© 2BEX design & konzept

21
© 2BEX design & konzept

# Walking and the Potential for Social Contact

Antonio Páez

School of Geography and Earth Sciences

McMaster University

Frontiers in Transportation August 2, 2013

# Background

- Social contact
  - Innovation, productivity, technology adoption (Carlino et al. 2007; Sedgley and Elmslie 2011; Abel et al. 2012; McMichael and Shipworth 2013)
  - Social cohesion, social capital, segregation (Hilber 2010; Leyden 2003; Forrest and Kearns 2001; Grannis 1998)
  - Well-being and quality of life (Wang and Schwanen 2011; Doi et al. 2008)

# Background

- Social contact is mediated by mobility
  - Density facilitates face-to-face contact (Duany and Plater-Zyberk, 2001; Talen, 1999), low density limits potential for interaction (Farber and Páez 2011)
  - Importance of face-to-face contact for 'sense of community' (Glynn 1981; Nasar and Julian 1995; Grannis 2009; Whalen et al. 2012) but possible limitations at high levels of density (Bramley and Power 2009; Bramley et al. 2009)

# Background

- Social contact is mediated by mobility
  - Travel for social and leisure activities (van den Berg et al. 2013; Carrasco and Cid-Aguayo 2012; Ettema and Schwanen 2012; LeMondia and Bhat 2012; van Acker et al. 2011; Ohnmacht et al. 2009; Sener et al. 2008)

# Background

- Previous work on potential for social contact
  - Urban contact fields (Moore 1970; Moore and Brown 1970; Dacey 1971)
  - Highly abstract, mainly concerned with analytical solutions for simple geometries (e.g. circular city)

# Background

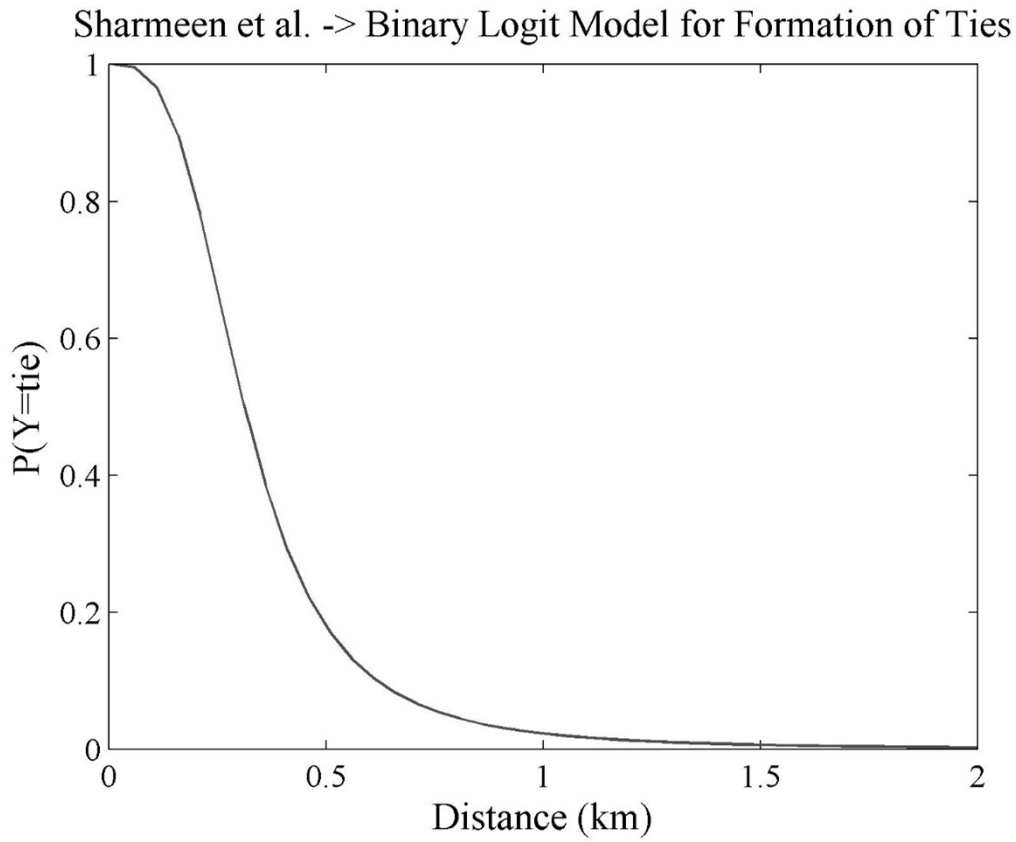
- Previous work on potential for social contact
  - Space-time concepts (space-time paths, potential path areas)
  - Mobility-based exposure (Wang and Shaw 2011; Farber et al. 2012)
  - Social Interaction Potential metrics (Farber et al. 2013; Farber and Li 2013)

# Background

- Previous work on potential for social contact
  - Mobility at a relatively large scale assuming (implicitly or explicitly) motorized travel

# Background

- Mobility
  - Social tie formation (Sharmeen et al.)

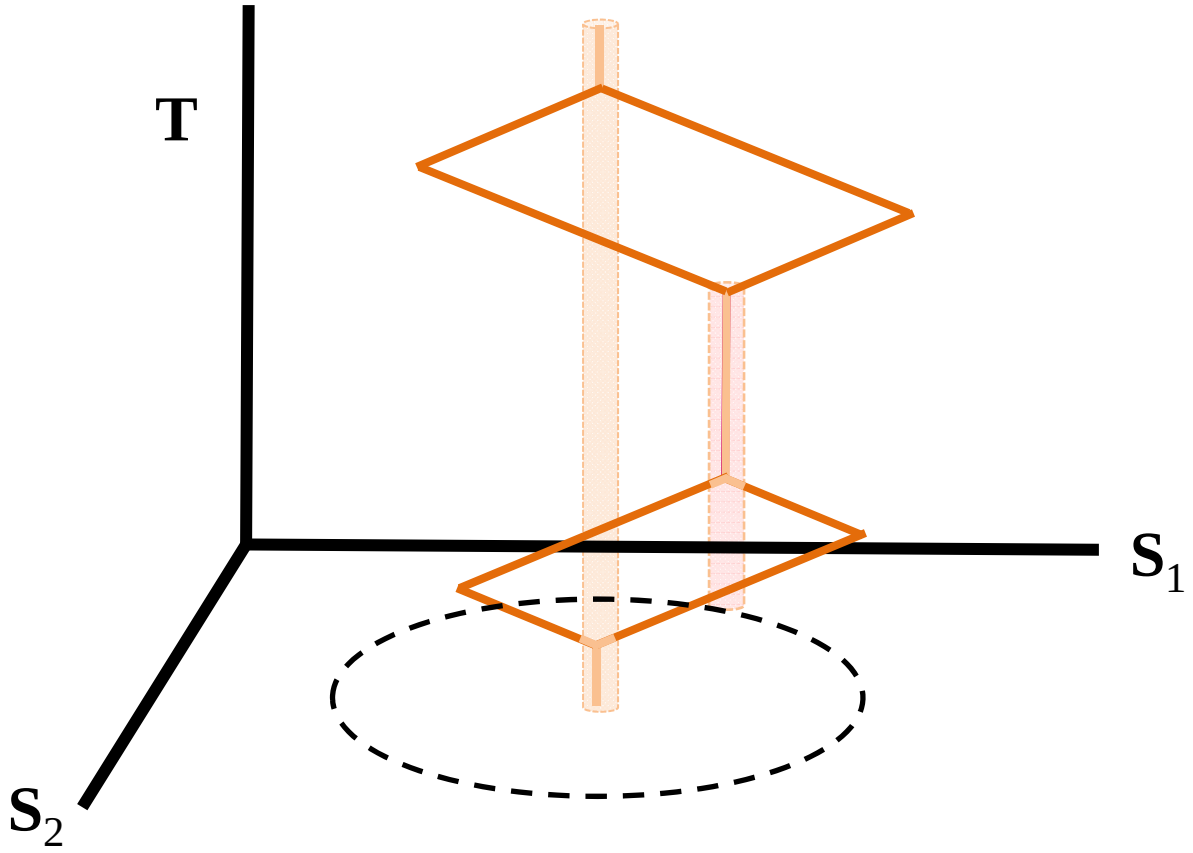


# Objective

- Measuring potential for social contact at the scale of non-motorized mobility

# Approach

- Use pedsheds to establish the size of the contact field



# Approach

- Use G statistic (local concentration) to measure exposure
  - Contact potential of field: proportion of population of type $r$ within field of individual profile $p$
  - Field defined for each spatial location i

$$ {}^{r}_{p}G_i^* = \frac{\sum_{j=1}^{n} w_{ij}(\hat{d}_{pi}) x_j^r}{\sum_{j=1}^{n} x_j^r} $$

# Technical Issues

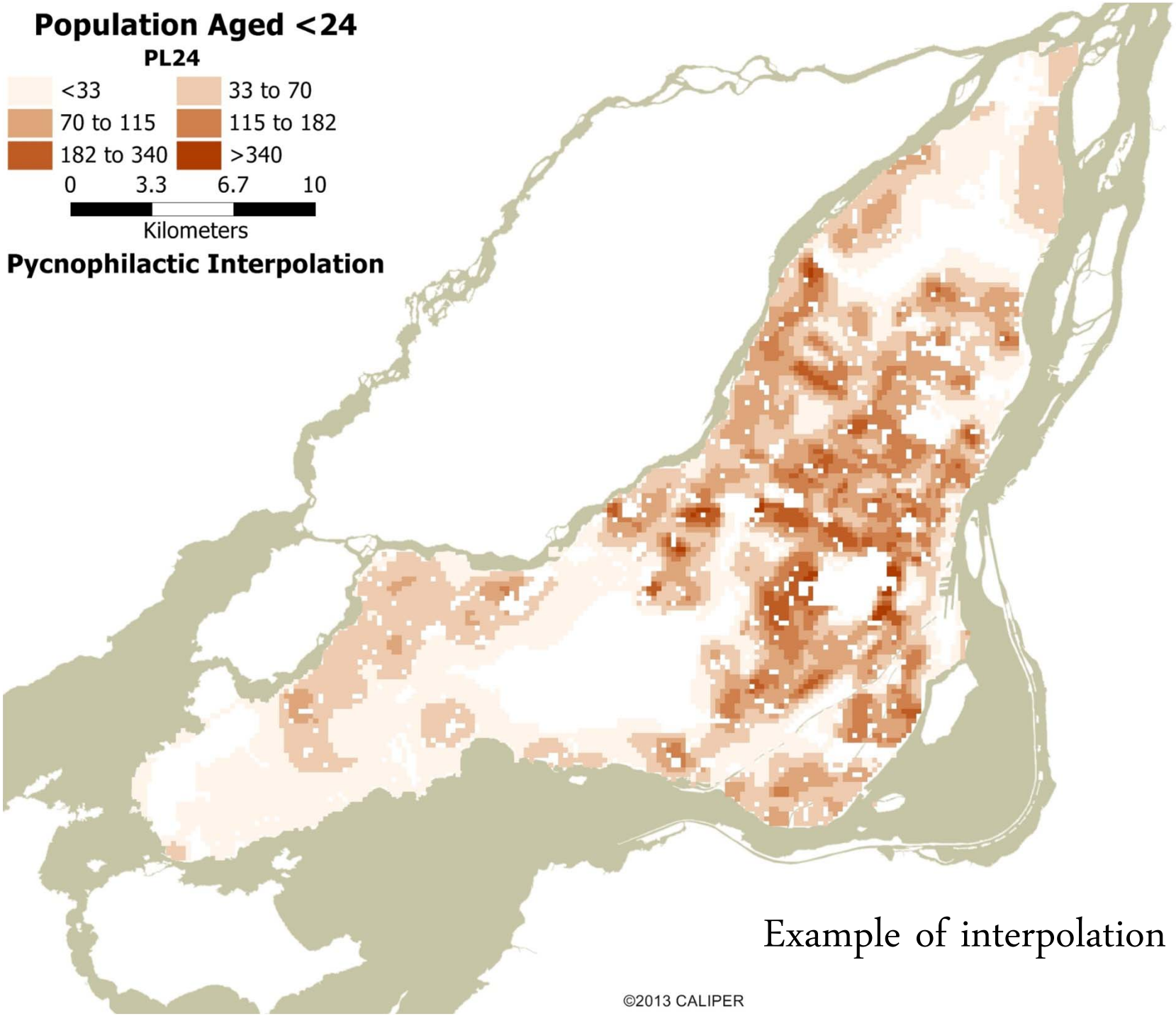
- Pedsheds
  - Previously, models of trip length (Mercado and Páez 2009; Morency et al. 2011)
  - Trip length by mode: crude approach used indicator variables for mode used
- Joint discrete-continuous model
  - Modal choice (including walking)
  - Trip length by mode

# Technical Issues

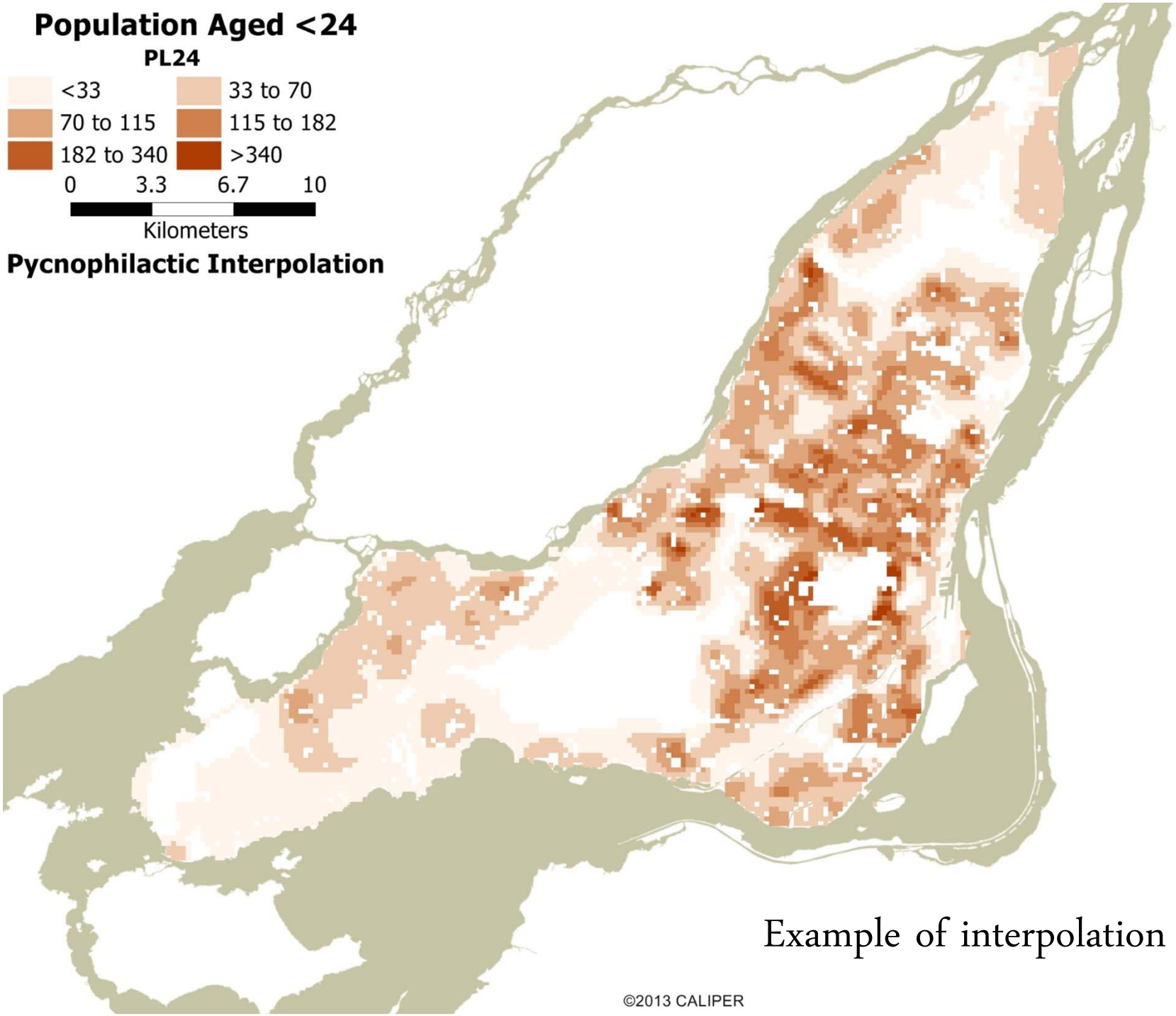
- Information about population for exposure
  - Previously census information
  - Change of support due to size of pedshed areas
- Pycnophilactic (mass-preserving) interpolation

# Empirical Application

- Potential for social contact from the perspective of mature/older adults
  - Importance of social contact for mental health and well-being (Nyqvist et al. 2013)
- Montreal Travel Survey 2008: home-based trips
- Spatial expansion of parameters for walking and walking trip length




Example of interpolation results



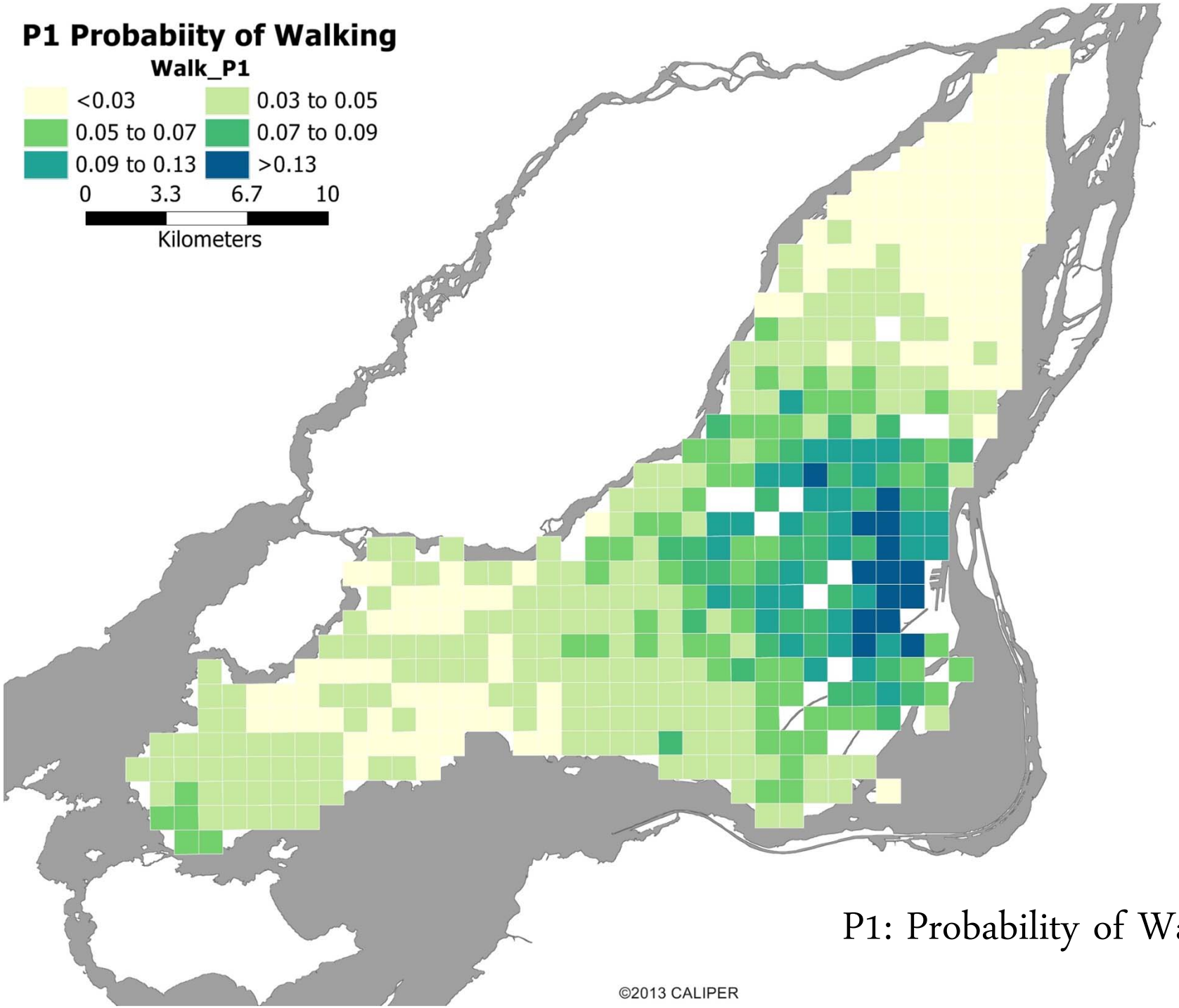

Example of interpolation results

# Walking Behavior

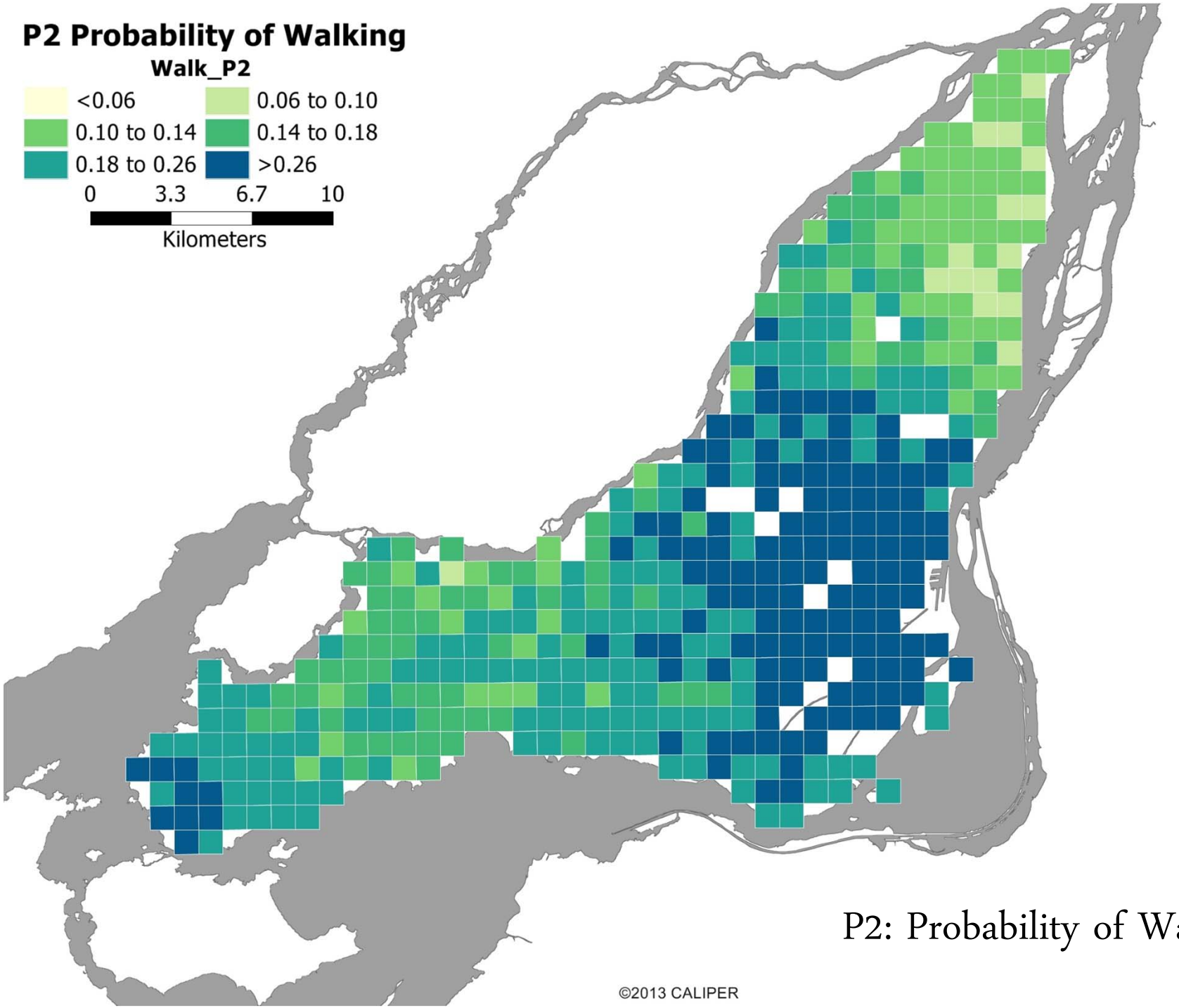
- For detailed results, see Moniruzzaman et al. (2013)

# Walking Behavior

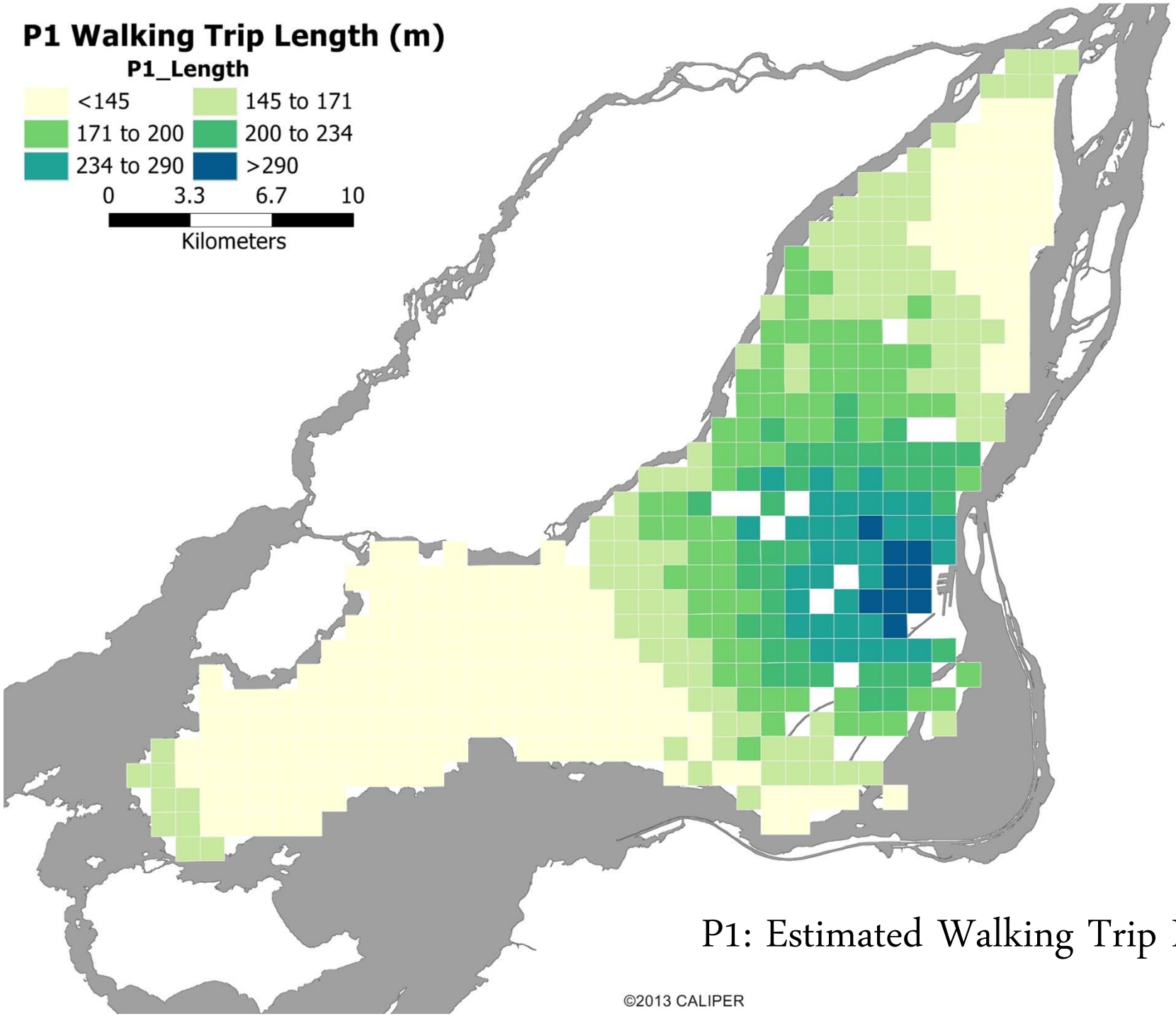
- Two profiles for analysis
  - P1: Male 55-64, Drivers License, Couple, Full Time Job, Income 80-100k, Urban Form/Built Environment as per grid centroid
  - P2: Female 55-64, No Drivers License, Couple, At Home, Income 80-100k, Urban Form/Built Environment as per grid centroid



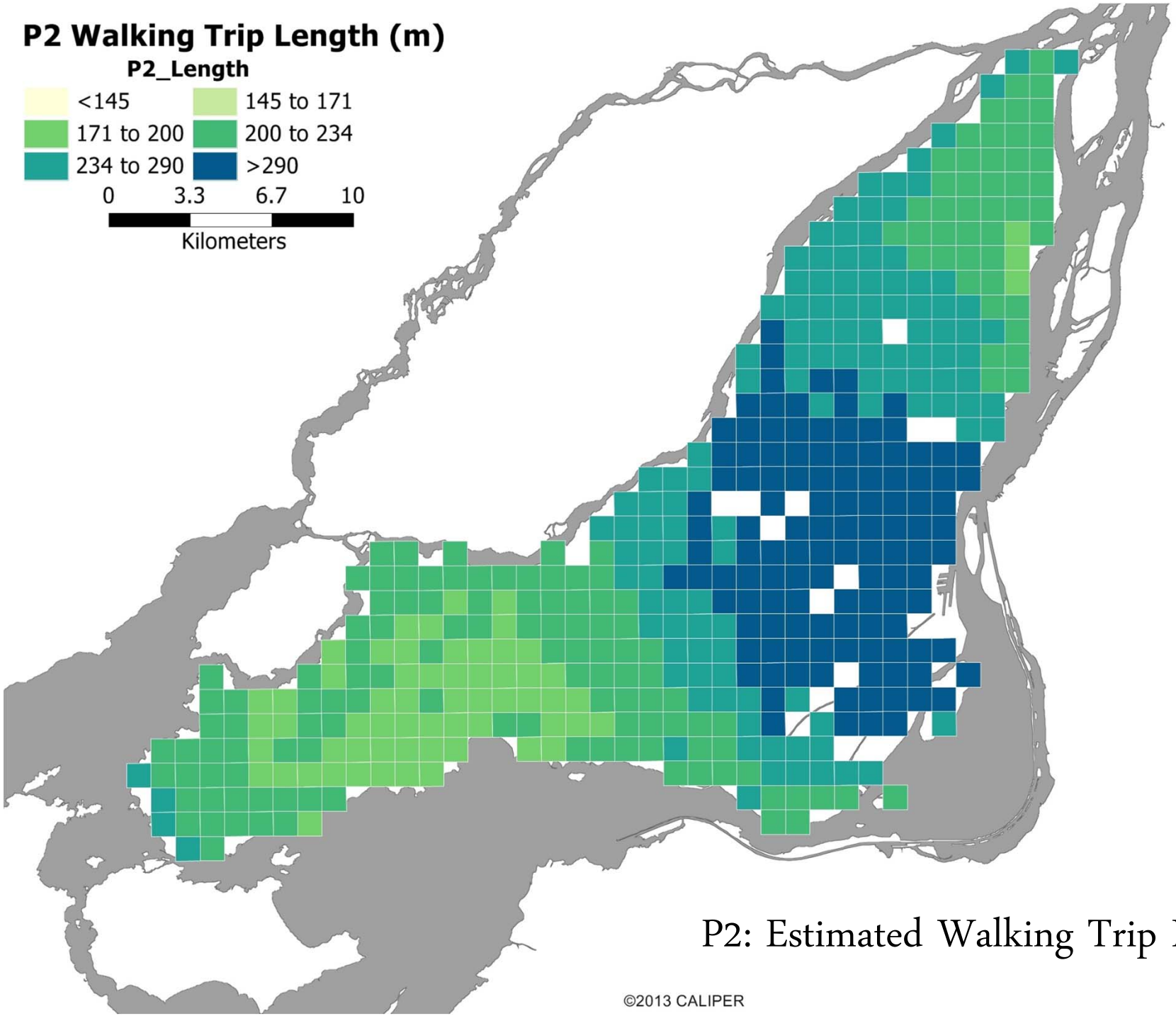

P1: Probability of Walking




P2: Probability of Walking




P1: Estimated Walking Trip Length



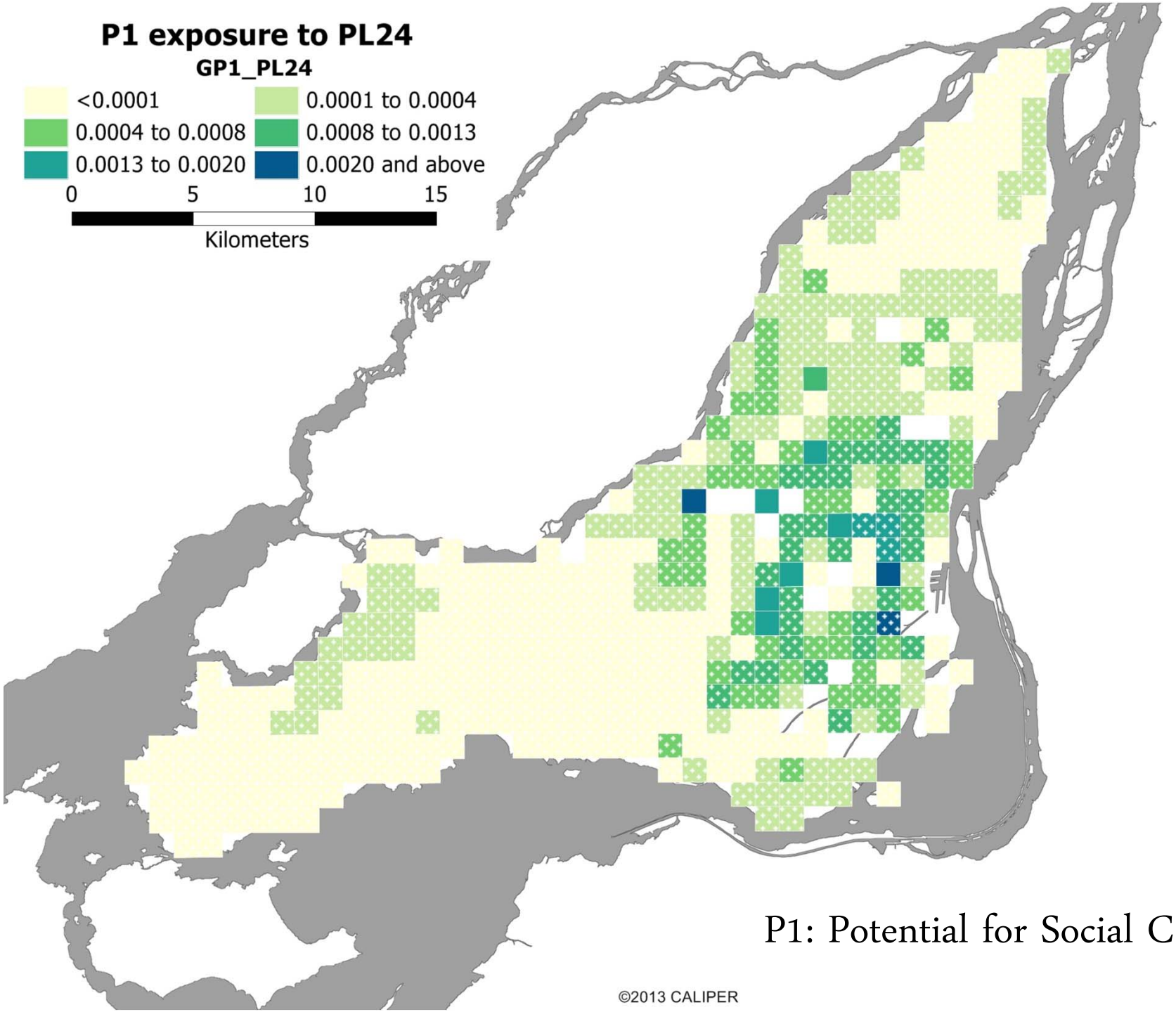

P2: Estimated Walking Trip Length

# Potential for Social Contact

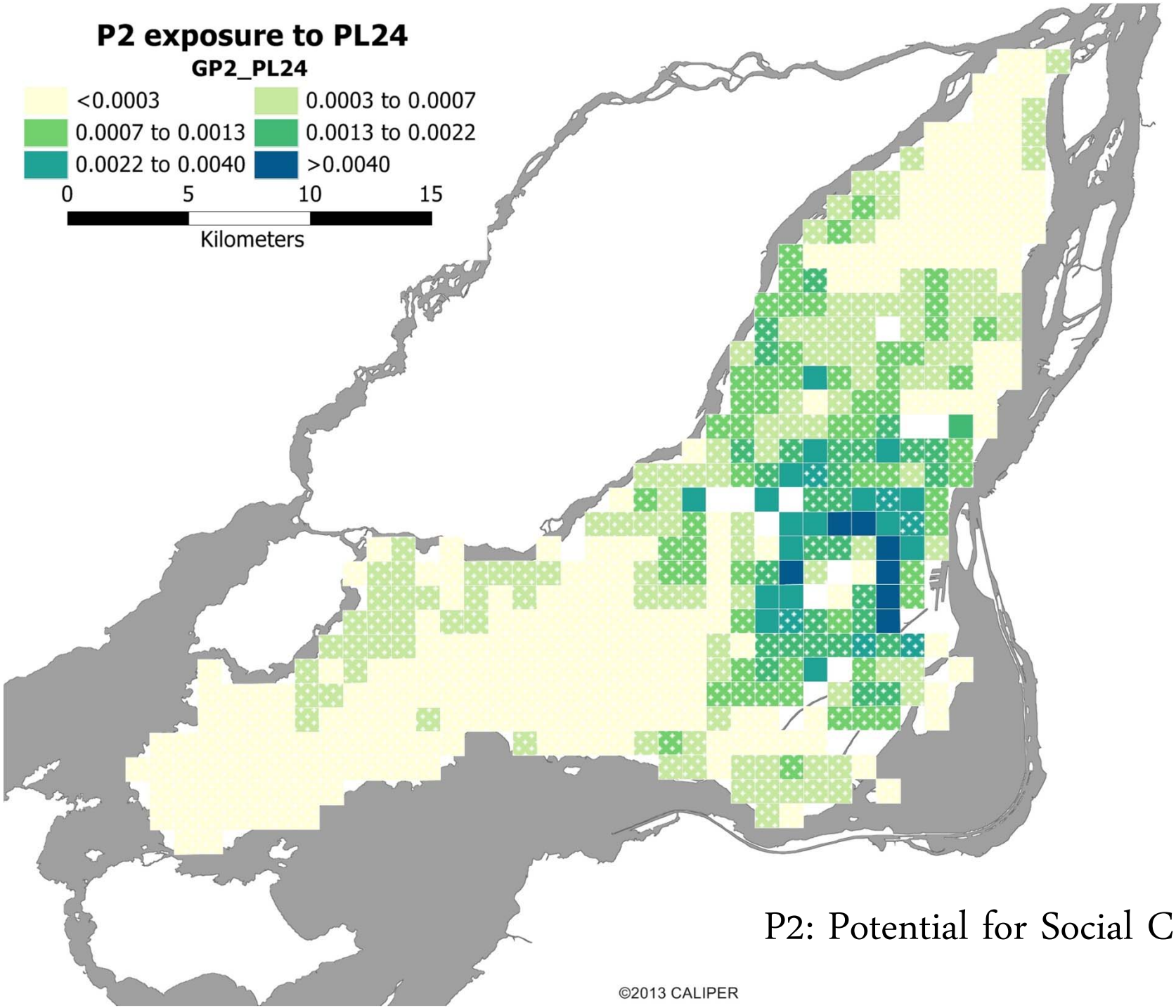
- Weight by probability of walking

$$ {}_{p}^{r}G_i^* = \frac{\sum_{j=1}^{n} w_{ij}(\hat{d}_{pi}) x_j^r P_{pi}}{\sum_{j=1}^{n} x_j^r P_{pi}} $$

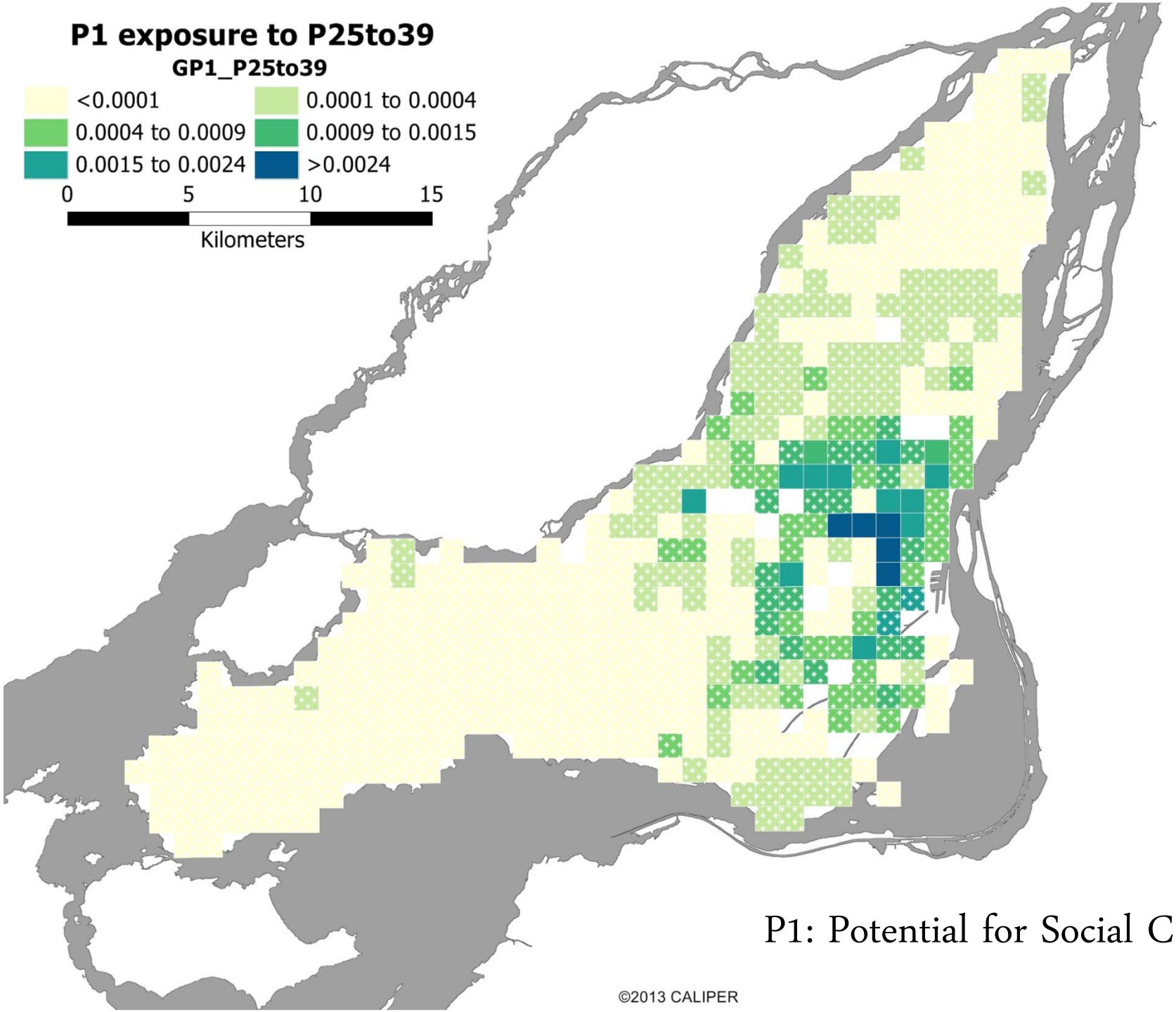
- Significance testing conducted in usual fashion



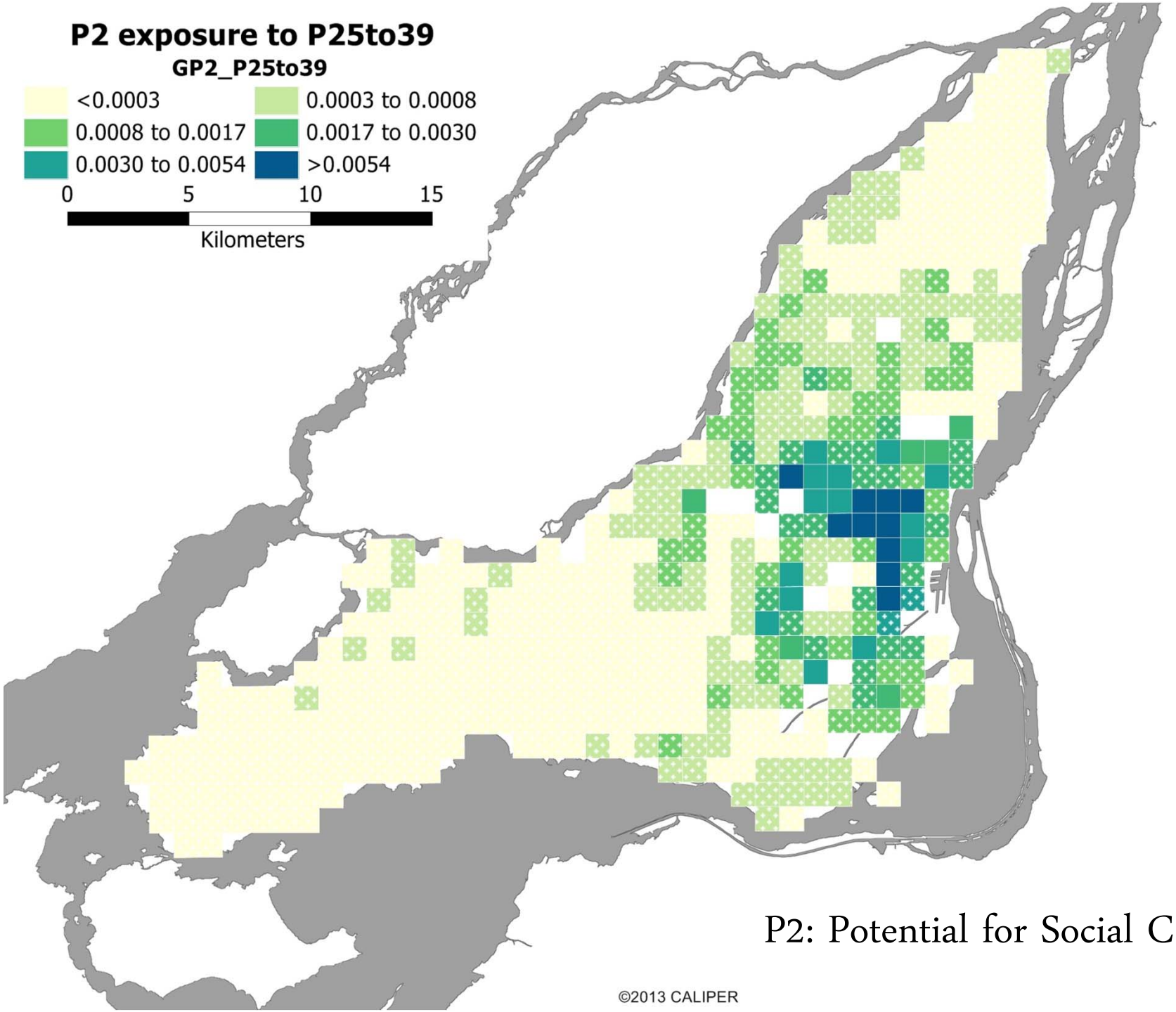

P1: Potential for Social Contact



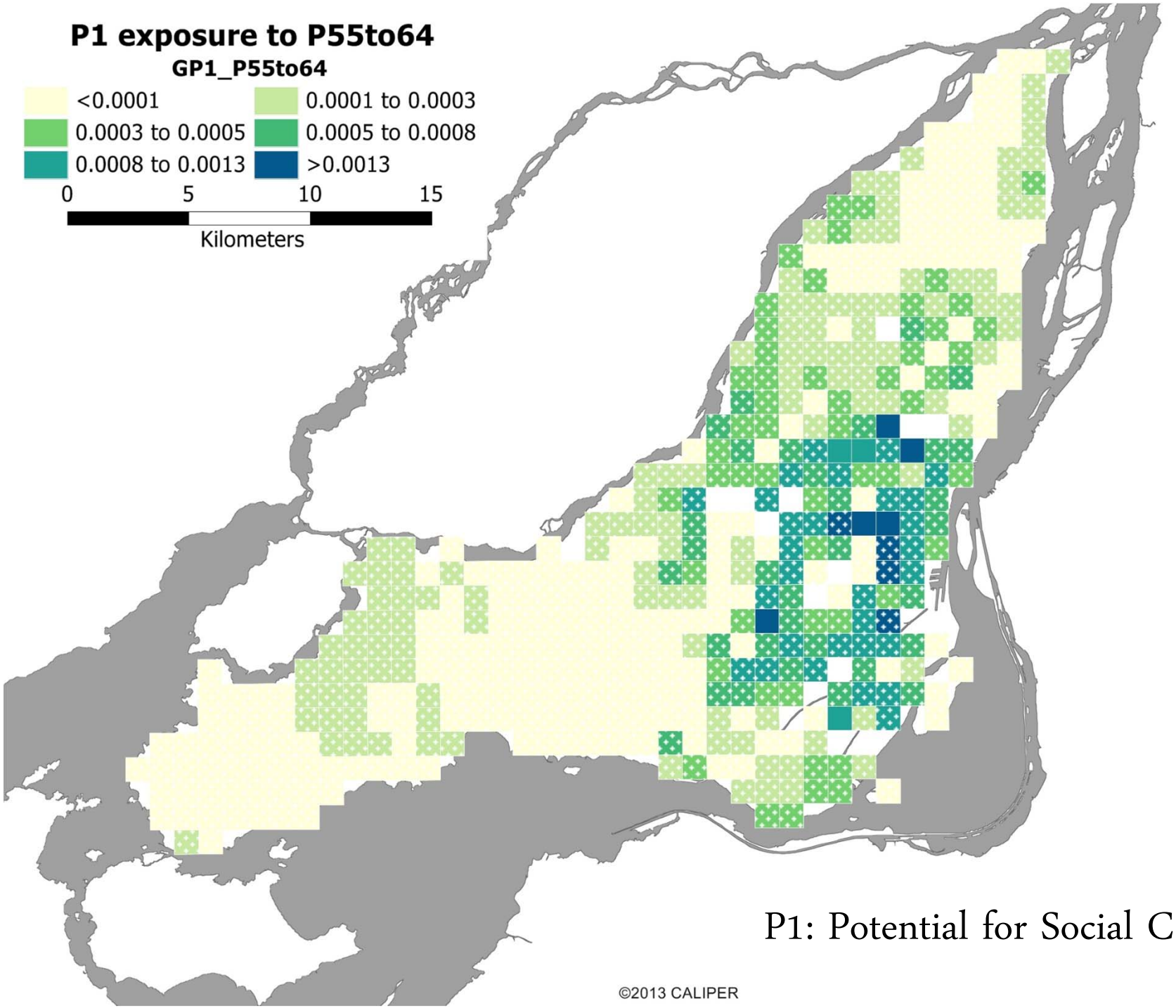

P2: Potential for Social Contact



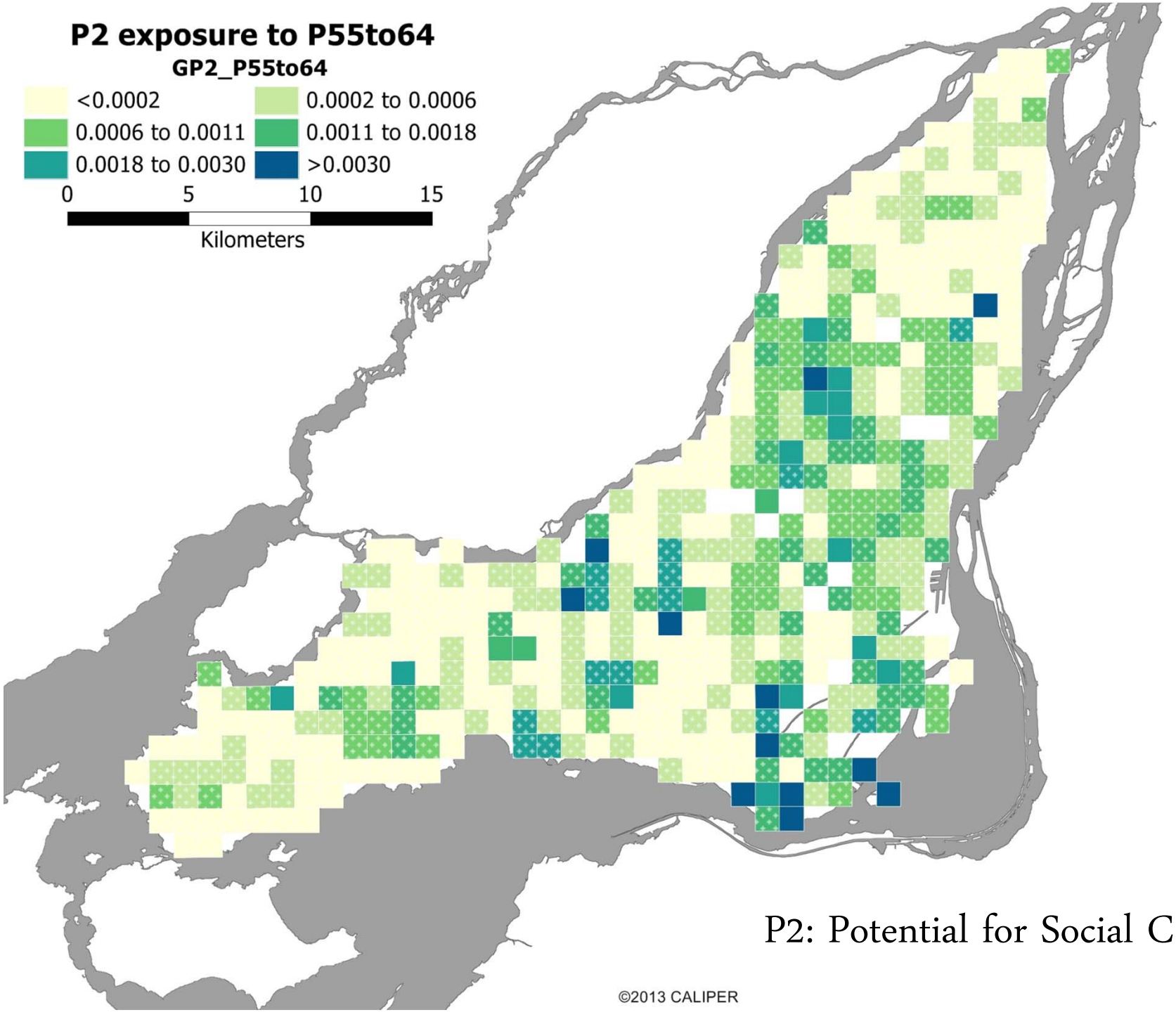

P1: Potential for Social Contact




P2: Potential for Social Contact




P1: Potential for Social Contact




P2: Potential for Social Contact

# Conclusions

- Potential for social contact varies widely, depending on mobility behavior and reference population group
- Related work: effect of distance on tie formation/maintenance (Carrasco, Matous, Sharmeen et al.)
  - Potential for tie formation

# Conclusions

- Possible applications
  - Identification of areas of policy interest
  - Case study site selection
  - Related outcomes: wellbeing, mass effects (Abou-Zeid et al., Dugundji)