity 64)

Population (intensity 64)	Frequency	Percentage	Accumulate
> 20.000.000	24	,005	,0
10.000.000-20.000.000	23	,005	,0
5.000.000-10.000.000	45	,010	,0
1.000.000-5.000.000	341	,077	,1
500.000/1.000.000	366	,082	,2
100.000-500.000	2.323	,523	,7
50.000-100.000	2.453	,552	1,3
10.000-50.000	12.325	2,773	4,0
5.000-10.000	12.371	2,783	6,8
1.000-5.000	57.357	12,904	19,7
100-1.000	133.982	30,142	49,9
< 100	222.892	50,144	100
TOTAL	444.502	100	

Source: Self prepared from LandScan (2012).

Figure 13. Proto-Megas (more than 15 million of inhabitants)

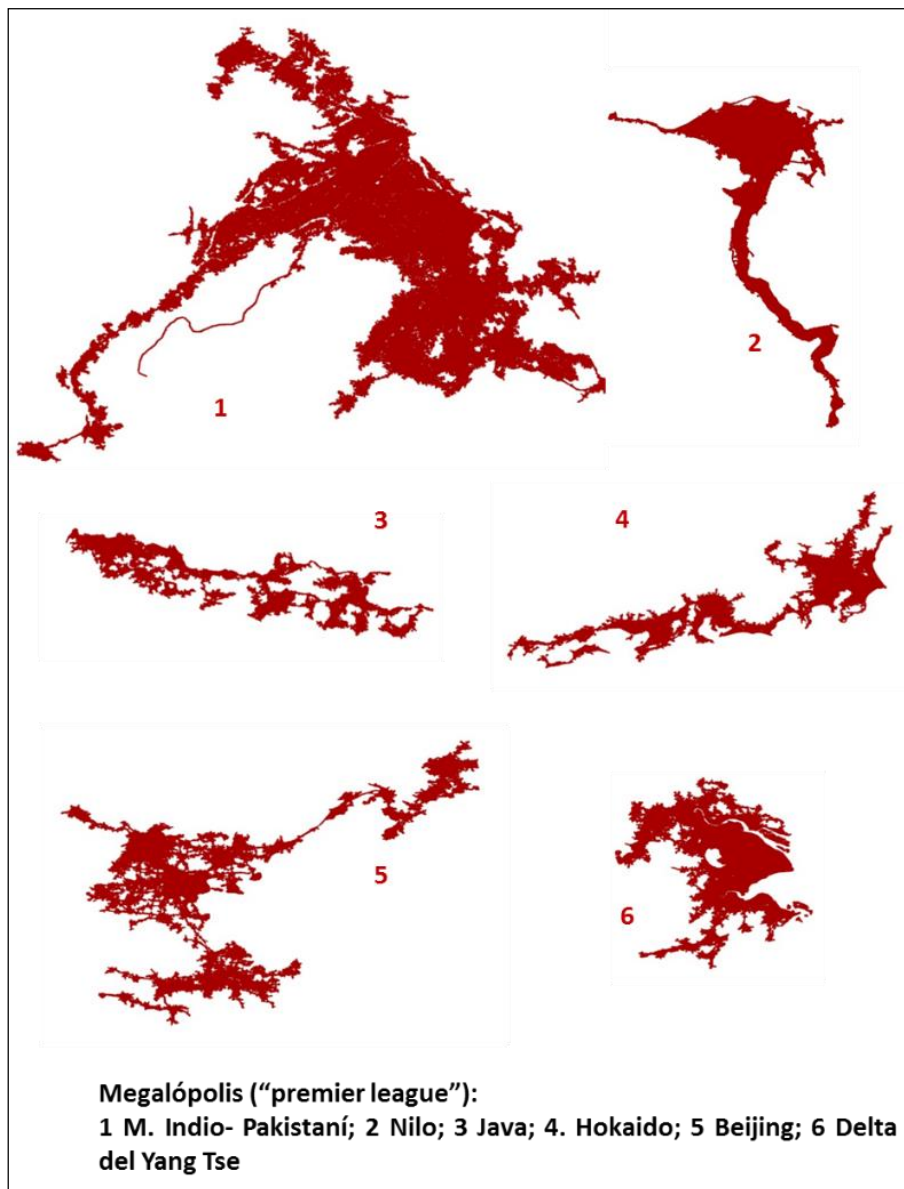


Source: Self prepared from LandScan (2012).

In the study we identified 26 megacities with a population exceeding 20 million, concentrating 1,374,291,094 people in their environment. These megalopolis are distributed throughout the entire planet. Asia highlights the presence of 18 large agglomerations: 2 transnational (India-Pakistan and India-Bangladesh), 5 in India, 6 in China (5 in the continent and one in Taiwan), and 1 in Japan, Indonesia, Korea, Philippines and the Middle East. America (4 megalopolis), Europe (3 agglomerations) and Africa (1 agglomeration), demonstrate the global reach of the geography of the megalopolis. Only Oceania is free of such urban agglomerations.

Six megalopolis stand out for its extraordinary population size, with a population exceeding 75 million. These megalopolis are what might be called the premier league of world urban agglomerations. All of them located in Asia, with the exception of an African: the Indian-Pakistani, Java Island, Yangtze Delta, the island of Hokkaido, the Nile and Beijing agglomeration (Figure 14). No European or American megalopolis between these giants.

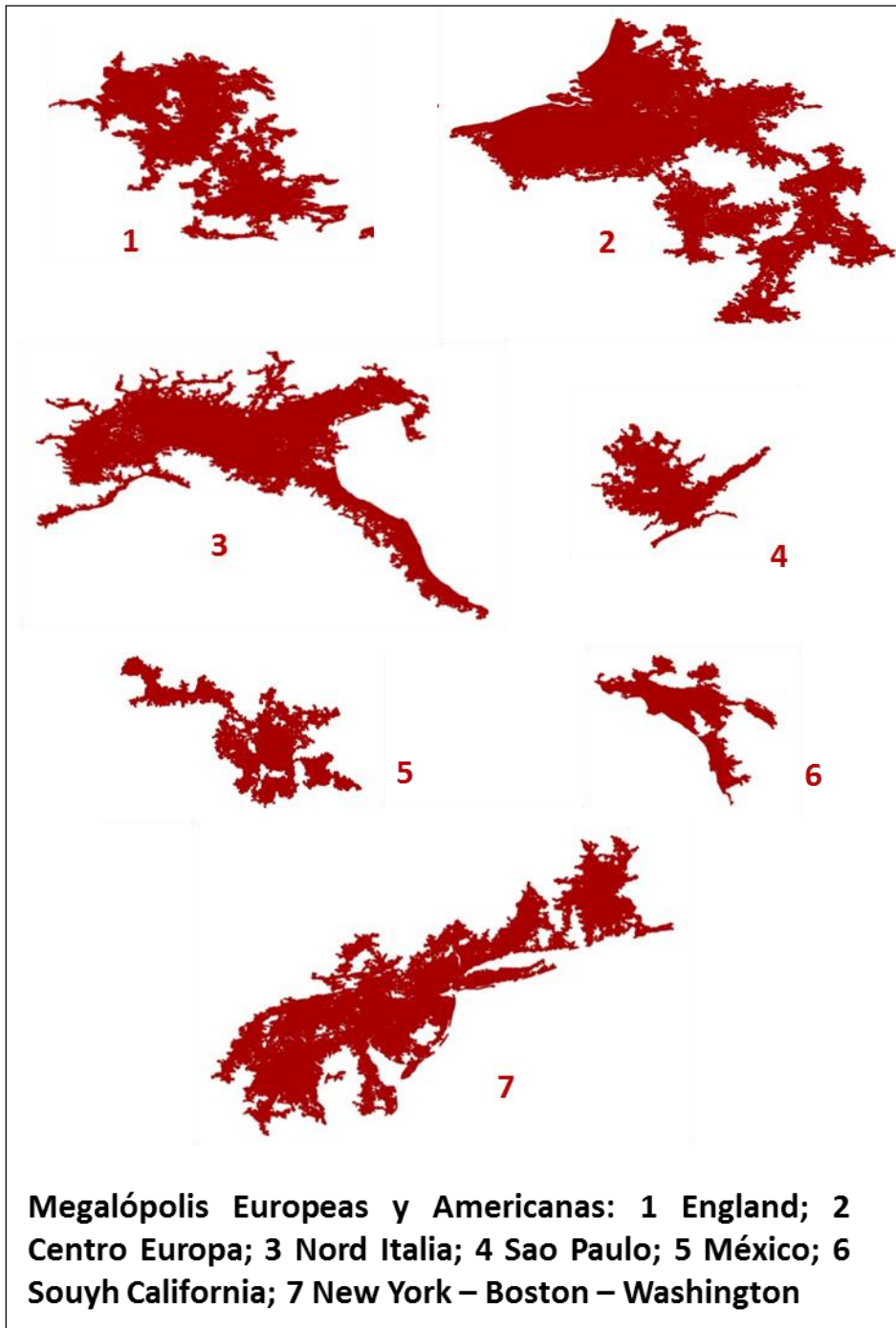
Figure 14. **Premier League**



Source: Self prepared from NASA-NOAA (2012) and LandScan (2012).

Faced with these giants it appears a second group of megacities (see Figure 22) which is led by the large conurbation of Central Europe, which stretches from Brussels Dutch Randstad, the Rhine-Ruhr, Strasbourg and Stuttgart. Europe completes its presence with English megacities (London to Cardiff and Bristol on the one hand, and Birmingham, Sheffield, Manchester, Liverpool and Leeds on the other), on the fourteenth place, and the vast agglomeration of northern Italy, which it extends from Milan to Venice, in the twenty-first. With regard to America, the megalopolis par excellence, the US Northeast (Boston - New York - Philadelphia - Baltimore - Washington), does not appear until the tenth place ranking, preceded by the two large Chinese structures Zhengzhou- Pearl River Xian. The rest of American megalopolis is reduced to other giant, the large urban agglomeration round the city of Mexico, which only appears in the fifteenth place, relegating Sao Paulo - Santos seventeenth, and other great American agglomeration of Los Angeles - San Diego - Tijuana (Southern California), which is the penultimate of the 26 megacities obtained in the present work.

Figure 15. European and American Megalo



Source: Self prepared from NASA-NOAA (2012) and LandScan (2012).

Conclusions

It can be concluded that megacities are a new form of urban settlement that affects the entire planet. This fact is not a phenomenon exclusive of the first world versus what the pioneering work of Geddes, Mumford and Gottmann seemed to suggest. Latin America, Africa and especially Asia, are also protagonists of these new forms of occupation of space. Emerging urban territories that seem to make out a new economic and social order in Europe, and North America will no longer have the unique role of protagonists.

References

- ARELLANO, B y ROCA, J. LAS MEGAESTRUCTURAS URBANAS DEL SIGLO XXI: UN ENSAYO PARA LA IDENTIFICACIÓN Y CARACTERIZACIÓN DE LAS MEGALÓPOLIS. ACE: architecture, city and environment - Year 09, num. 25 June, 2014.
- ARELLANO, B. y ROCA, J. El Urban Sprawl, ¿Un Fenómeno de Alcance Planetario? Los Ejemplos de México y España. En: ACE (Arquitectura, Ciudad y Entorno), 4 (12): 115-147, 2010.
- ARELLANO, B. y ROCA, J. Sprawl en las metrópolis europeas. Las periferias metropolitanas, ¿principal escenario de la dispersión de la urbanización en Europa? En: ACE (Arquitectura, Ciudad y Entorno), 7 (20): 95-114, 2012.
- ASCHER, F. *Metápolis ou l'avenir des villes*. París, Odile Jacob, 1995.
- BAUER, G. y ROUX, J.M. *La rurbanization, ou la ville éparpillée*. París, Ed. du Seuil, 1976.
- BERRY, B. *The Counterurbanization Process: Urban American since 1970 en su Urbanization and Counterurbanization*, Beverly Hills, Sage, 1976.
- CARBONELL, A. e YARO, R.D. American Spatial Development and the New Megalopolis. En: *Land Lines*, Lincoln Institute of Land Policy, 17 (2), April 2005.
- CHESHIRE P.C. y HAY D.G. *Urban Problems in Western Europe: An Economic Analysis*. Londres, Unwin Hyman, 1989.
- CINZANO, P.; FALCHI, F. y ELVIDGE, C.D. The first World Atlas of the artificial night sky brightness. En: *Mon. Not. R. Astron. Soc.*, 328: 689-707, 2001.
- CLAWSON, M. *Suburban Land Conversion in the United States: An Economic and Governmental Process*. , Routledge, 1971.
- DEWAR, M. y EPSTEIN, D. Planning for "Megaregions" in the United States". En: *Journal of Planning Literature*, 22: 108, 2007.
- DEMATTEIS, G. *Suburbanización y periurbanización. Ciudades anglosajonas y ciudades latinas*. En: *La ciudad dispersa. Suburbanización y nuevas periferias*. Barcelona, Centro de Cultura Contemporánea de Barcelona, 1998
- DOLL, C.N.H.; MULLER, J.P. y ELVIDGE, C.D. Night-time imagery as a tool for global mapping of socio-economic parameters and greenhouse gas emissions. En: *Ambio*, 29 (3): 157-162, 2000.
- DOLL, C.N.H.; MULLER, J.P. y MORLEY, G.J. Mapping regional economic activity from night-time light satellite imagery. En: *Ecological Economics*, 57: 75-92, 2006.
- ELVIDGE, C.D.; IMHOFF, M.L.; BAUGH, K.E.; HOBSON, V.R.; NELSON, I.; SAFRAN, J.; DIETZ, J.B. y TUTTLE, B.T. Night-time lights of the world: 1994-1995". En: *ISPRS Journal of Photogrammetry & Remote Sensing*, 56: 81-99, 2001.
- ELVIDGE, C.D.; BAUGH, K.E.; ANDERSON, S.J.; SUTTON, P.C. y GHOSH, T. The Night Light Development Index (NLDI): a spatially explicit measure of human development from satellite data. En: *Social Geography*, 7: 23-35, 2012.
- EC. European Comission. *European Spatial Development Perspective. Towards Balanced and Sustainable Development of the Territory of the European Union*. , 1999.
- FISHMAN, R. *America's New City*. En: *The Wilson Quaterly*, 14, 1990.
- FISHMAN, R. *The American Planning Tradition*. FISHMAN, R. (Ed.) *The American Planning Tradition: Culture and Policy*. Washington D.C., The Woodrow Wilson Center Press, 2000
- FRIEDMANN, J. The World City Hypothesis. *Development and Change*, 17: 69-83, 1986.
- FLORIDA, R.; GULDEN, T. y MELLANDER, C. The rise of the mega-region. En: *Cambridge Journal of Regions, Economy and Society*, 1: 459-476, 2008.
- GEDDES, P. *Cities in Evolution*. Londres, Williams and Norgate, 1915.
- GHOSH, T.; POWELL, R.L.; ELVIDGE, C.D.; BAUGH, K.E.; SUTTON, P.C. y ANDERSON, S. Shedding Light on the Global Distribution of Economic Activity. En: *The Open Geography Journal*, 3: 148-161, 2010.
- GOTTMANN, J. *Megalopolis or the Urbanization of the Northeastern Seaboard*. En: *Economic Geography*, 33 (3): 189-200, 1957.
- GOTTMANN, J. *Megalopolis: the urbanized northeastern seaboard of the United States*. New York, Twentieth Century Fund. 1961.
- GOTTMANN, J. *Megalopolitan systems around the world*. En: *Ekistics*, 243: 109-113, 1976.
- HALL, P. *The World Cities*. Londres, World University Library, Weidenfeld & Nicolson, 1966.
- HALL, P. y HAY, D. *Growth Centres in the European Urban System*. Londres, Heinemann, 1980.

- HALL, P. Looking Backward, Looking Forward: The City Region of the Mid-21st Century. En: *Regional Studies*, 43 (6): 803-817, 2009.
- HALL, P. y PAIN, K. *The Polycentric Metropolis. Learning from Mega-city Regions in Europe*. Londres, Earthscan, 2006.
- HALL P.; THOMAS R.; GRACEY H. y DREWETT R. *The Containment of Urban England (2 volúmenes)*. Londres, George Allen & Unwin, 1973.
- KERN County Council of Governments, San Diego Association of Governments and Southern California Association of Governments: *The Southern California Mega-region A Case Study of Global Gateway Regions: America's Third Century Strategy*. September 2005.
- KRUGMAN, P.R. *The Self Organizing Economy*. , Blackwell Publishers, 1996.
- HARVEY, D. *Cities or urbanization? City. Analysis of Urban Trends Culture, Theory, Policy Action*, 1-2, 1996.
- HEALEY, P. *City Regions and Place Development*. *Regional Studies*, 43 (6): 831-843, 2009.
- LANG, R.E. y DHAVALA, D. *Beyond Megalopolis: Exploring America's New "Megapolitan" Geography (Census Report 05:01)*. VA, Metropolitan Institute at Virginia Tech, 2005.
- LANG, R.E. y KNOX, P.K. *The New Metropolis: Rethinking Megalopolis*. *Regional Studies*, 43 (6): 789-802, 2009.
- LUCAS, R. *On the mechanics of economic development*. *Journal of Monetary Economics*, 22: 3-42, 1988.
- MORRILL, R. *Classic Map Revisited: The Growth of Megalopolis*. En: *The Professional Geographer*, 58 (2): 155-160, 2006.
- MUMFORD, L. *The Culture of Cities*. Nueva York, Harcourt. Brace & world, 1938. p.
- NASA. *Night Lights 2012 - Flat map [en línea]* Fecha de consulta: . Disponible en: <<http://visibleearth.nasa.gov/view.php?id=79765>>. 2012.
- NEUMAN, M. y HULL, A. *The Futures of the City Region*. *Regional Studies*, 43 (6): 777-787, 2009.
- NUREC. *Network on Urban Research in the European Community. Atlas of Agglomerations in the European Union*. Duisburg, NUREC, 1994.
- ORNL. *Oak Ridge National Laboratory. Landscan [on line]* <<http://web.ornl.gov/sci/landscan/>>. 2012.
- SASSEN, S. *The Global City: New York, London, Tokyo*. Princeton, Princeton University Press, 1991.
- RPA. *Regional Plan Association. America 2050: Megaregions [on line]*. Available in: <http://www.america2050.org/megaregions.html>
- RPA. *Regional Plan Association. America 2050: A Prospectus*. Nueva York, 2006.
- RPA. *Regional Plan Association. Toward an American Spatial Development Perspective*. Nueva York, 2004.
- ROY, A. *The 21st-Century Metropolis: New Geographies of Theory*. *Regional Studies*, 43 (6): 819-830, 2009.
- SCOTT, H.J.; SOJA, E.W. y STORPER, M. *Global City-Regions*. SCOTT, A. (Ed.) *Global City-Regions. Trends, Theory, Policy*. Oxford, Oxford University Press, 2001.
- TAYLOR P.J. *World City Network: A Global Urban Analysis*. Nueva York, Routledge, 2004.
- TUROK, I. *Limits to the Mega-City Region: Conflicting Local and Regional Needs*. *Regional Studies*, 43 (6): 845-862, 2009.
- VAN DEN BERG, L. *Urban Europa: A study of Urban Growth and Decline*. Pargamon, Oxford, 1982.
- WHEELER, S. *Regions, Megaregions, and Sustainability*. *Regional Studies*, 43 (6): 863-876, 2009.