

ONLINE RESOURCE 1

MAPS IN PDF FORMAT OF THE RISK ATLAS OF MEXICO CITY, MEXICO

THE RISK ATLAS OF MEXICO CITY, MEXICO: A TOOL FOR DECISION-MAKING AND DISASTER PREVENTION

NATURAL HAZARDS

David A. Novelo-Casanova^{1*}, Gerardo Suárez¹, Enrique Cabral-Cano², Enrique A. Fernández-Torres³, Oscar A. Fuentes-Mariles⁴, Emre Havazli⁵, Miguel Á. Jaimes⁶, Erika D. López-Espinoza⁷, Ana Lillian Martin-Del-Pozzo⁸, Wendy V. Morales-Barrera⁹, Hipólito L. Morales-Rodríguez⁴, Amiel Nieto-Torres³, Sergio Rodríguez-Elizarrarás⁹, Darío Solano-Rojas¹⁰, Victor M. Velasco-Herrera¹¹

¹Departamento de Sismología, Instituto de Geofísica

²Departamento de Geomagnetismo y Exploración, Instituto de Geofísica

³Posgrado de Ciencias de la Tierra, Instituto de Geofísica

⁴Coordinación de Hidráulica, Instituto de Ingeniería

⁵University of Miami, Rosenstiel School of Marine and Atmospheric Science, 4600 Rickenbacker Cswy, Miami, FL 33149, USA

⁶Coordinación de Ingeniería Estructural, Instituto de Ingeniería

⁷Departamento de Ciencias Atmosféricas, Centro de Ciencias de la Atmósfera

⁸Departamento de Vulcanología, Instituto de Geofísica

⁹Departamento de Dinámica Terrestre Superficial, Instituto de Geología

¹⁰Facultad de Ingeniería

¹¹Sección de Radiación Solar, Instituto de Geofísica

^{1, 2, 3, 4, 6, 7, 8, 9, 10, 11}Universidad Nacional Autónoma de México, Col. Ciudad Universitaria, Alcaldía Coyoacán, Ciudad de México 04510, México

* Corresponding author: E-mail: dnovelo@geofisica.unam.mx; Tel: (5255) 5622 4127, Ext. 149.

HAZARD MAPS.

Map 1. Seismic hazard for peak ground acceleration (PGA) (g) for a return period of 20 years.

[Peligro sísmico por aceleración máxima del suelo (g) para un periodo de retorno de 20 años]

Map 2. Seismic hazard for peak ground acceleration (PGA) (g) for a return period of 125 years.

[Peligro sísmico por aceleración máxima del suelo (g) para un período de retorno de 125 años]

Map 3. Seismic hazard for peak ground acceleration (PGA) (g) for a return period of 250 years.

[Peligro sísmico por aceleración máxima del suelo (g) para un período de retorno de 250 años]

Map 4. Seismic hazard for peak ground acceleration (PGA) (g) for a return period of 475 years.

[Peligro sísmico por aceleración máxima del suelo (g) para un período de retorno de 475 años]

Map 5. Recording sites of the microseismic zonation and lithology.

[Sitios de registro de la microzonificación sísmica y litología]

Map 6. Seismic microzonation, isoperiods and recording sites.

[Zonificación geotécnica de la CDMX, isoperíodos y sitios de registro]

Map 7. Eruptive probability of the Younger Chichinautzin Volcanic Field¹.

[Análisis de probabilidad eruptiva del Joven Campo Volcánico Chichinautzin]

Map 8. Volcanic eruption probability in the Younger Chichinautzin Volcanic Field¹.

[Probabilidad de una erupción futura en el Joven Campo Volcánico Chichinautzin]

Map 9. Modeled lava flows for the Younger Chichinautzin Volcanic Field².

[Modelación del flujo de lava debido a una erupción futura en el Joven Campo Volcánico Chichinautzin]

Map 10. Ash fall distribution due to an eruption of the Popocatepetl Volcano in the scenario with the highest probability³.

[Distribución espacial de caída de ceniza debido a una erupción del Volcán Popocatepetl en el escenario de mayor probabilidad]

Map 11. Ash fall distribution due to an eruption of the Popocatepetl Volcano in the scenario with intermediate probability³.

[Distribución espacial de caída de ceniza debido a una erupción del Volcán Popocatepetl en el escenario con probabilidad intermedia]

Map 12. Ash fall distribution due to an eruption of the Popocatepetl volcano in a low probability scenario³.
[Distribución espacial de caída de ceniza del Volcán Popocatépetl en el escenario de menor probabilidad]

Map 13. Land velocity subsidence (m/year).
[Velocidad de subsidencia (m/año)]

Map 14. Subsidence horizontal gradient.
[Gradiente horizontal de subsidencia]

Map 15. Subsidence hazard zonation.
[Peligro por subsidencia]

Map 16. Angular distortion due to subsidence (radians).
[Distorsión angular debido a la subsidencia (radianes)]

Map 17. Angular distortion due to subsidence (radians) in Basic Geostatistical Area.
[Distorsión angular debido a la subsidencia por Área Geoestadística Básica (AGEB; radianes)]

Map 18. Flood areas for a return period of 2 years (maximum height).
[Peligro por inundación para un período de retorno de 2 años (tirante máximo)]

Map 19. Flood areas for a return period of 5 years (maximum height).
[Peligro por inundación para un período de retorno de 5 años (tirante máximo)]

Map 20. Flood areas for a return period of 10 years (maximum height).
[Peligro por inundación para un período de retorno de 10 años (tirante máximo)]

Map 21. Flood areas for a return period of 20 years (maximum height).
[Peligro por inundación para un período de retorno de 20 años (tirante máximo)]

Map 22. Flood areas for a return period of 50 years (maximum height).
[Peligro por inundación para un período de retorno de 50 años (tirante máximo)]

Map 23. Flood areas for a return period of 100 years (maximum height).
[Peligro por inundación para un período de retorno de 100 años (tirante máximo)]

Map 24. Probability of forest fires occurrence (41-60%) during the rainy season (May-October) for the next five years (2021-2025).
[Probabilidad de ocurrencia de incendios forestales (41-60%) durante la estación lluviosa (Mayo-October) para los siguientes cinco años (2021-2025)]

Map 25. Probability of forest fires occurrence (>81%) for the dry season (November-April) for the next five years (2021-2025).
[Probabilidad de ocurrencia de incendios forestales (>81%) durante la estación seca (Noviembre-Abril) para los siguientes cinco años (2021-2025)]

SUSCEPTIBILITY MAPS

Map 26. Landslide susceptibility.
[Susceptibilidad por deslizamientos]

VULNERABILITY MAPS

Map 27. Social Vulnerability.
[Vulnerabilidad social]

INVENTORY OF EXPOSED FACILITIES

Map 28. Elementary schools⁴.
[Planteles educativos de nivel básico]

Map 29. High schools and colleges⁴.
[Planteles educativos de nivel medio superior y superior]

Map 30. Public markets⁵.
[Mercados públicos]

Map 31. Fuel stations⁶.
[Gasolineras]

Map 32. Hospitals⁷.
[Hospitales]

Map 33. Radio⁸ and TV stations⁹.
[Radioemisoras y Televisoras]

Map 34. Free internet sites¹⁰.
[Sitios de internet gratuito]

RISK MAPS

Map 35. Social susceptibility to landslide damage.
[Susceptibilidad social de daño por deslizamientos de tierra]

Map 36. Social risk likelihood of floods for a return period of 2 years.
[Posibilidad de riesgo social por inundación para un período de retorno de 2 años]

Map 37. Social risk likelihood of floods for a return period of 5 years.
[Posibilidad de riesgo social por inundación para un período de retorno de 5 años]

Map 38. Social risk likelihood of floods for a return period of 10 years.
[Posibilidad de riesgo social por inundación para un período de retorno de 10 años]

Map 39. Social risk likelihood of floods for a return period of 20 years.

[Posibilidad de riesgo social por inundación para un período de retorno de 20 años]

Map 40. Social risk likelihood of floods for a return period of 50 years.

[Posibilidad de riesgo social por inundación para un período de retorno de 50 años]

Map 41. Social risk likelihood of floods for a return period of 100 years.

[Posibilidad de riesgo social por inundación para un período de retorno de 100 años]

Map 42. Social risk likelihood due to subsidence.

[Posibilidad de riesgo social por subsidencia]

Map 43. Social risk likelihood of seismic for a return period of 20 years.

[Posibilidad de riesgo social por sismicidad para un período de retorno de 20 años]

Map 44. Social risk likelihood of ash fall.

[Posibilidad de riesgo social por caída de ceniza]

SEISMIC RISK SCENARIOS

Map 45. Expected peak ground acceleration (PGA) (g) from an event like the 19 September 2017, earthquake (Mw 7.1; R=110 km).

[Aceleración pico (PGA) (g) esperada para un evento similar al sismo del 19 de septiembre de 2017 (Mw 7.1; R=110 km)]

Map 46. Damage area (m²) for constructions between 1-2 stories from an event like the 19 September 2017, earthquake (Mw 7.1; R=110 km).

[Área de daño (m²) para viviendas de 1 a 2 niveles por un evento similar al sismo del 19 de septiembre de 2017 (Mw 7.1; R=110 km)]

Map 47. Damage area (m²) for constructions between 3-5 stories from an event like the 19 September 2017, earthquake (Mw 7.1; R=110 km).

[Área de daño (m²) para viviendas de 3 a 5 niveles por un evento similar al sismo del 19 de septiembre de 2017 (Mw 7.1; R=110 km)]

Map 48. Damage area (m²) for constructions between 6-10 stories from an event like the 19 September 2017, earthquake (Mw 7.1; R=110 km).

[Área de daño (m²) para viviendas de 6 a 10 por un evento similar al sismo del 19 de septiembre de 2017 (Mw 7.1; R=110 km)]

Map 49. Damage area (m²) for constructions between 11-15 stories from an event like the 19 September 2017, earthquake (Mw 7.1; R=110 km).

[Área de daño (m²) para viviendas de 11 a 15 niveles por un evento similar al sismo del 19 de septiembre de 2017 (Mw 7.1; R=110 km)]

Map 50. Damage area (m²) for constructions between 16-20 stories from an event like the 19 September 2017, earthquake (Mw 7.1; R=110 km).

[Área de daño (m^2) para viviendas de 16 a 20 niveles por un evento similar al sismo del 19 de septiembre de 2017 (Mw 7.1; R=110 km)]

Map 51. Damage area (m^2) for constructions of >20 stories from an event like the 19 September 2017, earthquake (Mw 7.1; R=110 km).

[Área de daño (m^2) para viviendas de >20 niveles por un evento similar al sismo del 19 de septiembre de 2017 (Mw 7.1; R=110 km)]

Map 52. Expected peak ground acceleration (PGA) (g) from an event like the 7 September 2017, earthquake (Mw 8.2; R=700 km).

[Aceleración pico (PGA) (g) esperada para un evento similar al sismo del 7 de septiembre de 2017 (Mw 8.2; R=700 km)]

Map 53. Damage area (m^2) for constructions between 1-2 stories from an event like the 7 September 2017, earthquake (Mw 8.2; R=700 km).

[Área de daño (m^2) para viviendas de 1 a 2 niveles por un evento similar al sismo del 7 de septiembre de 2017 (Mw 8.2; R=700 km)]

Map 54. Damage area (m^2) for constructions between 3-5 stories from an event like the 7 September 2017, earthquake (Mw 8.2; R=700 km).

[Área de daño (m^2) para viviendas de 3 a 5 niveles por un evento similar al sismo del 7 de septiembre de 2017 (Mw 8.2; R=700 km)]

Map 55. Damage area (m^2) for constructions between 6-10 stories from an event like the 7 September 2017, earthquake (Mw 8.2; R=700 km).

[Área de daño (m^2) para viviendas de 6 a 10 niveles por un evento similar al sismo del 7 de septiembre de 2017 (Mw 8.2; R=700 km)]

Map 56. Damage area (m^2) for constructions between 11-15 stories from an event like the 7 September 2017, earthquake (Mw 8.2; R=700 km).

[Área de daño (m^2) para viviendas de 11 a 15 niveles por un evento similar al sismo del 7 de septiembre de 2017 (Mw 8.2; R=700 km)]

Map 57. Damage area (m^2) for constructions between 16-20 stories from an event like the 7 September 2017, earthquake (Mw 8.2; R=700 km).

[Área de daño (m^2) para viviendas de 16 a 20 niveles por un evento similar al sismo del 7 de septiembre de 2017 (Mw 8.2; R=700 km)]

Map 58. Damage area (m^2) for constructions of >20 stories from an event like the 7 September 2017, earthquake (Mw 8.2; R=700 km).

[Área de daño (m^2) para viviendas de >20 niveles por un evento similar al sismo del 7 de septiembre de 2017 (Mw 8.2; R=700 km)]

Map 59. Expected peak ground acceleration (PGA) (g) from an event like the 19 September 1985, earthquake (Mw 8.1; R=300 km).

[Aceleración pico (PGA) (g) esperada para un evento similar al sismo del 19 de septiembre de 1985 (Mw 8.1; R=300 km)]

Map 60. Damage area (m^2) for constructions between 1-2 stories from an event like the 19 September 1985, earthquake (Mw 8.1; R=300 km).
[Área de daño (m^2) para viviendas de 1 a 2 niveles por un evento similar al sismo del 19 de septiembre de 1985 (Mw 8.1; R=300 km)]

Map 61. Damage area (m^2) for constructions between 3-5 stories from an event like the 19 September 1985, earthquake (Mw 8.1; R=300 km).
[Área de daño (m^2) para viviendas de 3 a 5 niveles por un evento similar al sismo del 19 de septiembre de 1985 (Mw 8.1; R=300 km)]

Map 62. Damage area (m^2) for constructions between 6-10 stories from an event like the 19 September 1985, earthquake (Mw 8.1; R=300 km).
[Área de daño (m^2) para viviendas de 6 a 10 niveles por un evento similar al sismo del 19 de septiembre de 1985 (Mw 8.1; R=300 km) en viviendas de 6 a 10 niveles]

Map 63. Damage area (m^2) for constructions between 11-15 stories from an event like the 19 September 1985, earthquake (Mw 8.1; R=300 km).
[Área de daño (m^2) para viviendas de 11 a 15 niveles por un evento similar al sismo del 19 de septiembre de 1985 (Mw 8.1; R=300 km)]

Map 64. Damage area (m^2) for constructions between 16-20 stories from an event like the 19 September 1985, earthquake (Mw 8.1; R=300 km).
[Área de daño (m^2) para viviendas de 16 a 20 niveles por un evento similar al sismo del 19 de septiembre de 1985 (Mw 8.1; R=300 km)]

Map 65. Damage area (m^2) for constructions of >20 stories from an event like the 19 September 1985, earthquake (Mw 8.1; R=300 km).
[Área de daño (m^2) para viviendas de >20 niveles por un evento similar al sismo del 19 de septiembre de 1985 (Mw 8.1; R=300 km)]

Map 66. Expected peak ground acceleration (PGA) (g) from a hypothetical earthquake (Mw 7.3; R=100 km).
[Aceleración pico (PGA) (g) esperada para un sismo hipotético (Mw 7.3; R=100 km)]

Map 67. Damage area (m^2) for constructions between 1-2 stories from a hypothetical earthquake (Mw 7.3; R=100 km).
[Área de daño (m^2) para viviendas de 1 a 2 niveles por un sismo hipotético (Mw 7.3; R=100 km)]

Map 68. Damage area (m^2) for constructions between 3-5 stories from a hypothetical earthquake (Mw 7.3; R=100 km).
[Área de daño (m^2) para viviendas de 3 a 5 niveles por un sismo hipotético (Mw 7.3; R=100 km)]

Map 69. Damage area (m^2) for constructions between 6-10 stories from a hypothetical earthquake (Mw 7.3; R=100 km).
[Área de daño (m^2) para viviendas de 6 a 10 niveles por un sismo hipotético (Mw 7.3; R=100 km)]

Map 70. Damage area (m^2) for constructions between 11-15 stories from a hypothetical earthquake ($M_w 7.3$; $R=100$ km).

[Área de daño (m^2) para viviendas de 11 a 15 niveles por un sismo hipotético ($M_w 7.3$; $R=100$ km)]

Map 71. Damage area (m^2) for constructions between 16-20 stories from a hypothetical earthquake ($M_w 7.3$; $R=100$ km).

[Área de daño (m^2) para viviendas de 16 a 20 niveles por un sismo hipotético ($M_w 7.3$; $R=100$ km)]

Map 72. Damage area (m^2) for constructions of >20 stories from a hypothetical earthquake ($M_w 7.3$; $R=100$ km).

[Área de daño (m^2) para viviendas de >20 niveles por un sismo hipotético ($M_w 7.3$; $R=100$ km)]

Map 73. Expected peak ground acceleration (PGA) (g) from a hypothetical earthquake ($M_w 8.2$; $R=200$ km).

[Aceleración pico (PGA) (g) esperada para un sismo hipotético ($M_w 8.2$; $R=200$ km)]

Map 74. Damage area (m^2) for constructions between 1-2 stories from a hypothetical earthquake ($M_w 8.2$; $R=200$ km).

[Área de daño (m^2) para viviendas de 1 a 2 niveles por un sismo hipotético ($M_w 8.2$; $R=200$ km)]

Map 75. Damage area (m^2) for constructions between 3-5 stories from a hypothetical earthquake ($M_w 8.2$; $R=200$ km).

[Área de daño (m^2) para viviendas de 3 a 5 niveles por un sismo hipotético ($M_w 8.2$; $R=200$ km)]

Map 76. Damage area (m^2) for constructions between 6-10 stories from a hypothetical earthquake ($M_w 8.2$; $R=200$ km).

[Área de daño (m^2) para viviendas de 6 a 10 niveles por un sismo hipotético ($M_w 8.2$; $R=200$ km)]

Map 77. Damage area (m^2) for constructions between 11-15 stories from a hypothetical earthquake ($M_w 8.2$; $R=200$ km).

[Área de daño (m^2) para viviendas de 11 a 15 niveles por un sismo hipotético ($M_w 8.2$; $R=200$ km)]

Map 78. Damage area (m^2) for constructions between 16-20 stories from a hypothetical earthquake ($M_w 8.2$; $R=200$ km).

[Área de daño (m^2) para viviendas de 16 a 20 niveles por un sismo hipotético ($M_w 8.2$; $R=200$ km)]

Map 79. Damage area (m^2) for constructions of >20 stories from a hypothetical earthquake ($M_w 8.2$; $R=200$ km).

[Área de daño (m^2) para viviendas de >20 niveles por un sismo hipotético (Mw 8.2; R=200 km)]

Map 80. Expected peak ground acceleration (PGA) (g) from a hypothetical earthquake (Mw 8.6; R=300 km).

[Aceleración pico (PGA) (g) esperada para un sismo hipotético (Mw 8.6; R=300 km)]

Map 81. Damage area (m^2) for constructions between 1-2 stories from a hypothetical earthquake (Mw 8.6; R=300 km).

[Área de daño (m^2) para viviendas de 1 a 2 niveles por un sismo hipotético (Mw 8.6; R=300 km)]

Map 82. Damage area (m^2) for constructions between 3-5 stories from a hypothetical earthquake (Mw 8.6; R=300 km).

[Área de daño (m^2) para viviendas de 3 a 5 niveles por un sismo hipotético (Mw 8.6; R=300 km)]

Map 83. Damage area (m^2) for constructions between 6-10 stories from a hypothetical earthquake (Mw 8.6; R=300 km).

[Área de daño (m^2) para viviendas de 6 a 10 niveles por un sismo hipotético (Mw 8.6; R=300 km)]

Map 84. Damage area (m^2) for constructions between 11-15 stories from a hypothetical earthquake (Mw 8.6; R=300 km).

[Área de daño (m^2) para viviendas de 11 a 15 niveles por un sismo hipotético (Mw 8.6; R=300 km)]

Map 85. Damage area (m^2) for constructions between 16-20 stories from a hypothetical earthquake (Mw 8.6; R=300 km).

[Área de daño (m^2) para viviendas de 16 a 20 niveles por un sismo hipotético (Mw 8.6; R=300 km)]

Map 86. Damage area (m^2) for constructions of >20 stories from a hypothetical earthquake (Mw 8.6; R=300 km).

[Área de daño (m^2) para viviendas de >20 niveles por un sismo hipotético (Mw 8.6; R=300 km)]

Map 87. Expected peak ground acceleration (PGA) (g) from a hypothetical crustal earthquake similar to the Acambay (Mw 6.9; R=40 km).

[Aceleración pico (PGA) (g) esperada para un sismo hipotético similar al de Acambay (Mw 6.9; R=40 km)]

Map 88. Damage area (m^2) for constructions between 1-2 stories from a hypothetical crustal earthquake similar to the Acambay (Mw 6.9; R=40 km).

[Área de daño (m^2) para viviendas de 1 a 2 niveles por un sismo hipotético similar al de Acambay (Mw 6.9; R=40 km)]

- Map 89. Damage area (m^2) for constructions between 3-5 stories from a hypothetical crustal earthquake similar to the Acambay (M_w 6.9; $R=40$ km).
[Área de daño (m^2) para viviendas de 3 a 5 niveles por un sismo hipotético similar al de Acambay (M_w 6.9; $R=40$ km)]
- Map 90. Damage area (m^2) for constructions between 6-10 stories from a hypothetical crustal earthquake similar to the Acambay (M_w 6.9; $R=40$ km).
[Área de daño (m^2) para viviendas de 6 a 10 niveles por un sismo hipotético similar al de Acambay (M_w 6.9; $R=40$ km)]
- Map 91. Damage area (m^2) for constructions between 11-15 stories from a hypothetical crustal earthquake similar to the Acambay (M_w 6.9; $R=40$ km).
[Área de daño (m^2) para viviendas de 11 a 15 niveles por un sismo hipotético similar al de Acambay (M_w 6.9; $R=40$ km)]
- Map 92. Damage area (m^2) for constructions between 16-20 stories from a hypothetical crustal earthquake similar to the Acambay (M_w 6.9; $R=40$ km).
[Área de daño (m^2) para viviendas de 16 a 20 niveles por un sismo hipotético similar al de Acambay (M_w 6.9; $R=40$ km)]
- Map 93. Damage area (m^2) for constructions of >20 stories from a hypothetical crustal earthquake similar to the Acambay (M_w 6.9; $R=40$ km).
[Área de daño (m^2) para viviendas de >20 niveles por un sismo hipotético similar al de Acambay (M_w 6.9; $R=40$ km)]
- Map 94. Expected peak ground acceleration (PGA) (g) from a hypothetical crustal earthquake similar to the Acambay (M_w 6.9; $R=80$ km).
[Aceleración pico (PGA) (g) esperada para un sismo hipotético similar al de Acambay (M_w 6.9; $R=80$ km)]
- Map 95. Damage area (m^2) for constructions between 1-2 stories from a hypothetical crustal earthquake similar to the Acambay (M_w 6.9; $R=80$ km).
[Área de daño (m^2) para viviendas de 1 a 2 niveles por un sismo hipotético similar al de Acambay (M_w 6.9; $R=80$ km)]
- Map 96. Damage area (m^2) for constructions between 3-5 stories from a hypothetical crustal earthquake similar to the Acambay (M_w 6.9; $R=80$ km).
[Área de daño (m^2) para viviendas de 3 a 5 niveles por un sismo hipotético similar al de Acambay (M_w 6.9; $R=80$ km)]
- Map 97. Damage area (m^2) for constructions between 6-10 stories from a hypothetical crustal earthquake similar to the Acambay (M_w 6.9; $R=80$ km).
[Área de daño (m^2) para viviendas de 6 a 10 niveles por un sismo hipotético similar al de Acambay (M_w 6.9; $R=80$ km)]
- Map 98. Damage area (m^2) for constructions between 11-15 stories from a hypothetical crustal earthquake similar to the Acambay (M_w 6.9; $R=80$ km).

[Área de daño (m²) para viviendas de 11 a 15 niveles por un sismo hipotético similar al de Acambay (Mw 6.9; R=80 km)]

Map 99. Damage area (m²) for constructions between 16-20 stories from a hypothetical crustal earthquake similar to the Acambay (Mw 6.9; R=80 km).

[Área de daño (m²) para viviendas de 16 a 20 niveles por un sismo hipotético similar al de Acambay (Mw 6.9; R=80 km)]

Map 100. Damage area (m²) for constructions of >20 stories from a hypothetical crustal earthquake similar to the Acambay (Mw 6.9; R=80 km).

[Área de daño (m²) para viviendas de >20 niveles por un sismo hipotético similar al de Acambay (Mw 6.9; R=80 km)]

ADDITIONAL PRODUCTS

Map 101. Epicenters of earthquakes in the Valley of Mexico (2008-2019)¹¹.

[Sismos con epicentro en el Valle de México (2008-2019)]

Map 102. Flood inventory (1920-2017).

[Inventario de Inundaciones (1920-2017)]

Map 103. Landslide inventory (1972-2018).

[Inventario de deslizamientos de tierra (1972-2018)]

Map 104. Forest fires inventory (2000-2019)^{12,13,14}.

[Inventario de Incendios Forestales (2000-2019)]

¹ Nieto-Torres A, Martin-Del-Pozzo AL (2019) Spatio-temporal hazard assessment of a monogenetic volcanic field, near México City. J Volcan Geother Res 371: 46-58 doi: 0.1016/j.jvolgeores.2019.01.006

² Nieto Torres A (2020) Evaluación del riesgo asociado al vulcanismo monogenético hacia la Ciudad de México. PhD Thesis, Earth Sciences, Universidad Nacional Autónoma de México

³ Mapas de peligros del volcán Popocatepetl, financiado por el Fondo para la Prevención de Desastres Naturales (FOPREDEN), Secretaría de Gobernación, 2016. Responsable: Martin-Del-Pozzo AL.

<http://www.atlasnacionalderiesgos.gob.mx/archivo/mapa-peligros-popo.html>.

⁴ Updated from: Secretaría de Educación Pública (SEP, 2018) Centros escolares de educación básica, media superior, superior, especial, inicial y formación para el trabajo. Catálogo Estatal Distrito Federal. Publicado por la Secretaría de Educación Pública, SEP. Dirección General de Gobernabilidad de Tecnologías de la Información y Comunicaciones, DGGTIC. México. www.datosabiertos.cdmx.gob.mx.

⁵ Updated from: Secretaría de Desarrollo Económico (SEDECO, 2019) Mercados públicos de la CDMX.

Available in: http://sedecodf.gob.mx/archivos/Listado_de_Mercados_Publicos.pdf

⁶ Updated from: Comisión Reguladora de Energía (CRE, 2019) Gasolineras de México.

www.datosabiertos.cdmx.gob.mx.

⁷ Data provided by the Centro Nacional de Prevención de Desastres (CENAPRED, 2018).

<http://www.atlasnacionalderiesgos.gob.mx/archivo/visor-capas.html>.

⁸ Updated from: Instituto Federal de Telecomunicaciones (IFT, 2019) Infraestructura de estaciones de radio AM-FM en México. Base de datos "InfraestructuraEstacionesRadio_AM_FM_14012019".

<http://www.ift.org.mx/>

⁹ Updated from: Instituto Federal de Telecomunicaciones (IFT, 2019) Infraestructura de canales de televisión en México. Data base: "InfraestructuraEstacionesRadio_TV_14012019". <http://www.ift.org.mx/>

¹⁰ Updated from: Secretaría de Comunicaciones y Transportes (SCT, 2017) Sitios con conectividad gratuita a internet en la Ciudad de México. Base de datos "total_sitios_cdmx_2017-09-19". <https://datos.gob.mx/busca/dataset/infraestructura-detelecomunicaciones/resource/9bffa0f4-3234-4e49-beca-c4f127600c09>

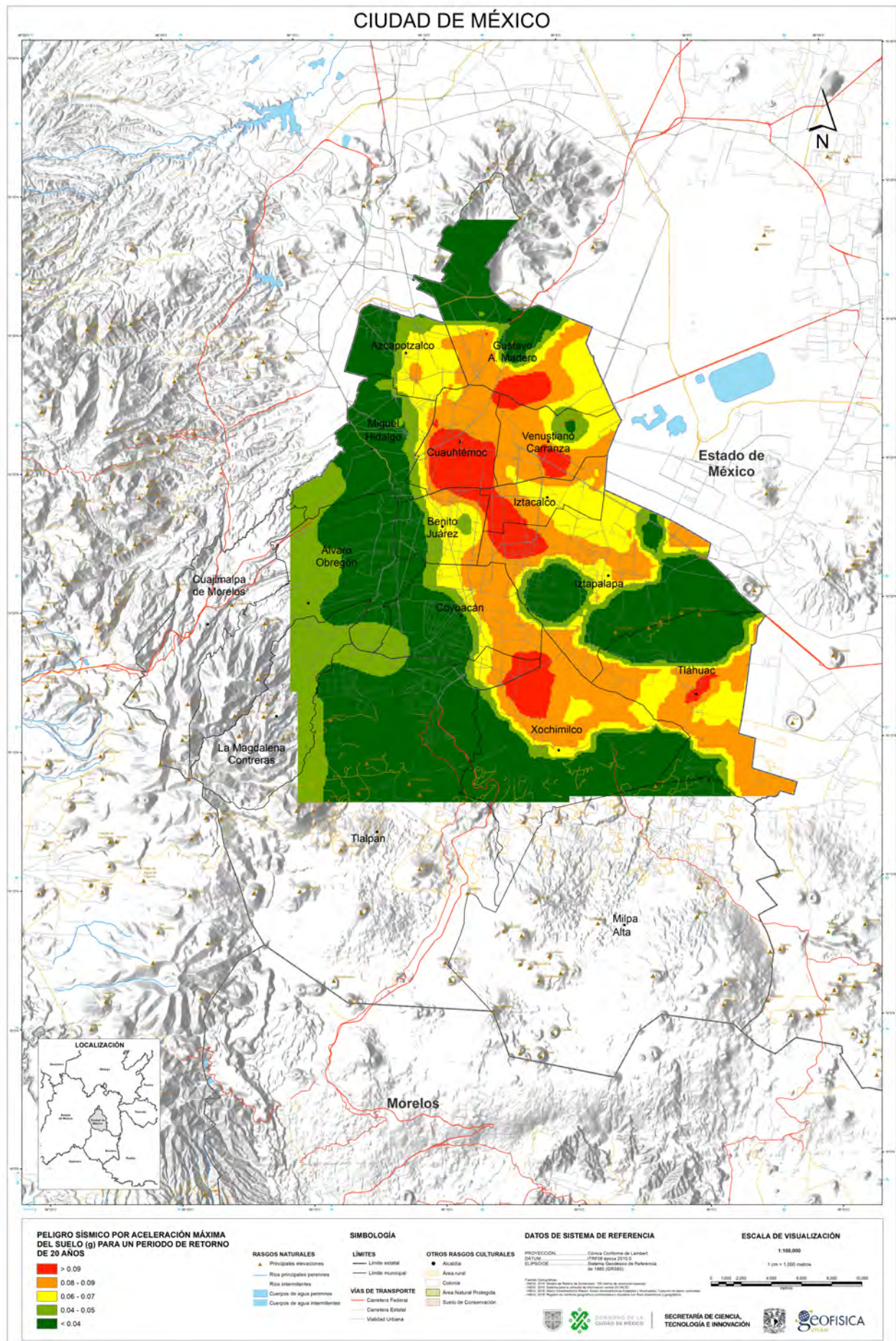
¹¹ From: Universidad Nacional Autónoma de México, Instituto de Geofísica, Servicio Sismológico Nacional, México. <http://www.ssn.unam.mx>

¹² From: Comisión Nacional para el Conocimiento y Uso de la Biodiversidad (CONABIO) (2019) Puntos de calor detectados con imágenes de satélite de 2017-2019. <http://incendios1.conabio.gob.mx/>.

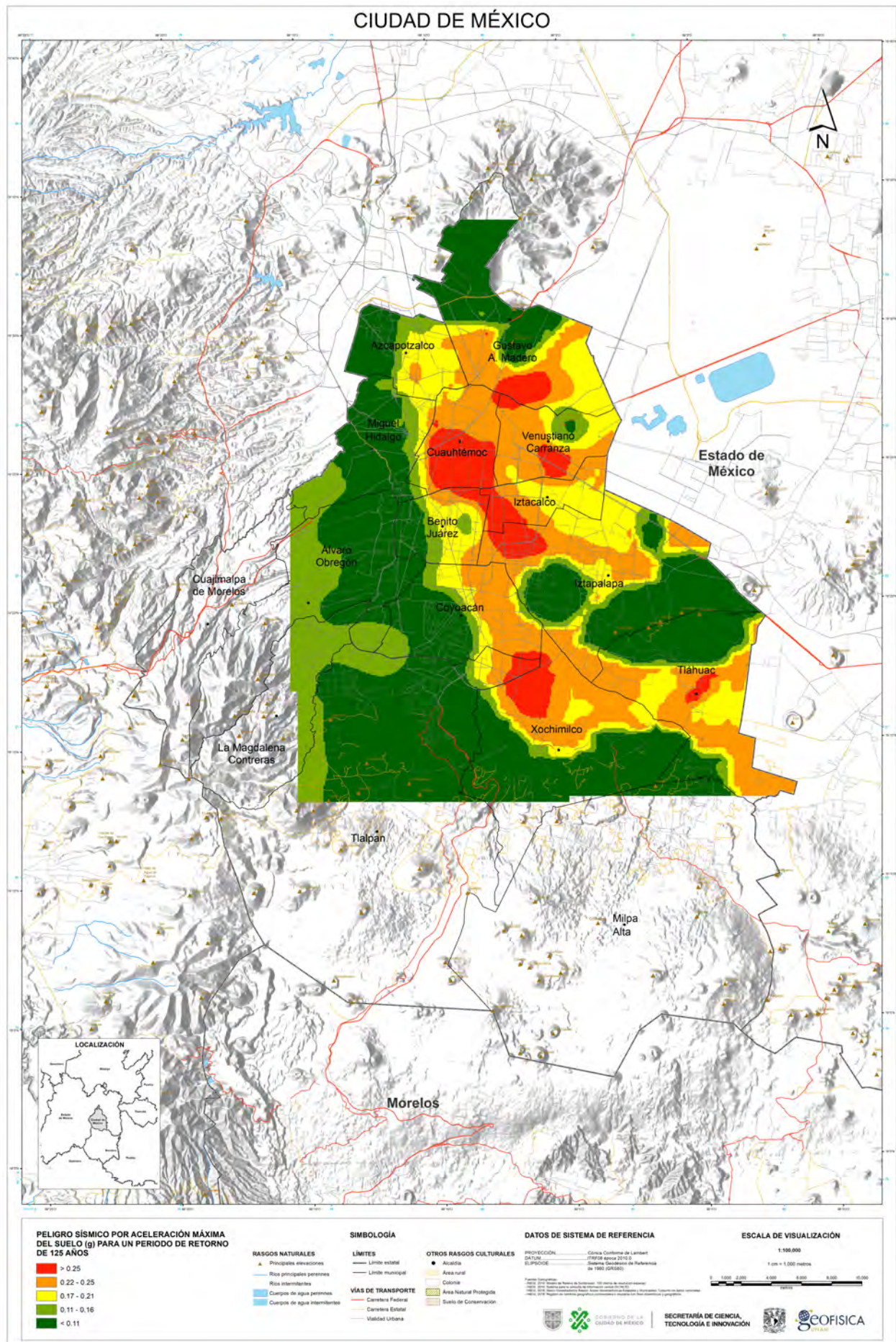
¹³ MODIS Collection 61 NRT Hotspot / Active Fire Detections MCD14DL distributed from NASA FIRMS. <https://earthdata.nasa.gov/firms>.

¹⁴ Procuraduría Ambiental y del Ordenamiento Territorial de la CDMX (PAOT) (2013) Uso de suelo y vegetación. <http://www.paot.org.mx/>.

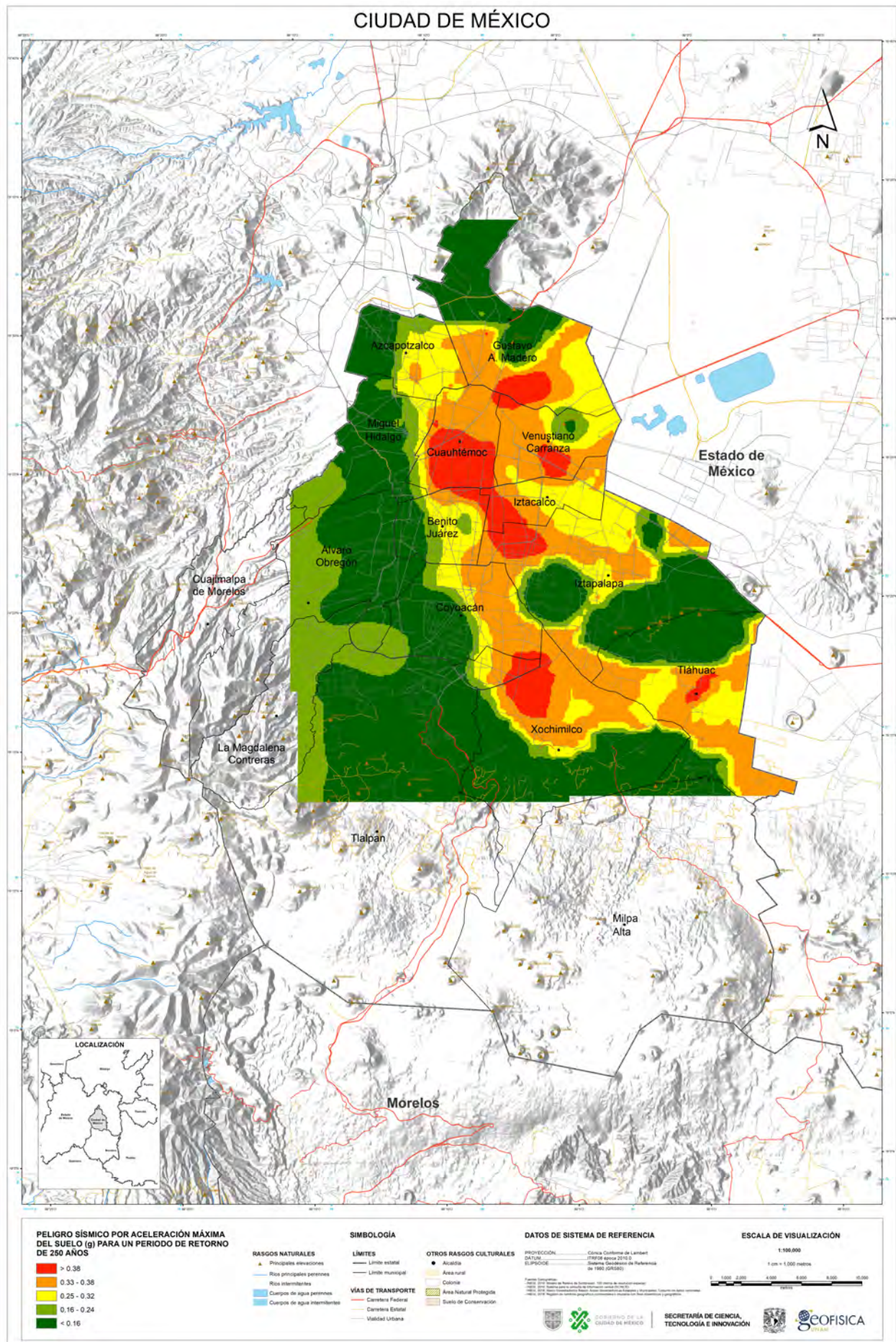
Map 1. Seismic hazard for peak ground acceleration (PGA) (g) for a return period of 20 years.



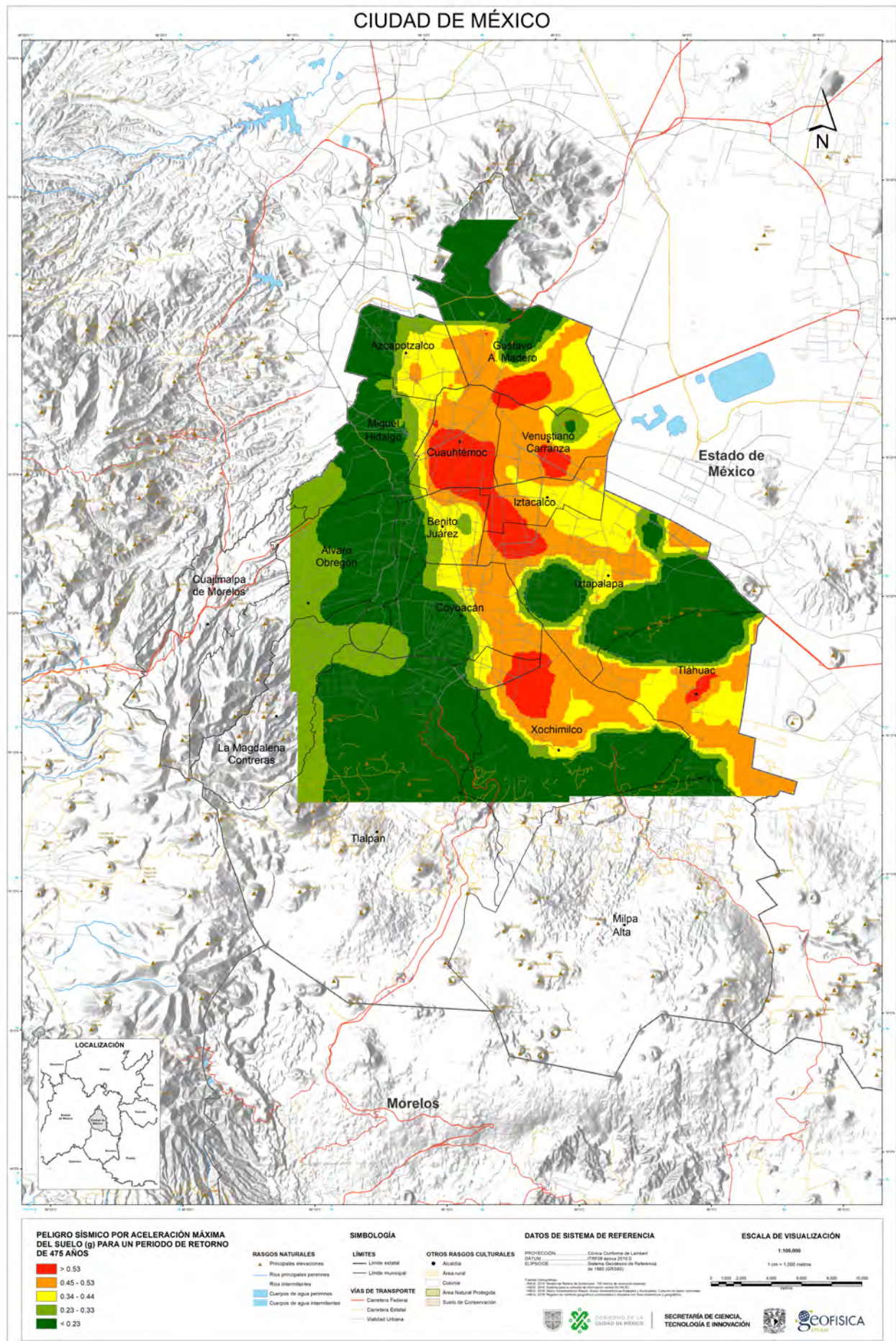
Map 2. Seismic hazard for peak ground acceleration (PGA) (g) for a return period of 125 years.



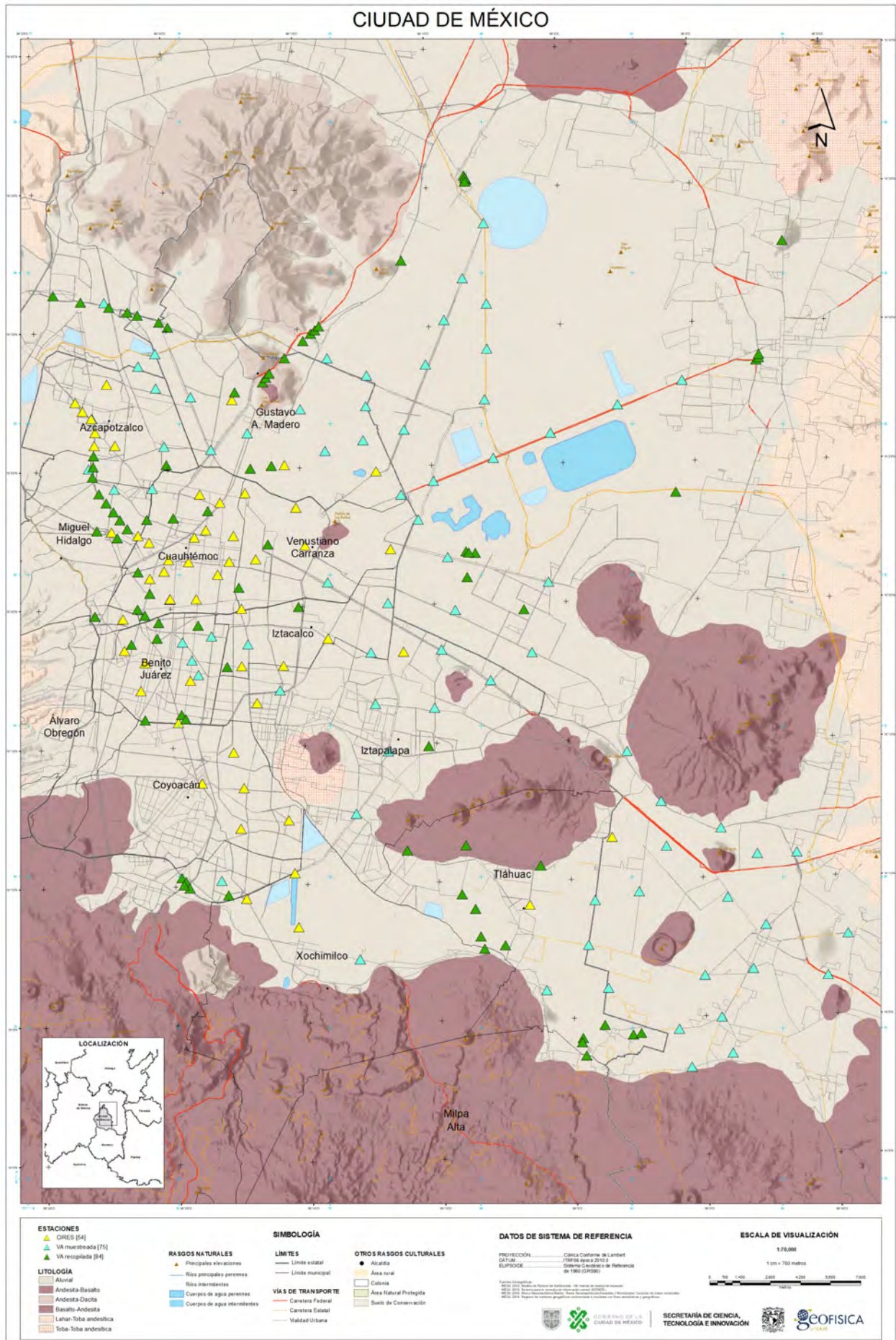
Map 3. Seismic hazard for peak ground acceleration (PGA) (g) for a return period of 250 years.



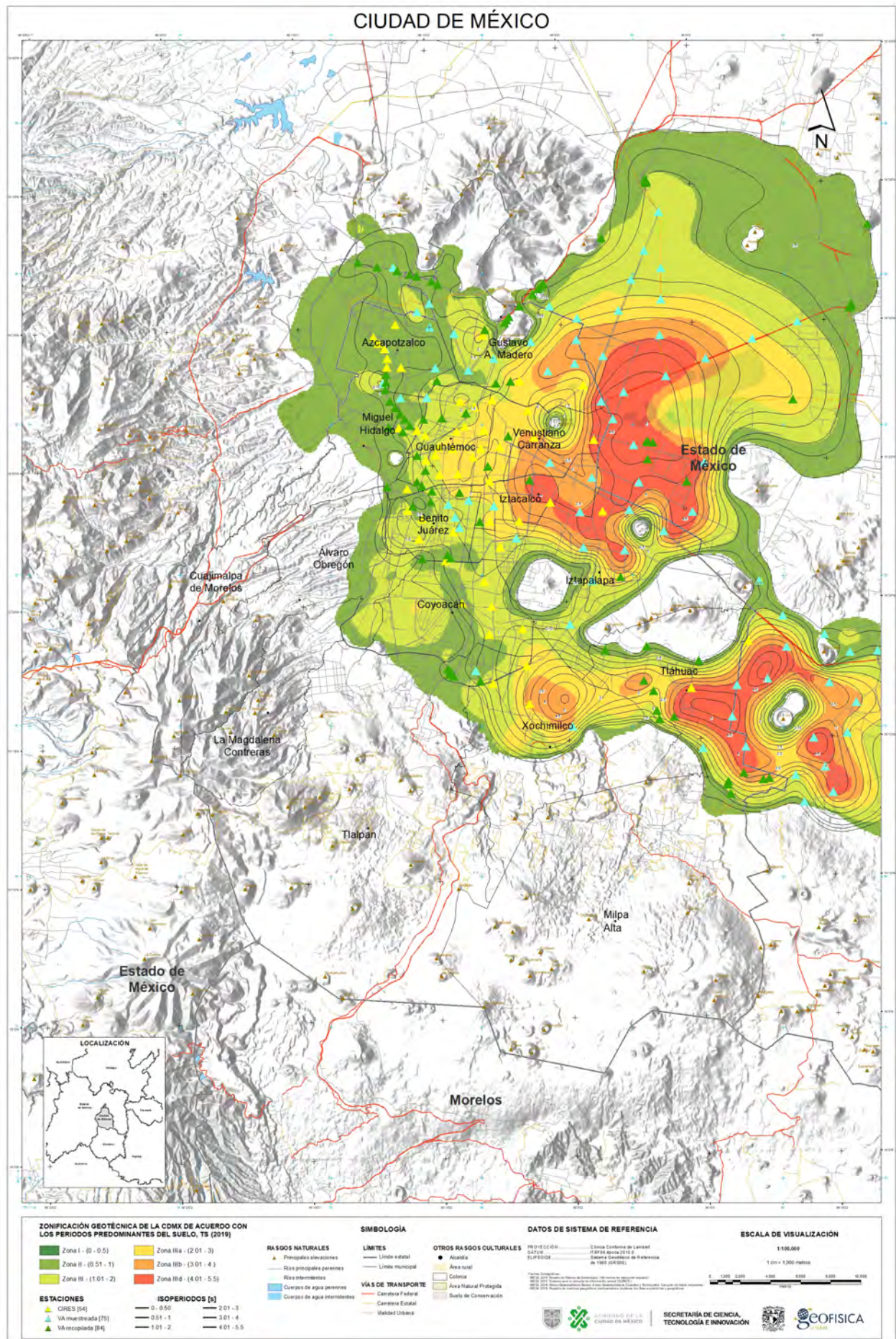
Map 4. Seismic hazard for peak ground acceleration (PGA) (g) for a return period of 475 years.



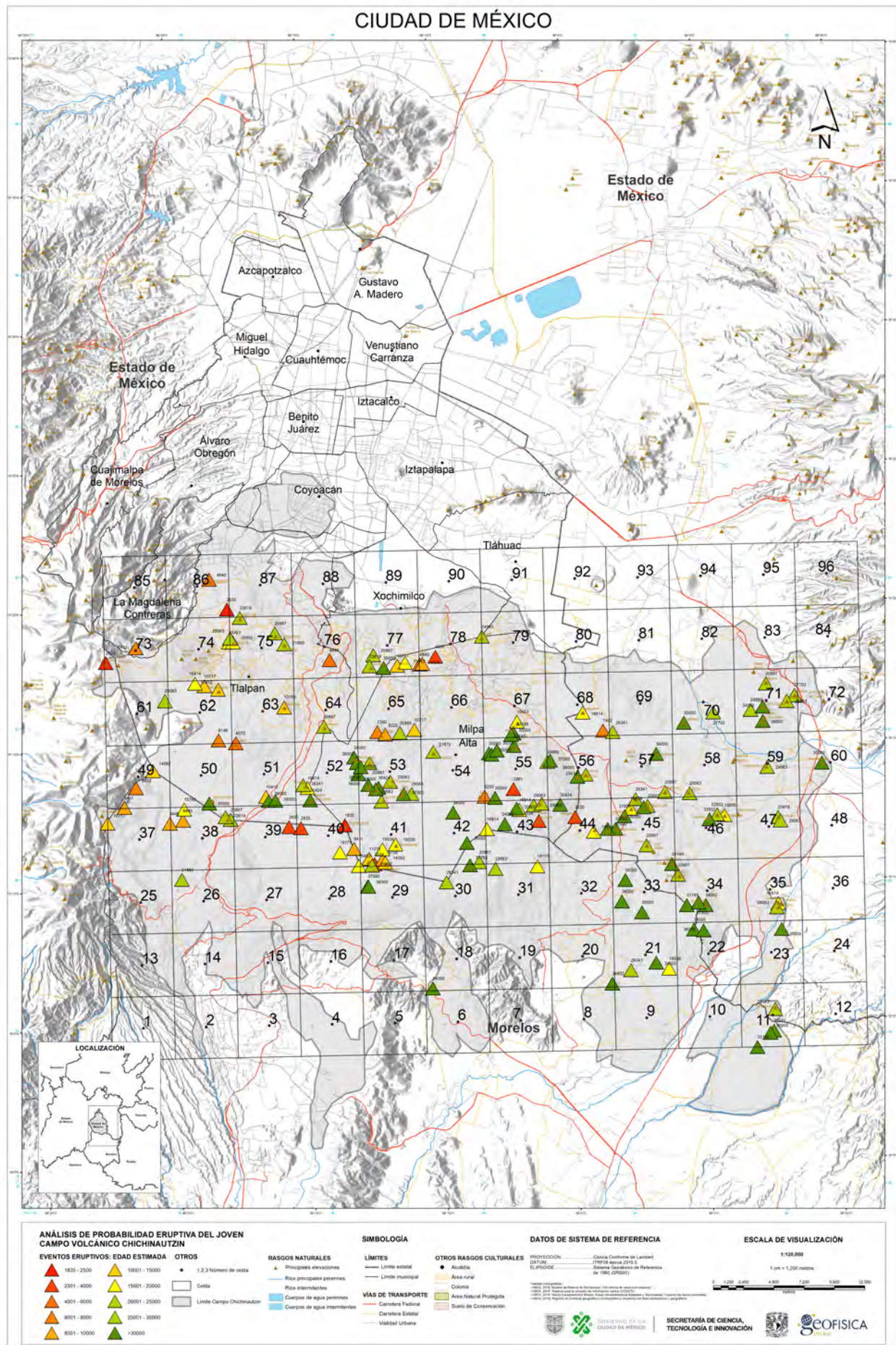
Map 5. Recording sites of the microseismic zonation and lithology.



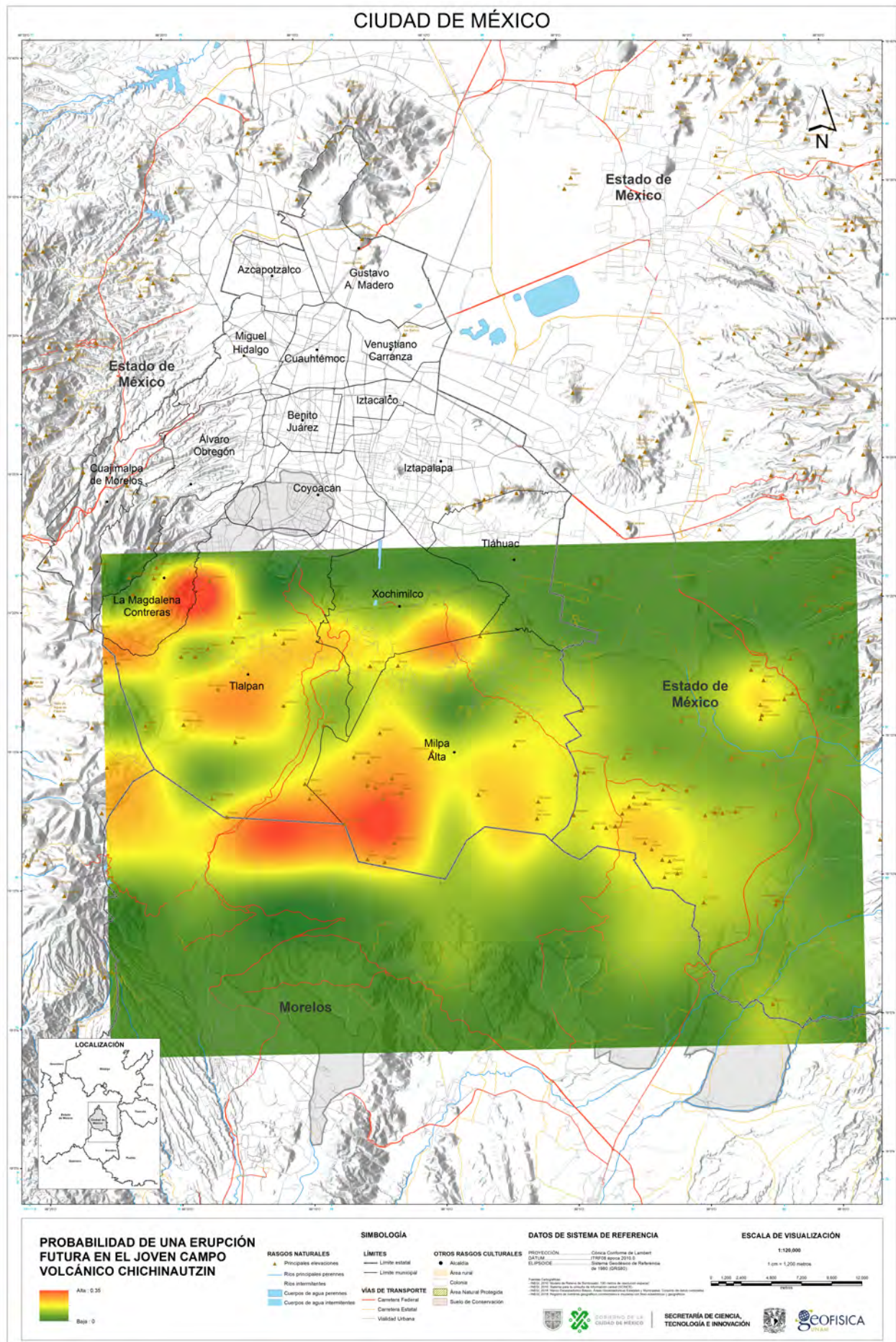
Map 6. Seismic microzonation, isoperiods and recording sites.



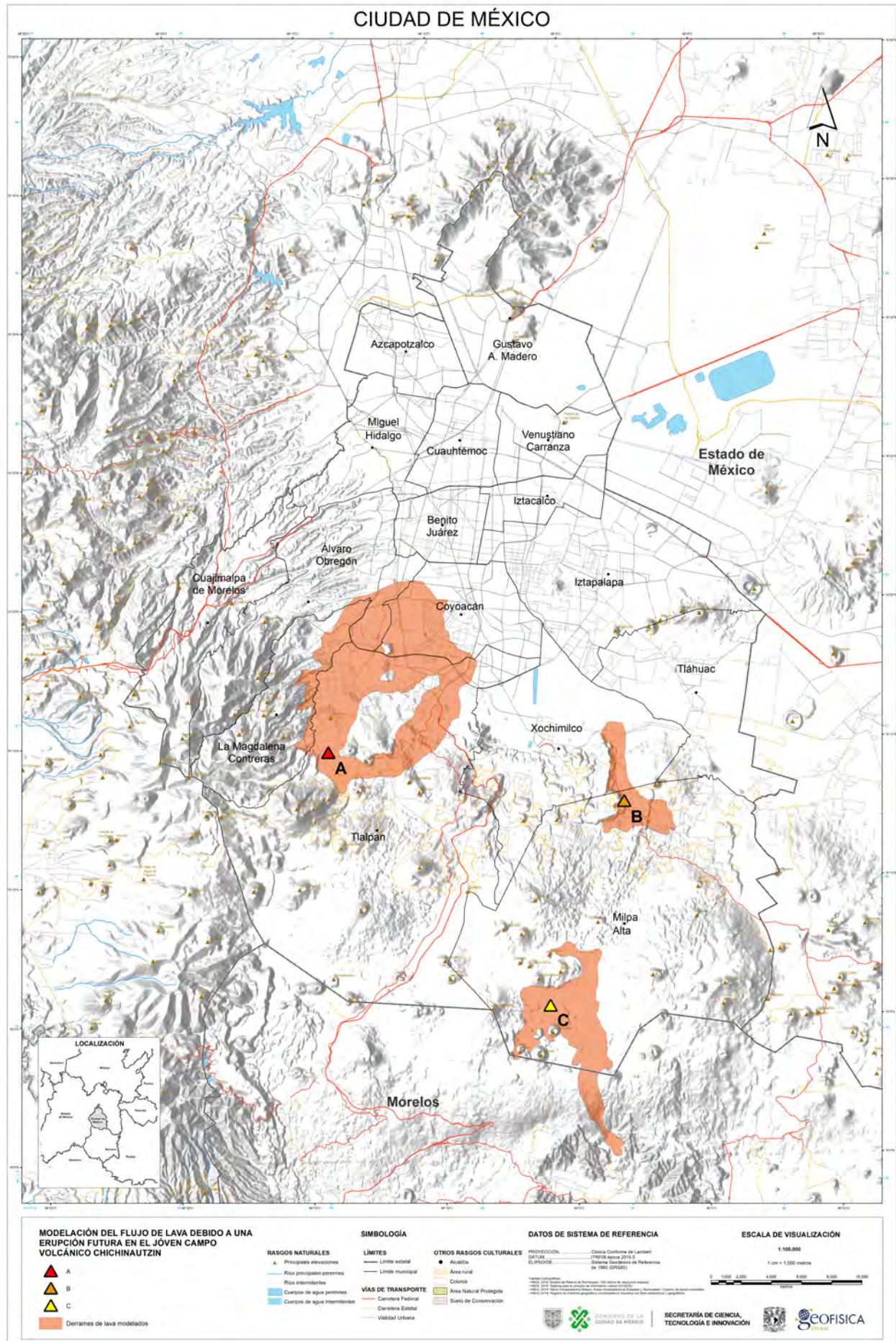
Map 7. Eruptive probability of the Younger Chichinautzin Volcanic Field.



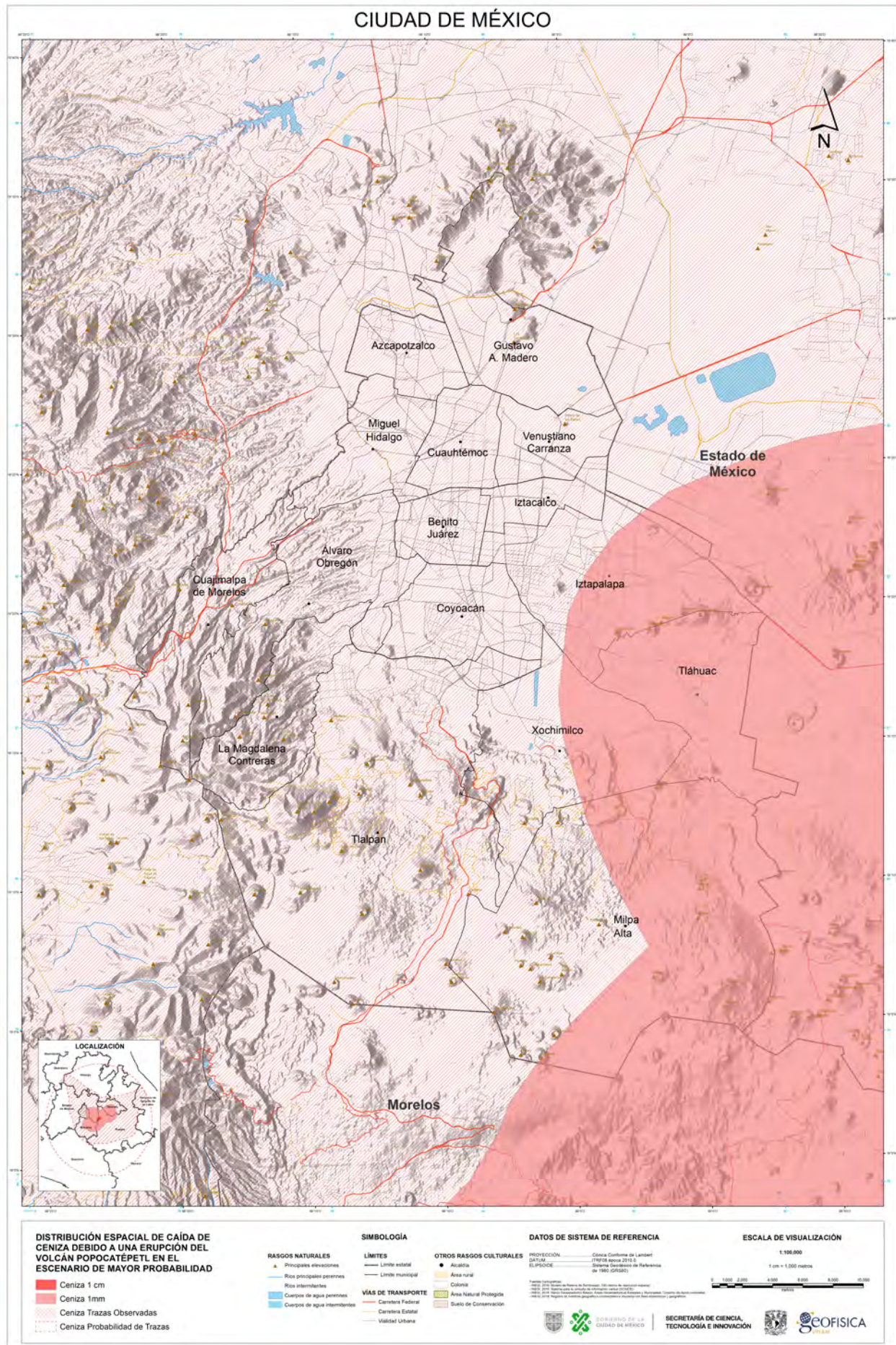
Map 8. Volcanic eruption probability in the Younger Chichinautzin Volcanic Field.



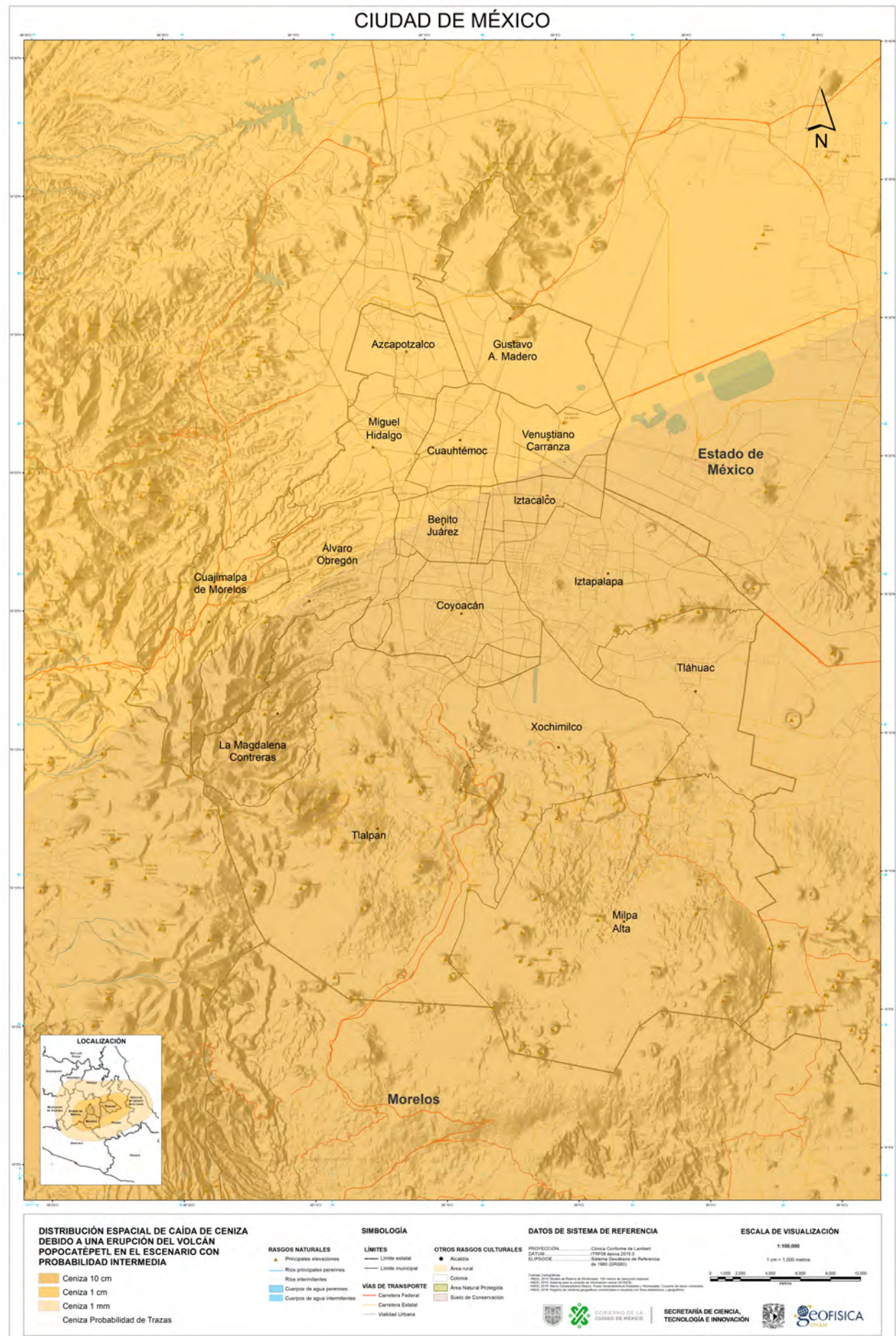
Map 9. Modeled lava flows for the Younger Chichinautzin Volcanic Field.



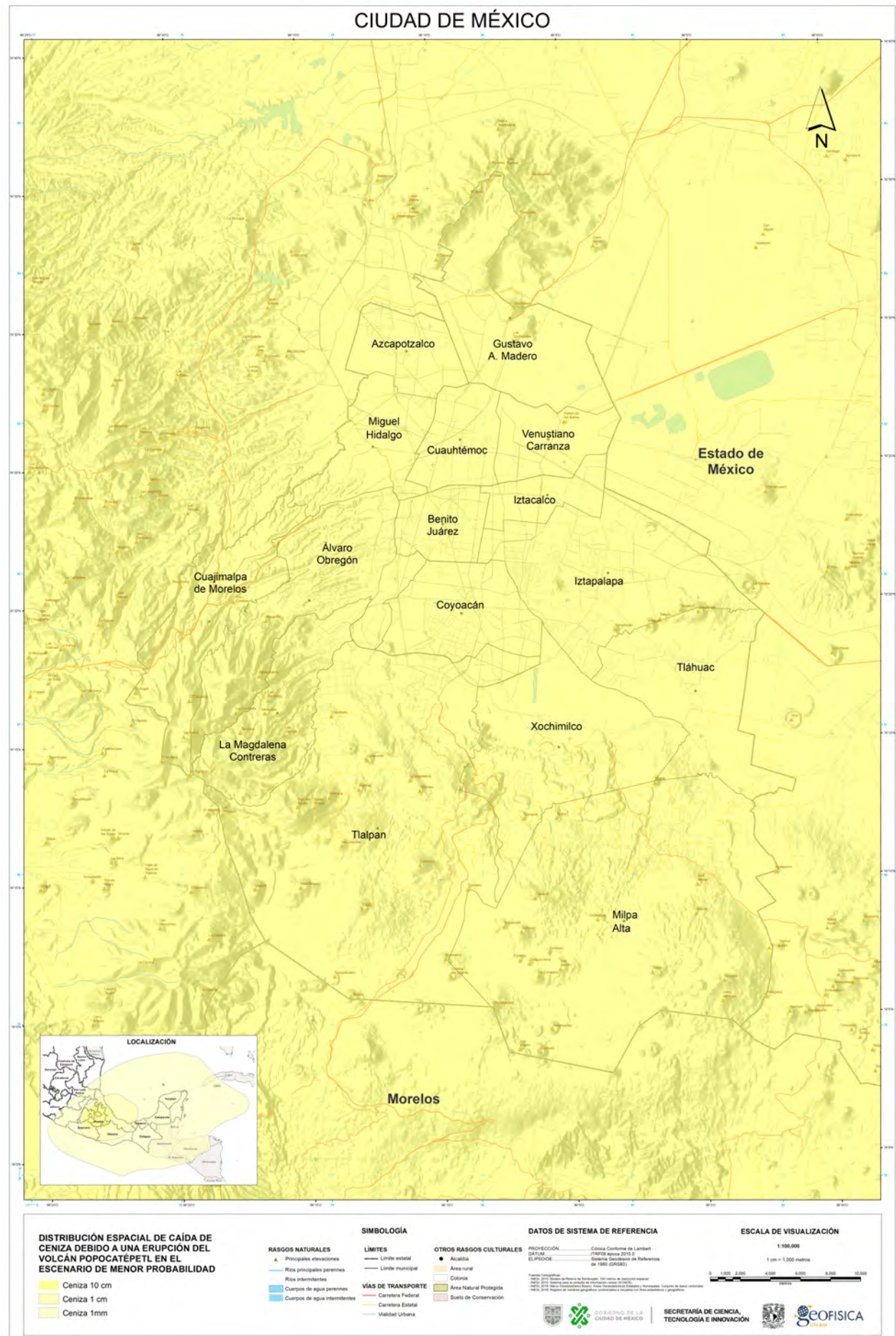
Map 10. Ash fall distribution of an eruption of the Popocatepetl Volcano in the scenario with the highest probability.



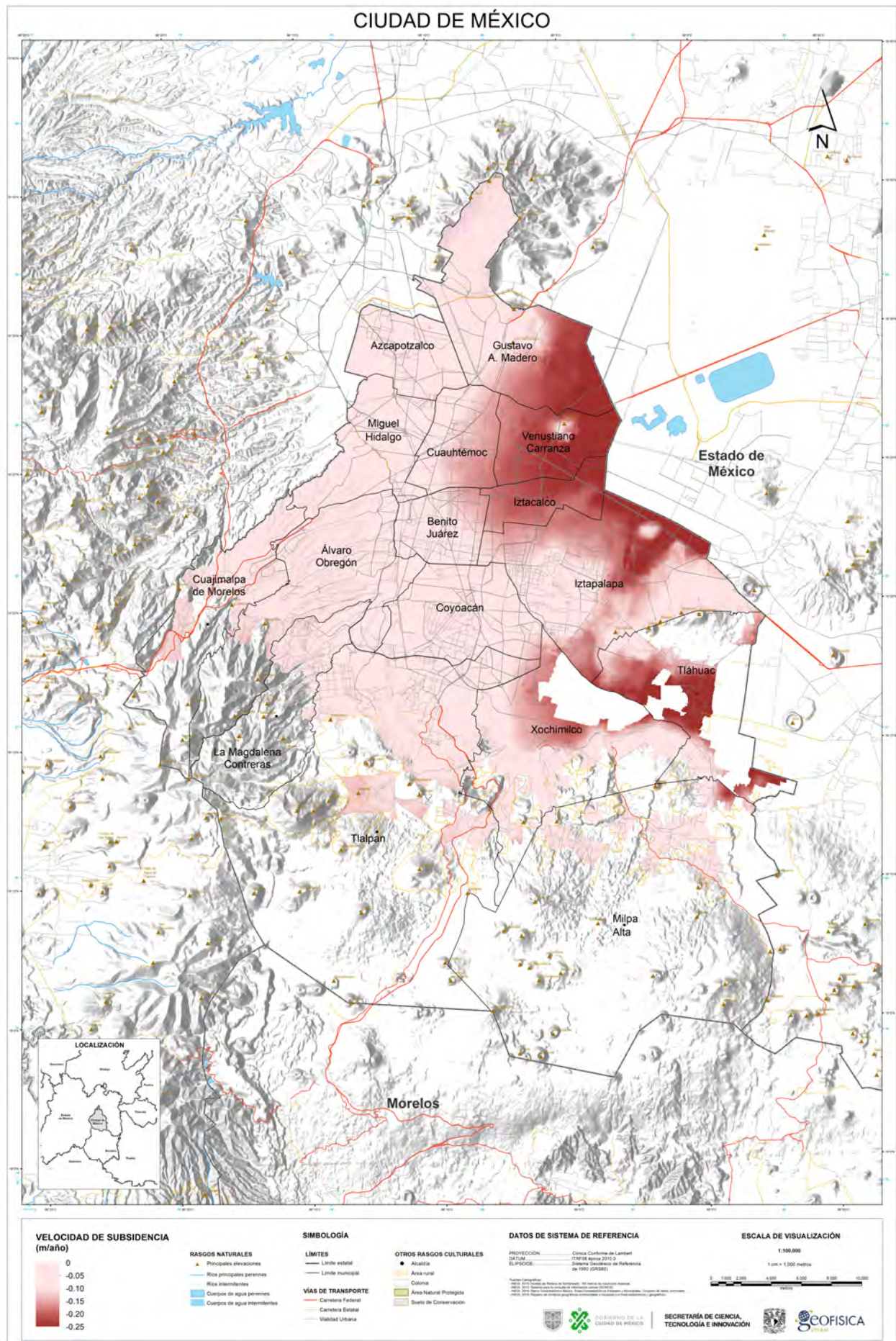
Map 11. Ash fall distribution due to an eruption of the Popocatepetl Volcano in the scenario with intermediate probability.



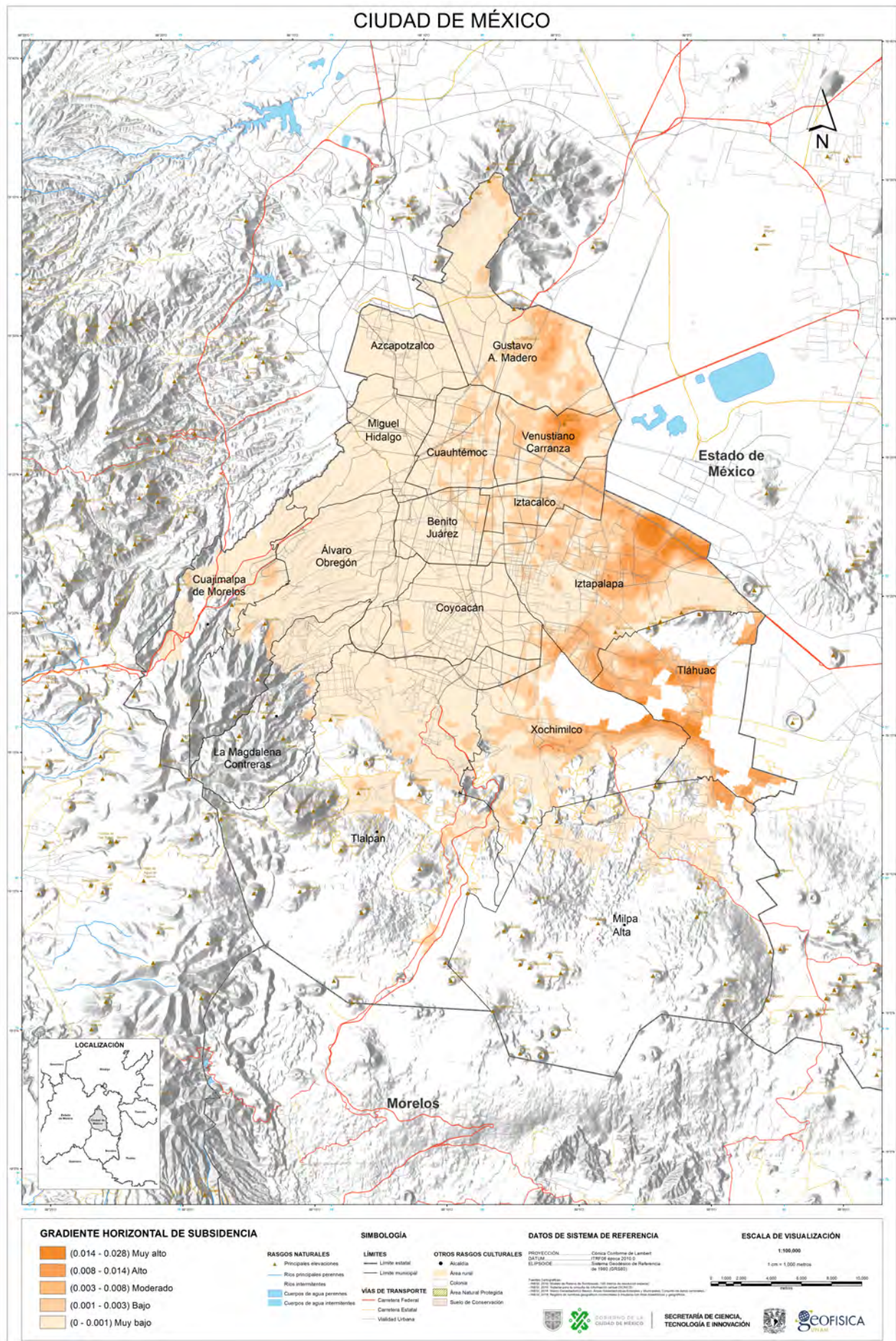
Map 12. Ash fall distribution due to an eruption of the Popocatepetl volcano in a low probability scenario.



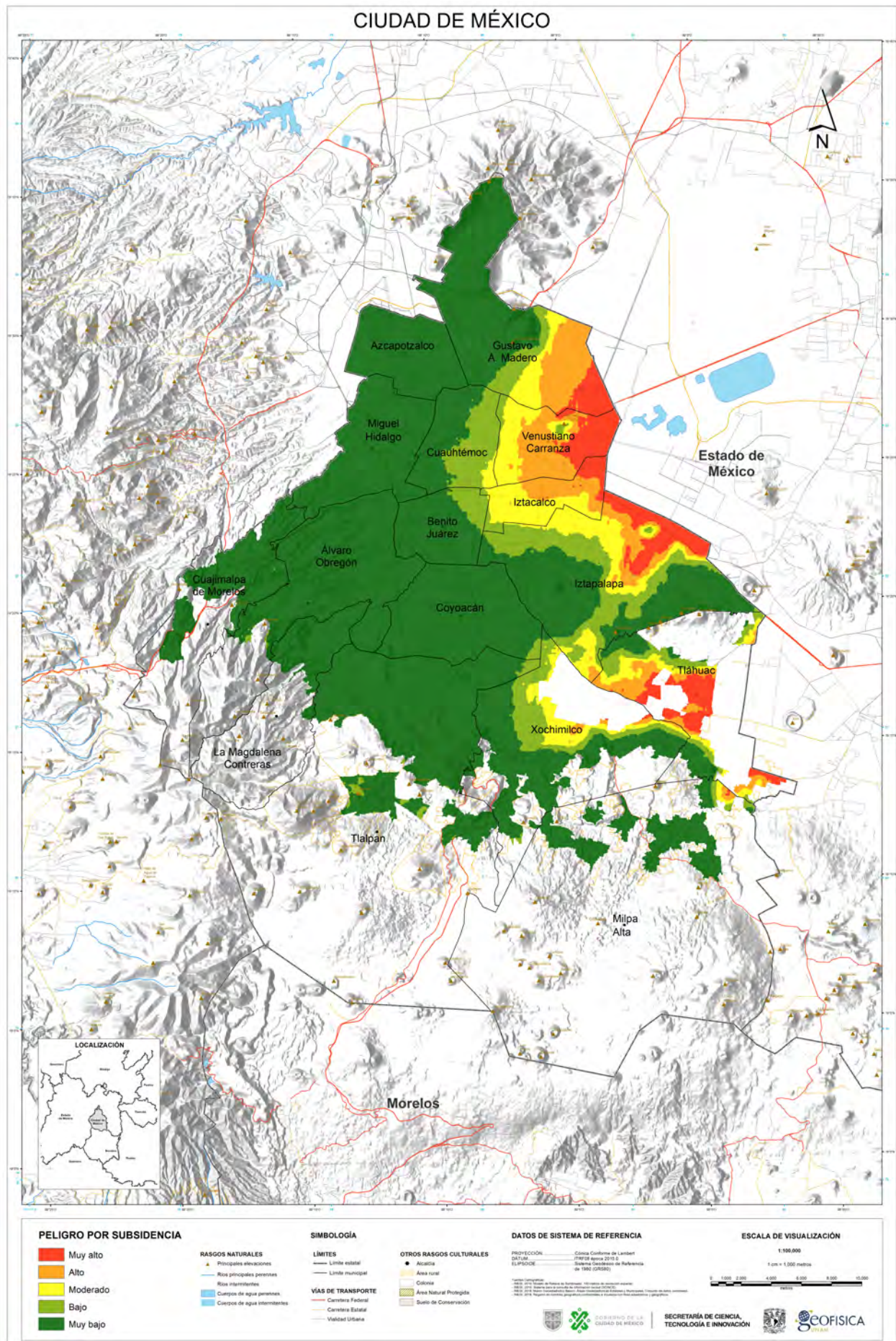
Map 13. Land velocity subsidence (m/year).



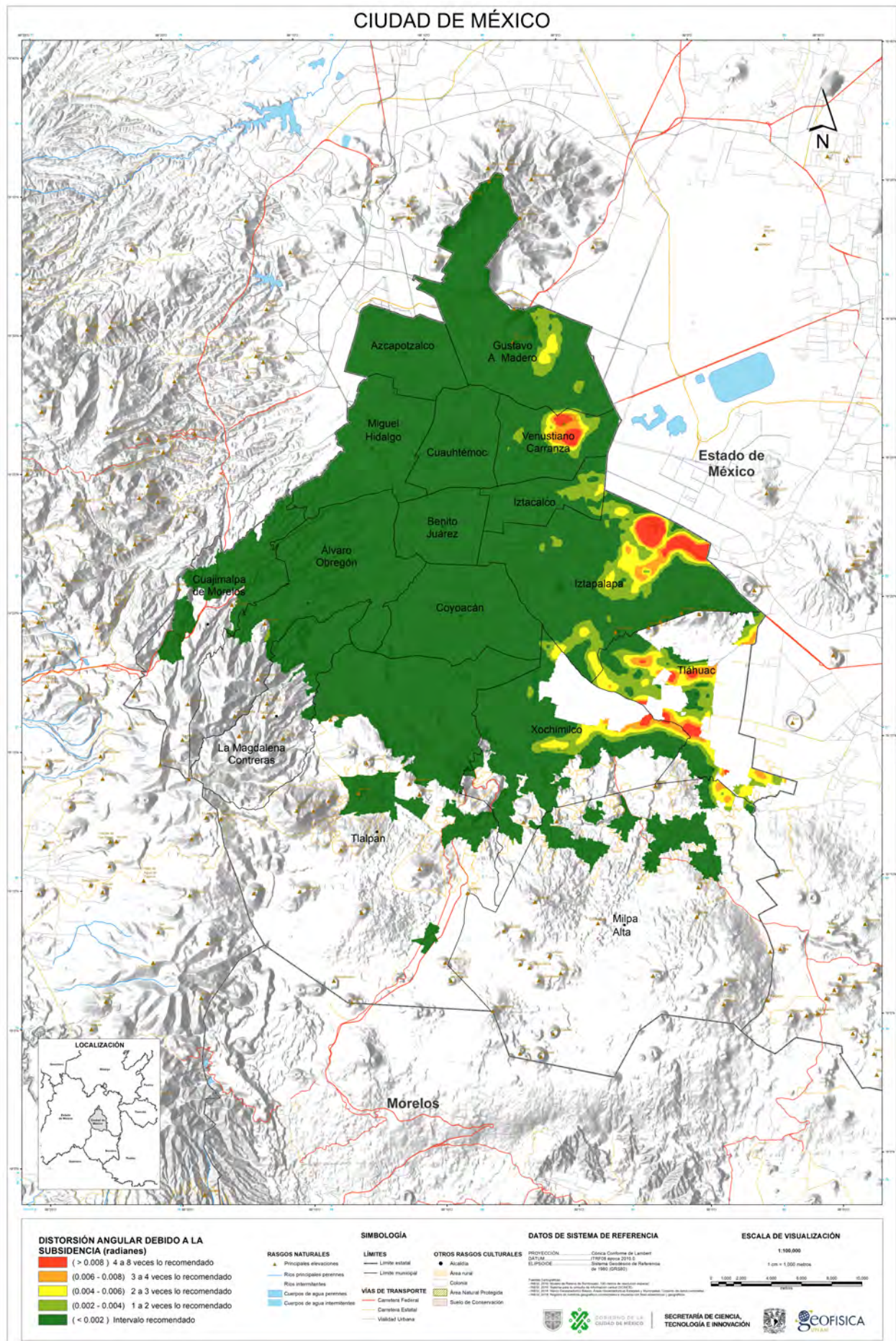
Map 14. Subsidence horizontal gradient.



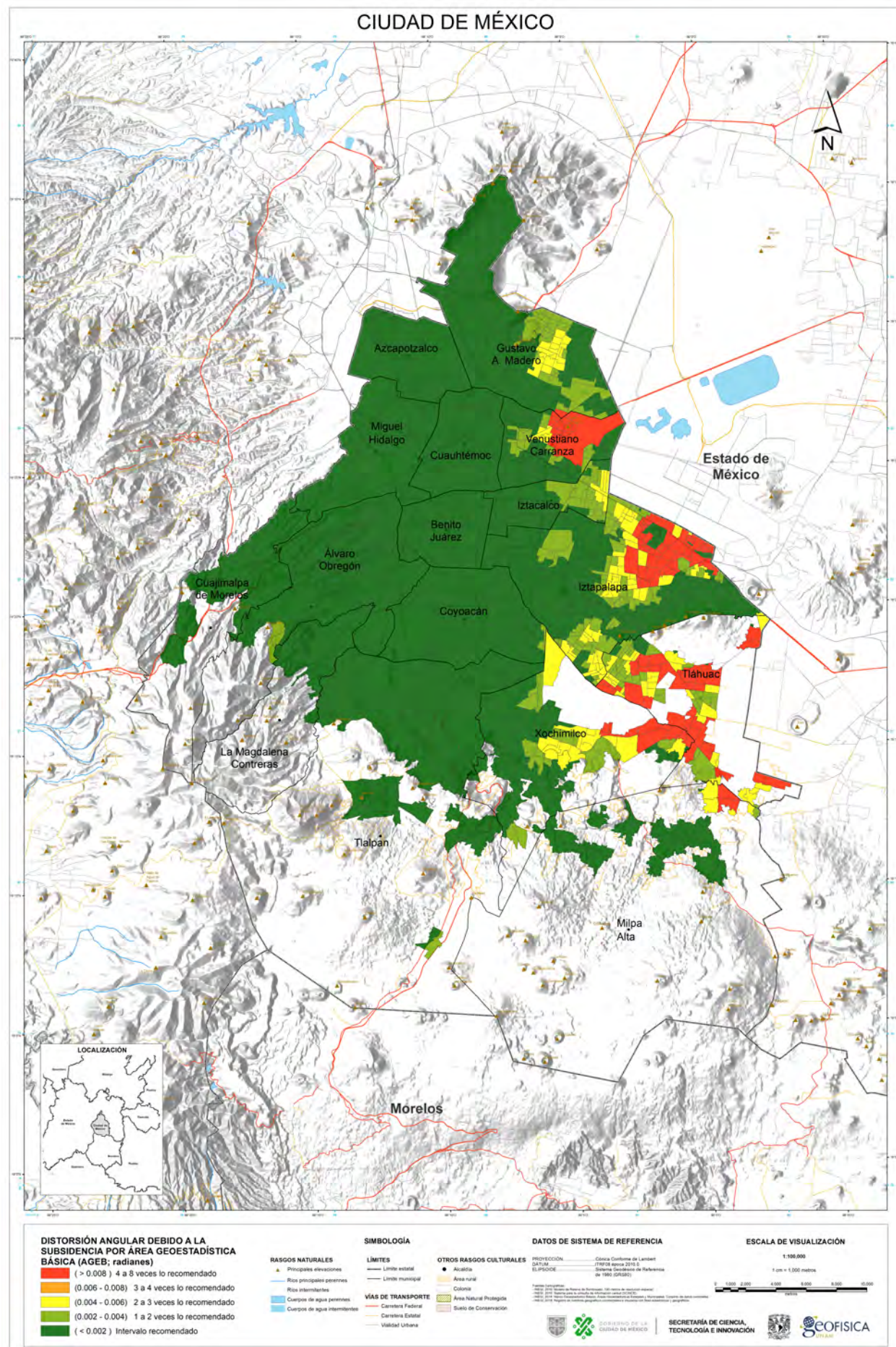
Map 15. Subsidence hazard zonation.



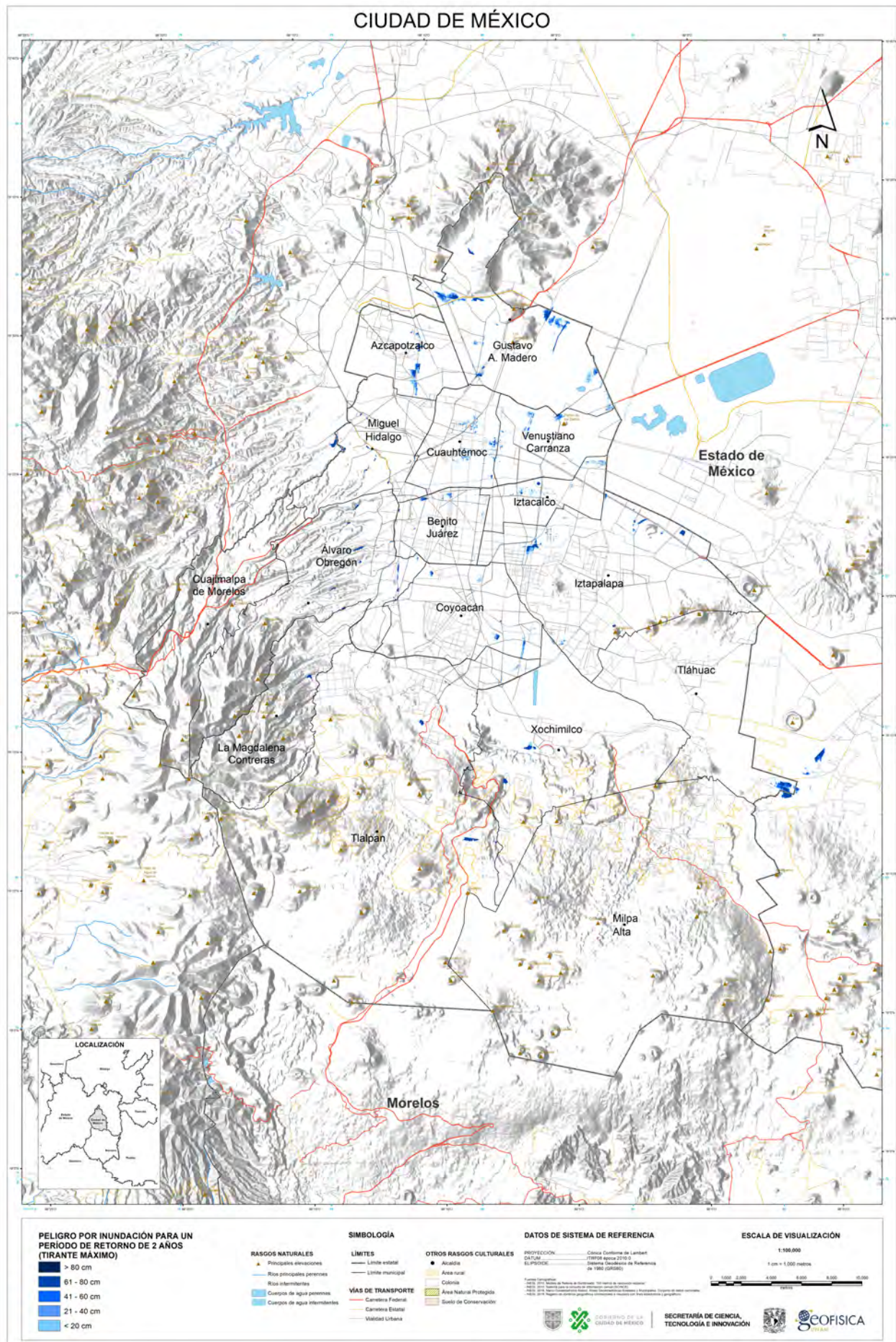
Map 16. Angular distortion due to subsidence (radians).



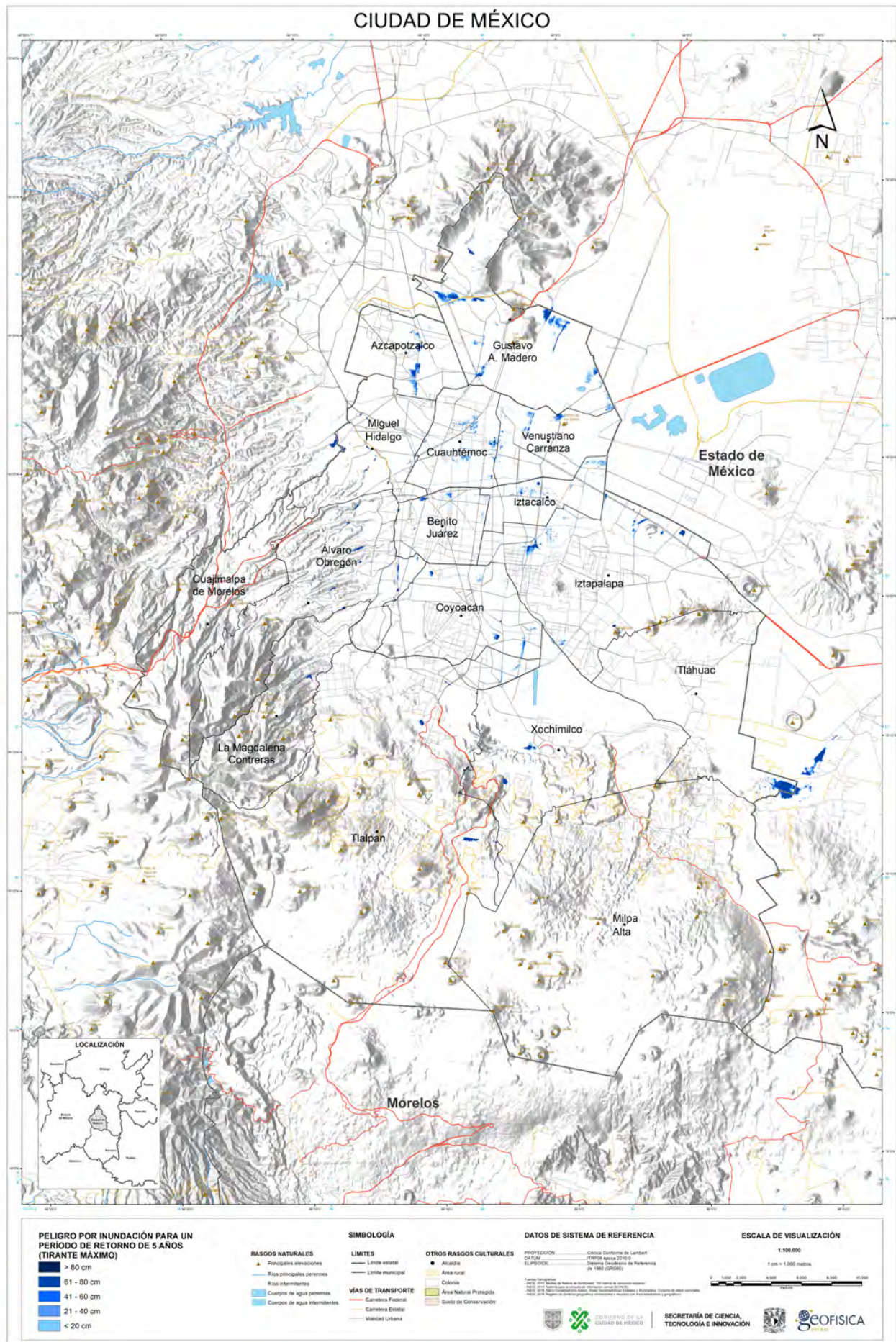
Map 17. Angular distortion due to subsidence (radians) in Basic Geostatistical Area.



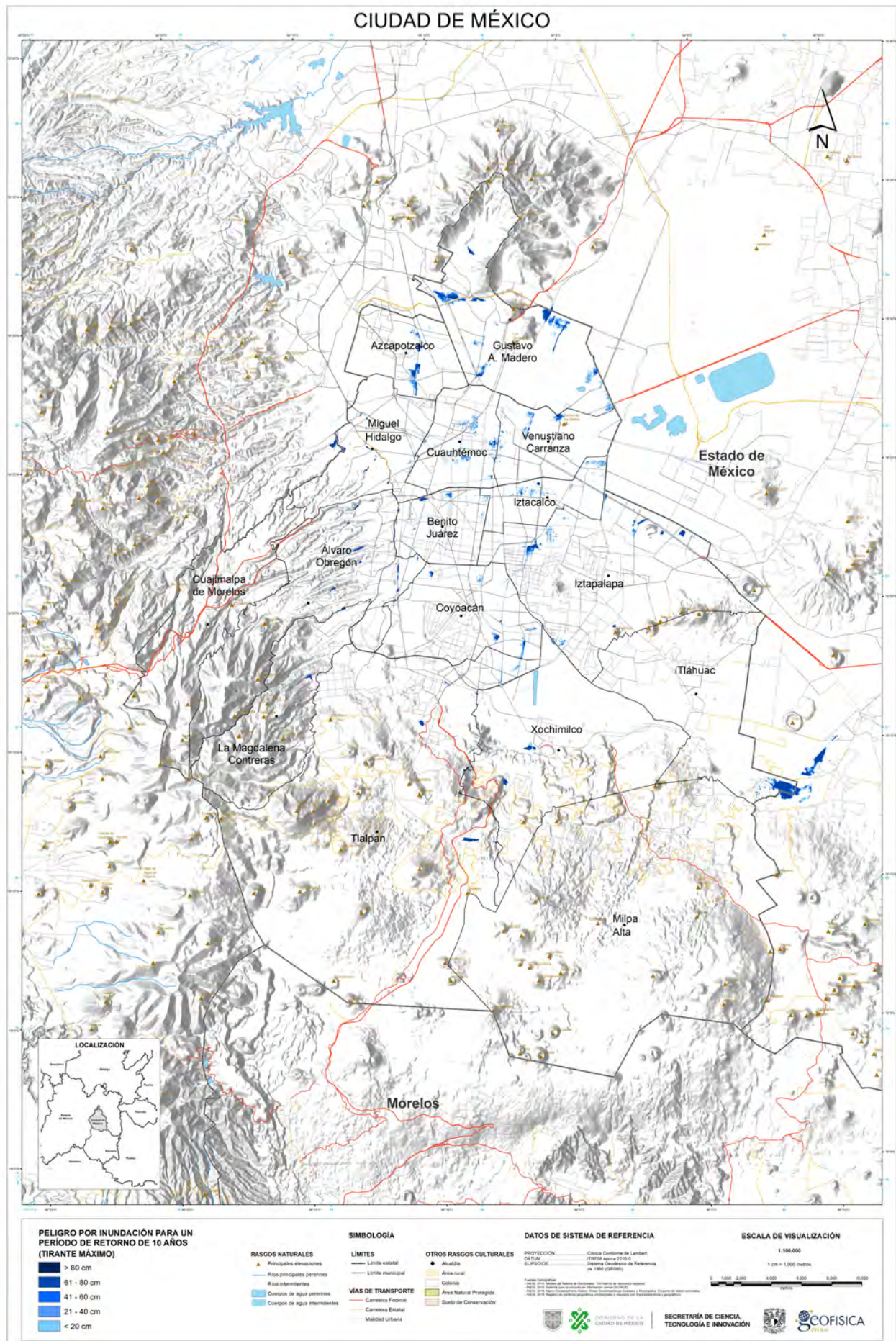
Map 18. Flood areas for a return period of 2 years (maximum height).



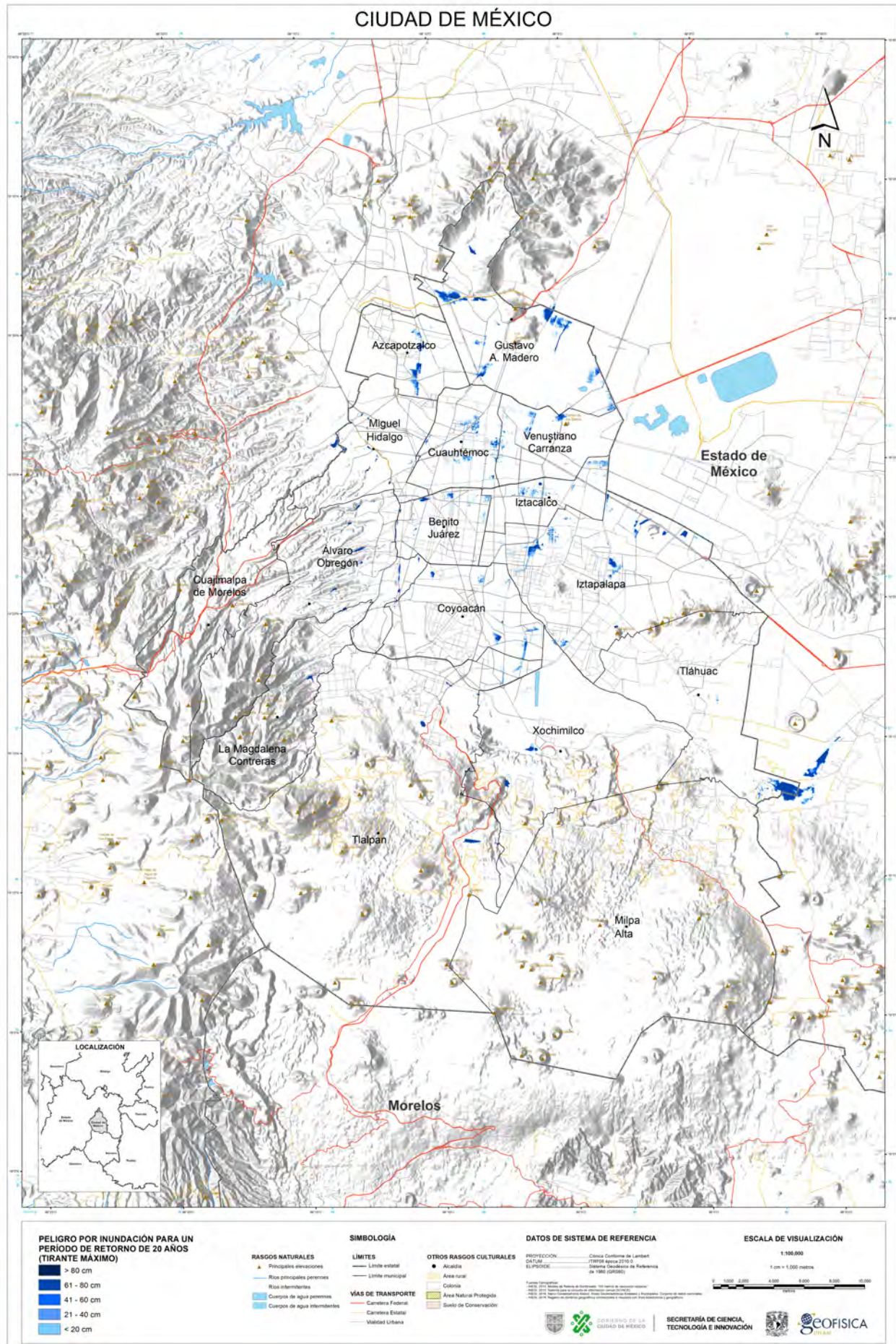
Map 19. Flood areas for a return period of 5 years (maximum height).



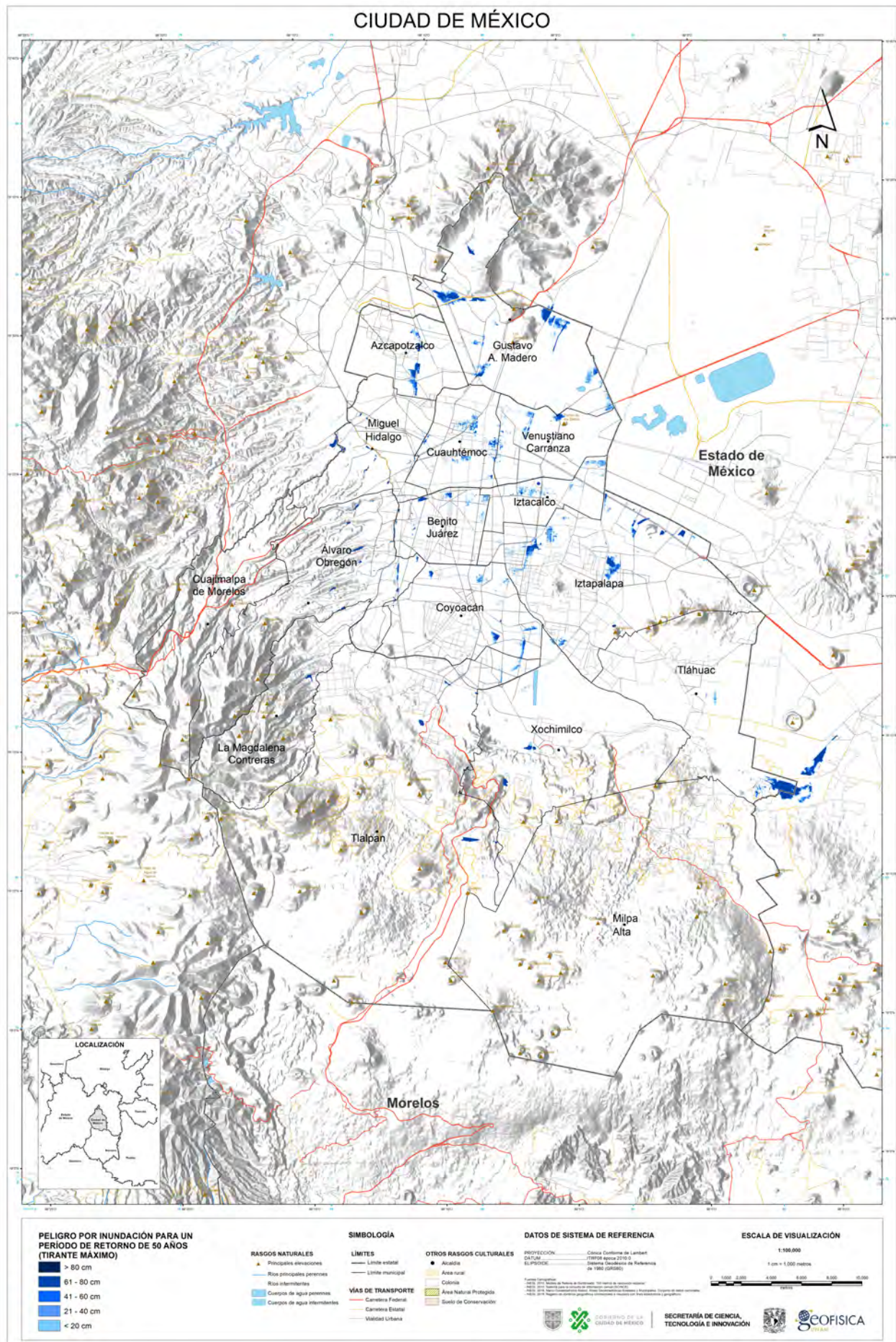
Map 20. Flood areas for a return period of 10 years (maximum height).



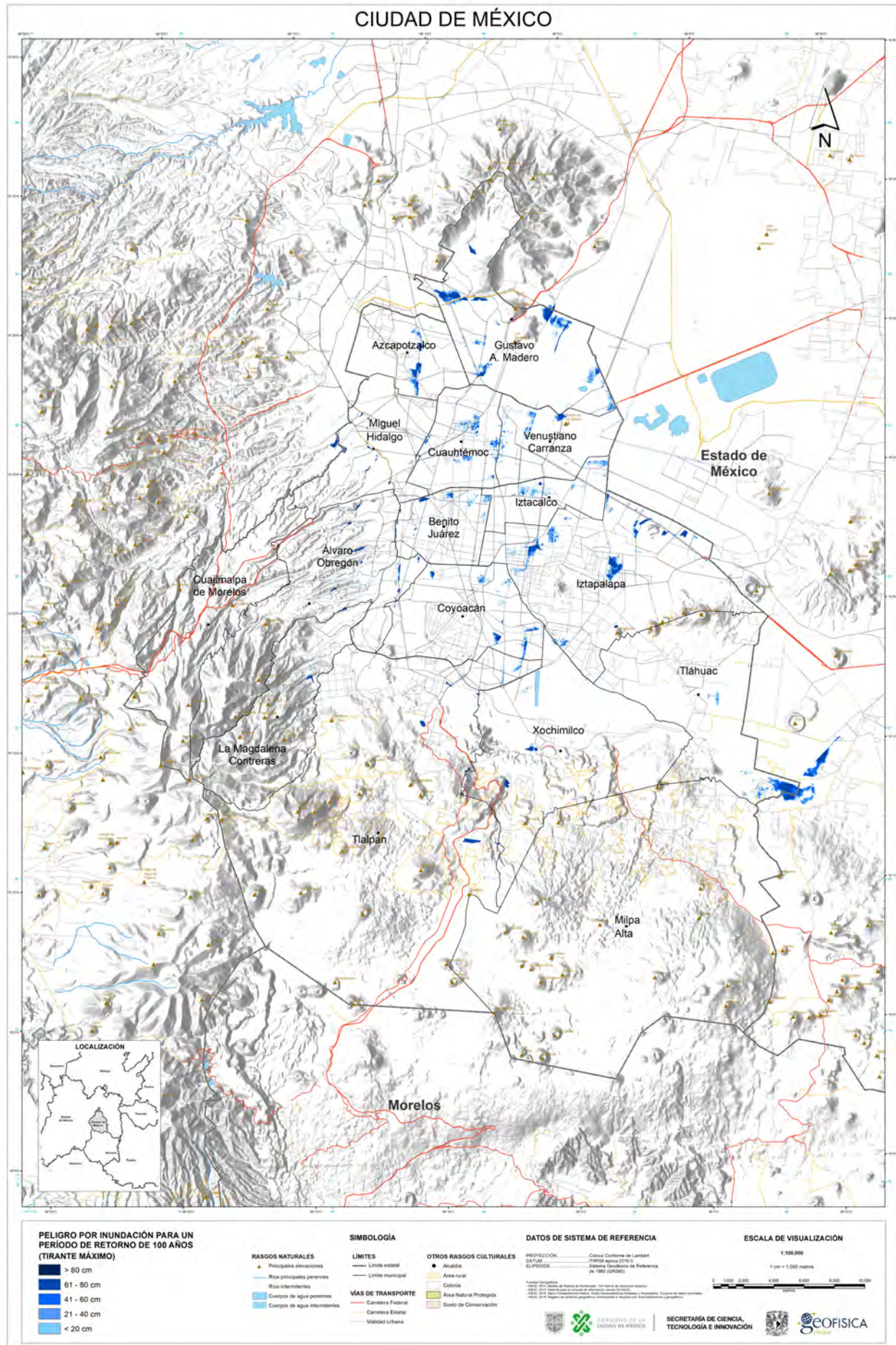
Map 21. Flood areas for a return period of 20 years (maximum height).



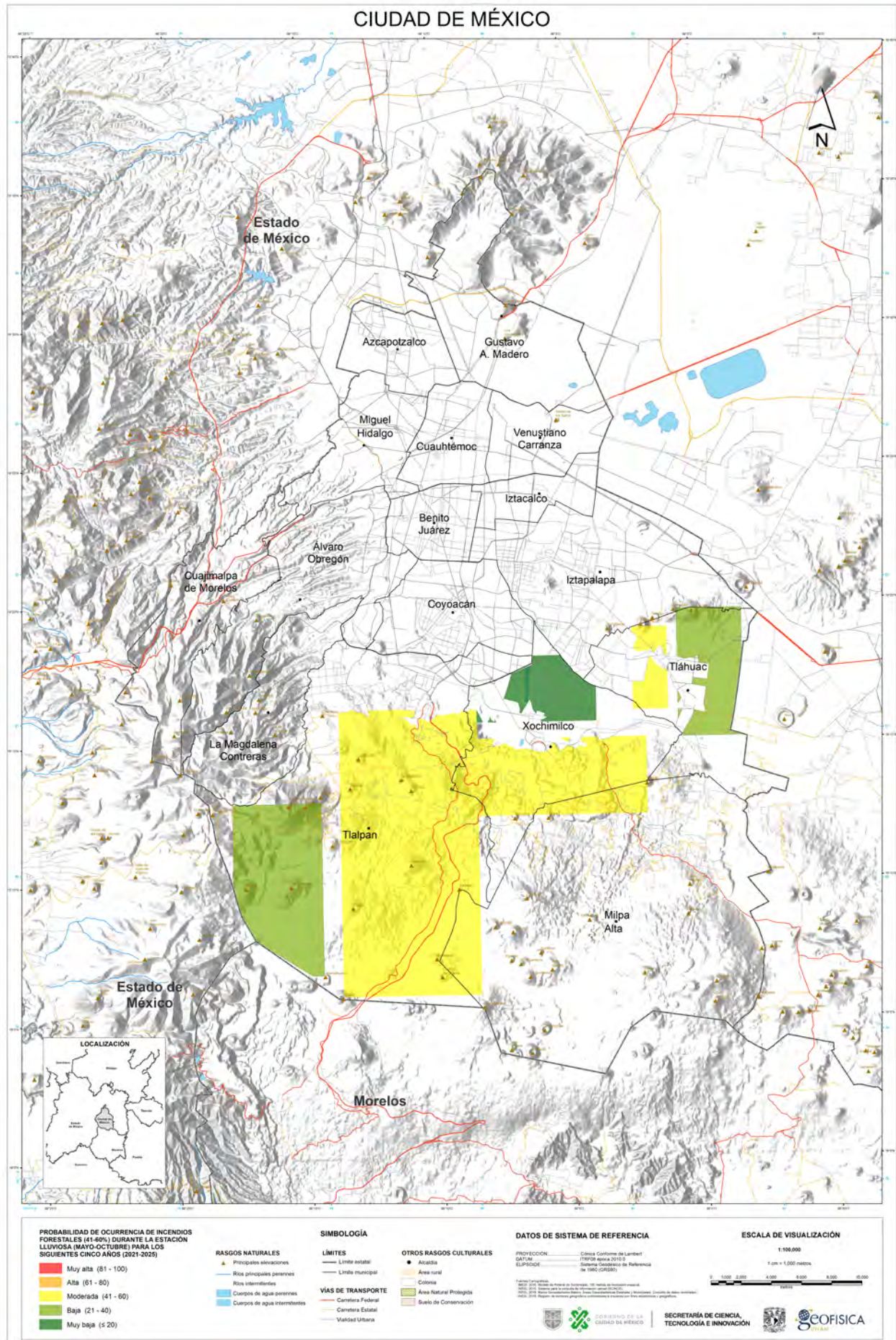
Map 22. Flood areas for a return period of 50 years (maximum height).



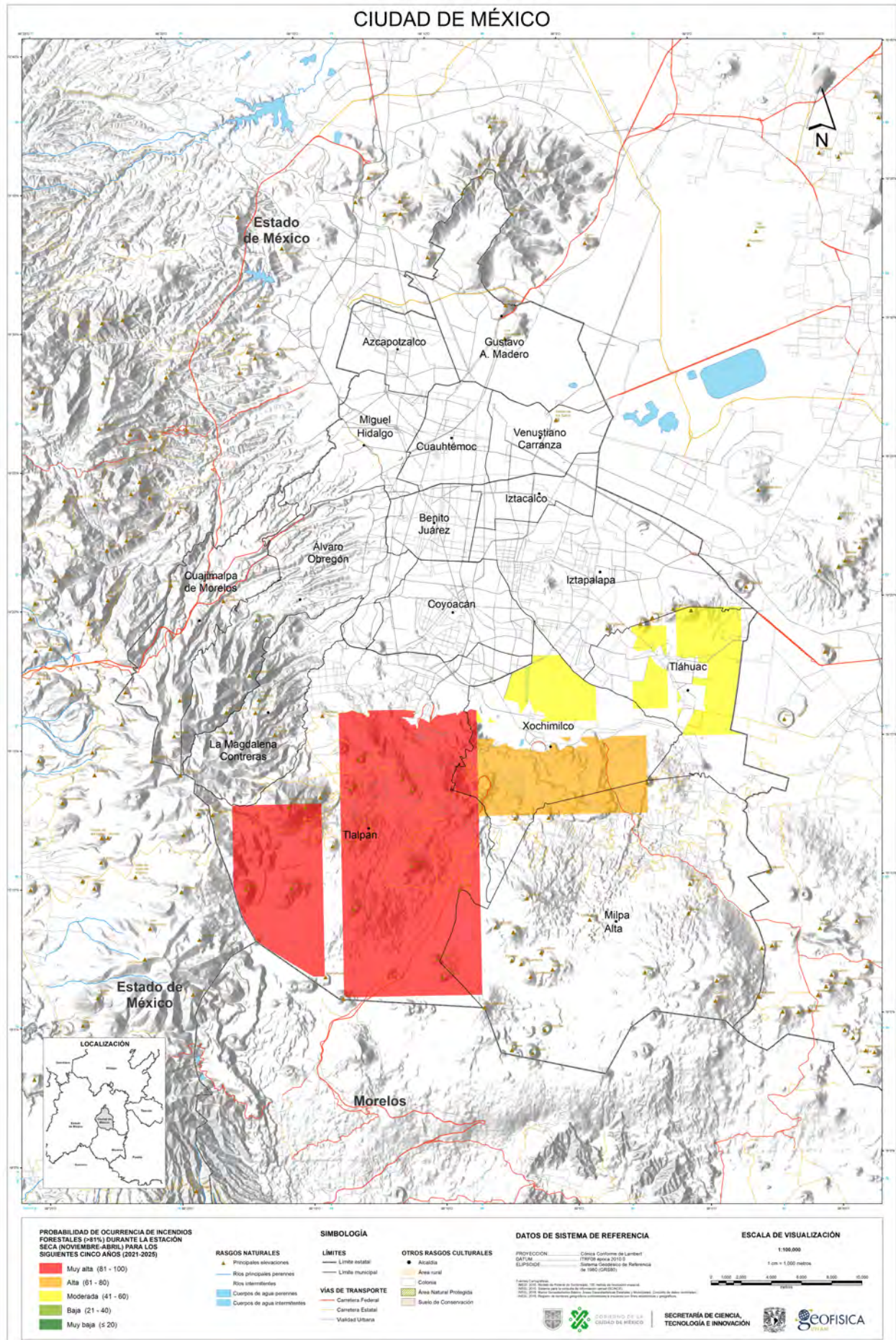
Map 23. Flood areas for a return period of 100 years (maximum height).



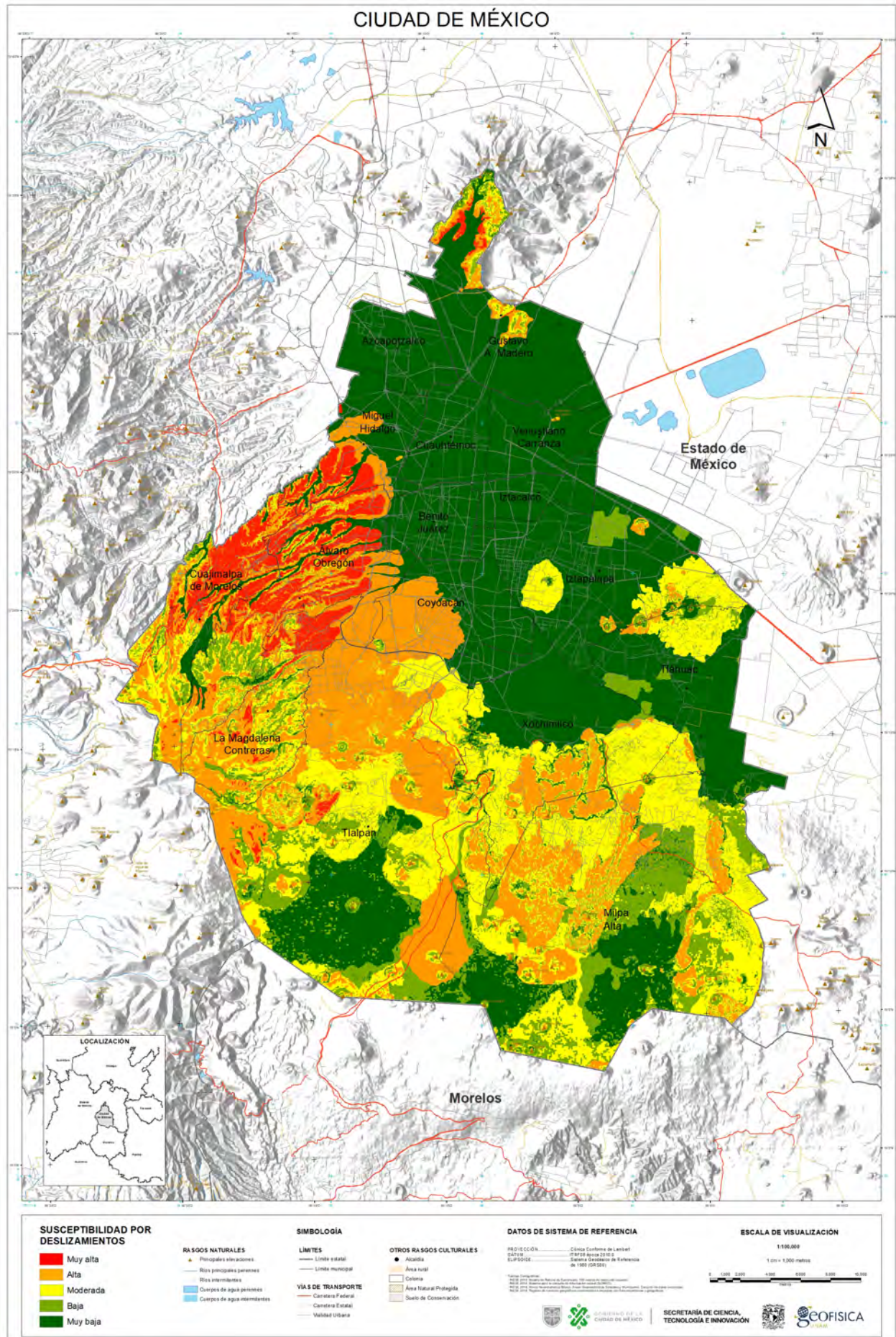
Map 24. Probability of forest fires occurrence (41-60%) during the rainy season (May-October) for the next five years (2021-2025).



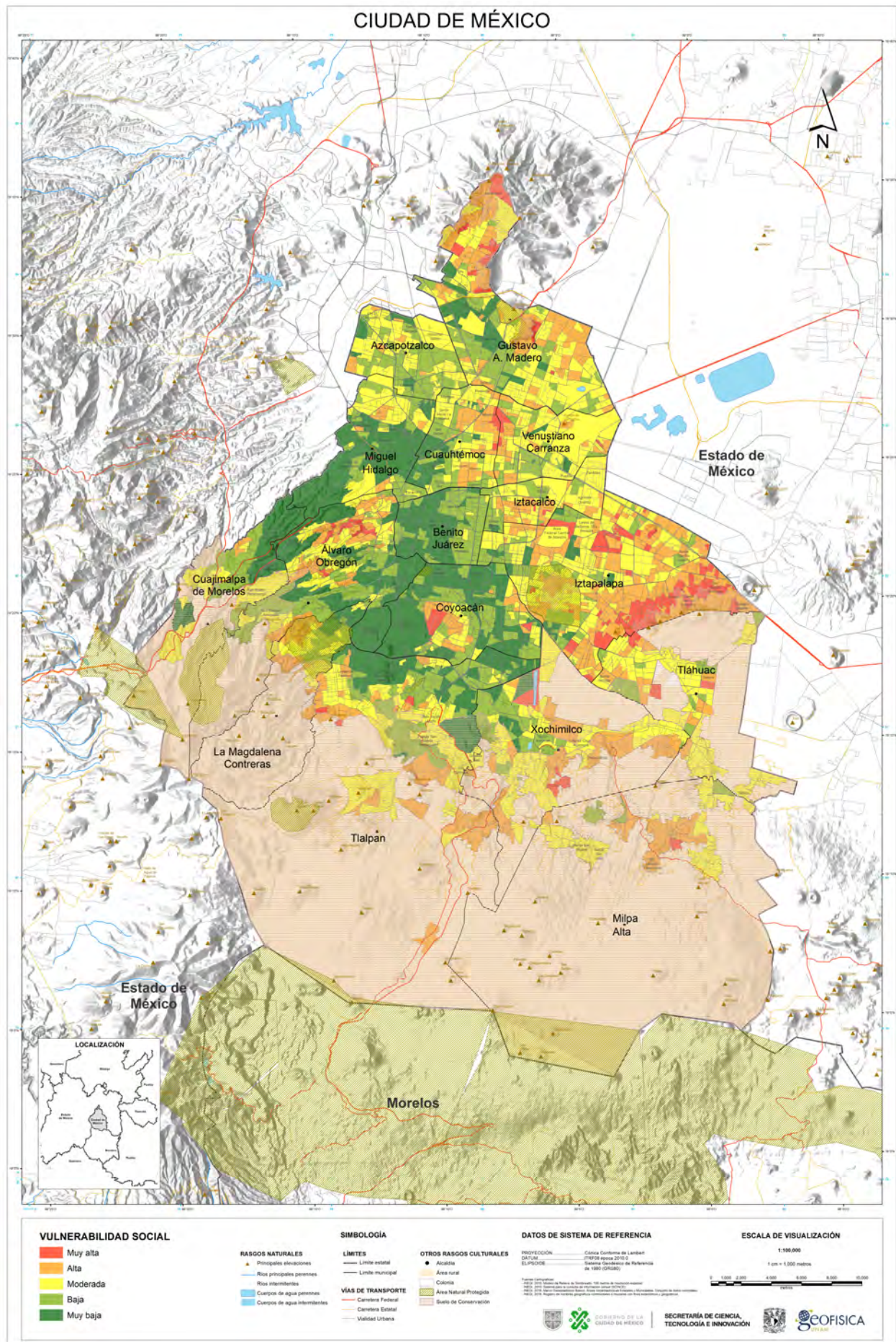
Map 25. Probability of forest fires occurrence (>81%) for the dry season (November-April) for the next five years (2021-2025).



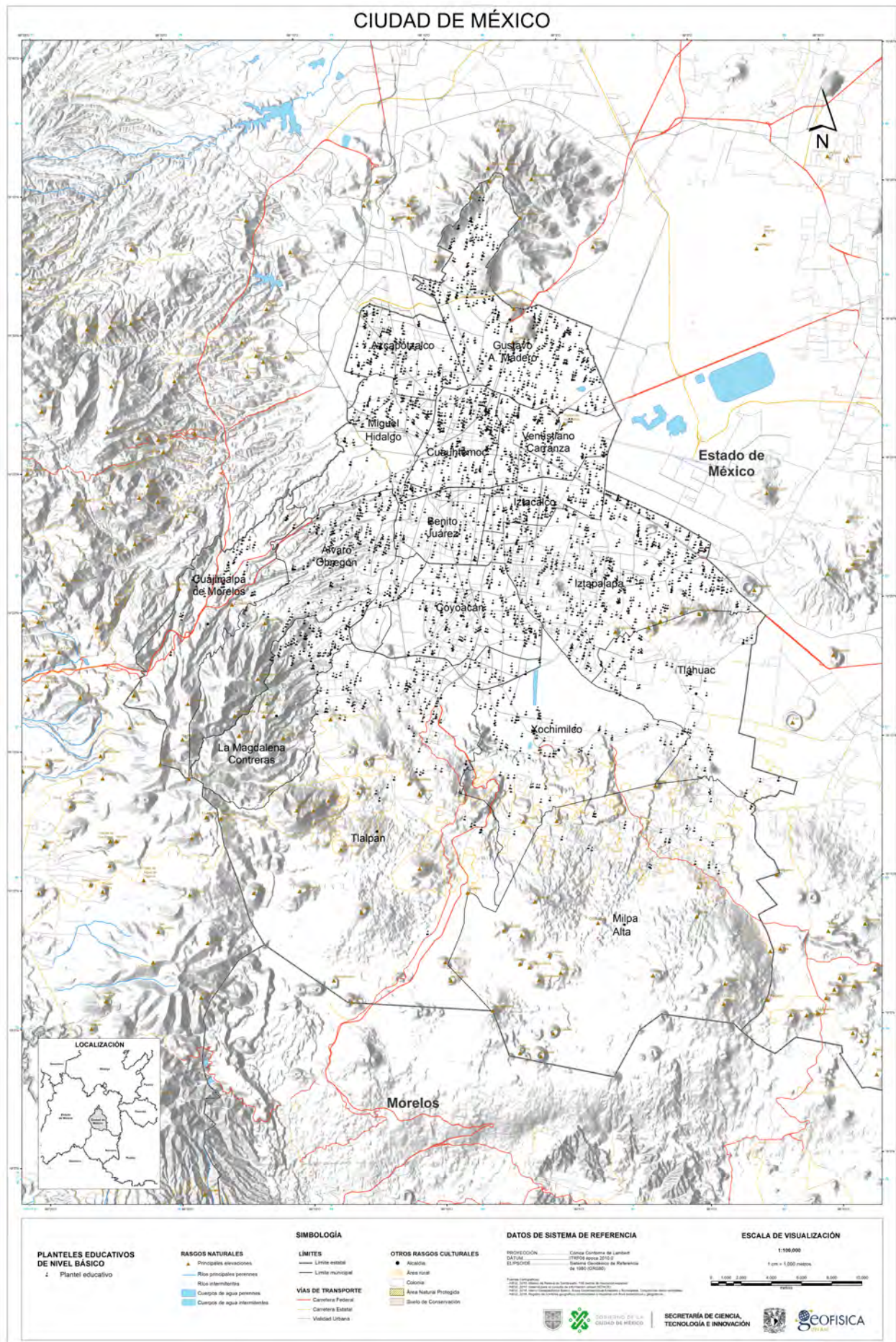
Map 26. Landslide susceptibility.



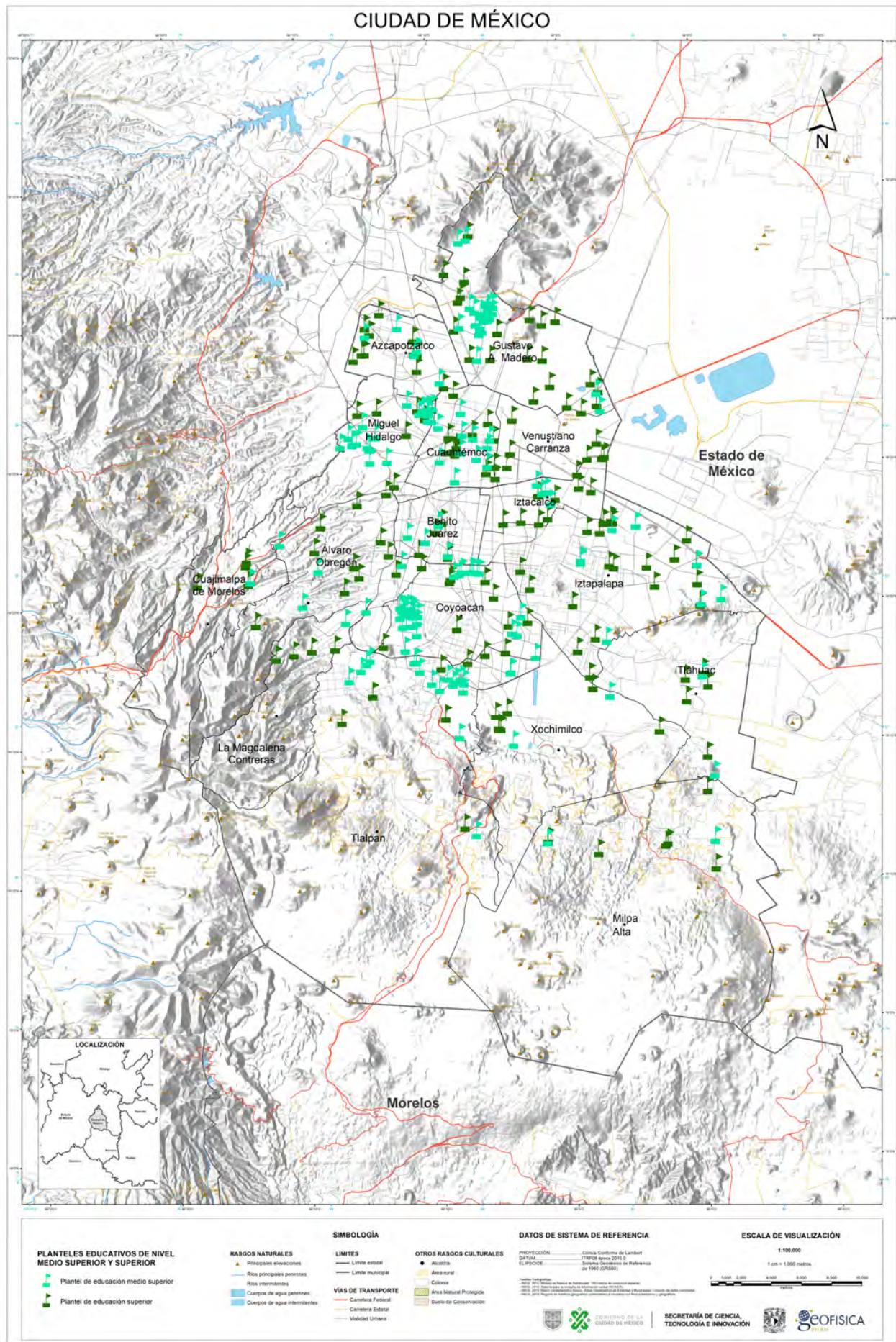
Map 27. Social Vulnerability.



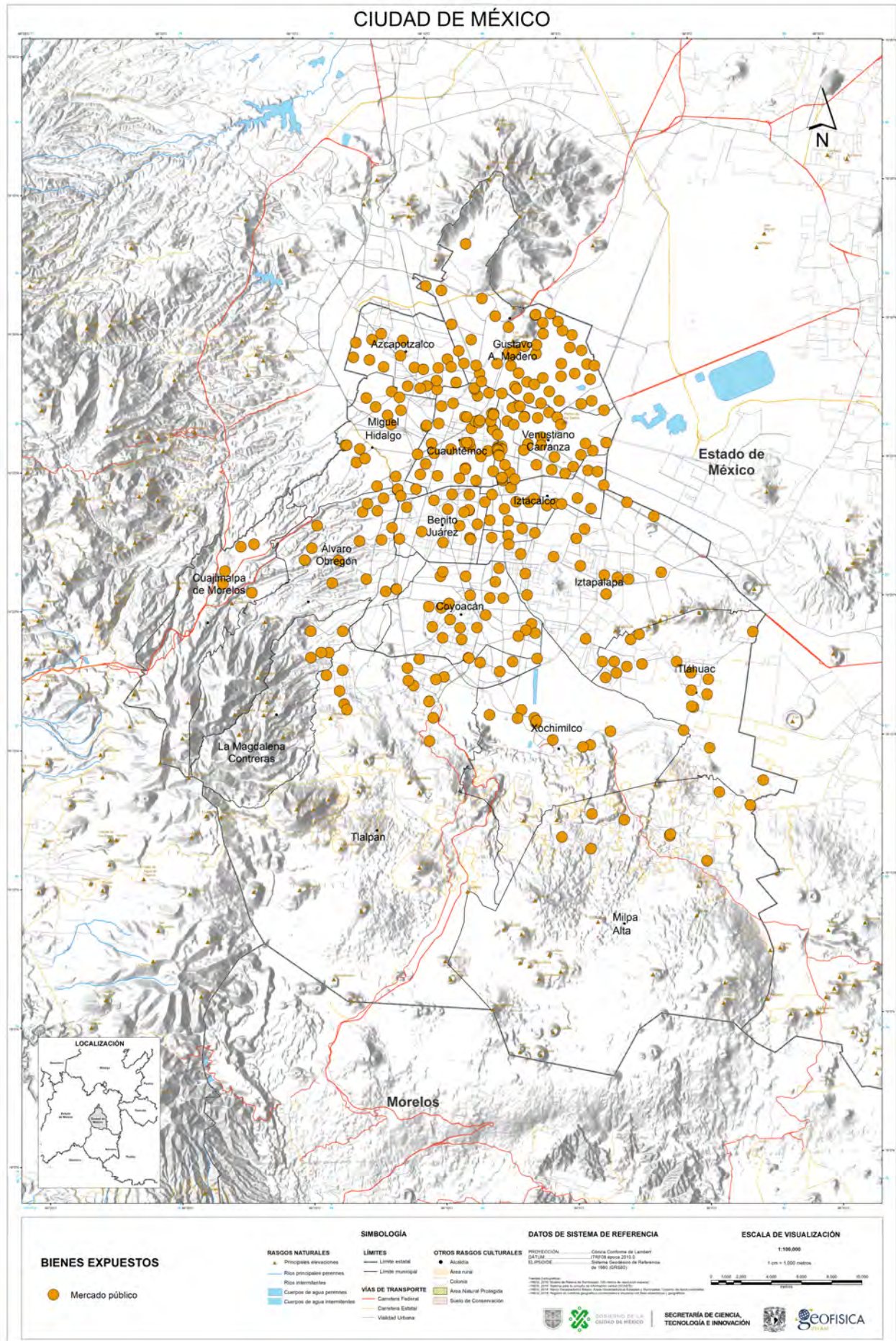
Map 28. Elementary schools.



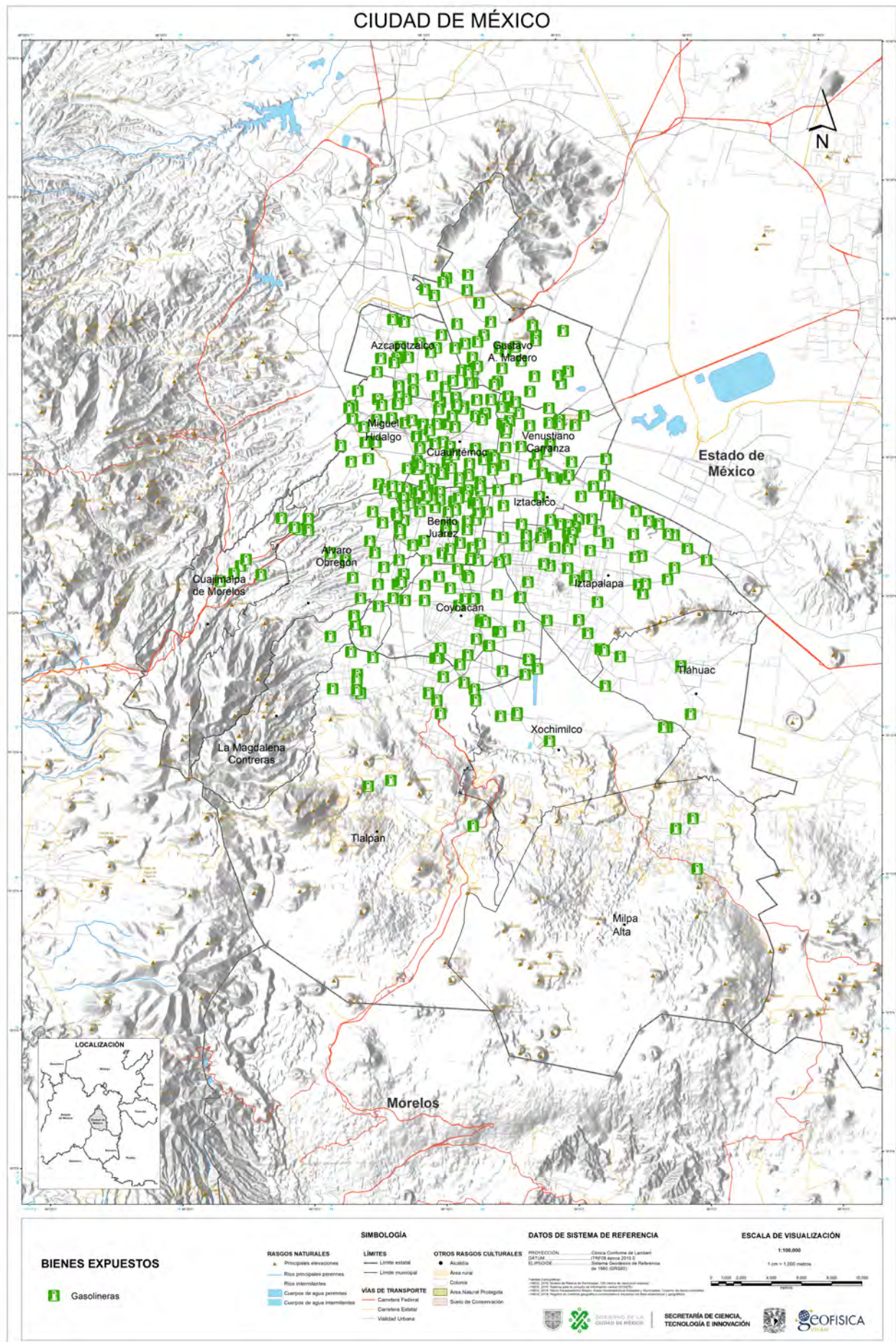
Map 29. High schools and colleges.



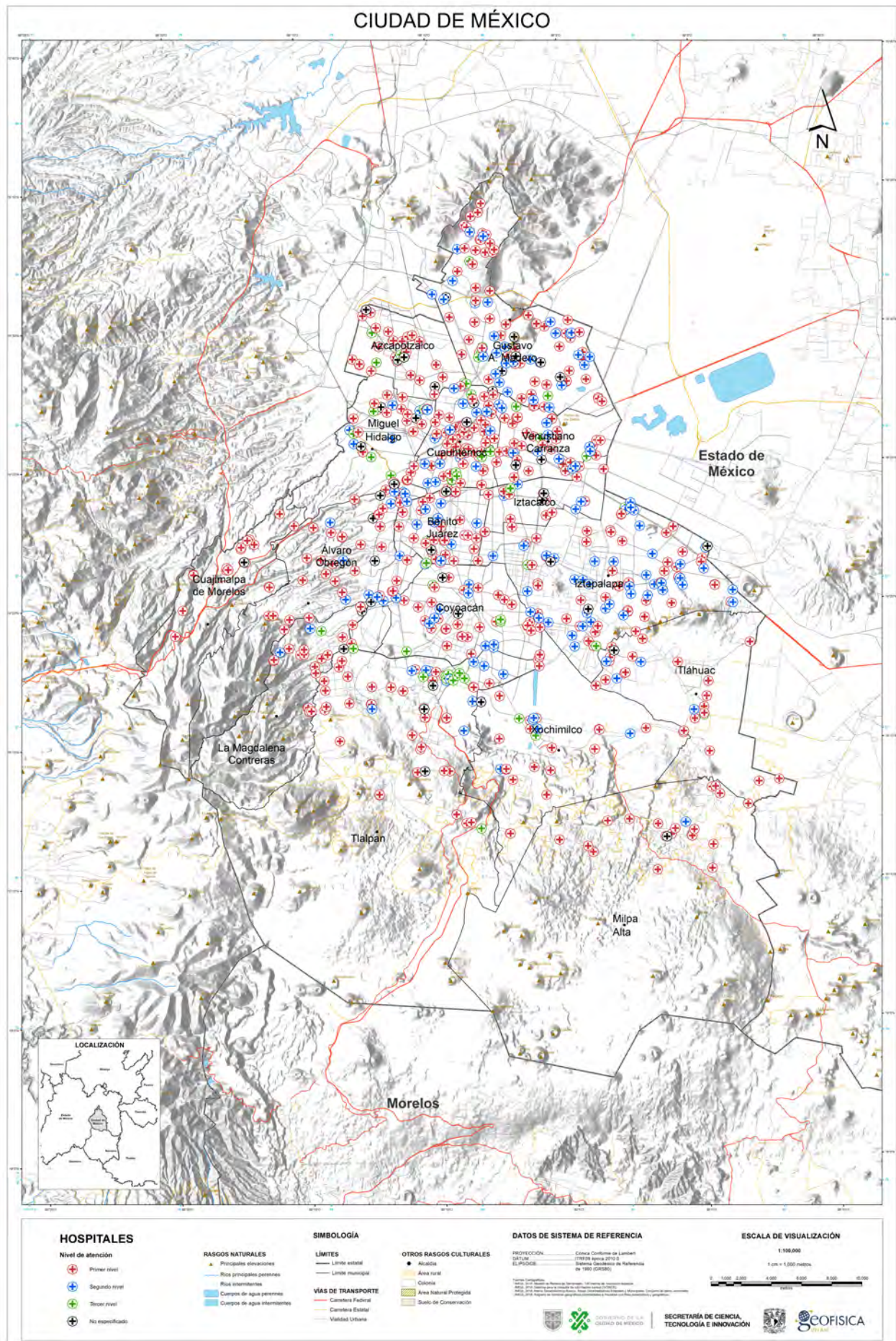
Map 30. Public markets.



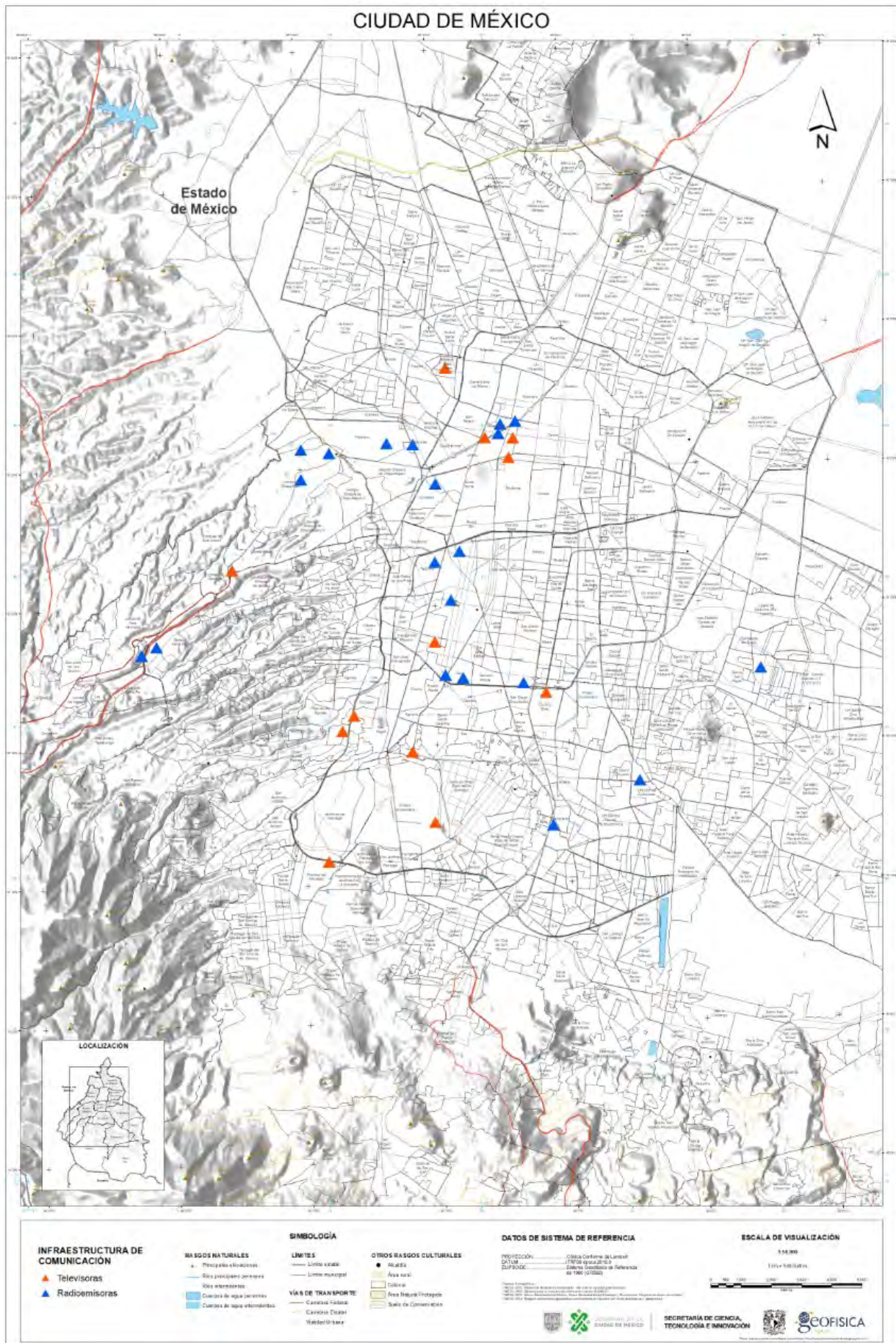
Map 31. Fuel stations.



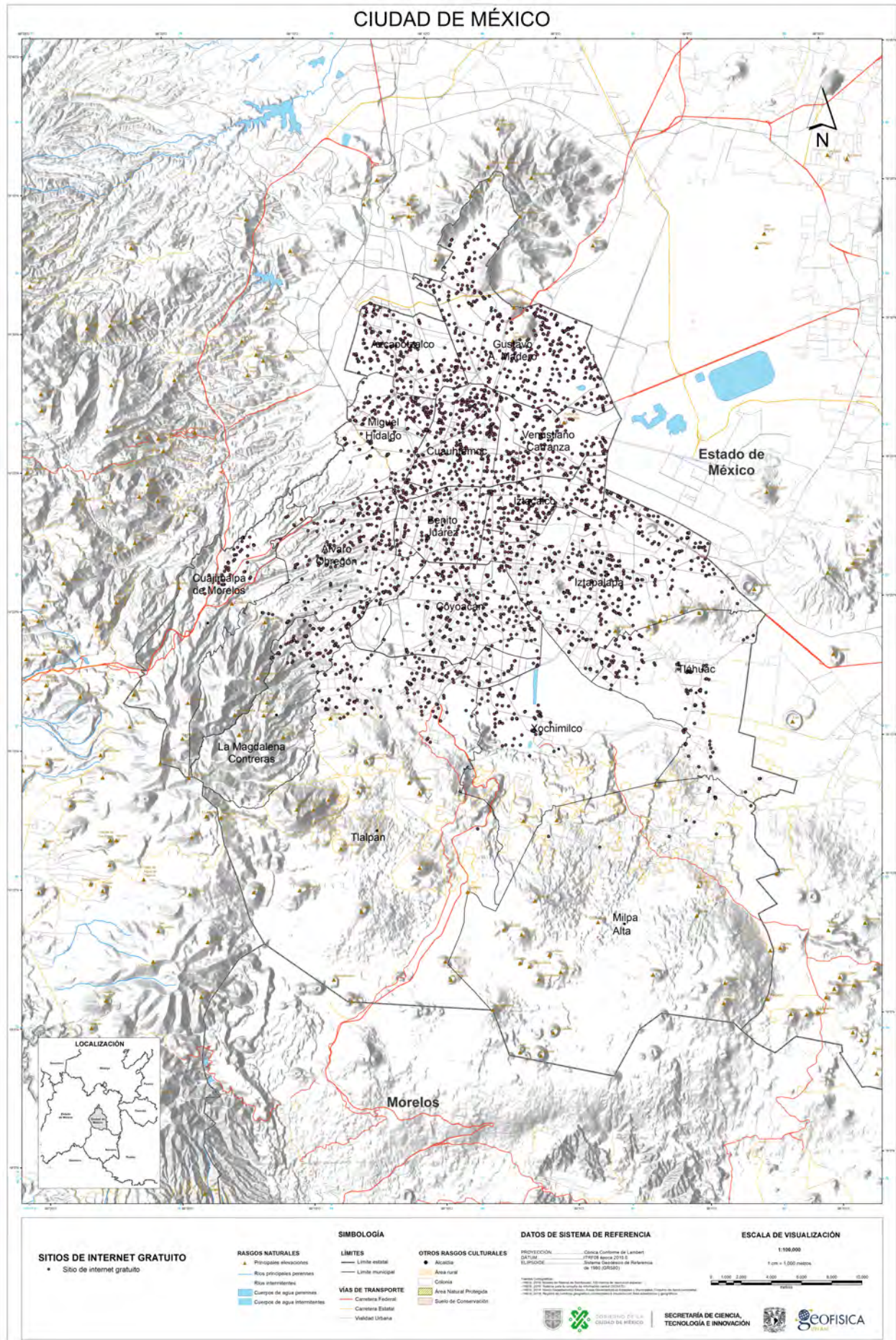
Map 32. Hospitals.



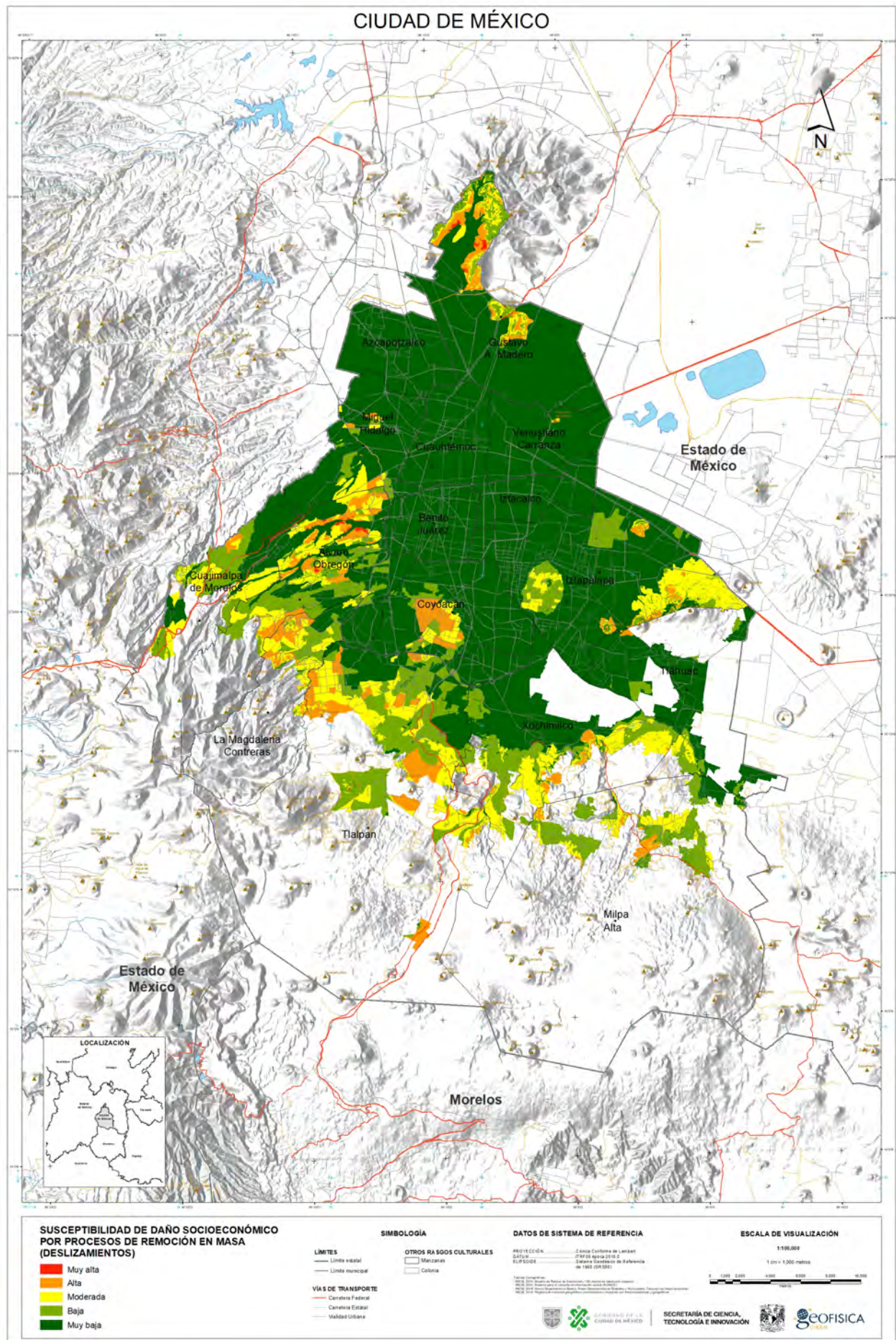
Map 33. Radio and TV stations.



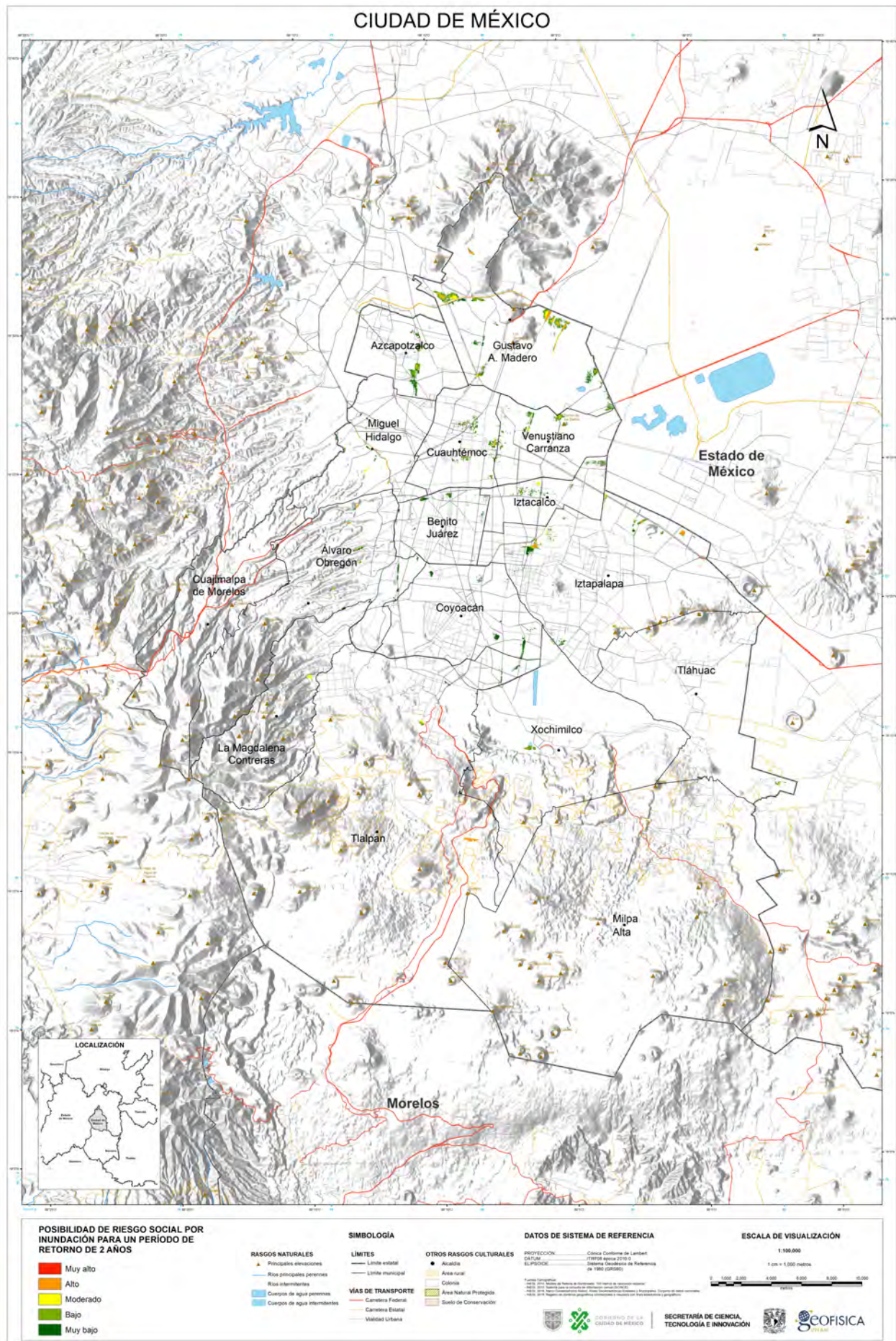
Map 34. Free internet sites.



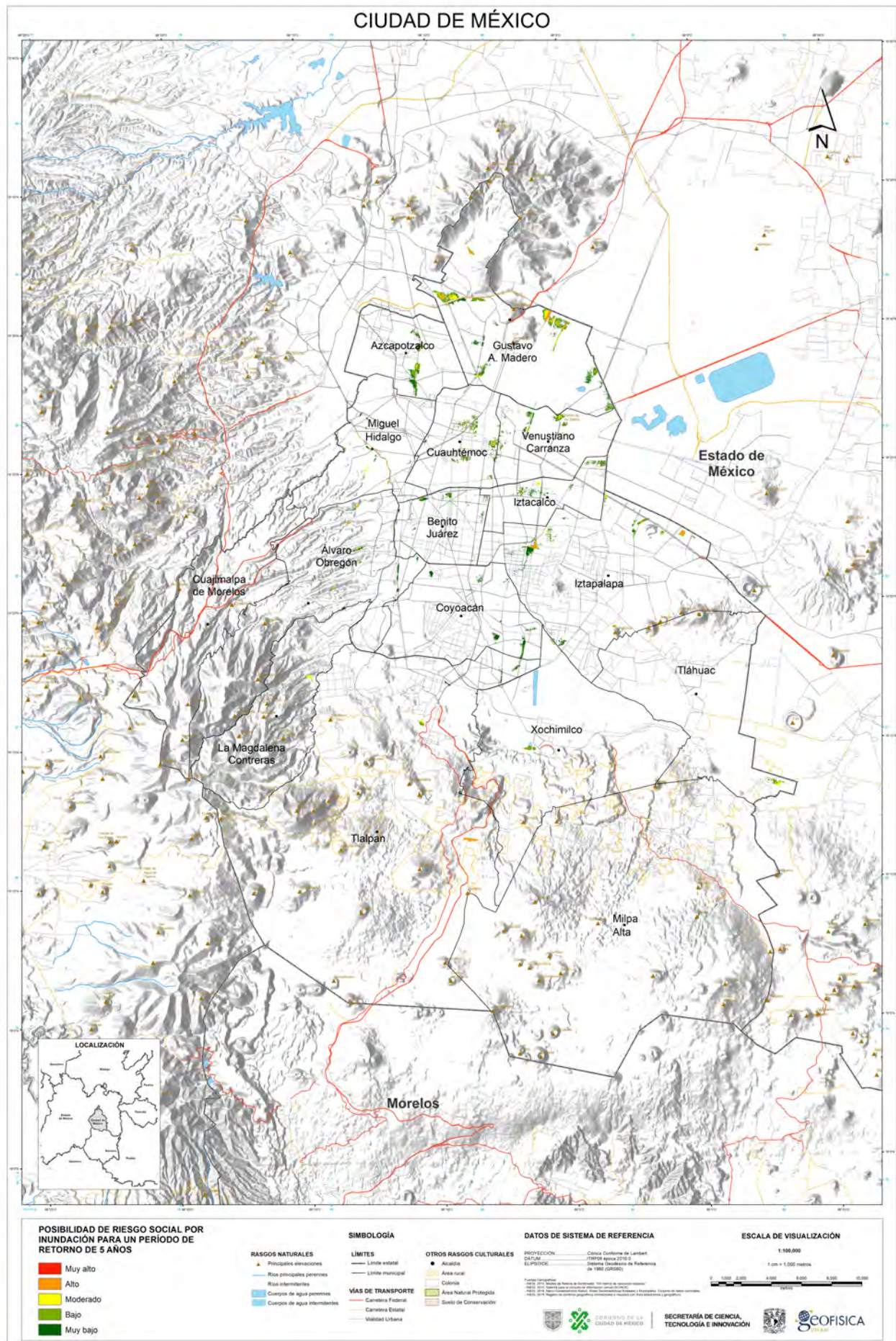
Map 35. Social susceptibility to landslide damage.



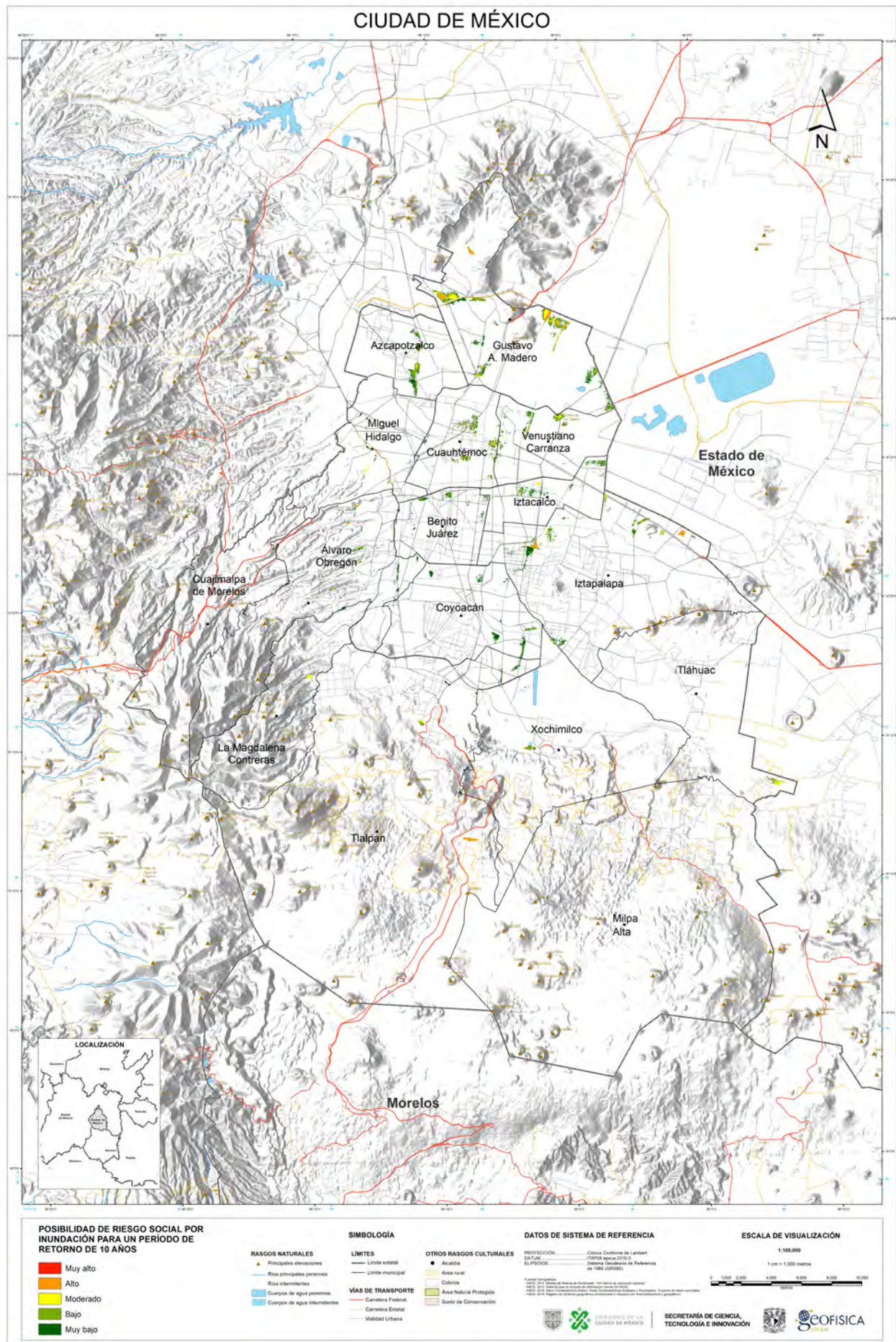
Map 36. Social risk likelihood of floods for a return period of 2 years.



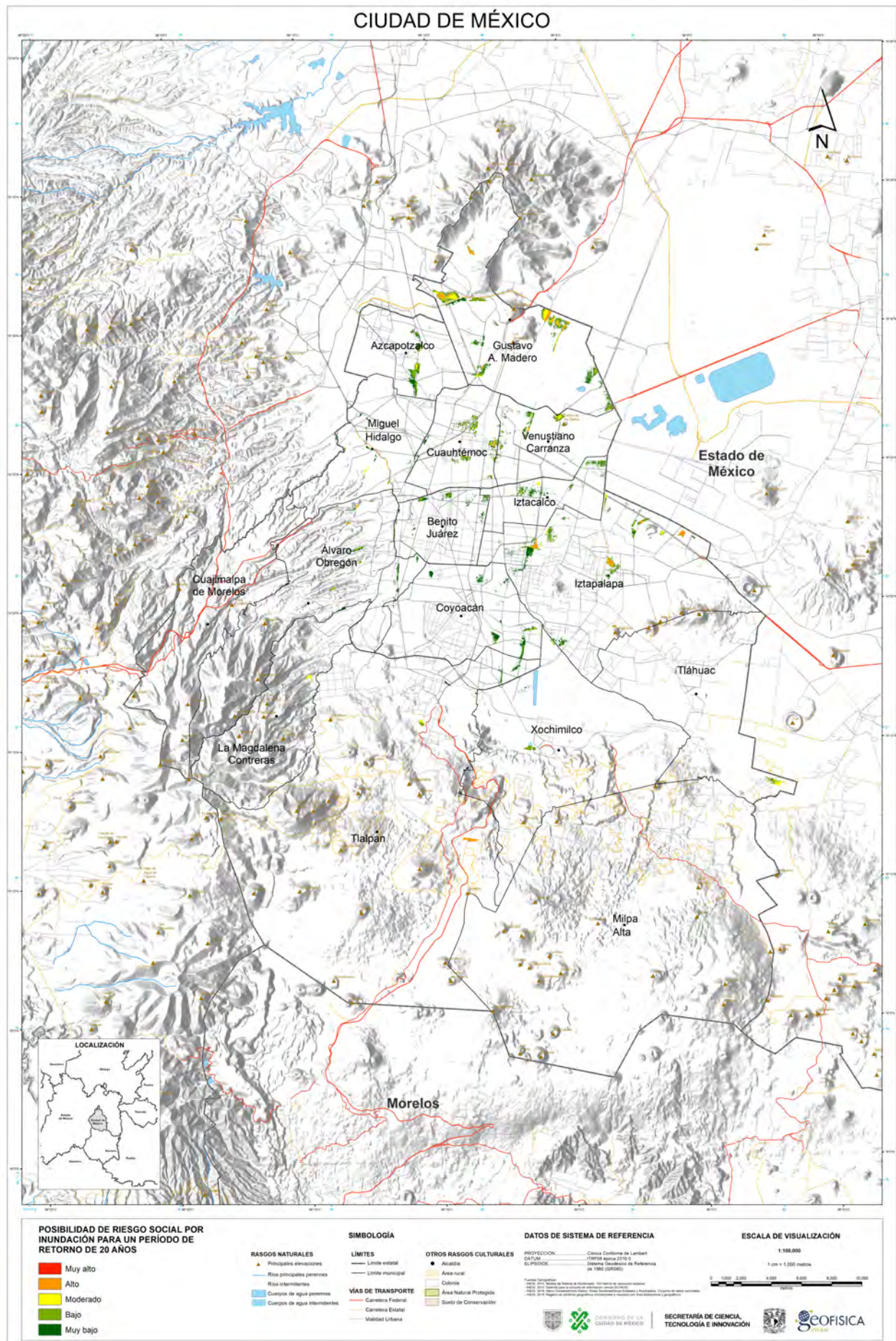
Map 37. Social risk likelihood of floods for a return period of 5 years.



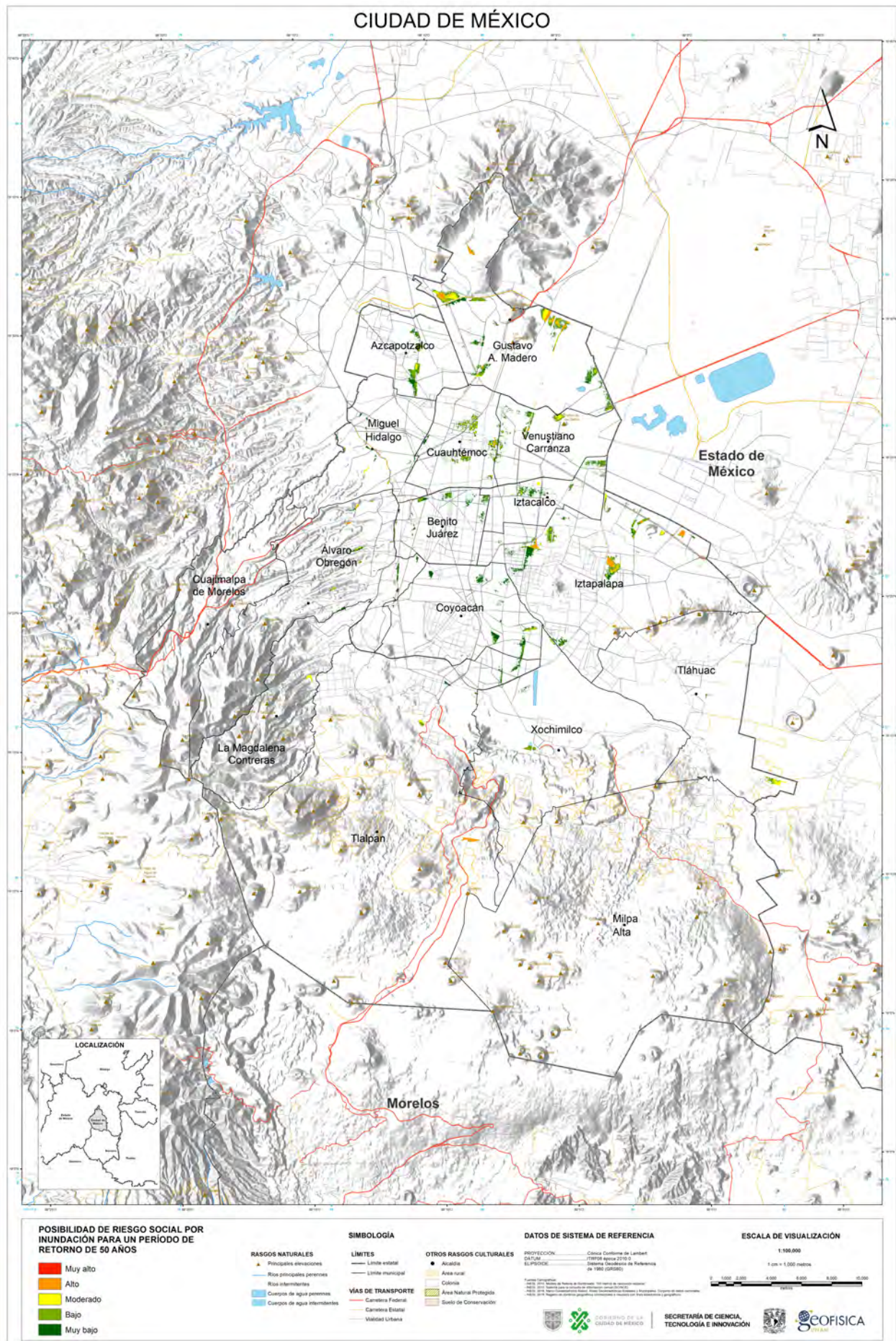
Map 38. Social risk likelihood of floods for a return period of 10 years.



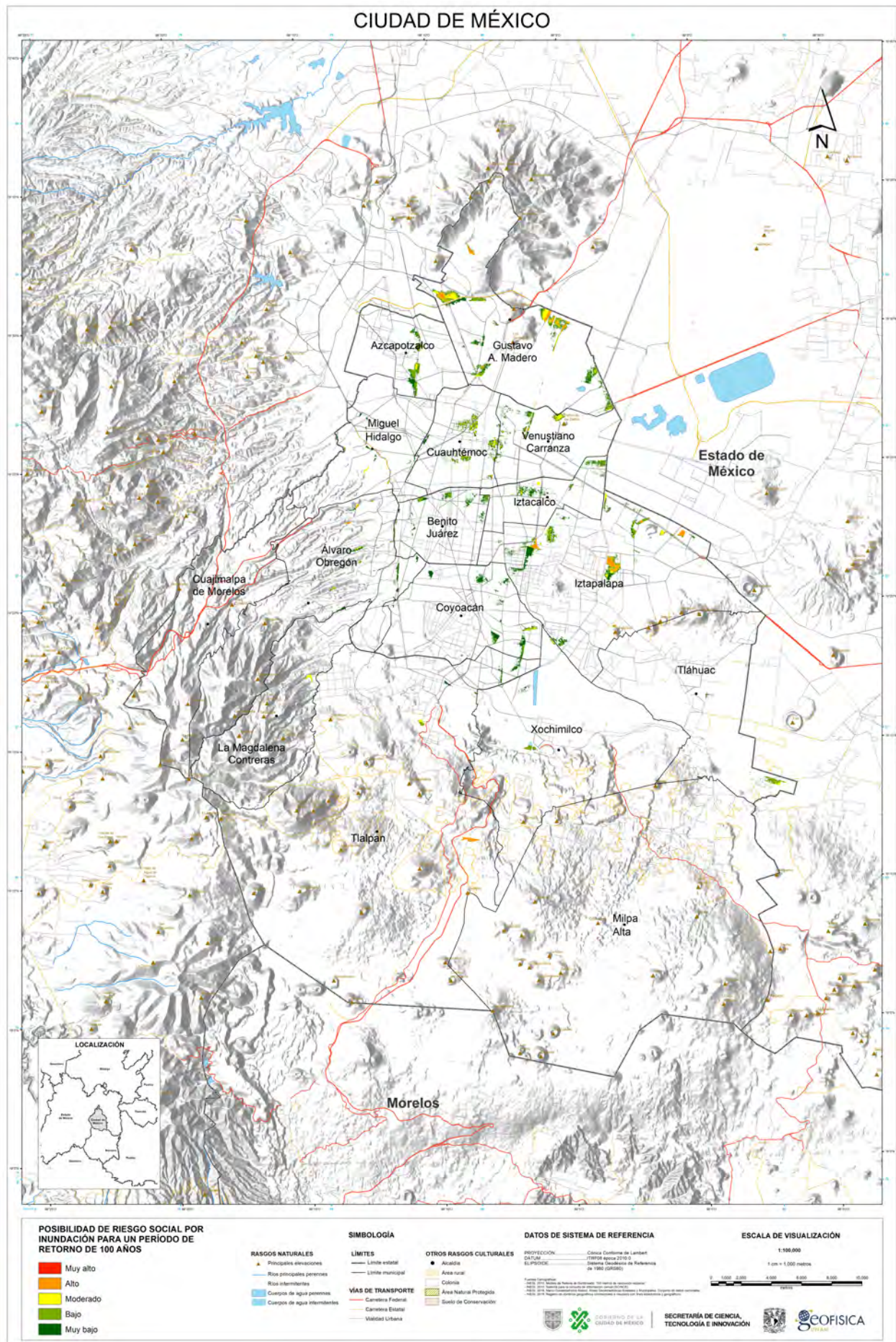
Map 39. Social risk likelihood of floods for a return period of 20 years.



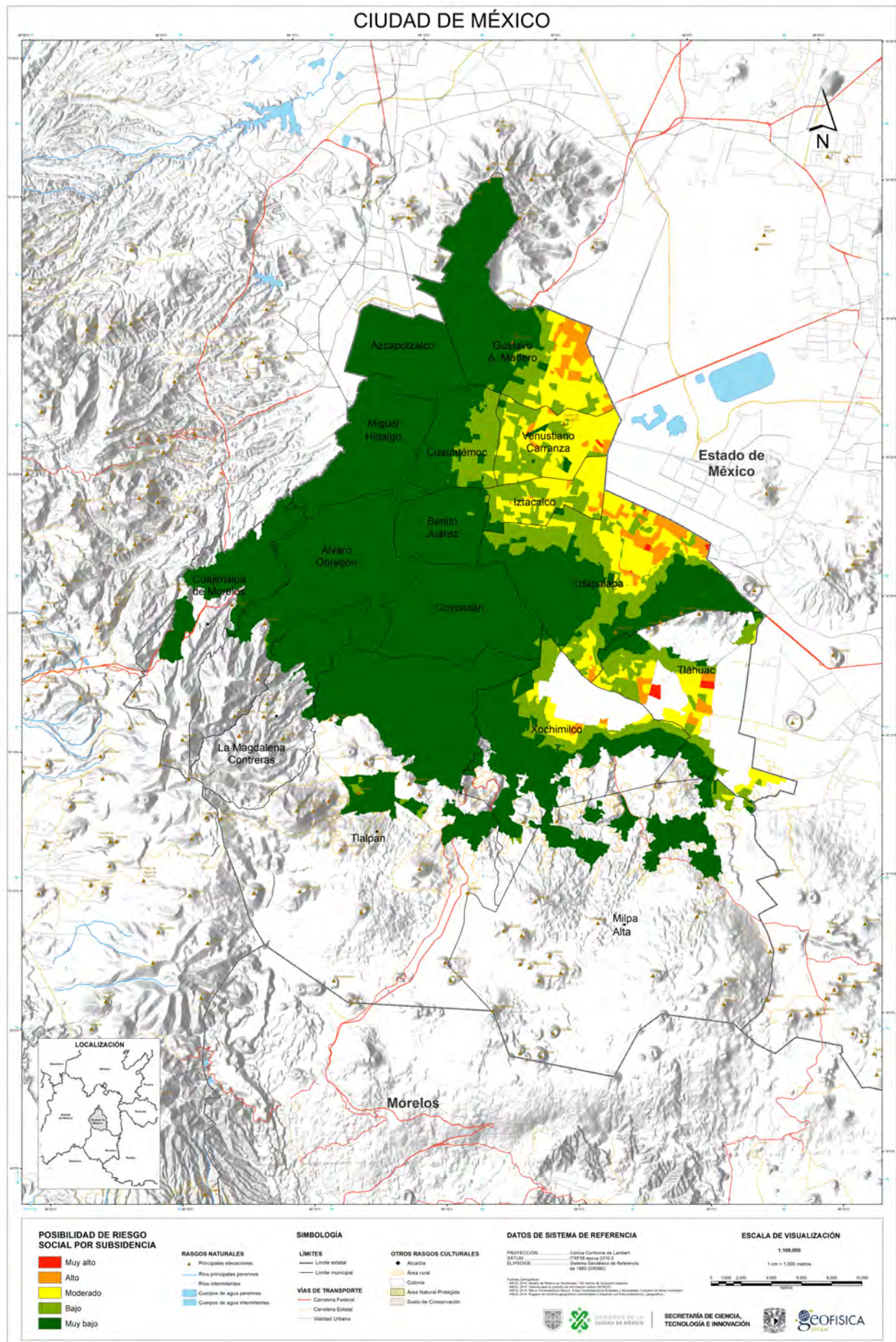
Map 40. Social risk likelihood of floods for a return period of 50 years.



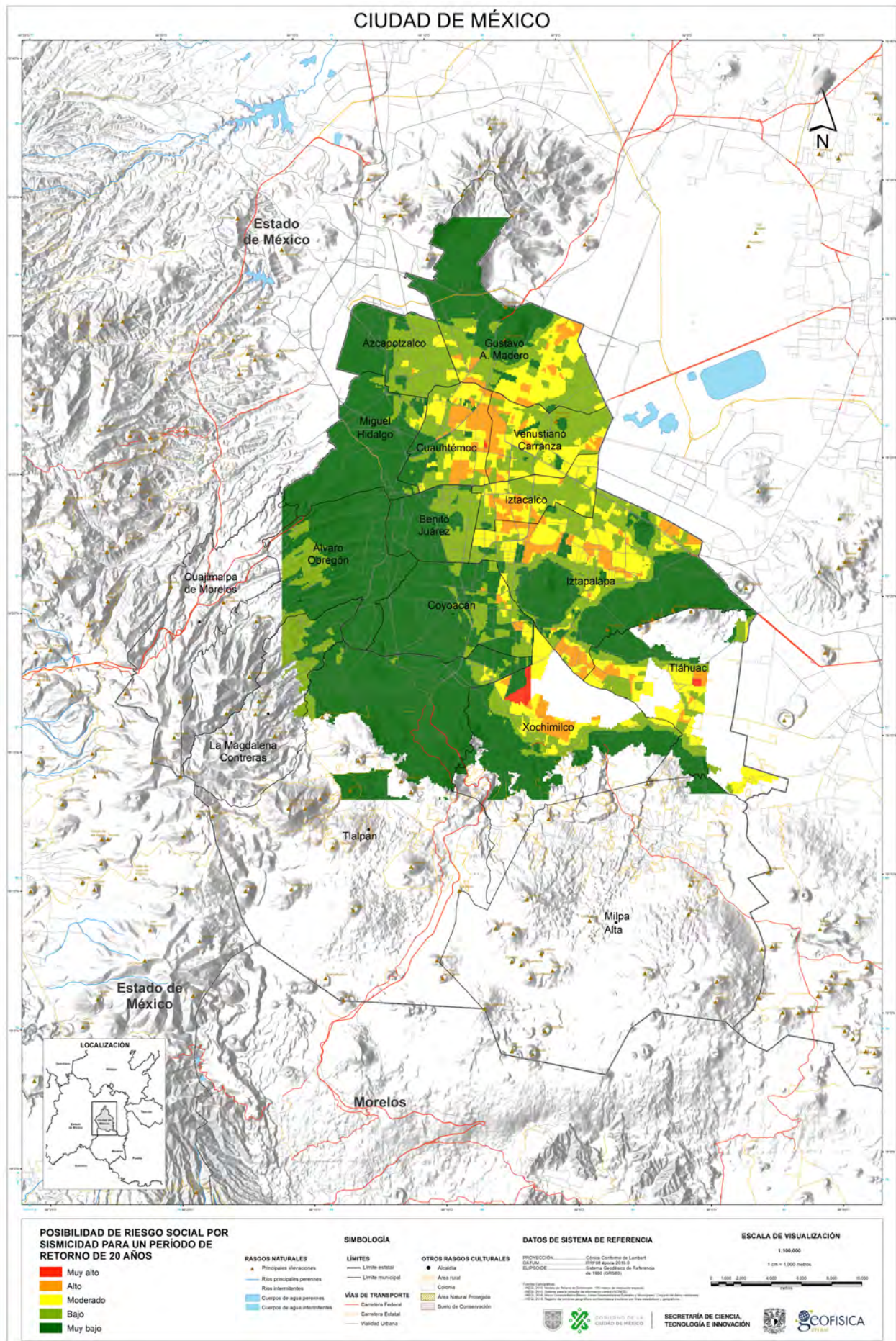
Map 41. Social risk likelihood of floods for a return period of 100 years.



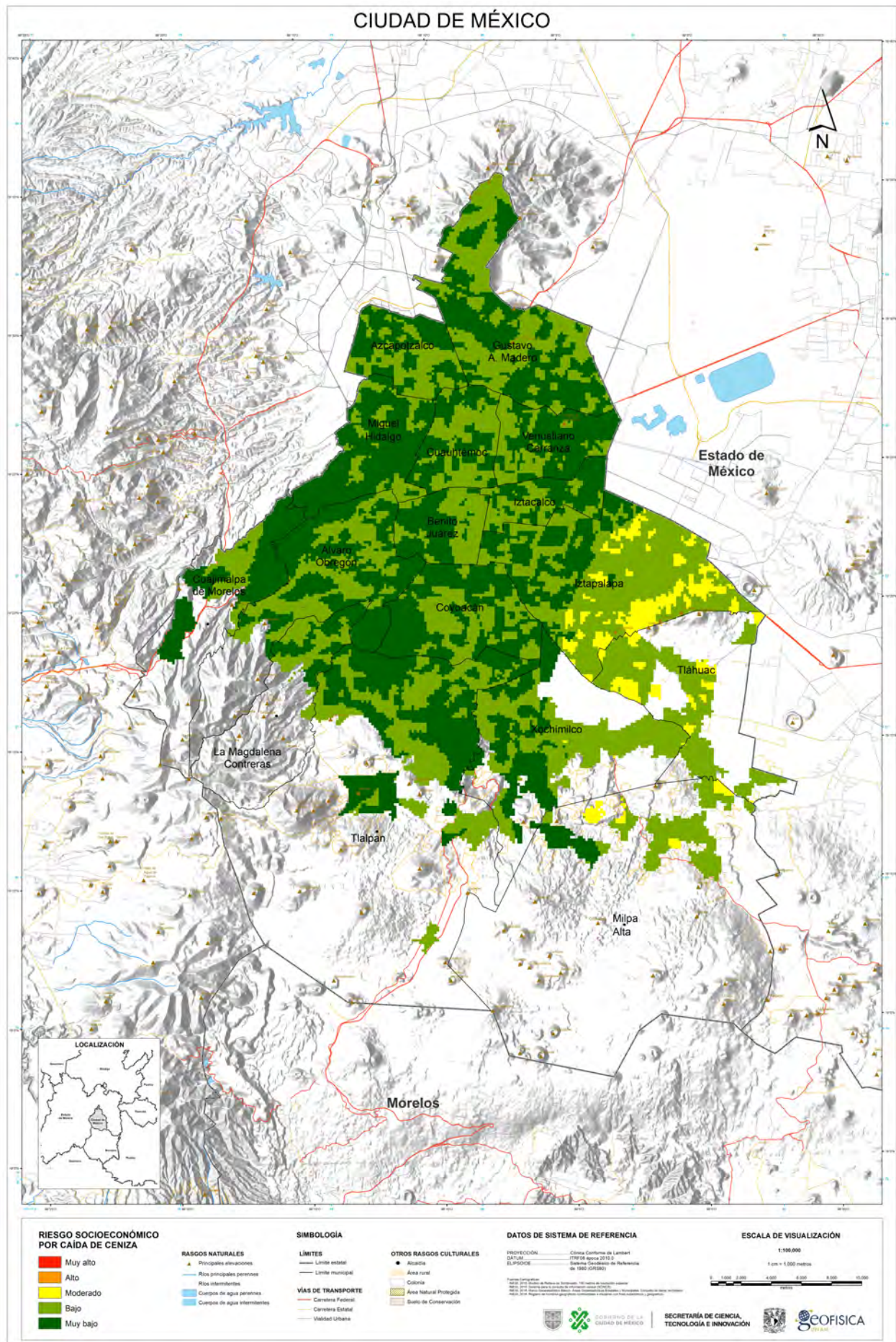
Map 42. Social risk likelihood due to subsidence.



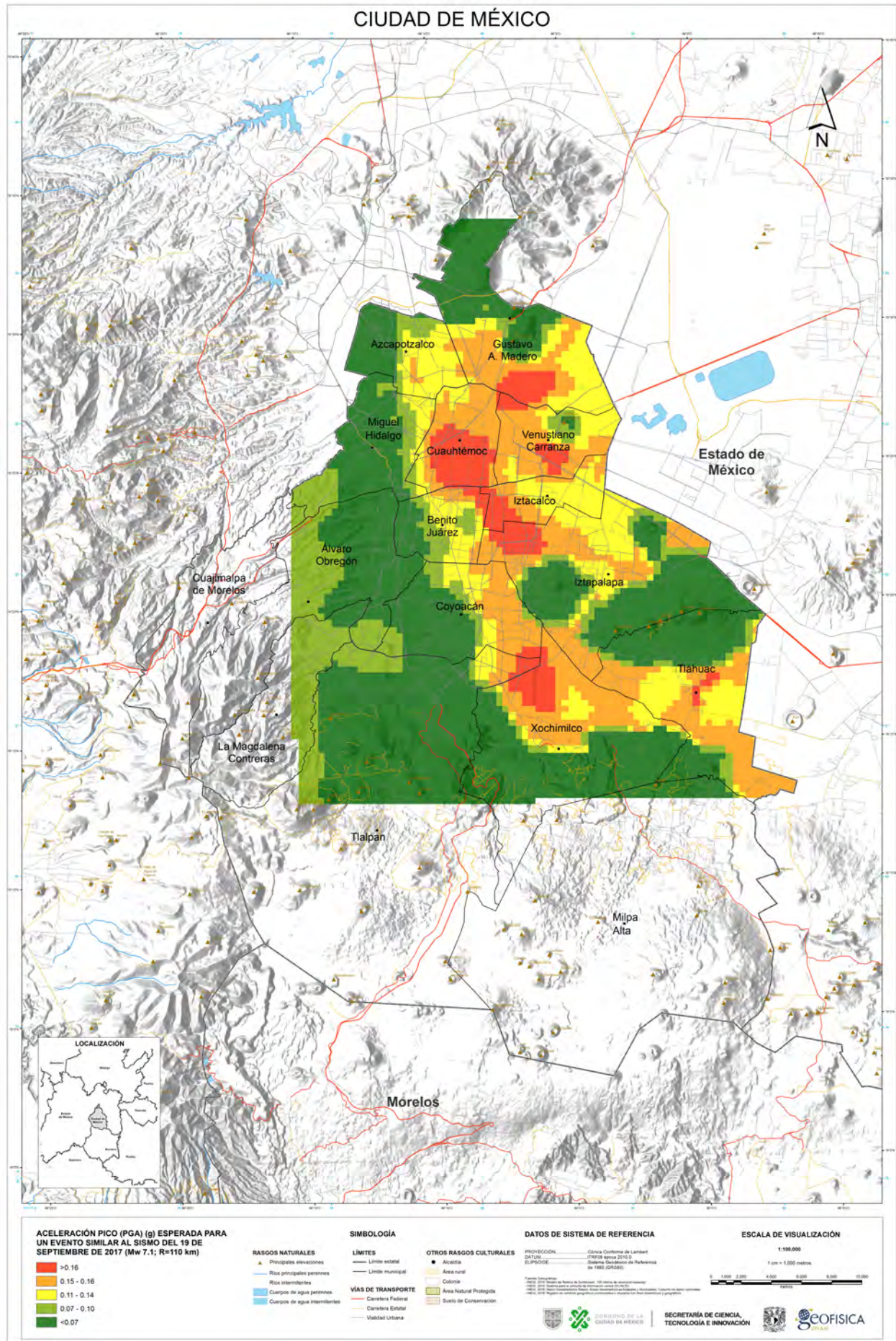
Map 43. Social risk likelihood of seismic for a return period of 20 years.



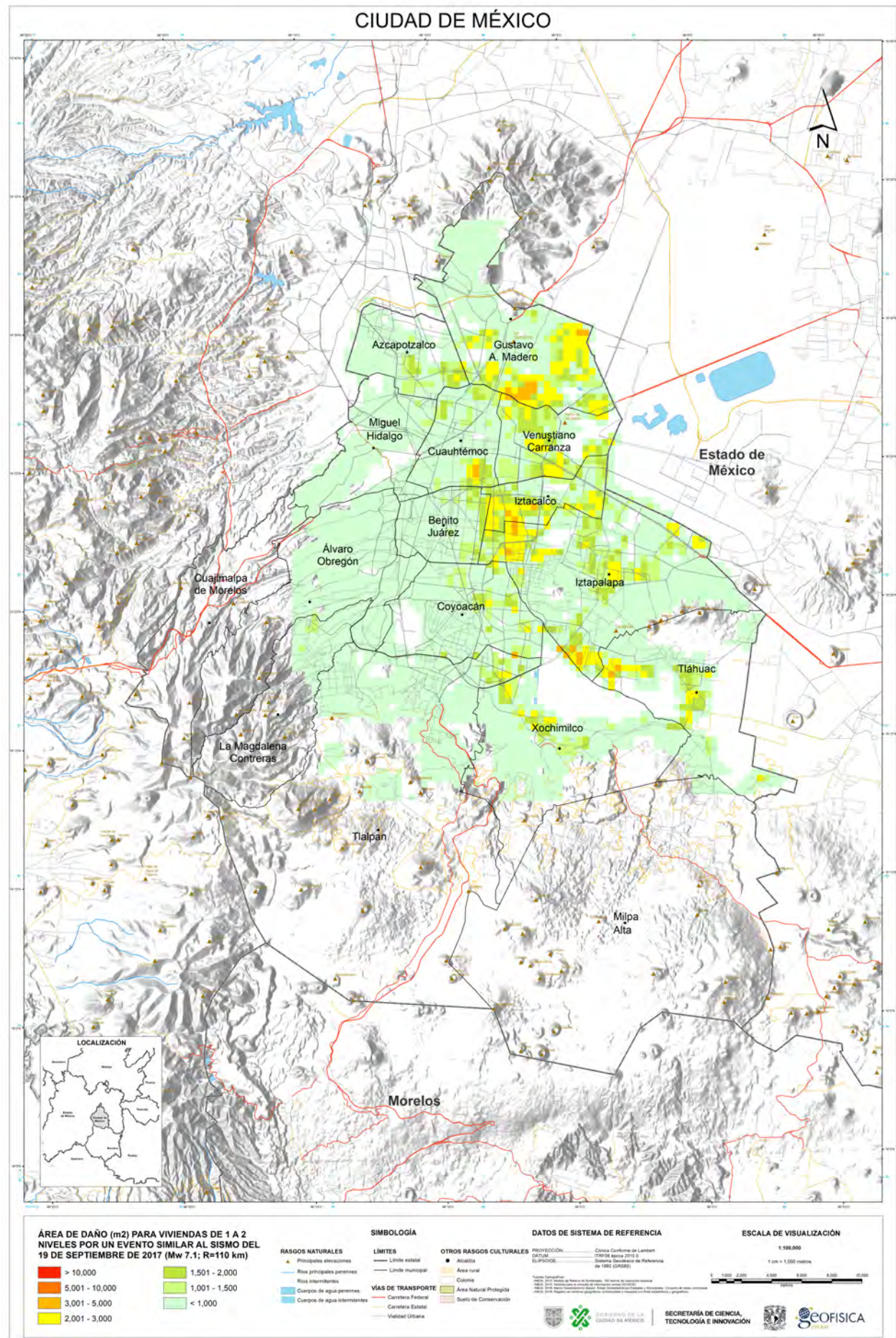
Map 44. Social risk likelihood of ash fall.



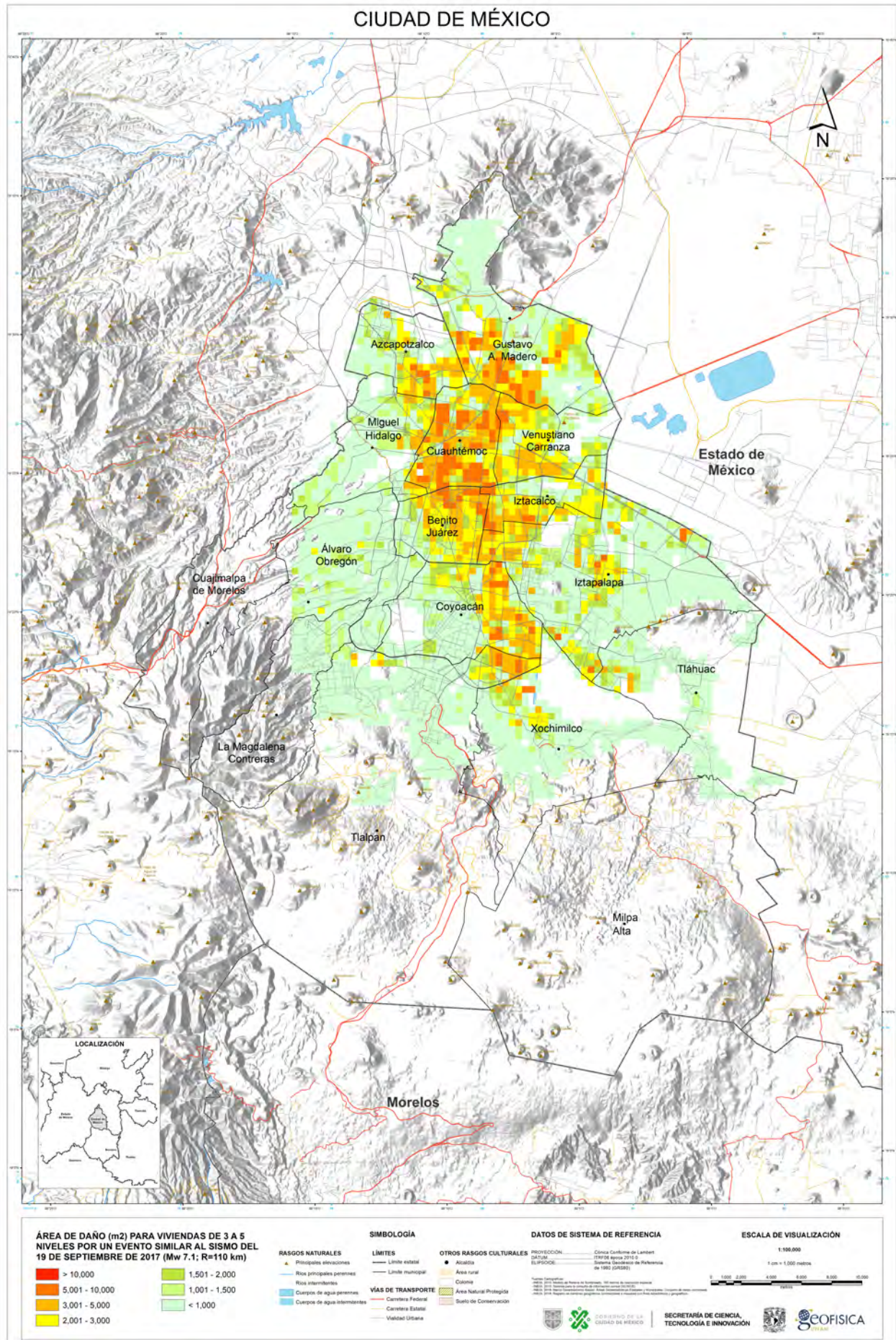
Map 45. Expected peak ground acceleration (PGA) (g) from an event like the 19 September 2017, earthquake (Mw 7.1; R=110 km).



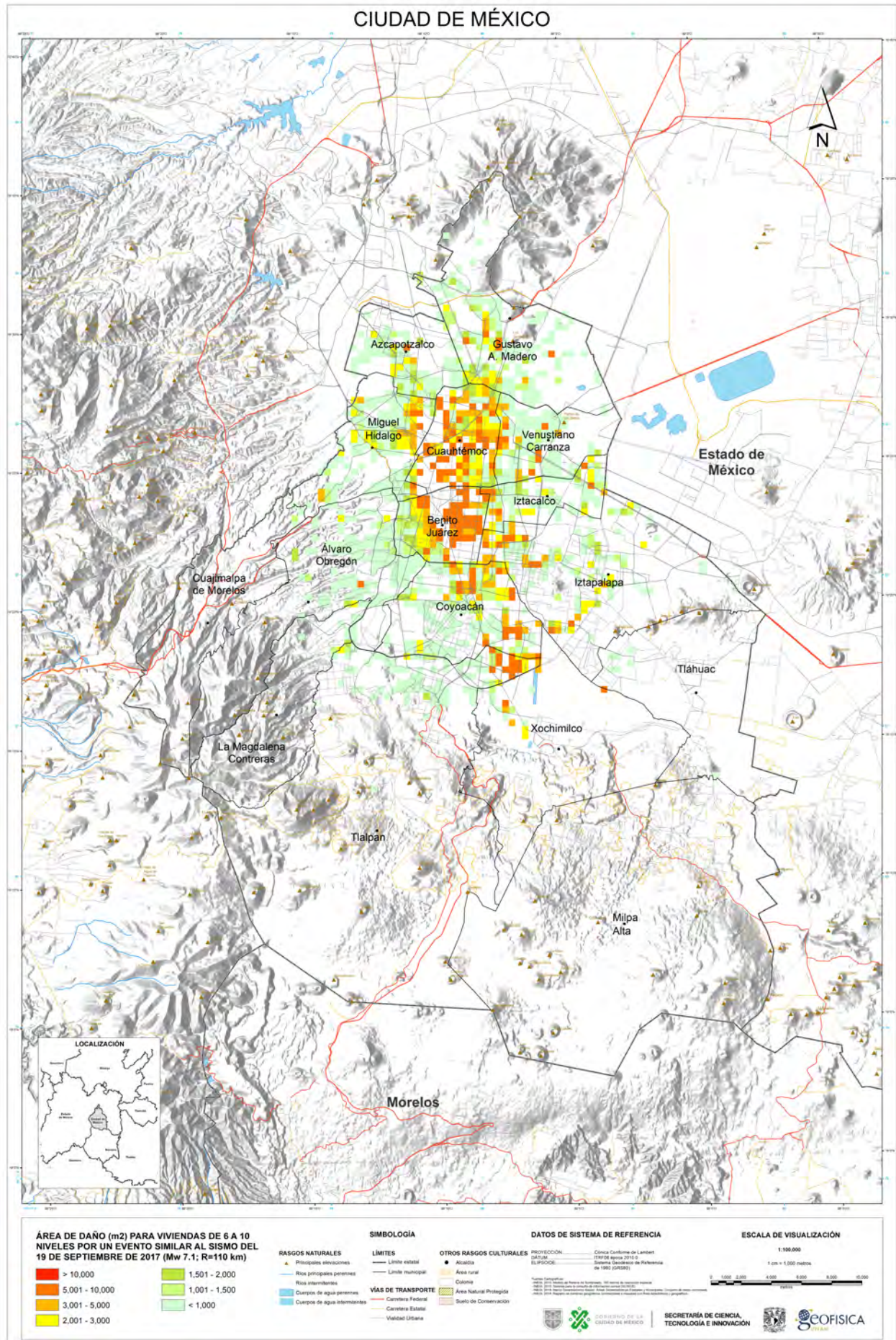
Map 46. Damage area (m²) for constructions between 1-2 stories from an event like the 19 September 2017, earthquake (Mw 7.1; R=110 km).



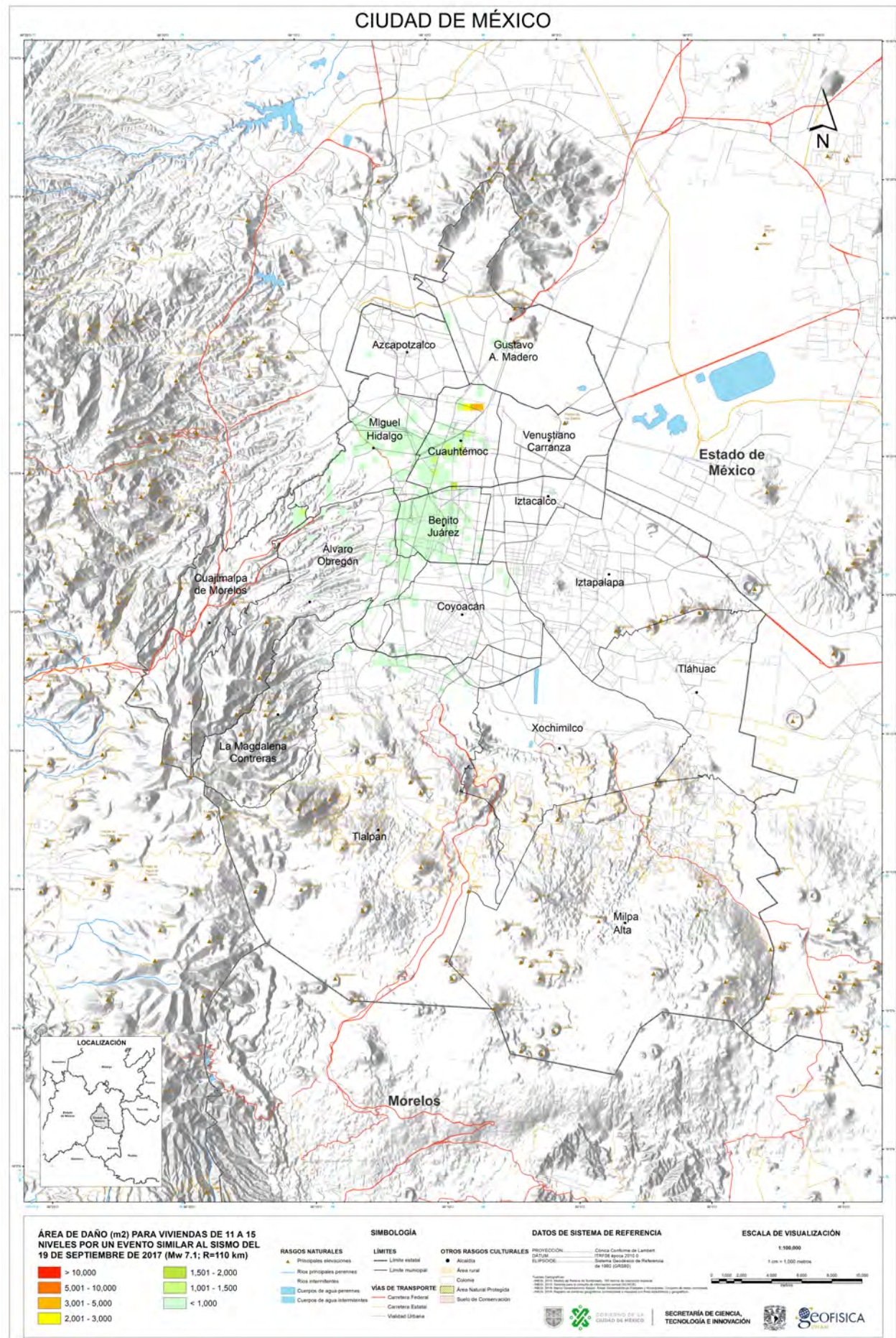
Map 47. Damage area (m²) for constructions between 3-5 stories from an event like the 19 September 2017, earthquake (Mw 7.1; R=110 km).



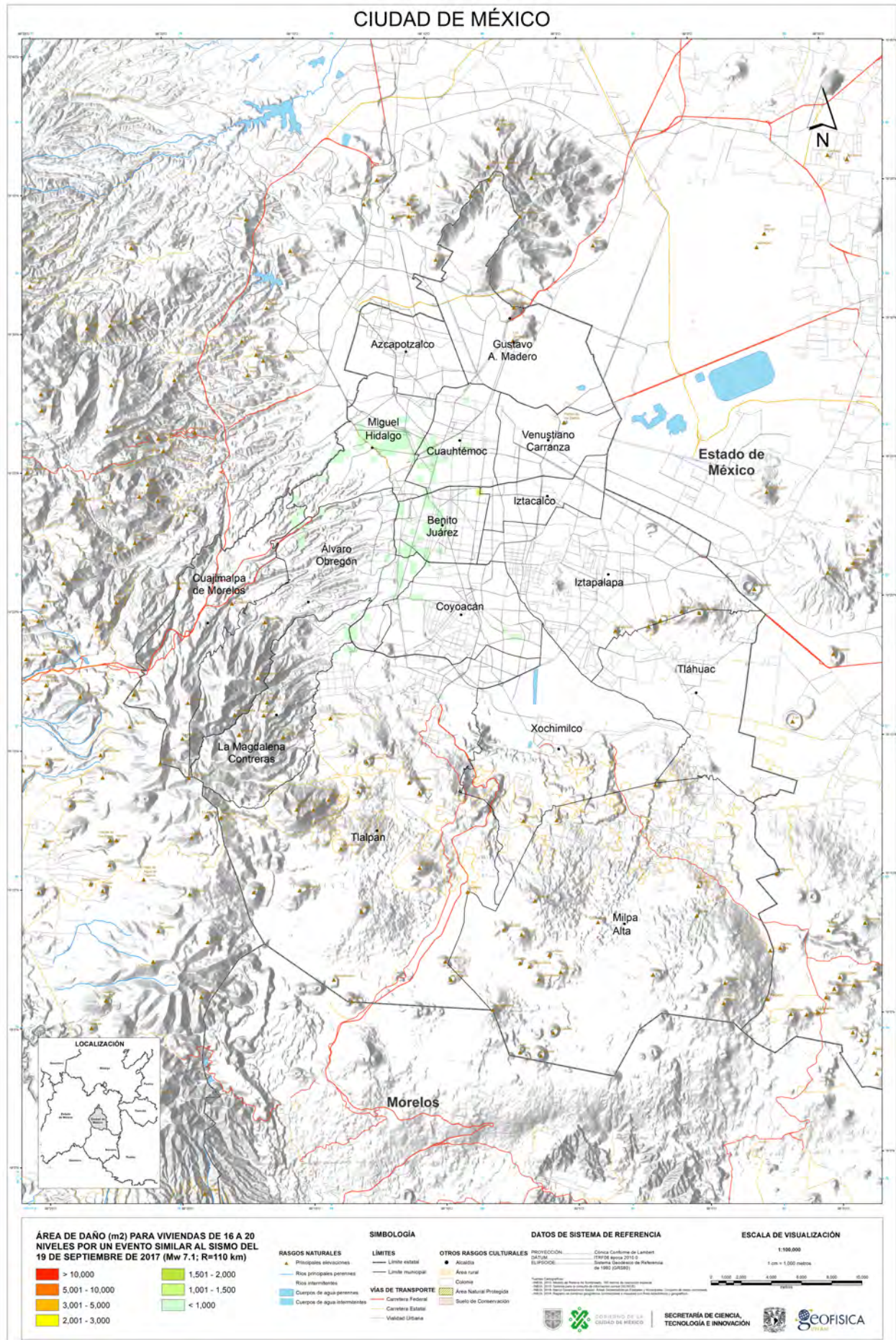
Map 48. Damage area (m²) for constructions between 6-10 stories from an event like the 19 September 2017, earthquake (Mw 7.1; R=110 km).



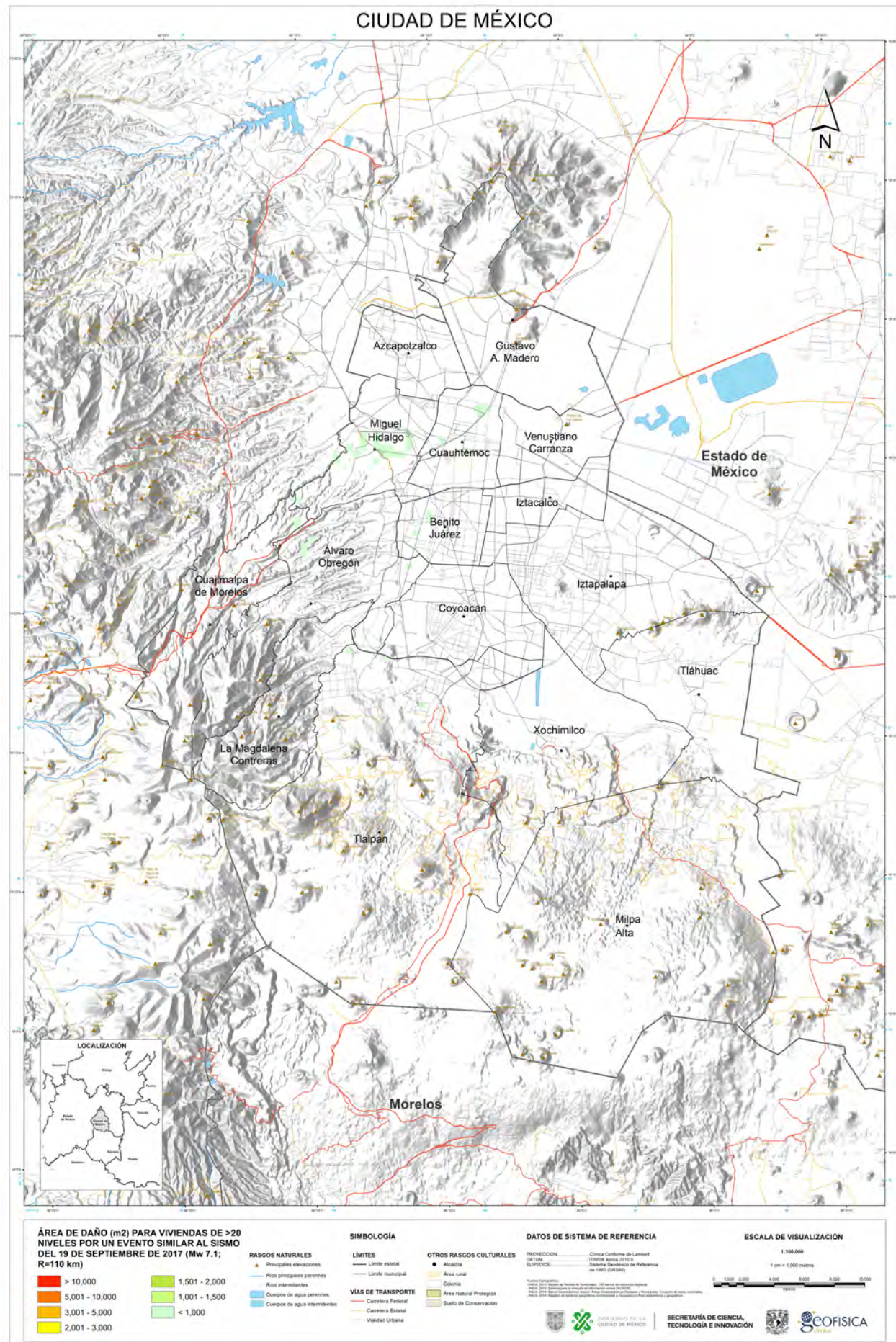
Map 49. Damage area (m²) for constructions between 11-15 stories from an event like the 19 September 2017, earthquake (Mw 7.1; R=110 km).



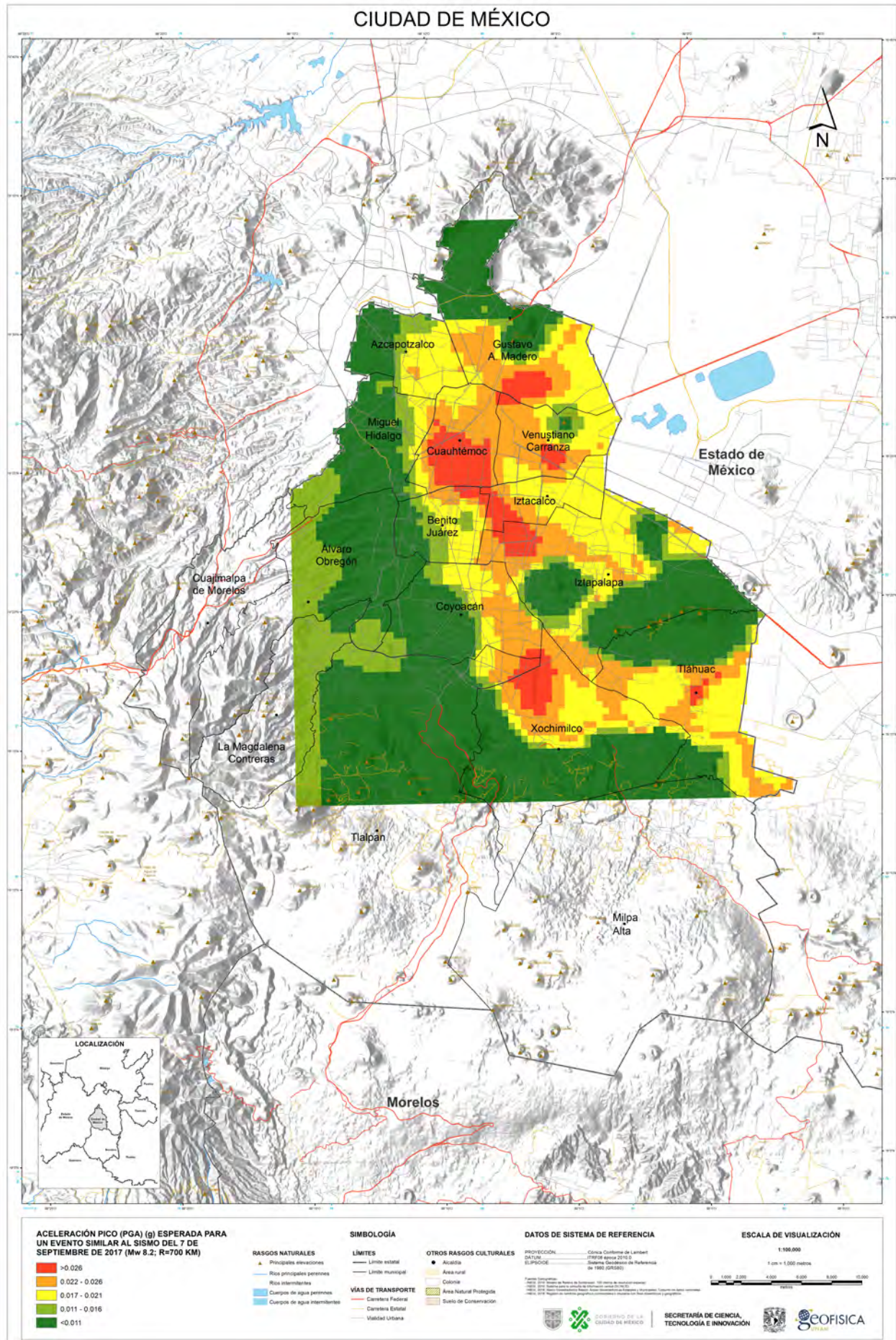
Map 50. Damage area (m²) for constructions between 16-20 stories from an event like the 19 September 2017, earthquake (Mw 7.1; R=110 km).



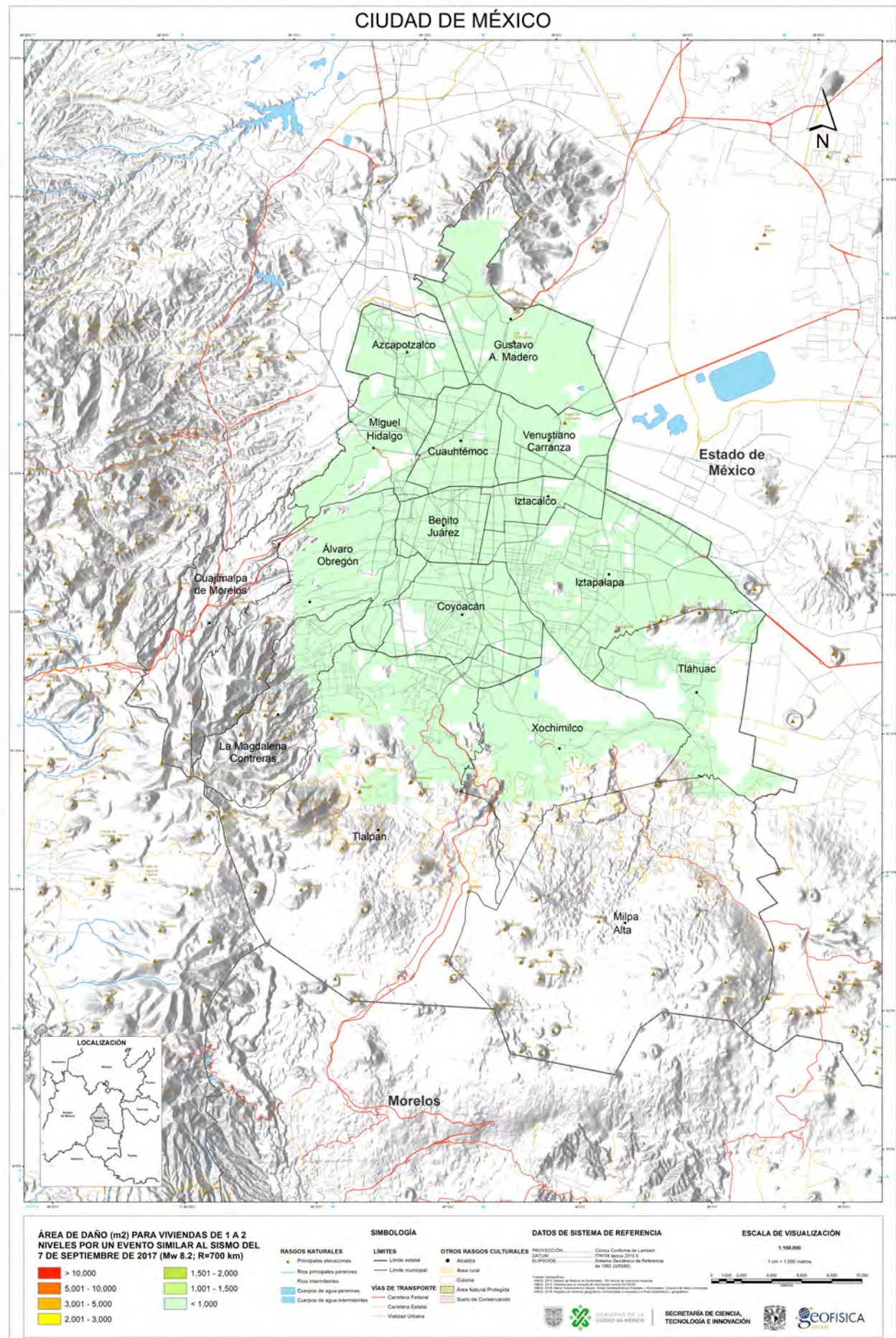
Map 51. Damage area (m²) for constructions of >20 stories from an event like the 19 September 2017, earthquake (Mw 7.1; R=110 km).



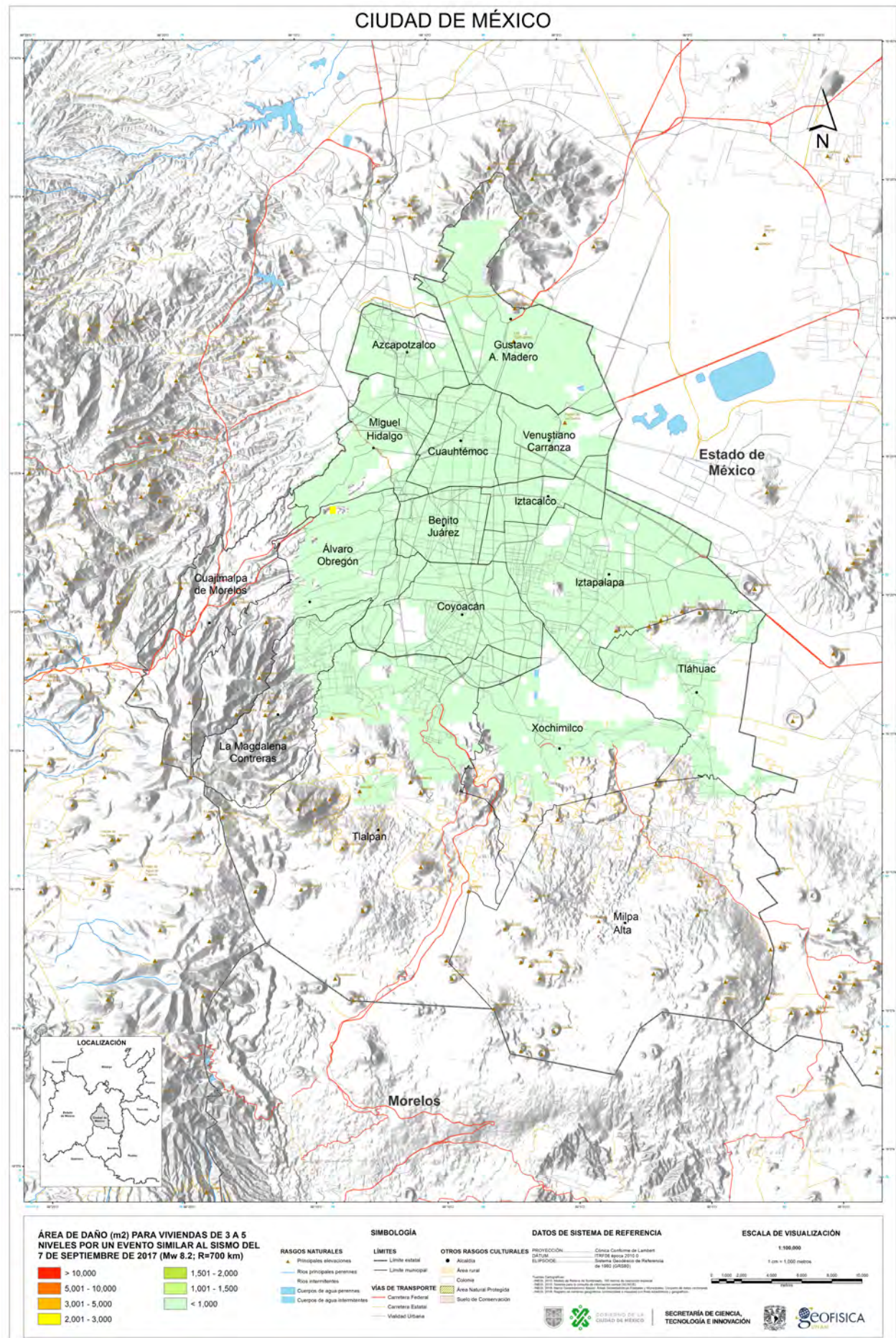
Map 52. Expected peak ground acceleration (PGA) (g) from an event like the 7 September 2017, earthquake (Mw 8.2; R=700 km).



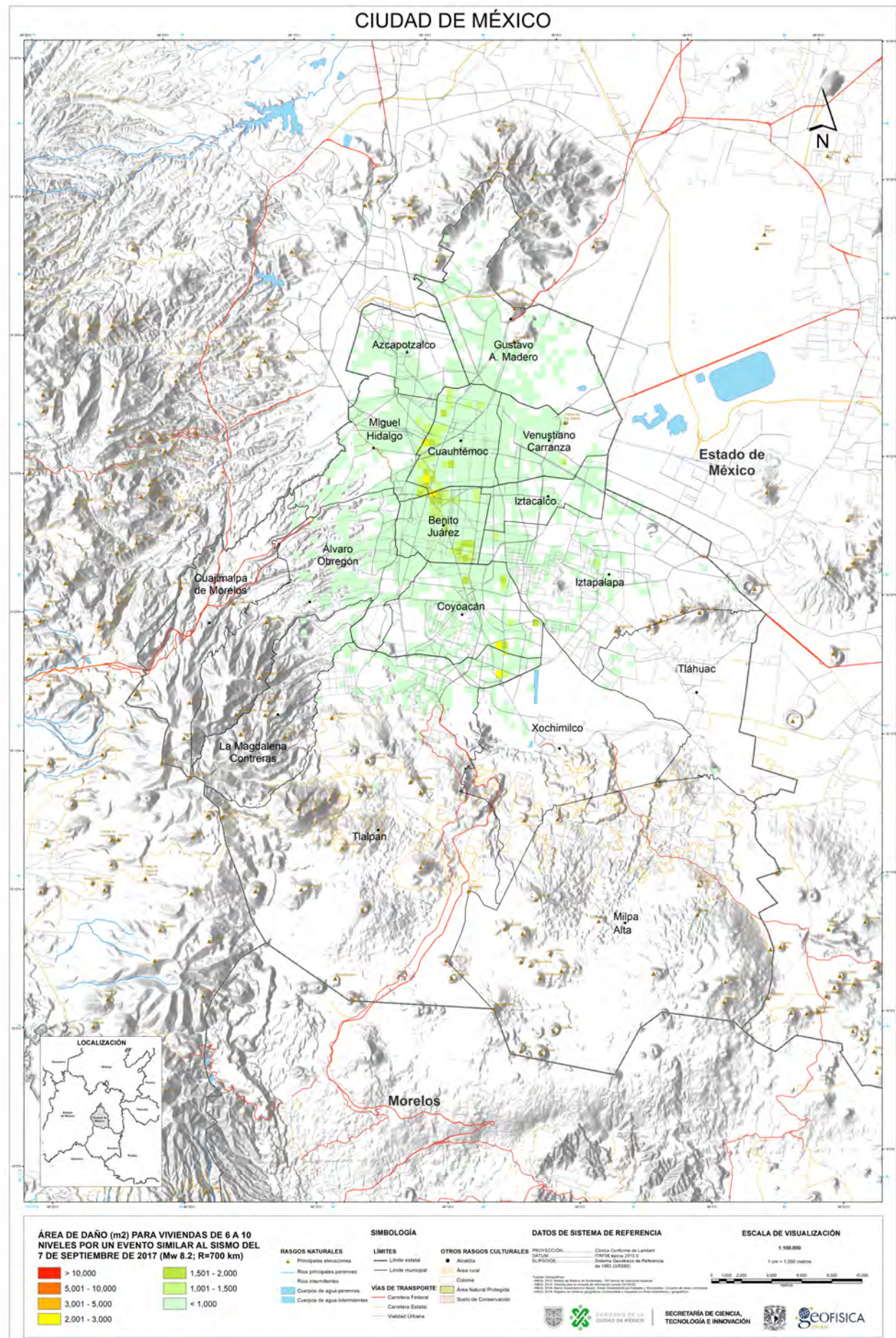
Map 53. Damage area (m²) for constructions between 1-2 stories from an event like the 7 September 2017, earthquake (Mw 8.2; R=700 km).



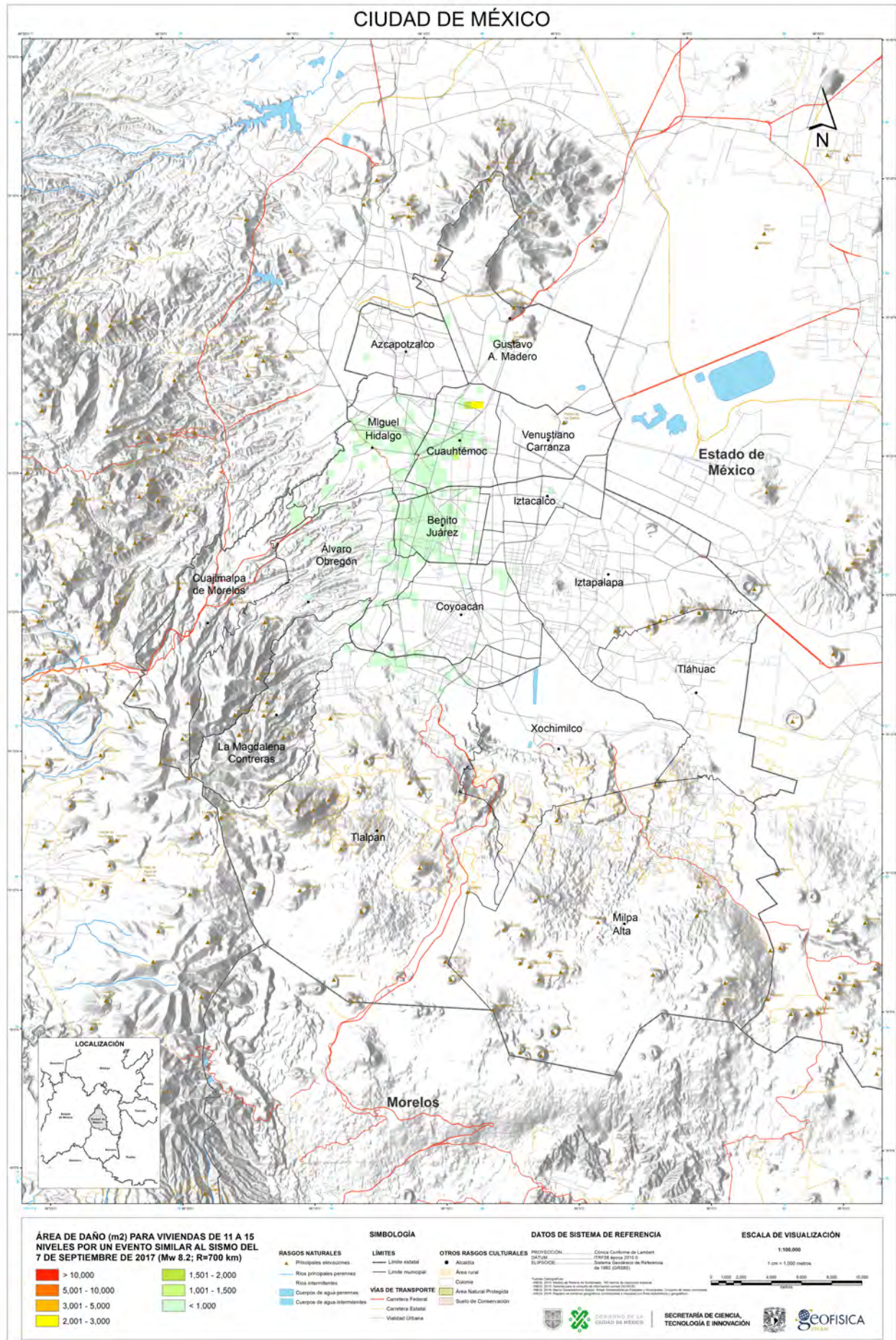
Map 54. Damage area (m²) for constructions between 3-5 stories from an event like the 7 September 2017, earthquake (Mw 8.2; R=700 km).



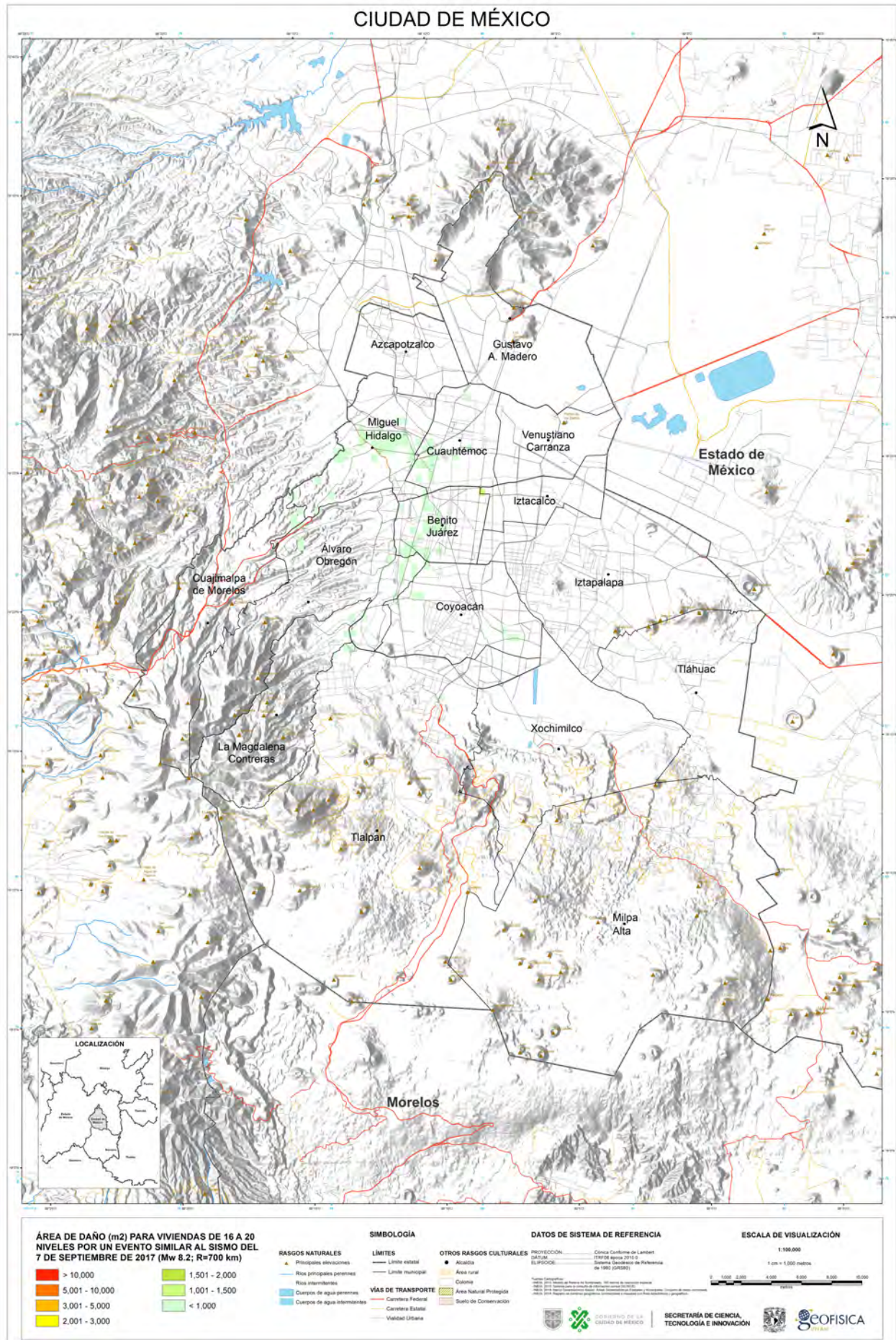
Map 55. Damage area (m²) for constructions between 6-10 stories from an event like the 7 September 2017, earthquake (Mw 8.2; R=700 km).



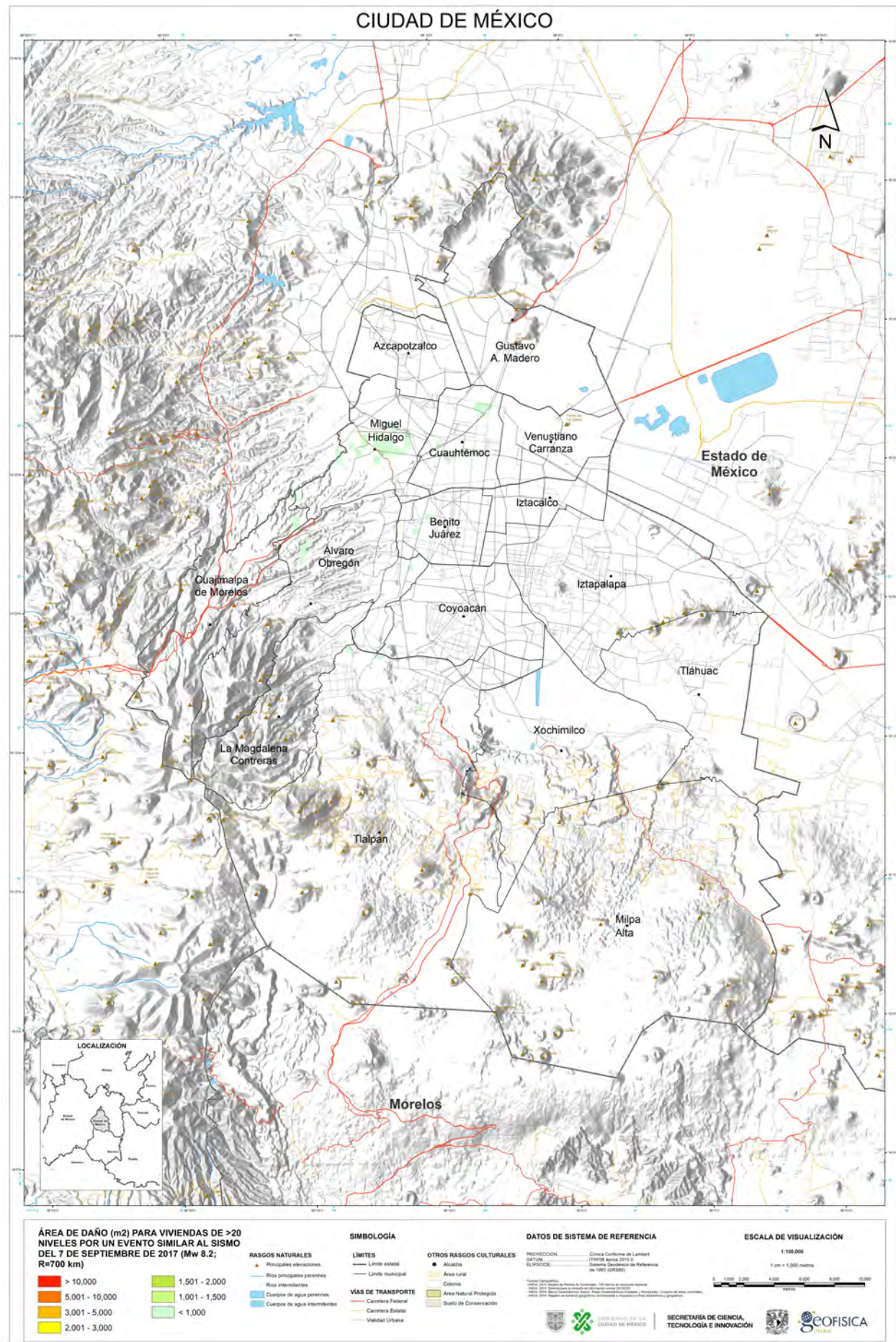
Map 56. Damage area (m²) for constructions between 11-15 stories from an event like the 7 September 2017, earthquake (Mw 8.2; R=700 km).



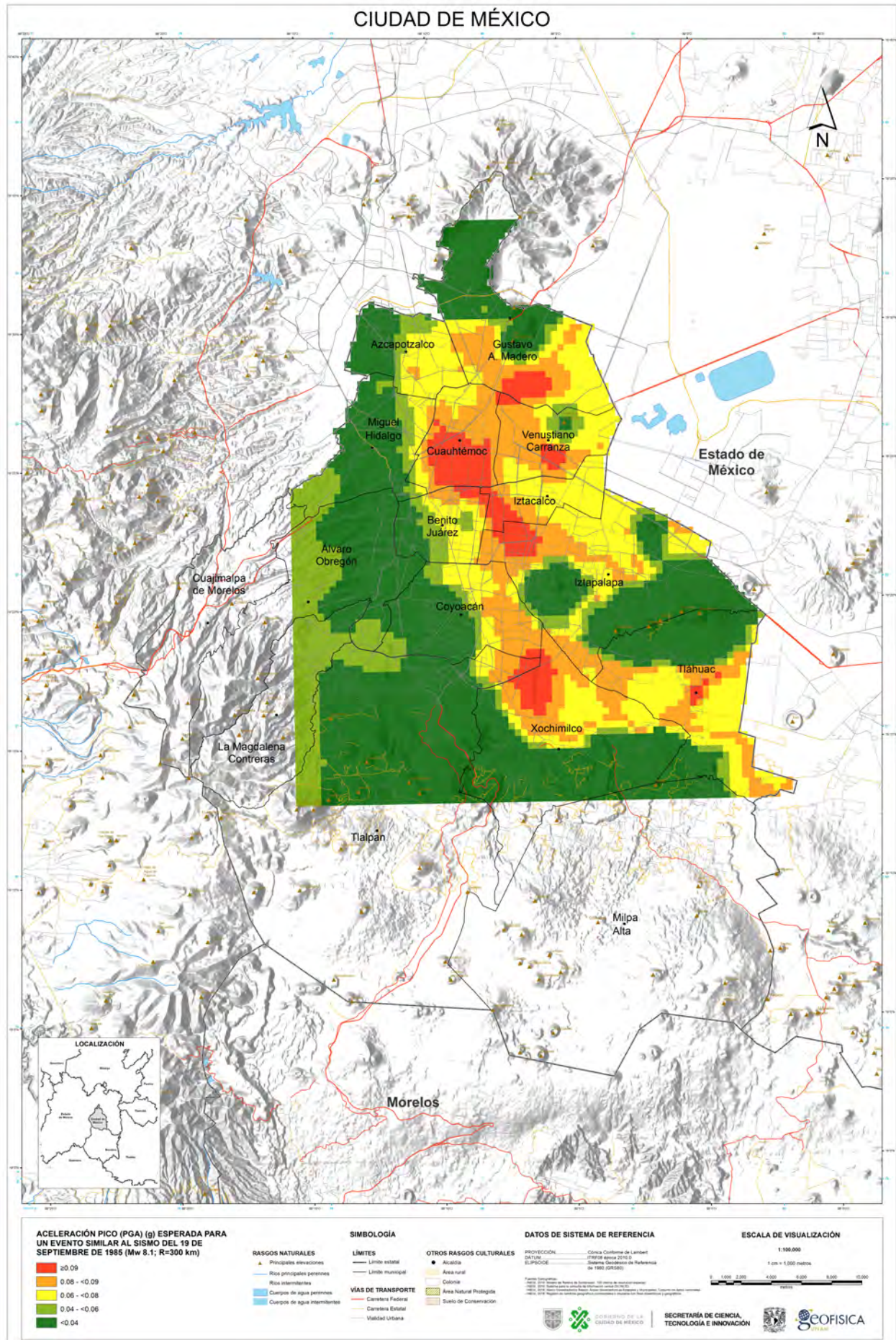
Map 57. Damage area (m²) for constructions between 16-20 stories from an event like the 7 September 2017, earthquake (Mw 8.2; R=700 km).



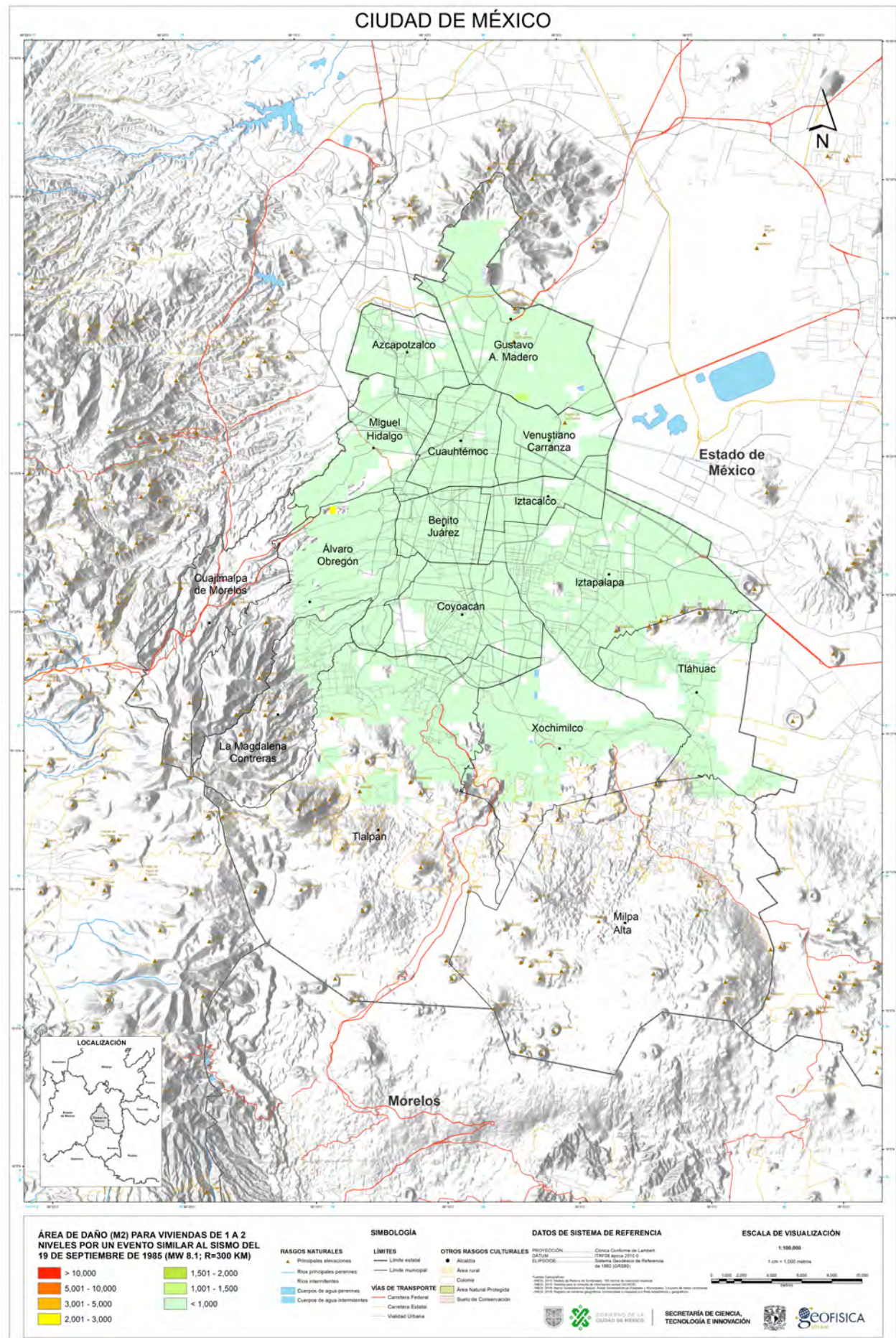
Map 58. Damage area (m²) for constructions of >20 stories from an event like the 7 September 2017, earthquake (Mw 8.2; R=700 km).



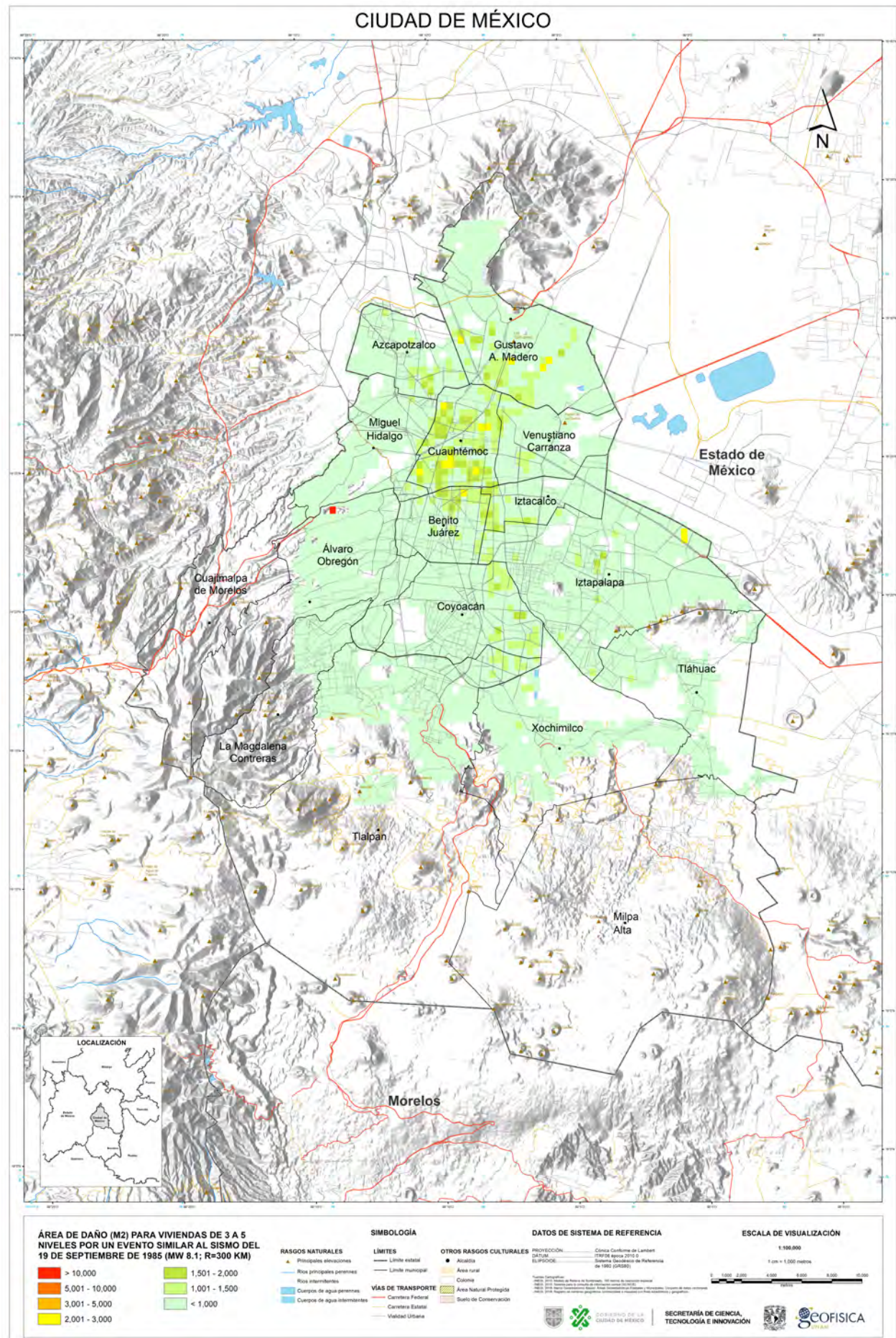
Map 59. Expected peak ground acceleration (PGA) (g) from an event like the 19 September 1985, earthquake (Mw 8.1; R=300 km).



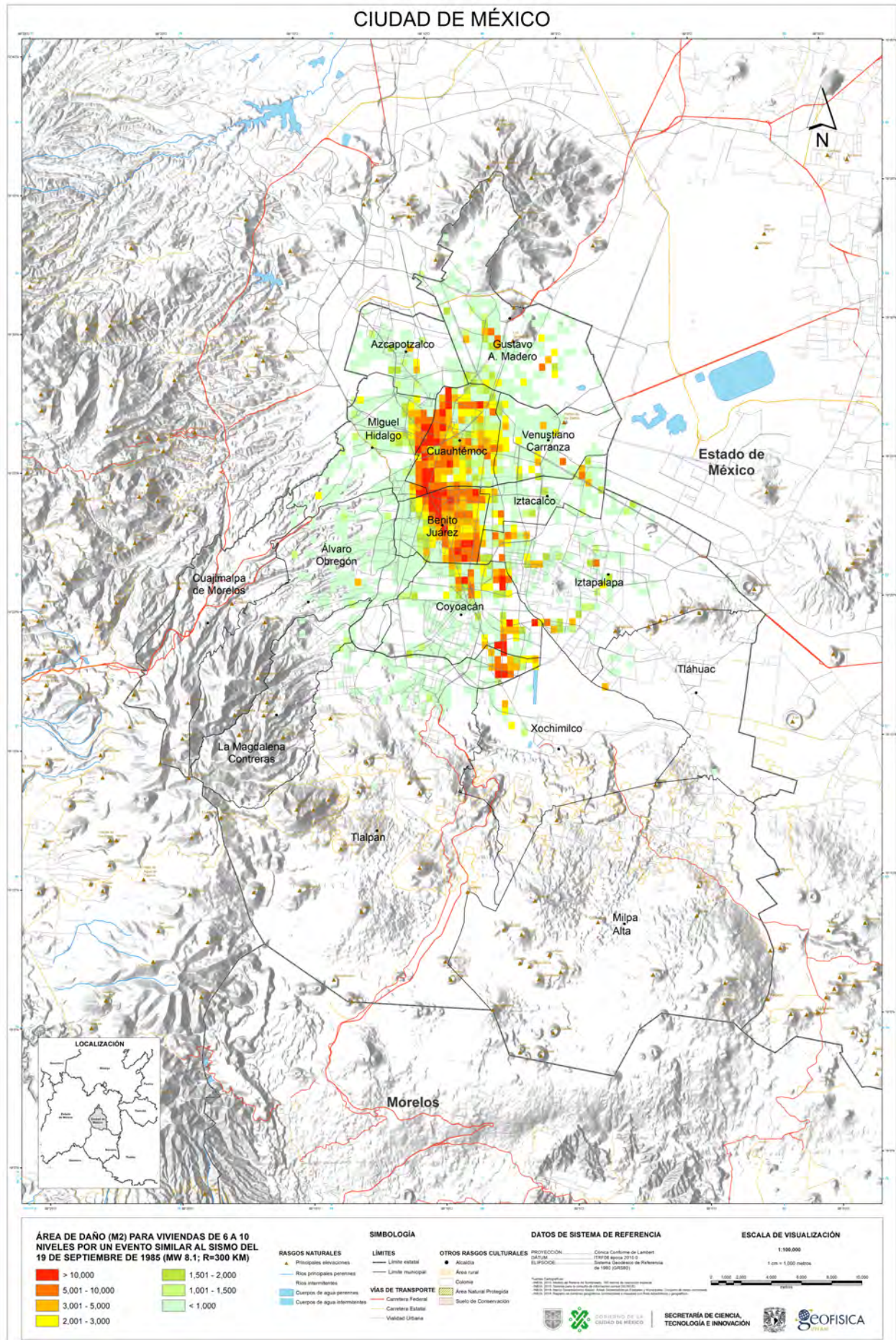
Map 60. Damage area (m^2) for constructions between 1-2 stories from an event like the 19 September 1985, earthquake (M_w 8.1; $R=300$ km).



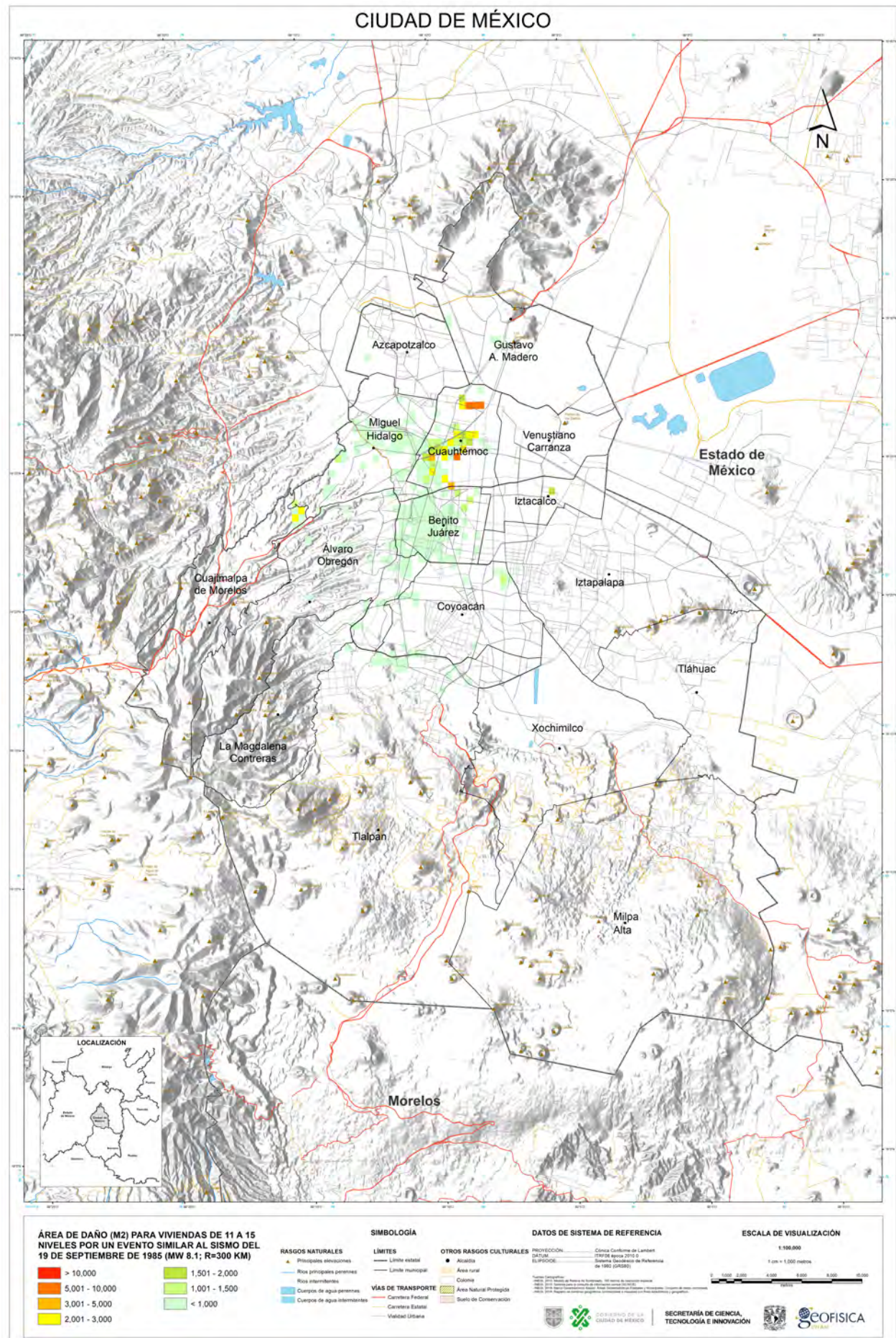
Map 61. Damage area (m^2) for constructions between 3-5 stories from an event like the 19 September 1985, earthquake (M_w 8.1; $R=300$ km).



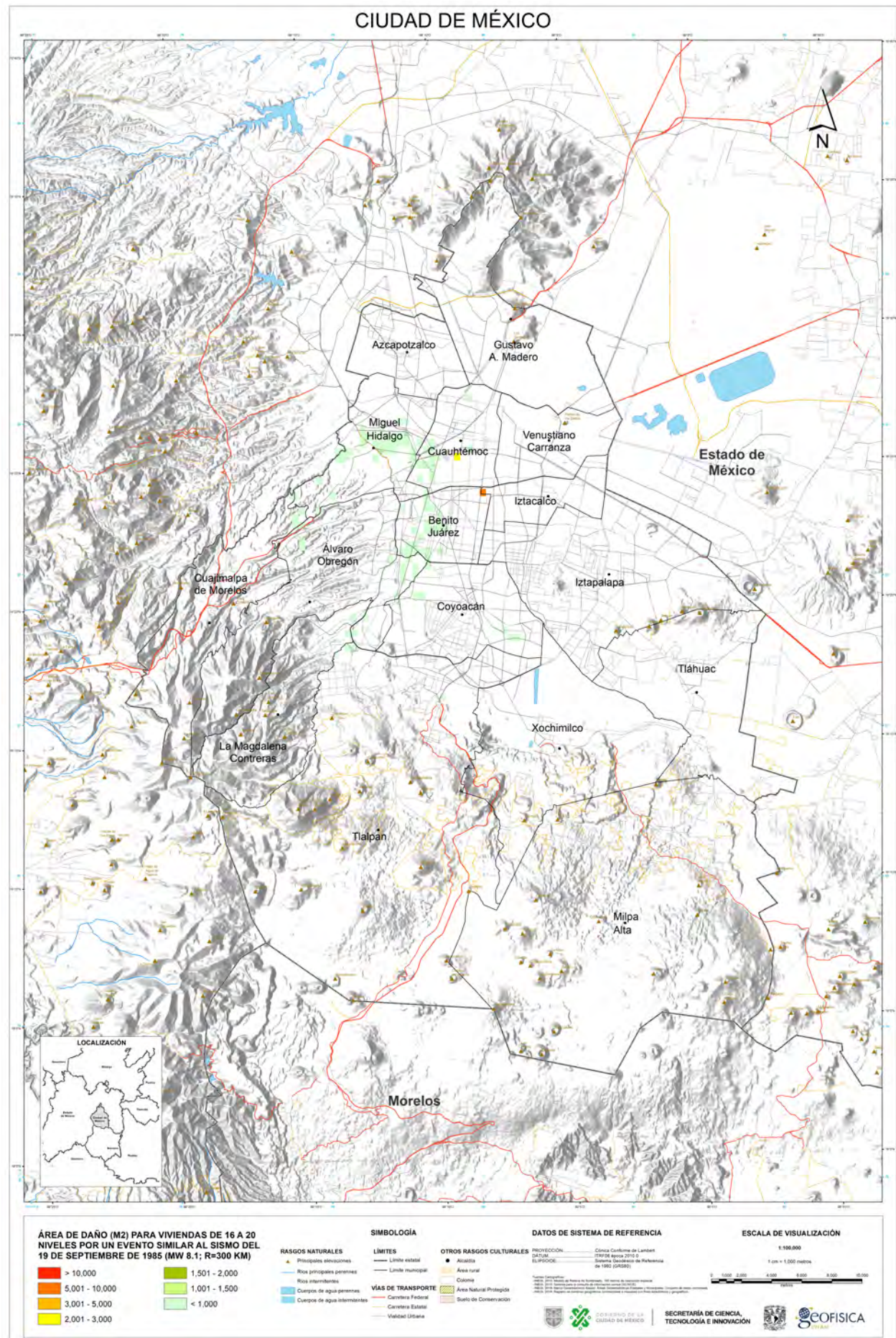
Map 62. Damage area (m²) for constructions between 6-10 stories from an event like the 19 September 1985, earthquake (Mw 8.1; R=300 km).



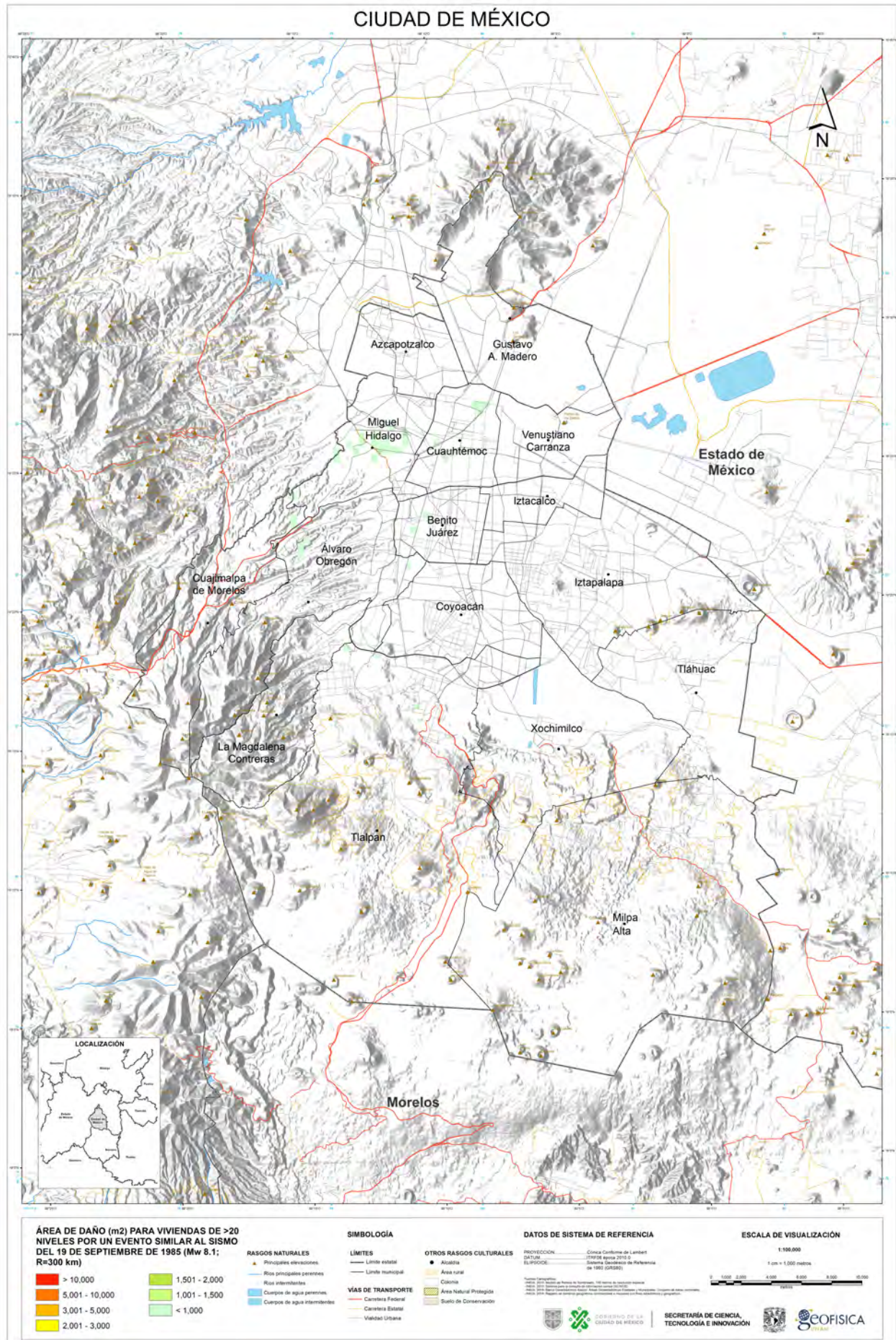
Map 63. Damage area (m²) for constructions between 11-15 stories from an event like the 19 September 1985, earthquake (Mw 8.1; R=300 km).



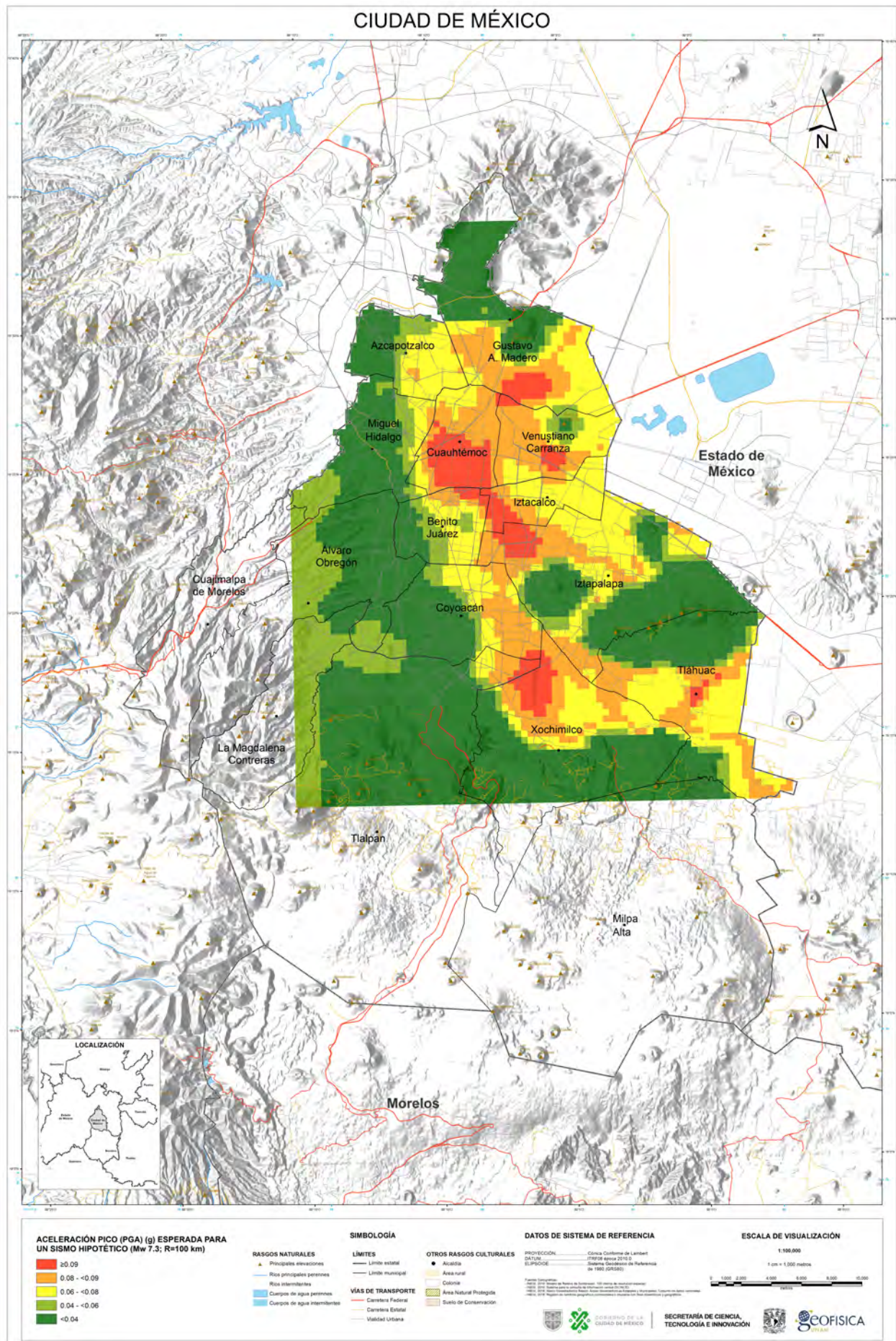
Map 64. Damage area (m²) for constructions between 16-20 stories from an event like the 19 September 1985, earthquake (Mw 8.1; R=300 km).



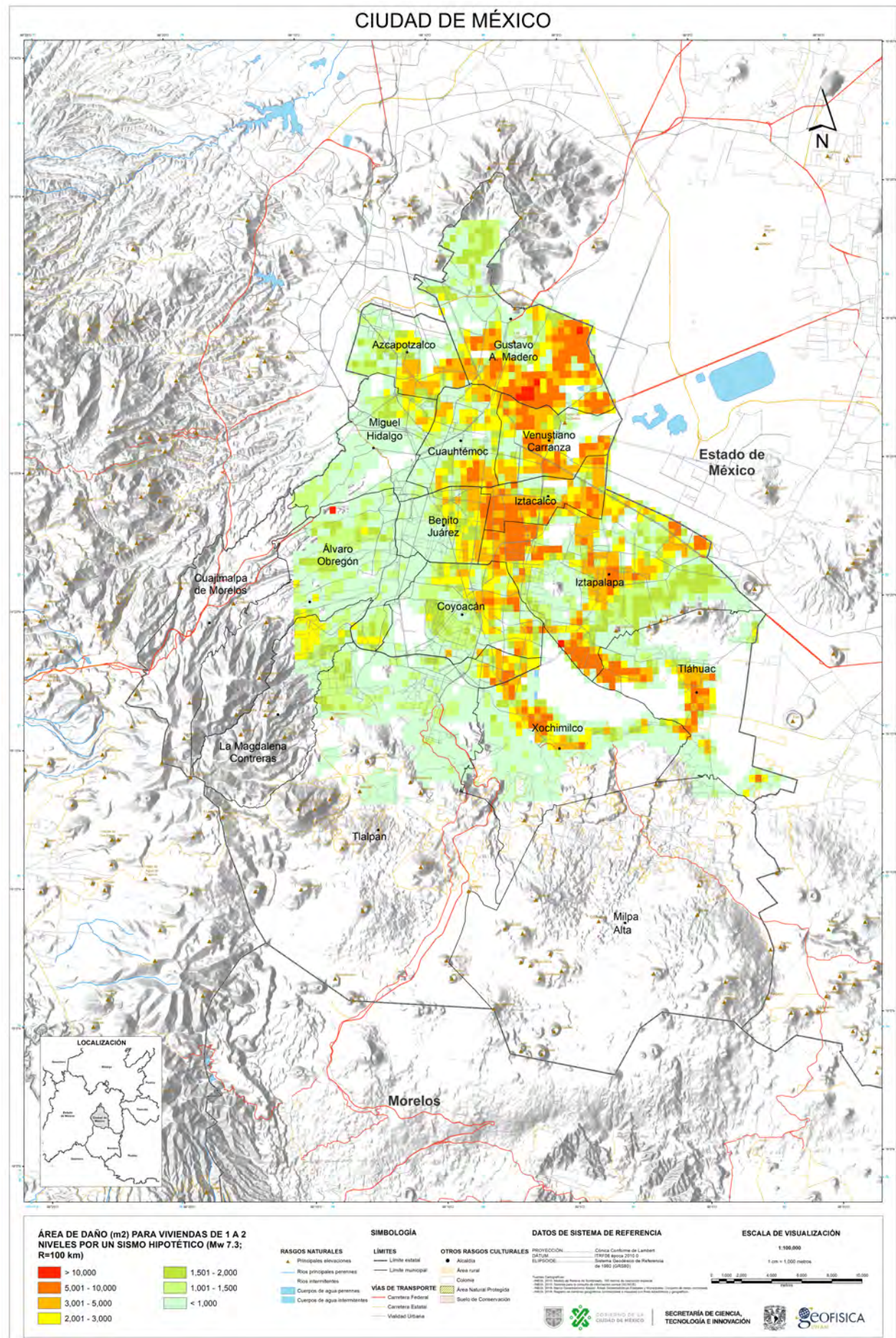
Map 65. Damage area (m²) for constructions of >20 stories from an event like the 19 September 1985, earthquake (Mw 8.1; R=300 km).



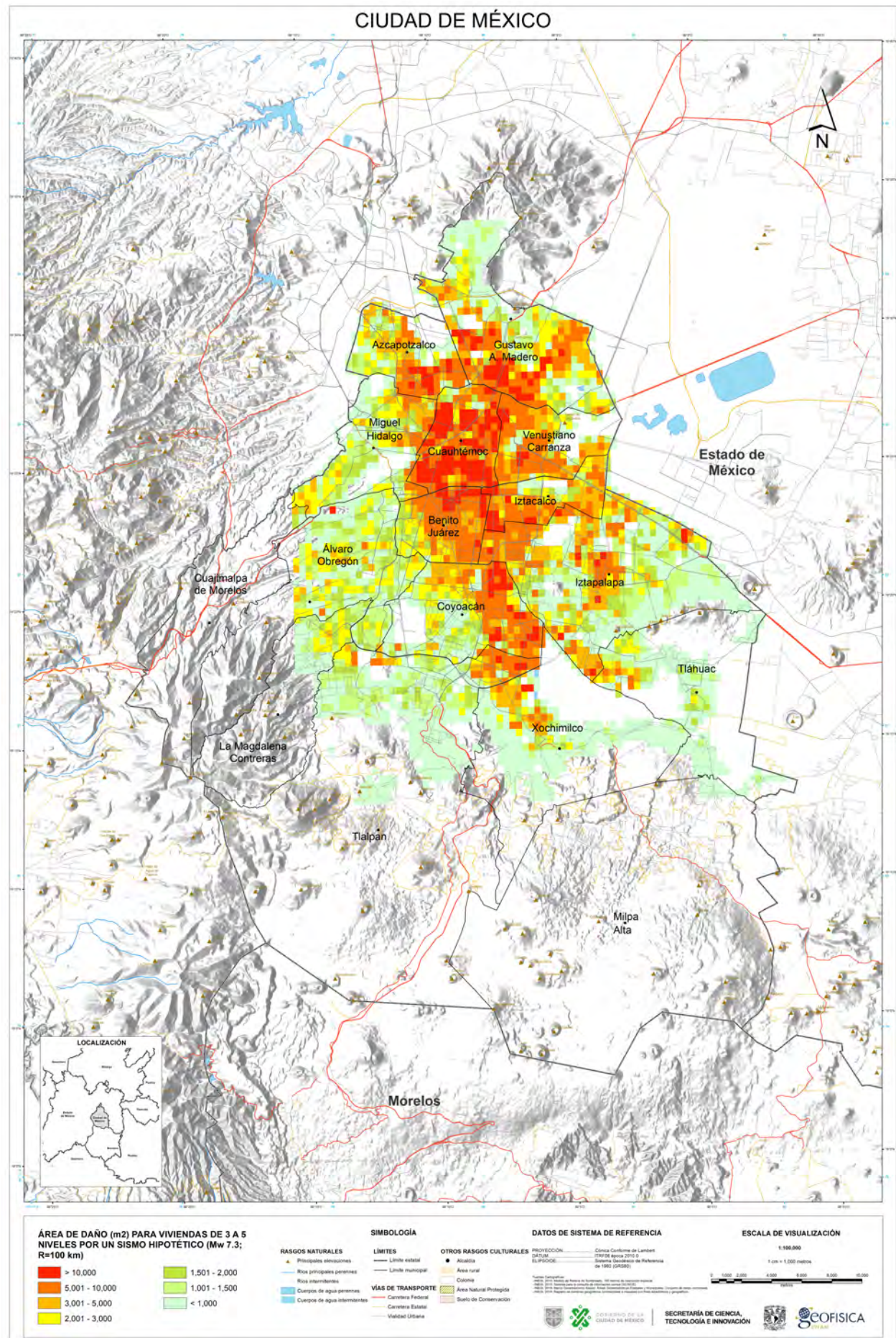
Map 66. Expected peak ground acceleration (PGA) (g) from a hypothetical earthquake (M_w 7.3; $R=100$ km).



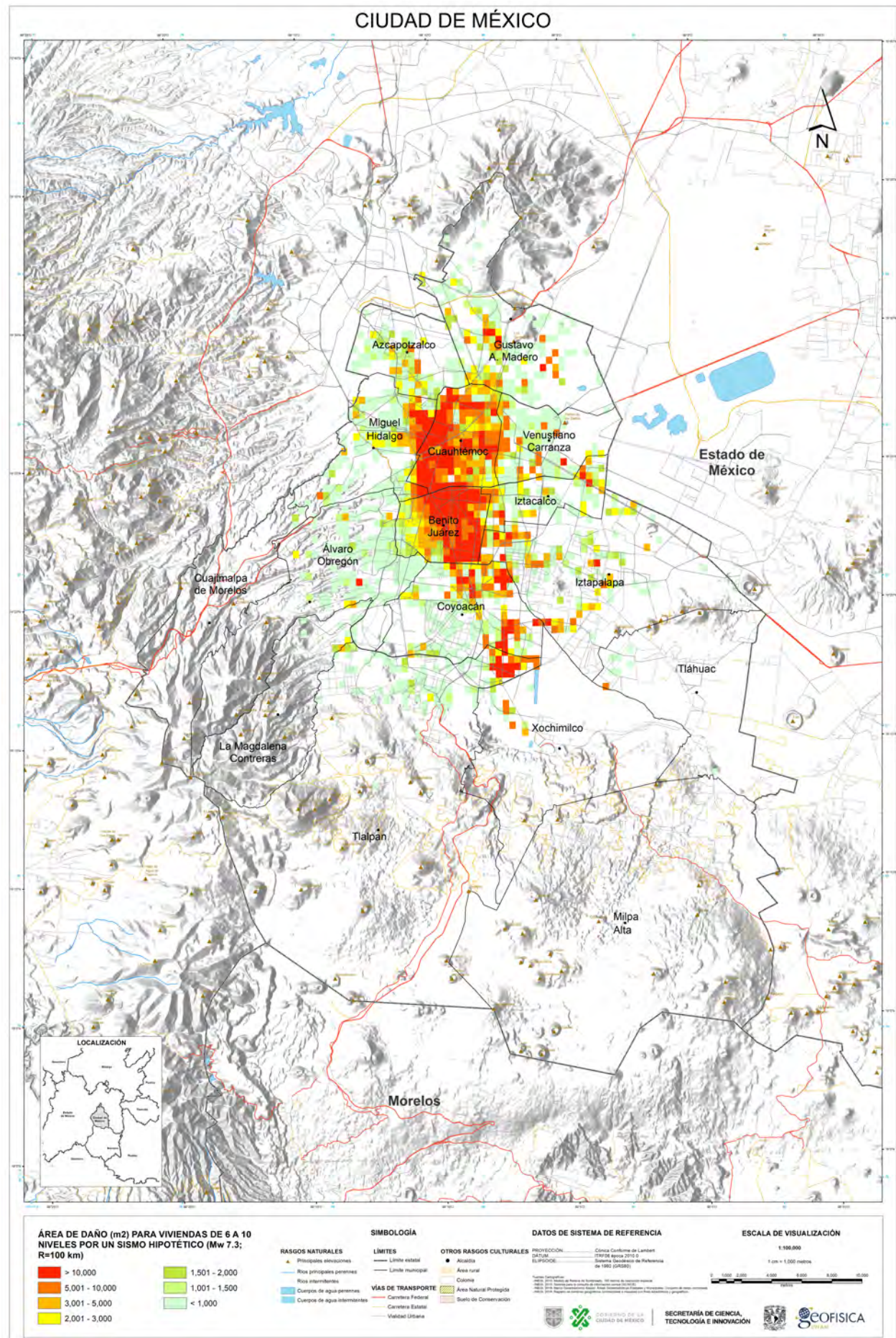
Map 67. Damage area (m²) for constructions between 1-2 stories from a hypothetical earthquake (Mw 7.3; R=100 km).



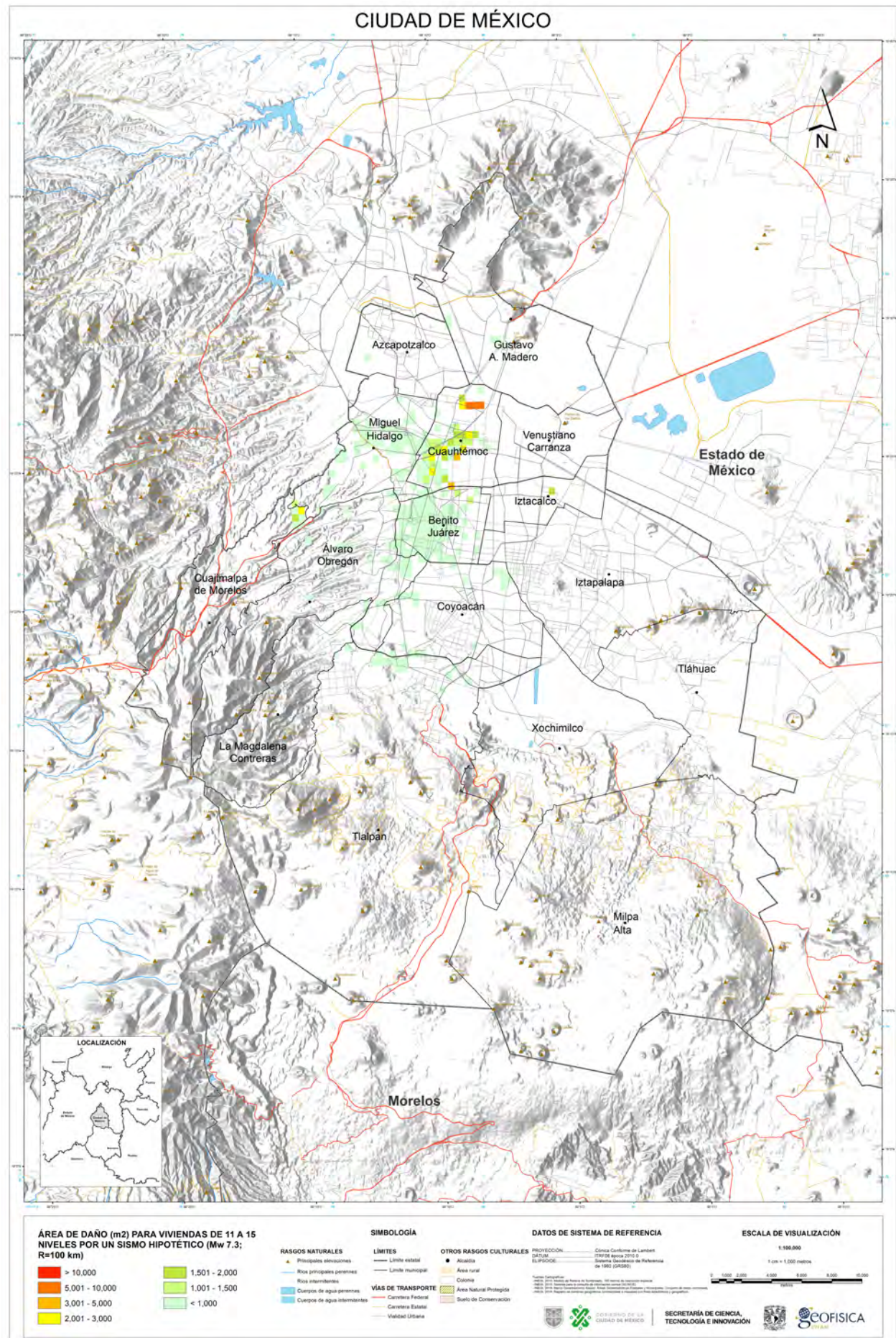
Map 68. Damage area (m²) for constructions between 3-5 stories from a hypothetical earthquake (Mw 7.3; R=100 km).



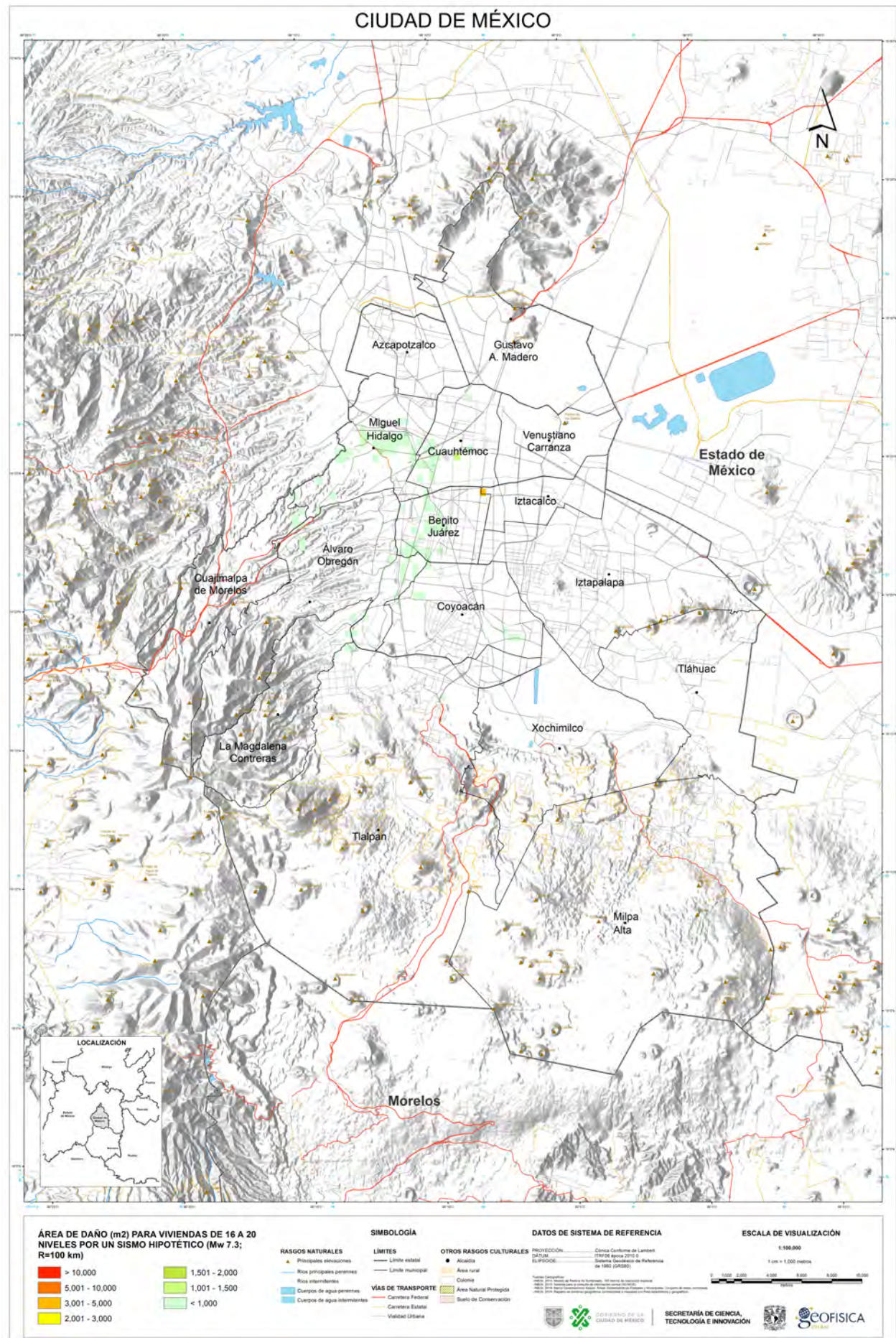
Map 69. Damage area (m²) for constructions between 6-10 stories from a hypothetical earthquake (Mw 7.3; R=100 km).



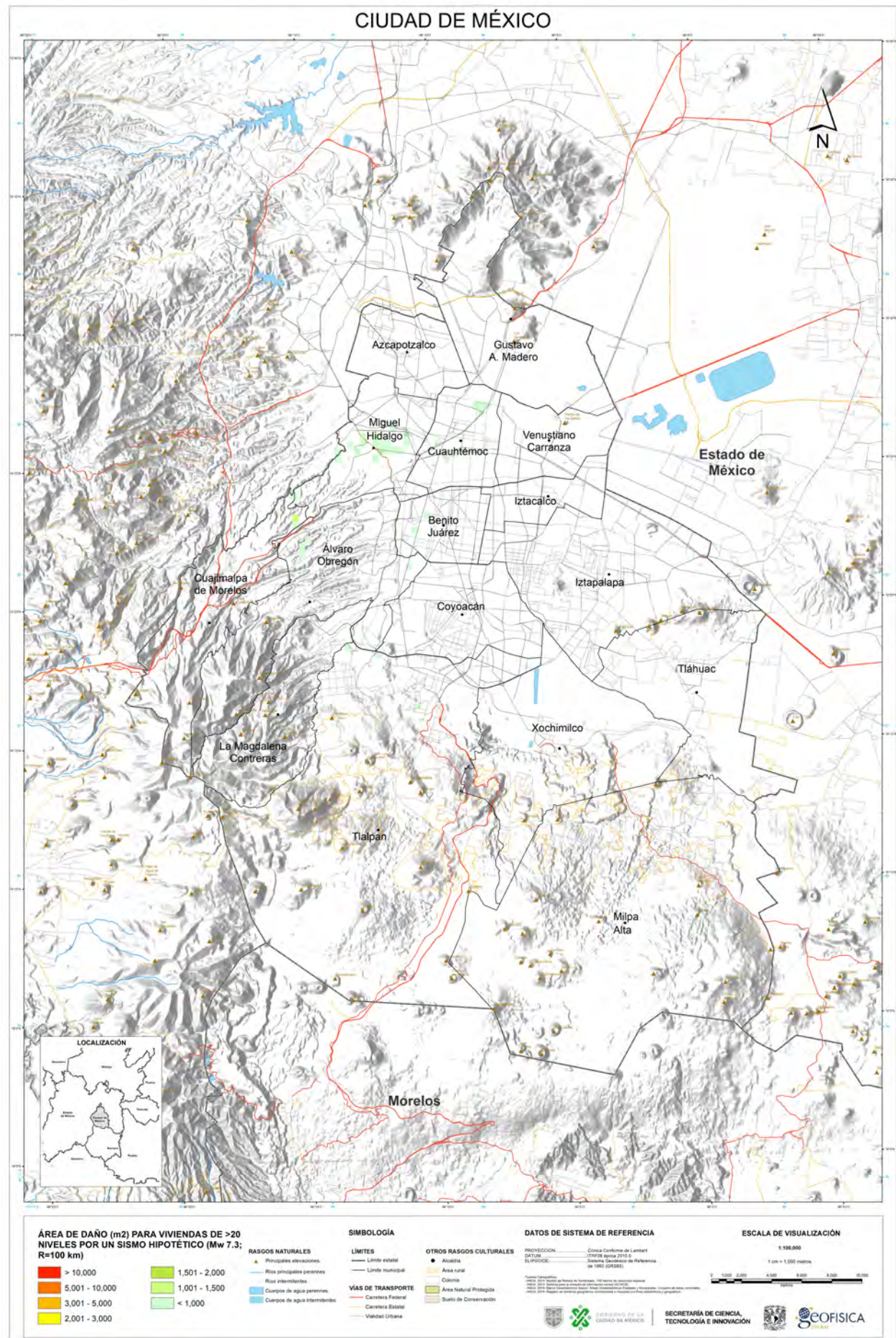
Map 70. Damage area (m²) for constructions between 11-15 stories from a hypothetical earthquake (Mw 7.3; R=100 km).



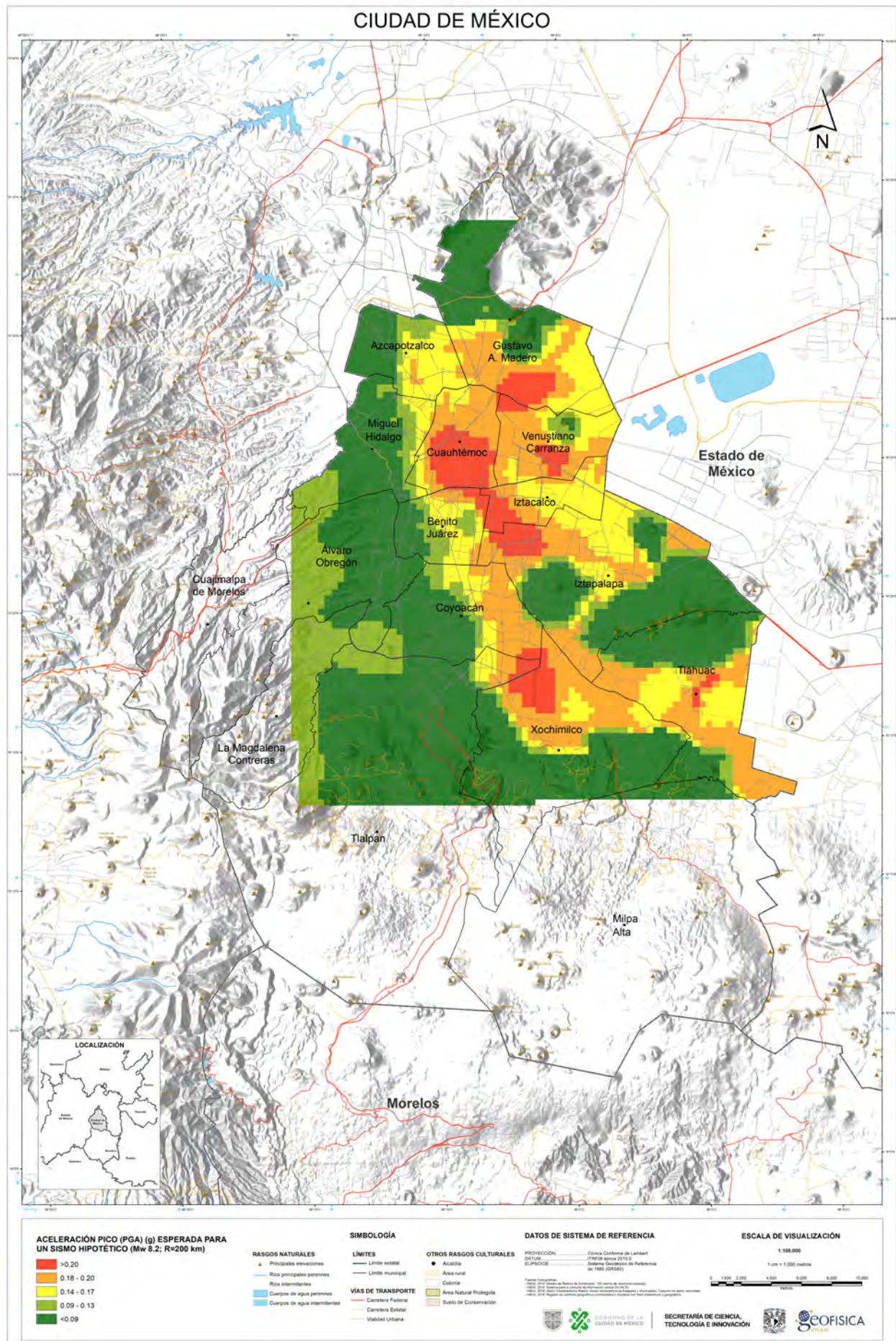
Map 71. Damage area (m²) for constructions between 16-20 stories from a hypothetical earthquake (Mw 7.3; R=100 km).



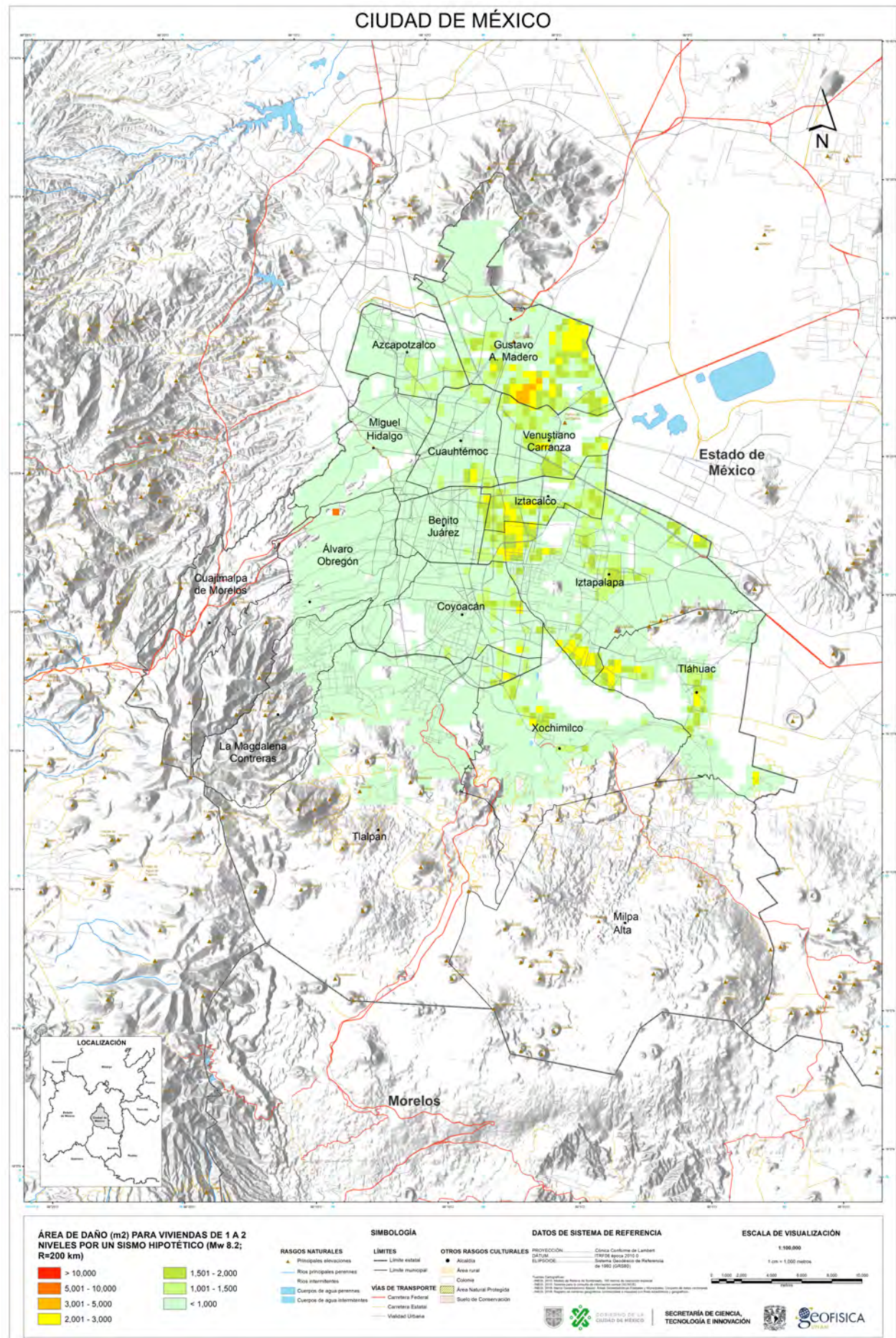
Map 72. Damage area (m²) for constructions of >20 stories from a hypothetical earthquake (Mw 7.3; R=100 km).



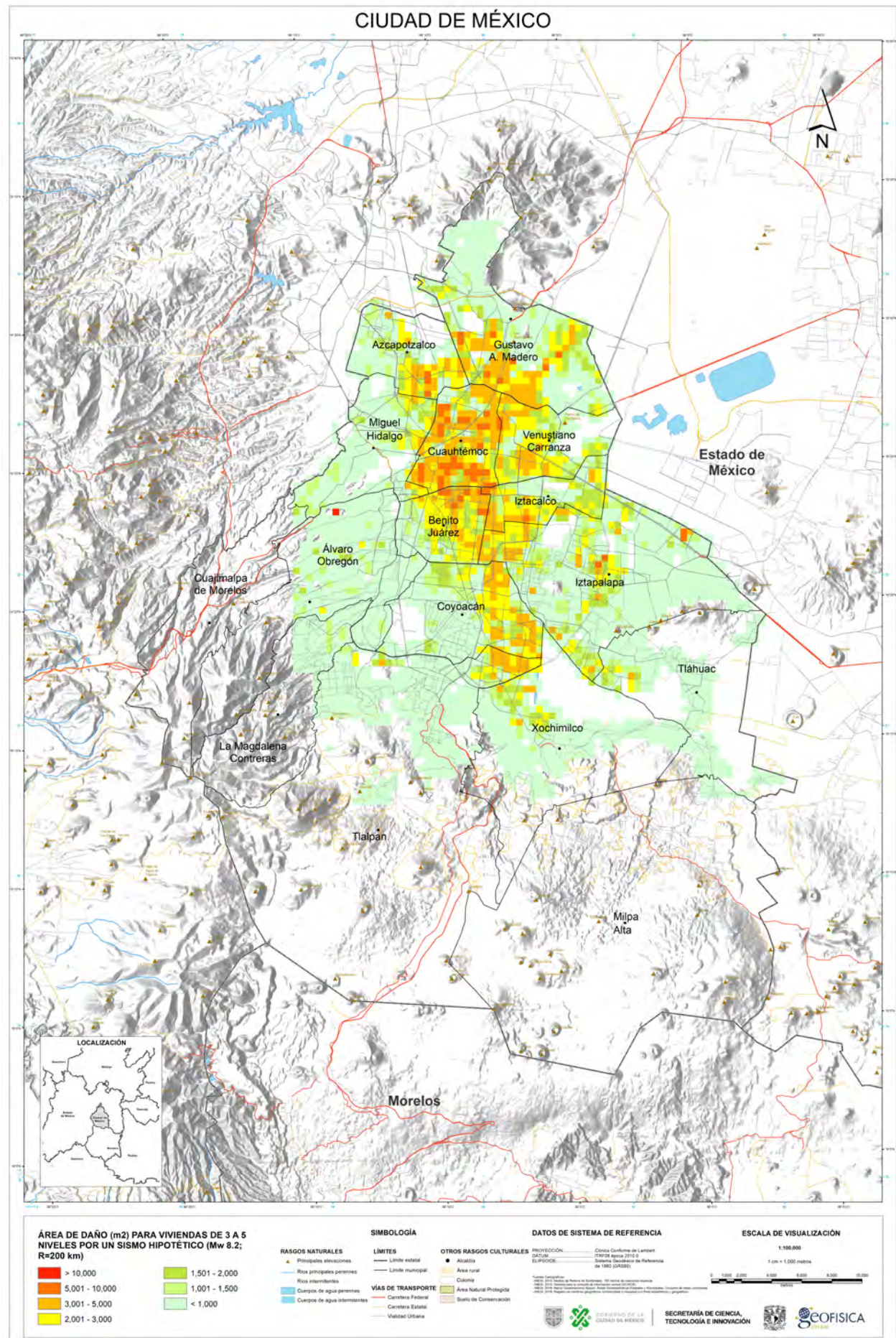
Map 73. Expected peak ground acceleration (PGA) (g) from a hypothetical earthquake (Mw 8.2; R=200 km).



Map 74. Damage area (m²) for constructions between 1-2 stories from a hypothetical earthquake (Mw 8.2; R=200 km).



Map 75. Damage area (m²) for constructions between 3-5 stories from a hypothetical earthquake (Mw 8.2; R=200 km).



CIUDAD DE MÉXICO

ÁREA DE DAÑO (m²) PARA VIVIENDAS DE 6 A 10 NIVELES POR UN SISMO HIPOTÉTICO (Mw 8.2; R=200 km)

LEGENDA:

- ÁREA DE DAÑO (m²):**
 - > 10,000
 - 5,001 - 10,000
 - 3,001 - 5,000
 - 2,001 - 3,000
 - 1,501 - 2,000
 - 1,001 - 1,500
 - < 1,000
- RASGOS NATURALES:**
 - Principales elevaciones
 - Rio principales perennes
 - Rio intermitentes
 - Cuerpos de agua perennes
 - Cuerpos de agua intermitentes
- SIMBOLOGÍA:**
 - LÍMITES:**
 - Límite estatal
 - Límite municipal
 - VÍAS DE TRANSPORTE:**
 - Carretera Federal
 - Carretera Estatal
 - Vialidad Urbana
 - OTROS RASGOS CULTURALES:**
 - Alcalde
 - Área rural
 - Colegio
 - Área Natural Protegida
 - Sitio de Conservación

DATOS DE SISTEMA DE REFERENCIA

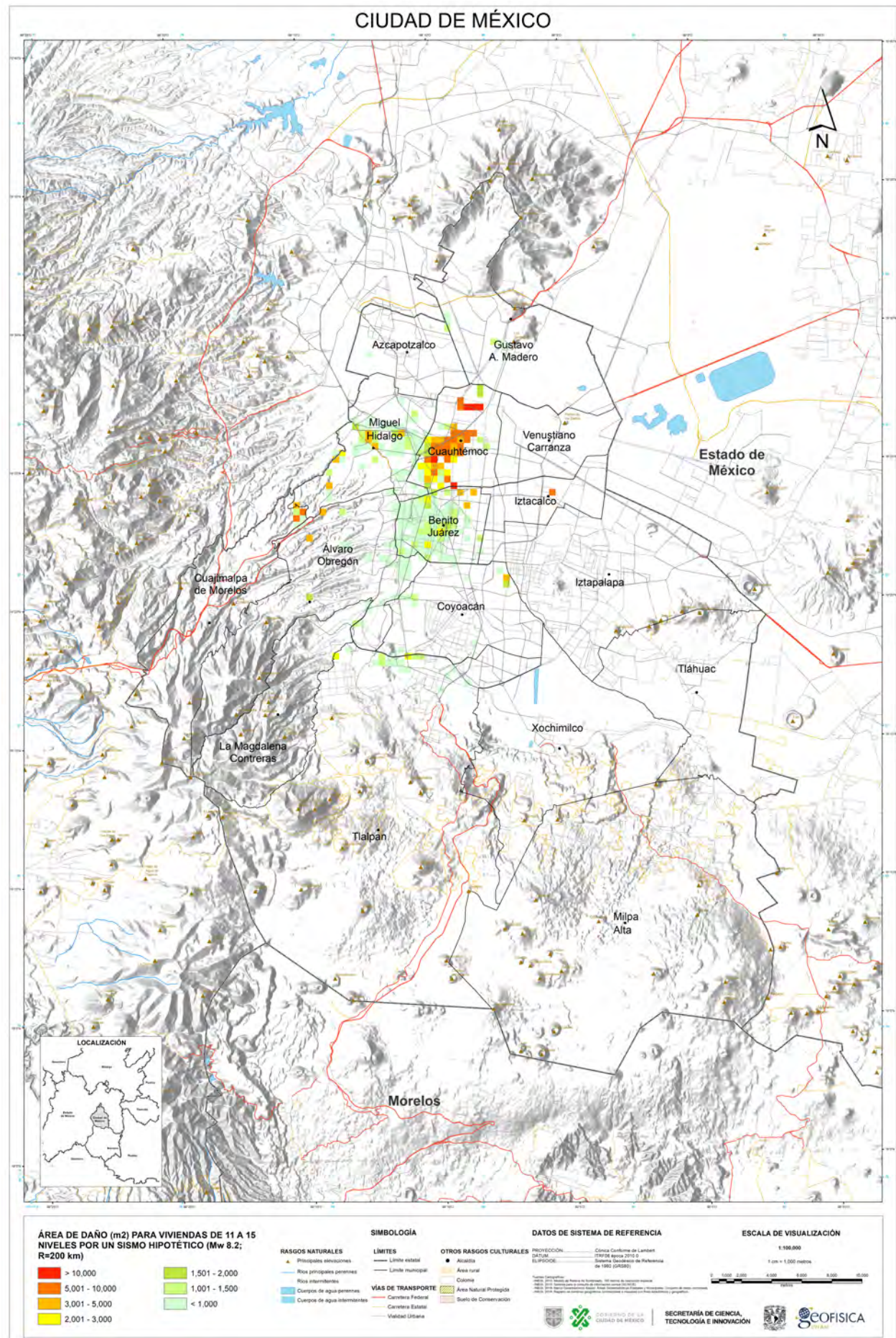
PROYECCIÓN: Círculo Conformado de Lambert
DATUM: PNTM 1993
ELEVACIÓN: Sistema Geodésico de Referencia de 1985 (SGR85)

ESCALA DE VISUALIZACIÓN

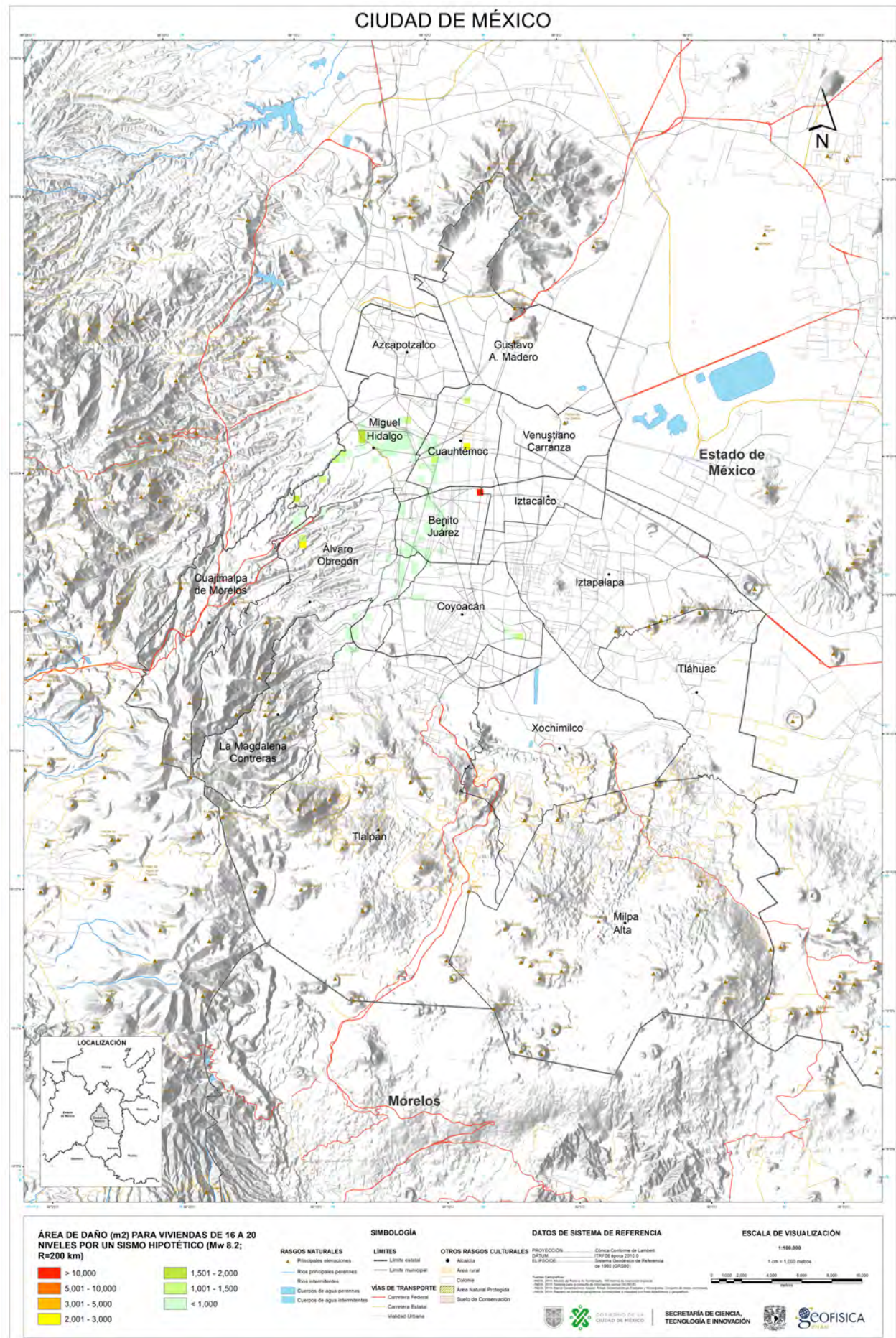
1:100,000
1 cm = 1,000 metros

GOBIERNO DE LA CIUDAD DE MÉXICO | **SECRETARÍA DE CIENCIA, TECNOLOGÍA E INNOVACIÓN** | **GEOFISICA**

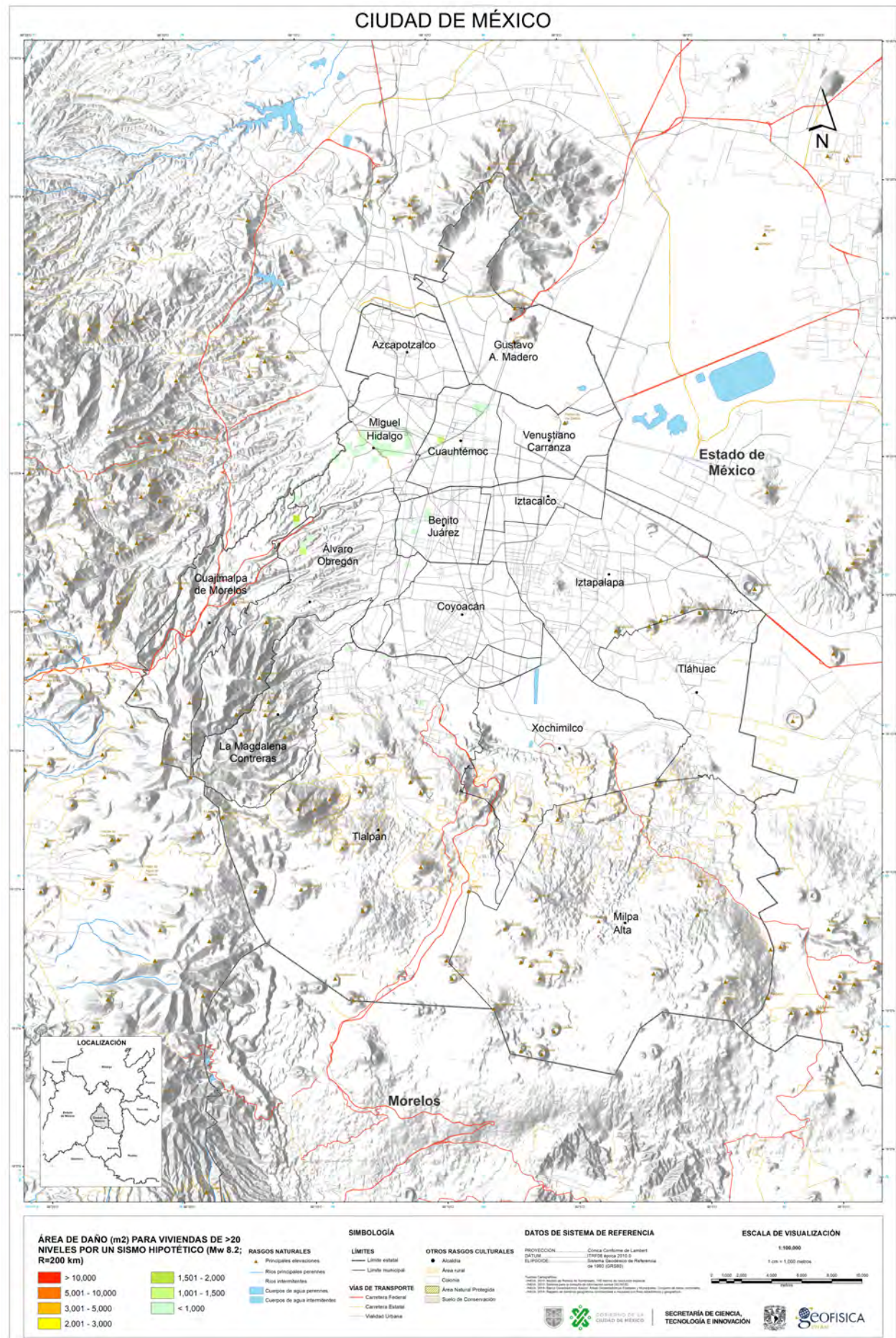
Map 77. Damage area (m²) for constructions between 11-15 stories from a hypothetical earthquake (Mw 8.2; R=200 km).



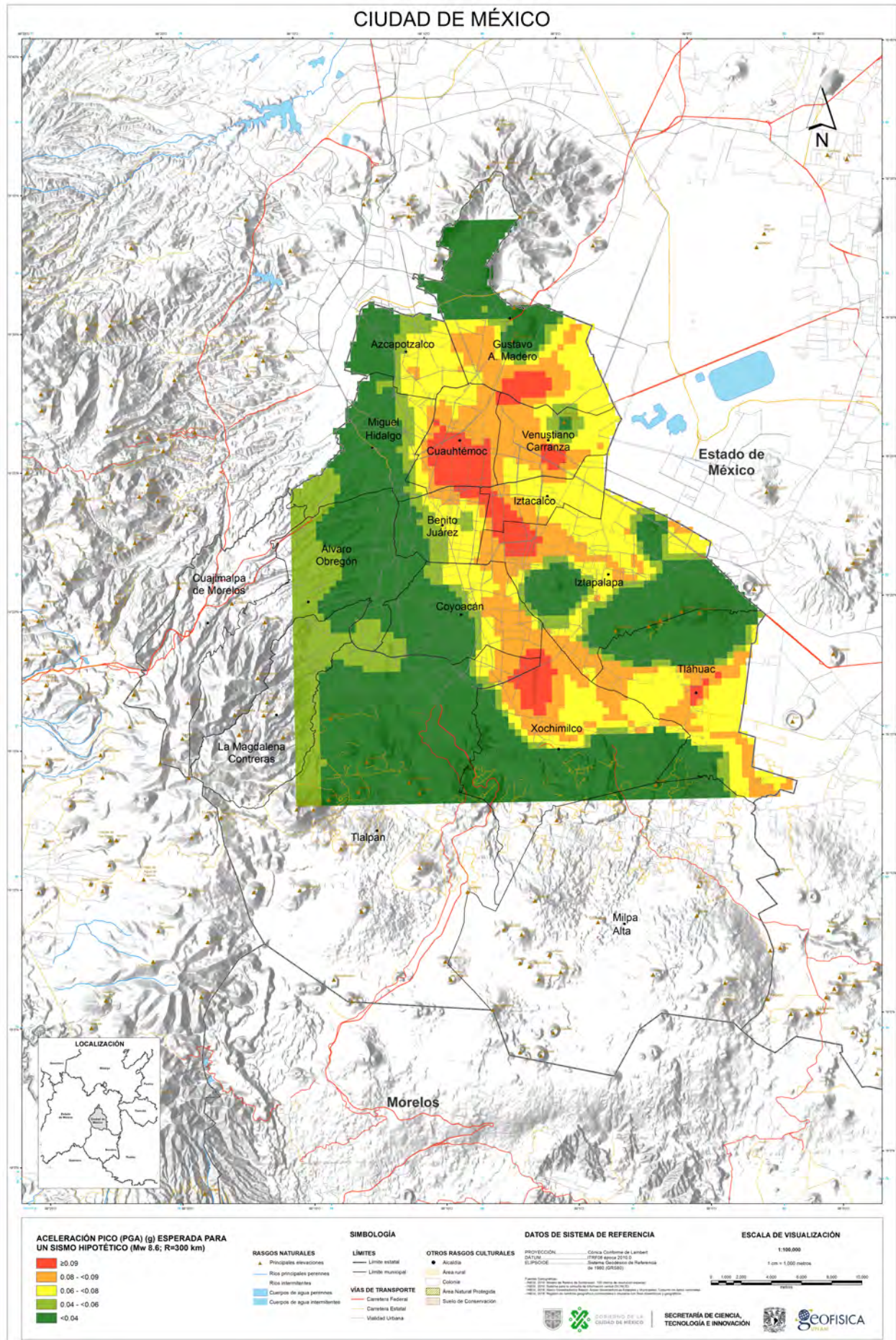
Map 78. Damage area (m²) for constructions between 16-20 stories from a hypothetical earthquake (Mw 8.2; R=200 km).



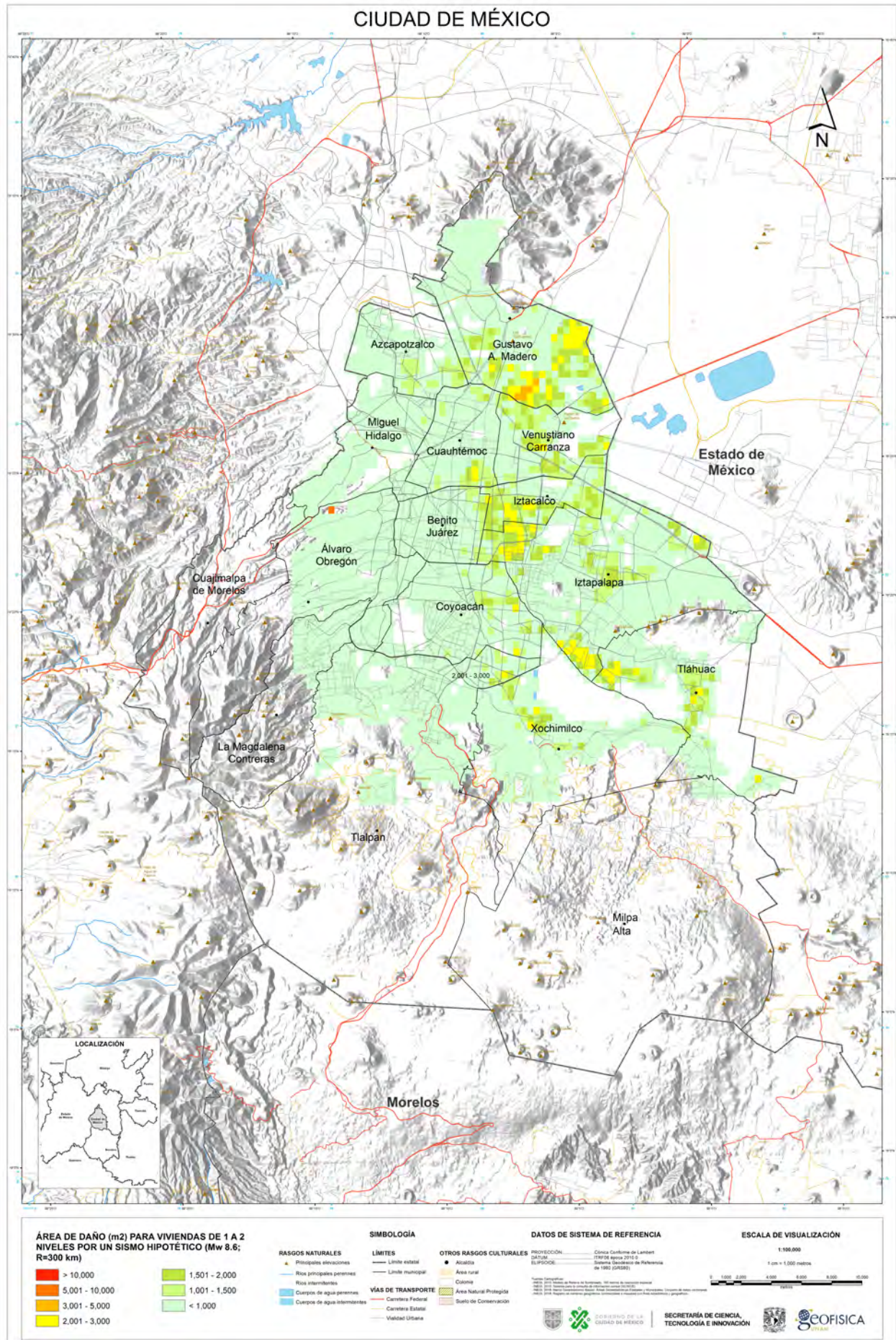
Map 79. Damage area (m²) for constructions of >20 stories from a hypothetical earthquake (Mw 8.2; R=200 km).



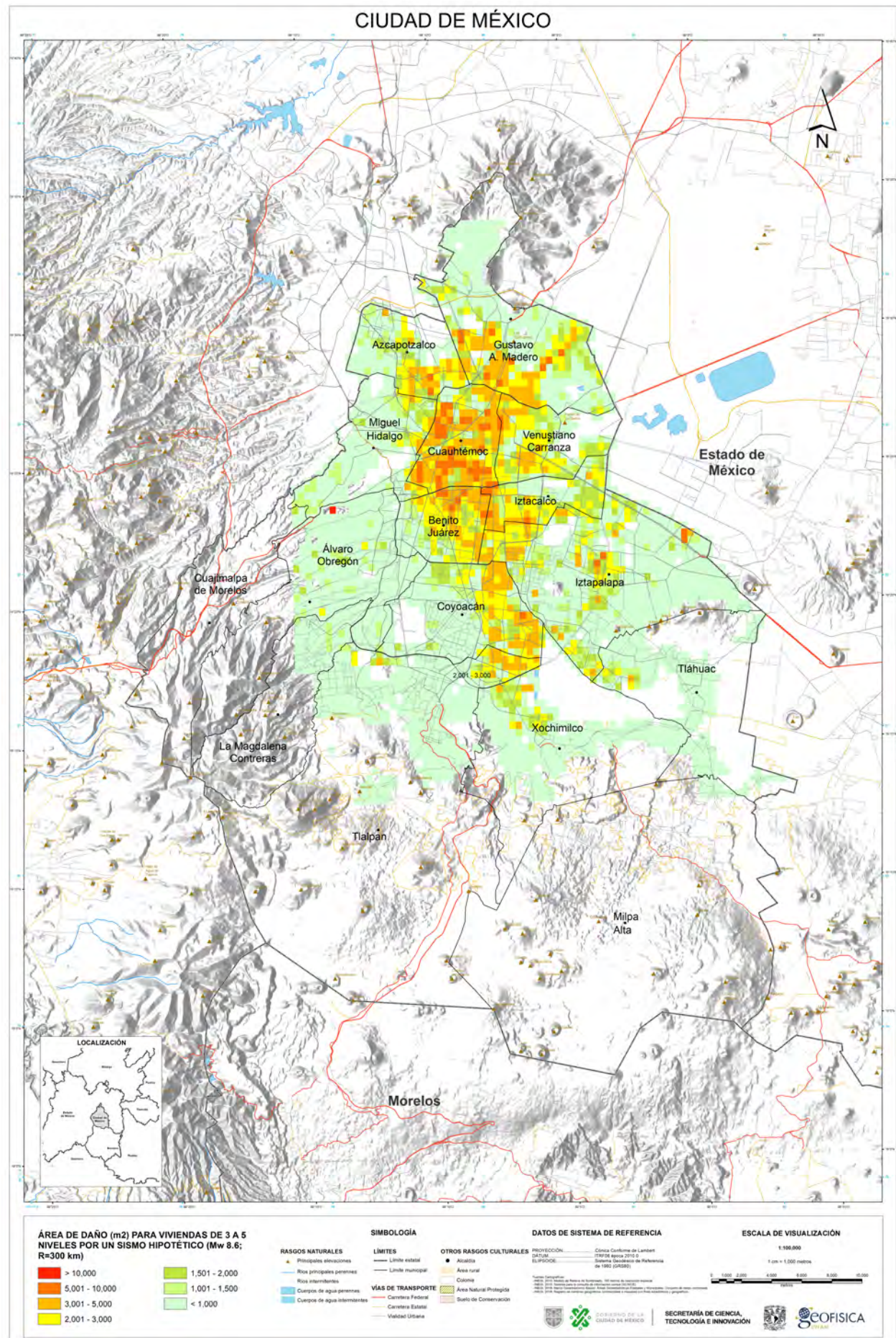
Map 80. Expected peak ground acceleration (PGA) (g) from a hypothetical earthquake (Mw 8.6; R=300 km).



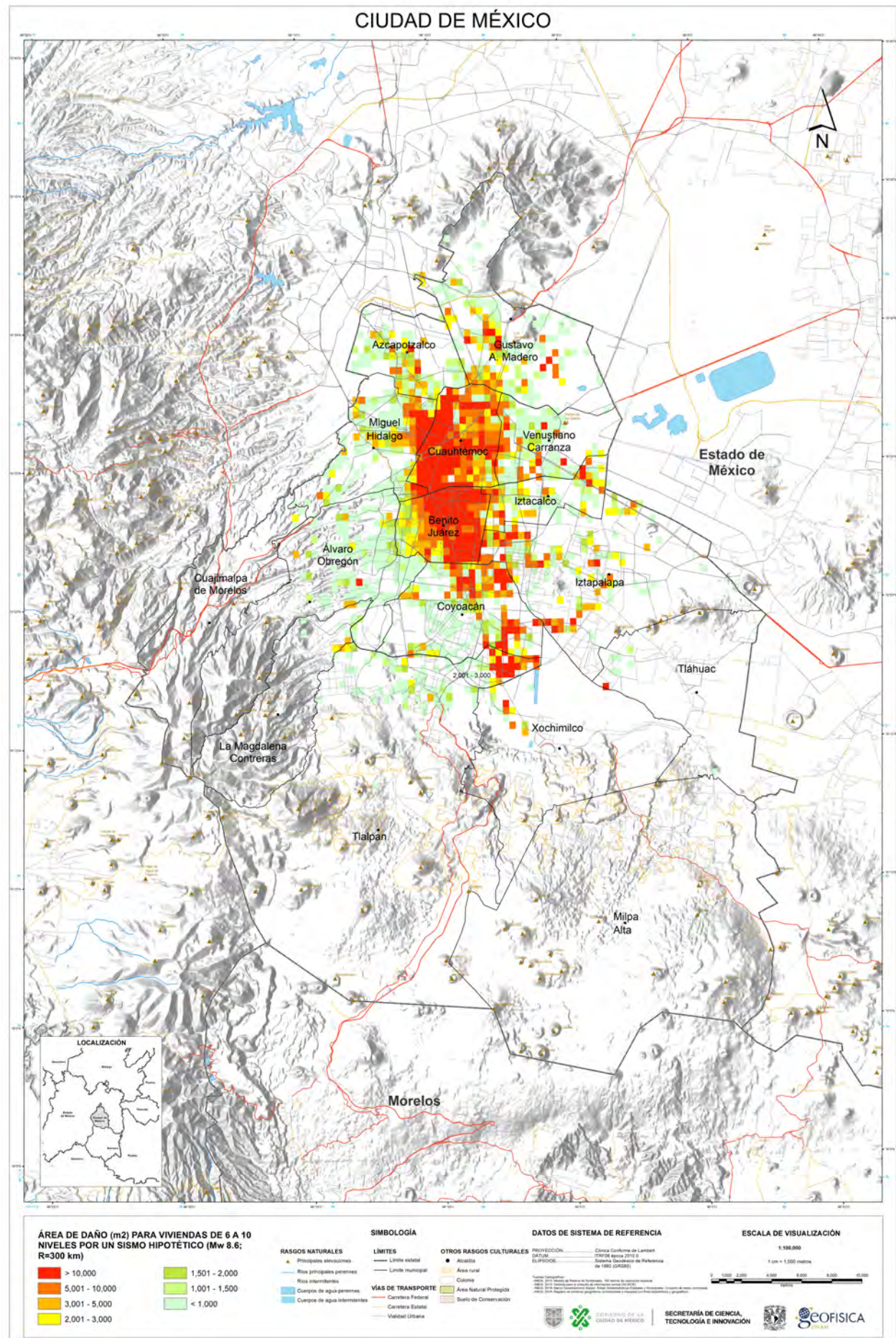
Map 81. Damage area (m²) for constructions between 1-2 stories from a hypothetical earthquake (Mw 8.6; R=300 km).



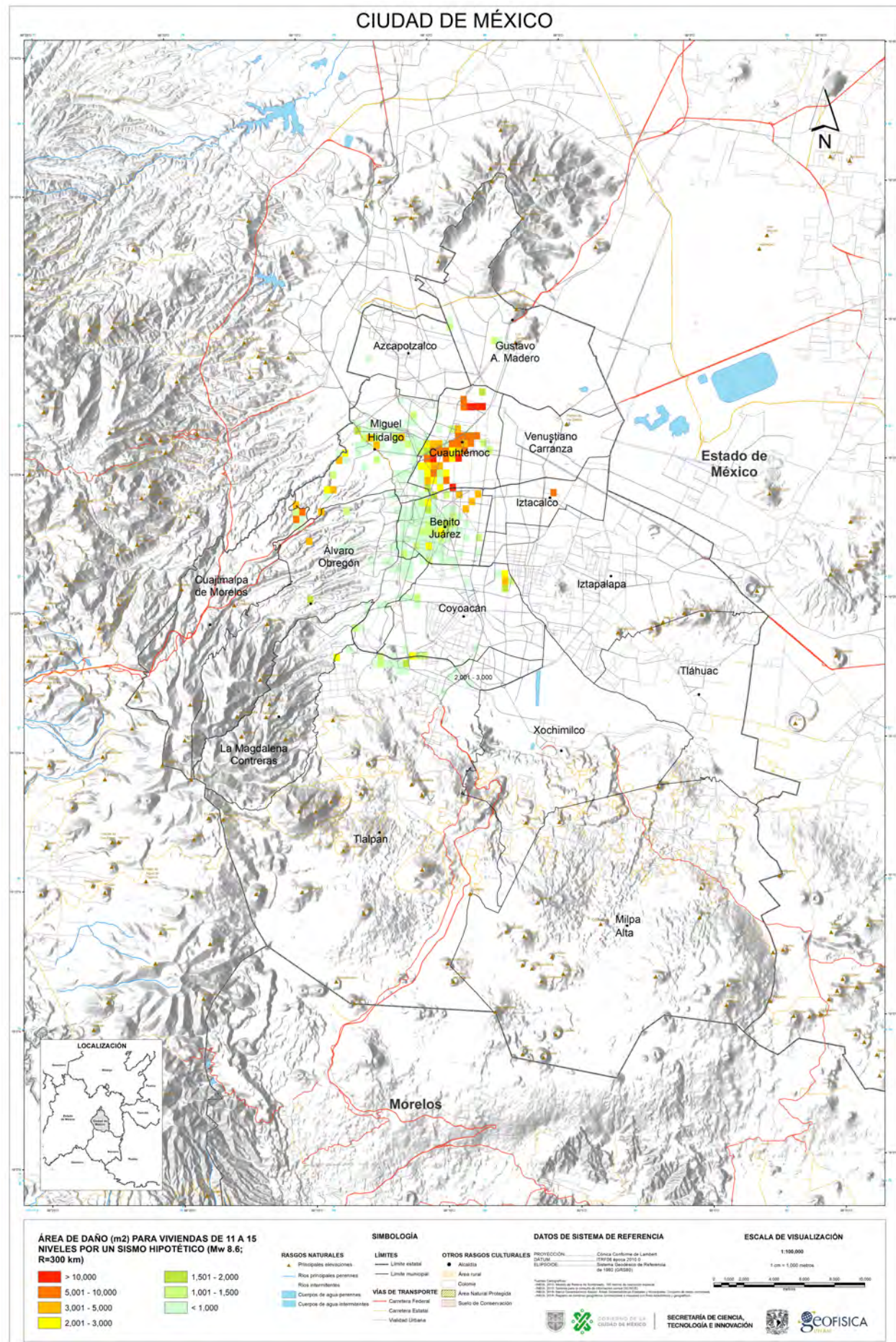
Map 82. Damage area (m²) for constructions between 3-5 stories from a hypothetical earthquake (Mw 8.6; R=300 km).



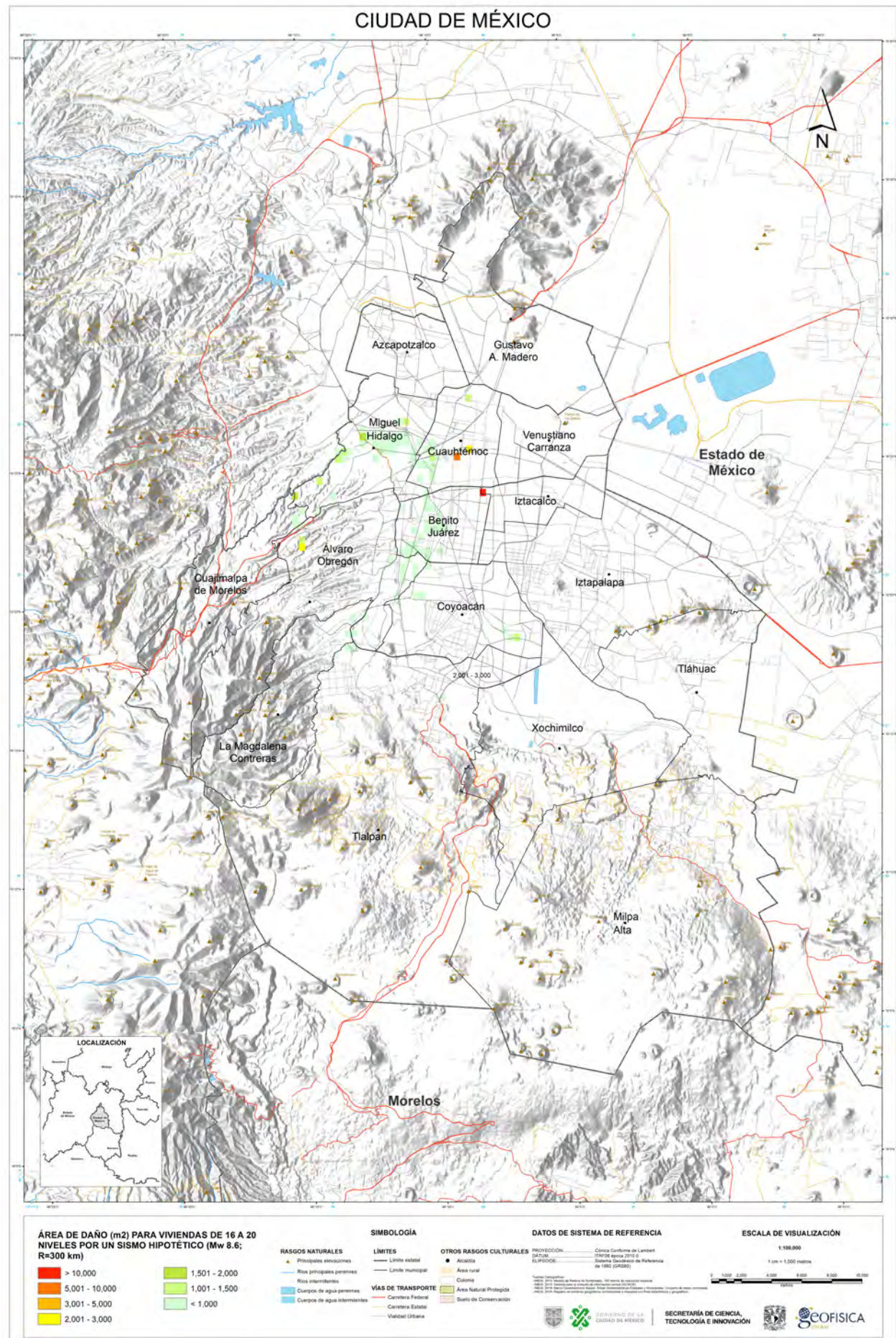
Map 83. Damage area (m²) for constructions between 6-10 stories from a hypothetical earthquake (Mw 8.6; R=300 km).



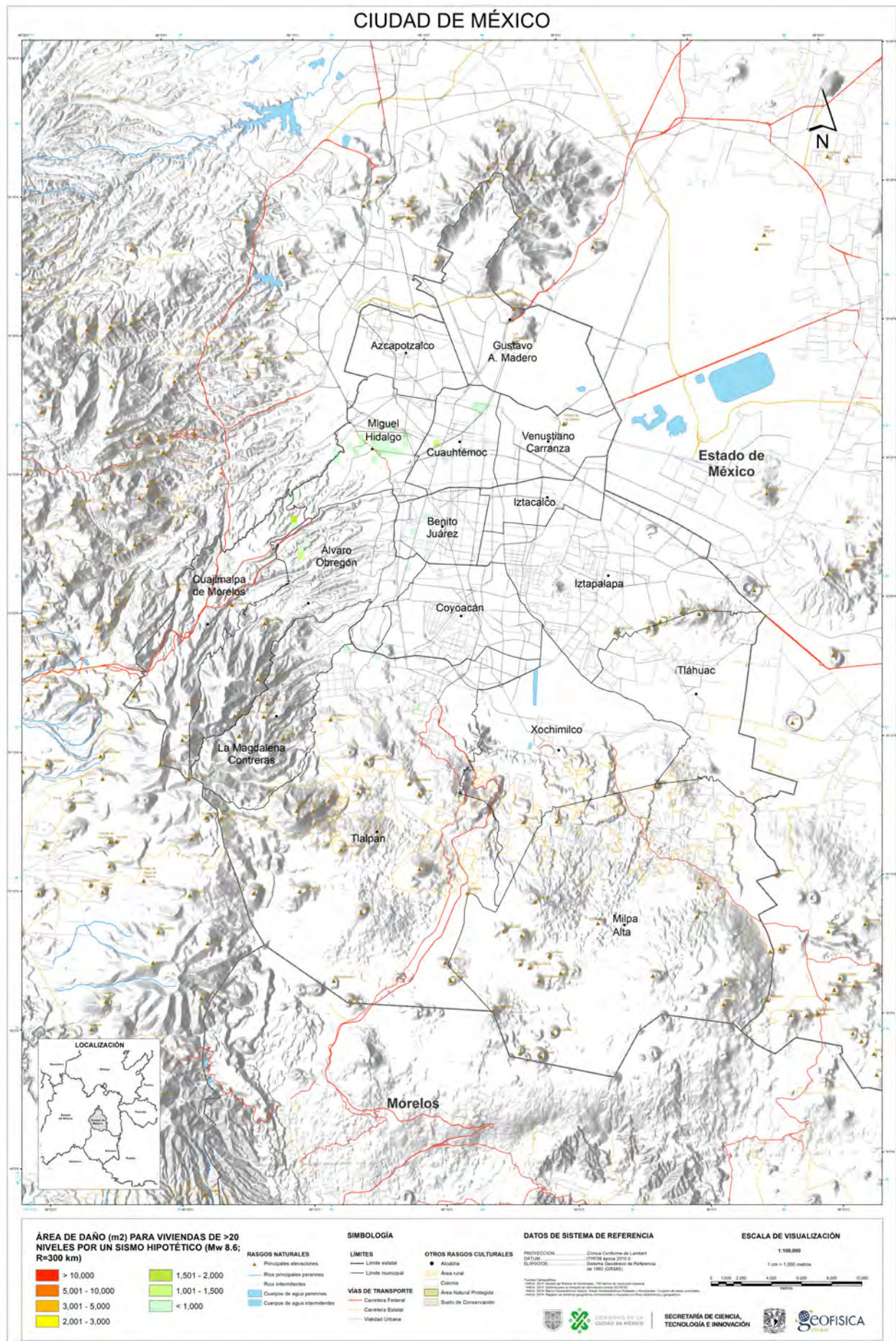
Map 84. Damage area (m²) for constructions between 11-15 stories from a hypothetical earthquake (Mw 8.6; R=300 km).



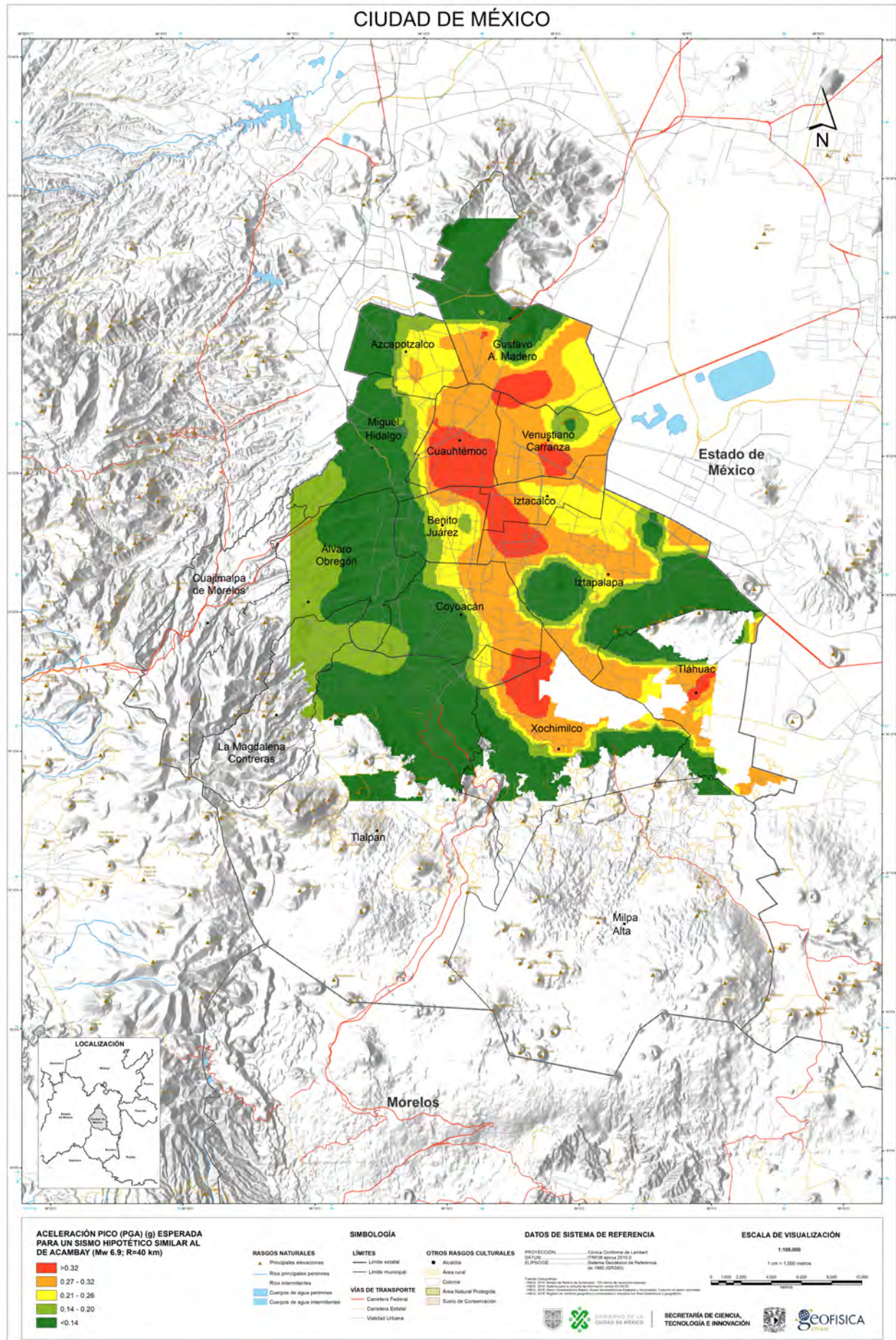
Map 85. Damage area (m²) for constructions between 16-20 stories from a hypothetical earthquake (Mw 8.6; R=300 km).



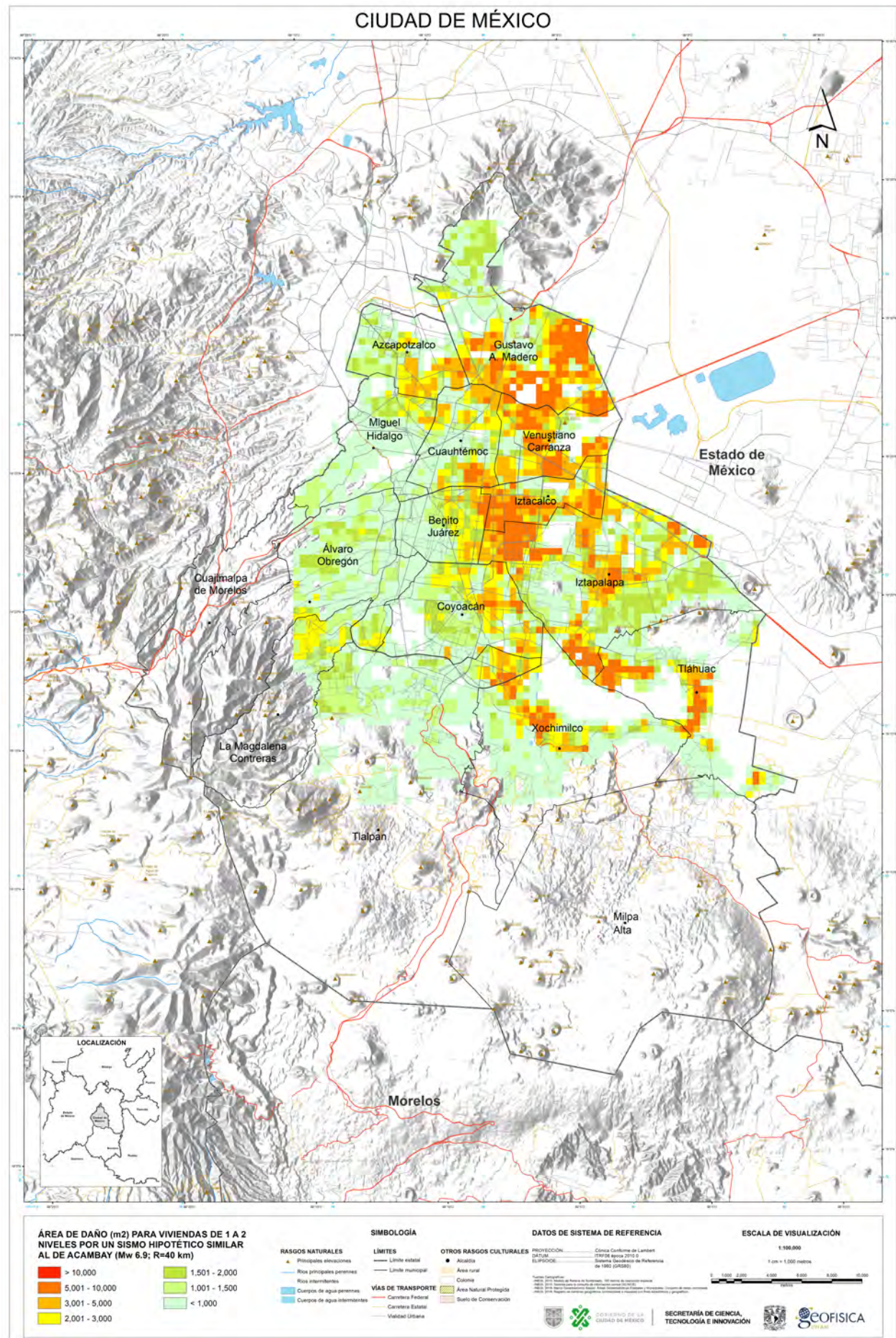
Map 86. Damage area (m²) for constructions of >20 stories from a hypothetical earthquake (Mw 8.6; R=300 km).



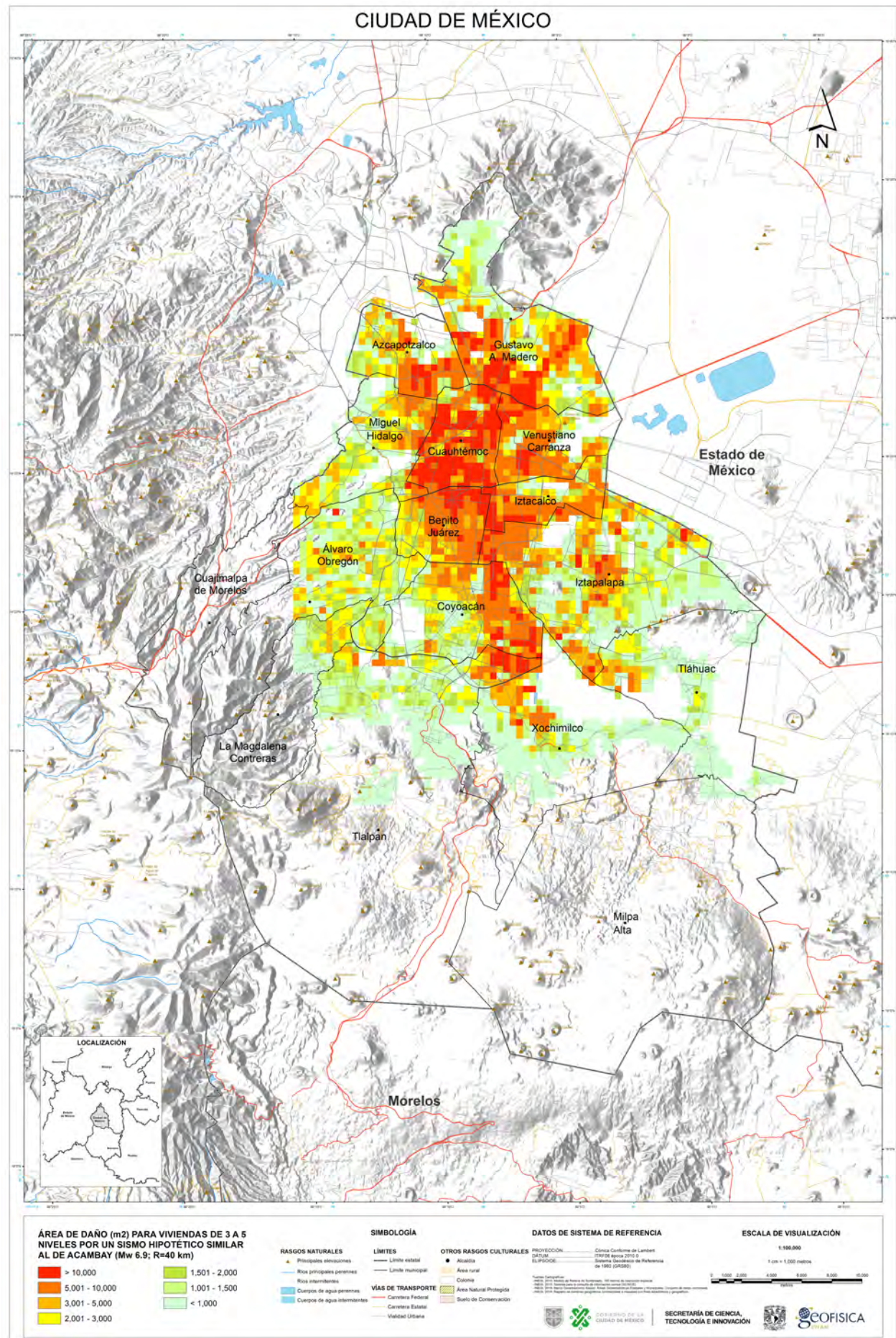
Map 87. Expected peak ground acceleration (PGA) (g) from a hypothetical crustal earthquake similar to the Acambay (Mw 6.9; R=40 km).



Map 88. Damage area (m²) for constructions between 1-2 stories from a hypothetical crustal earthquake similar to the Acambay (Mw 6.9; R=40 km).



Map 89. Damage area (m²) for constructions between 3-5 stories from a hypothetical crustal earthquake similar to the Acambay (Mw 6.9; R=40 km).



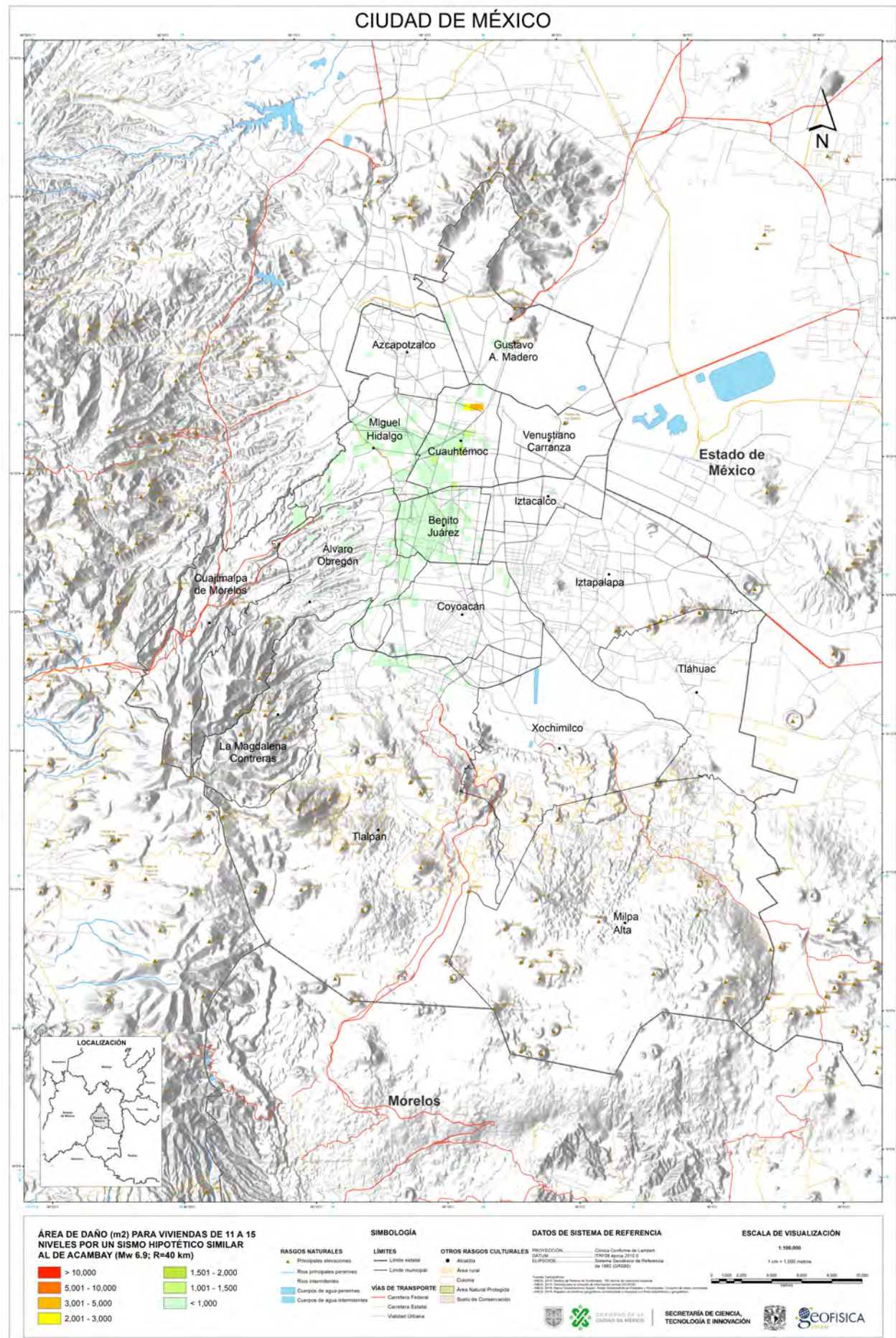
CIUDAD DE MÉXICO

ÁREA DE DAÑO (m²) PARA VIVIENDAS DE 6 A 10 NIVELES POR UN SISMO HIPOTÉTICO SIMILAR AL DE ACAMBAY (Mw 6.9; R=40 km)

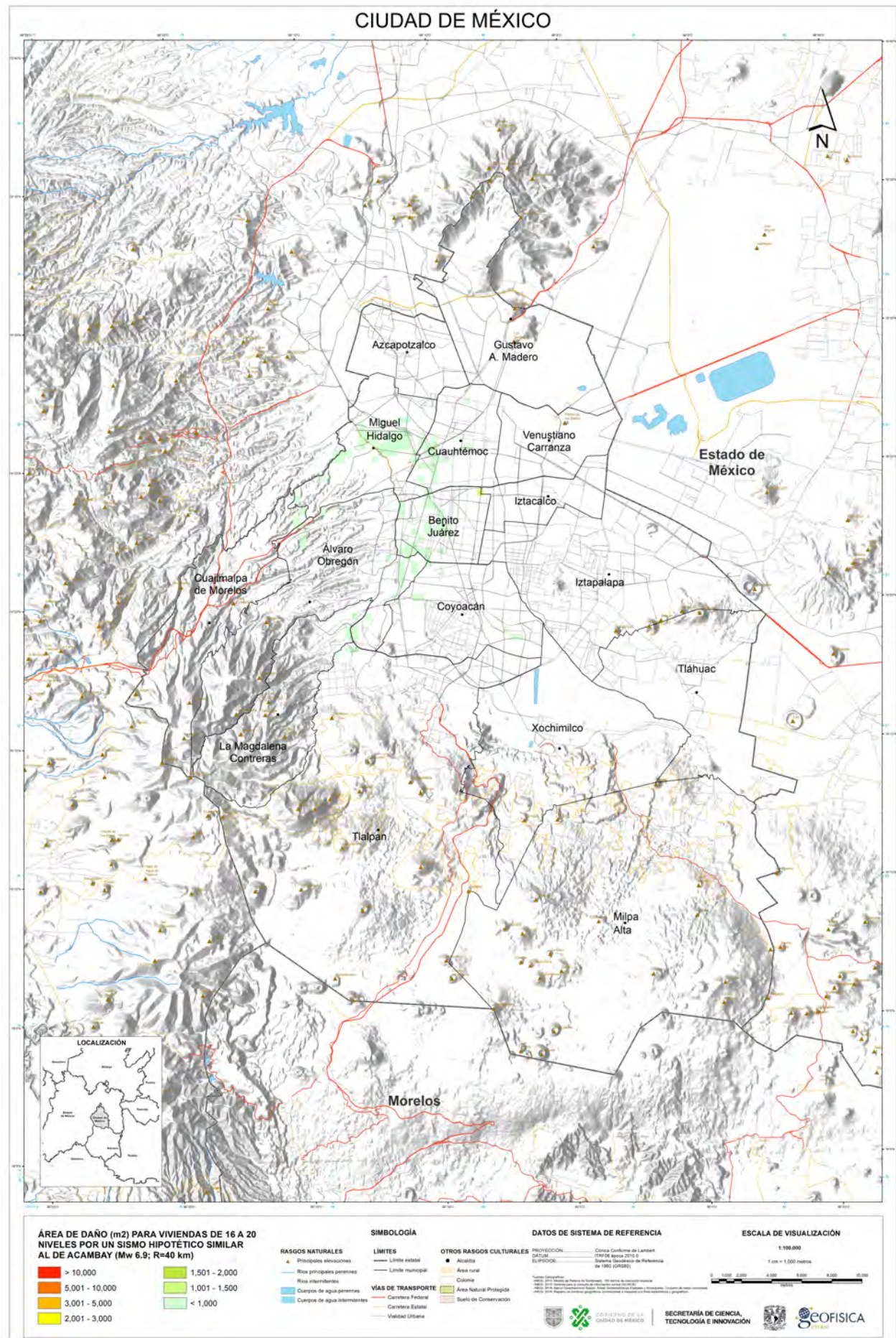
LEGENDA:

- ÁREA DE DAÑO (m²):**
 - > 10,000
 - 5,001 - 10,000
 - 3,001 - 5,000
 - 2,001 - 3,000
 - 1,501 - 2,000
 - 1,001 - 1,500
 - < 1,000
- RASGOS NATURALES:**
 - Principales elevaciones
 - Rio principales perennes
 - Rio intermitentes
 - Cuerpos de agua perennes
 - Cuerpos de agua intermitentes
- LÍMITES:**
 - Límite estatal
 - Límite municipal
- VÍAS DE TRANSPORTE:**
 - Calle
 - Calle Federal
 - Calle Estatal
 - Vialidad Urbana
- OTROS RASGOS CULTURALES:**
 - Alcalá
 - Área rural
 - Colegio
 - Área Natural Protegida
 - Sitio de Conservación
- DATOS DE SISTEMA DE REFERENCIA:**
 - PROYECCIÓN: Círculo Conformado de Lambert
 - DATUM: PNTM 1993
 - ELIPSOIDE: Spheroida (Spheroida de Referencia de 1960)
- ESCALA DE VISUALIZACIÓN:**
 - 1:100,000
 - 1 cm = 1,000 metros

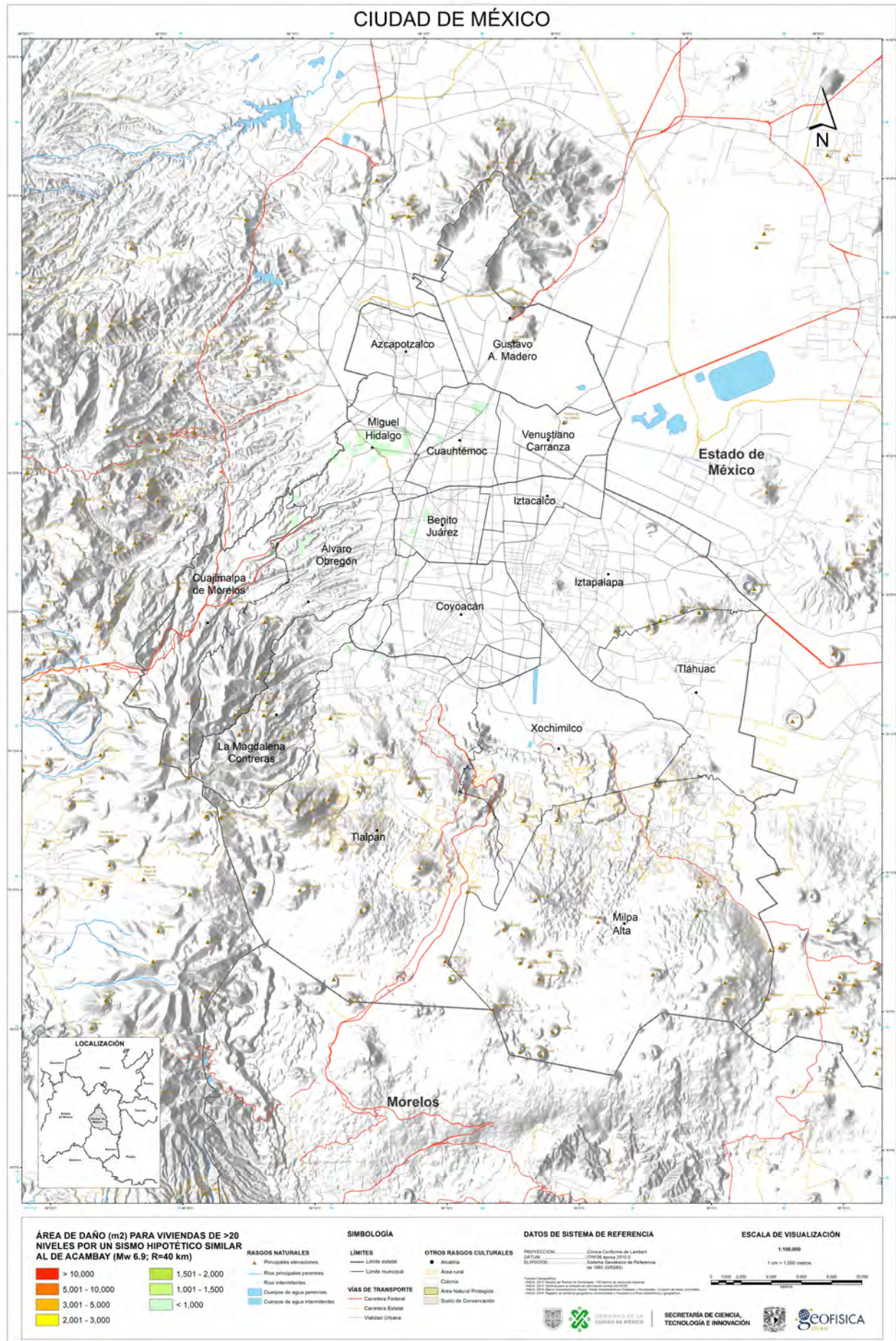
Map 91. Damage area (m²) for constructions between 11-15 stories from a hypothetical crustal earthquake similar to the Acambay (Mw 6.9; R=40 km).



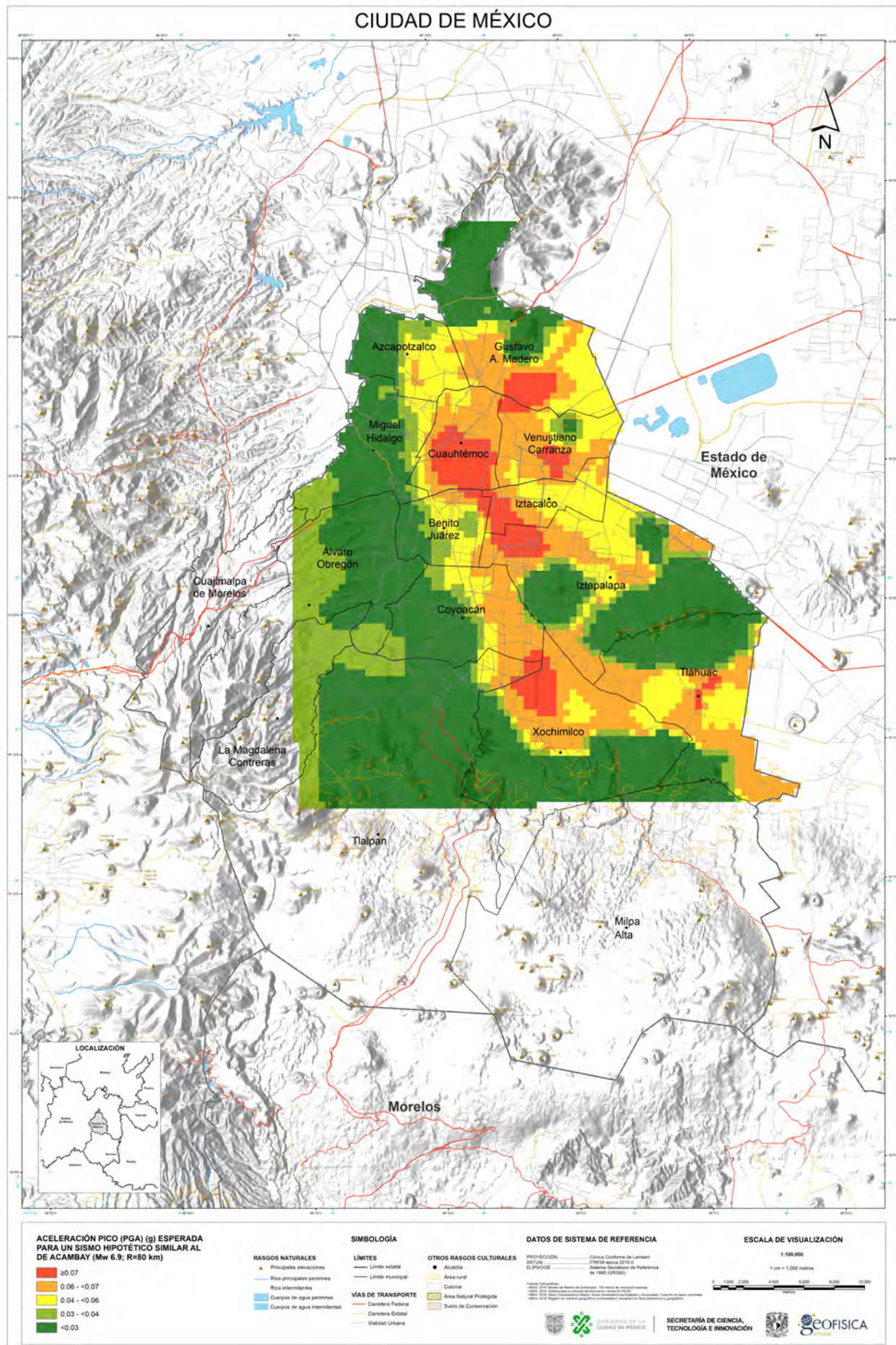
Map 92. Damage area (m²) for constructions between 16-20 stories from a hypothetical crustal earthquake similar to the Acambay (Mw 6.9; R=40 km).



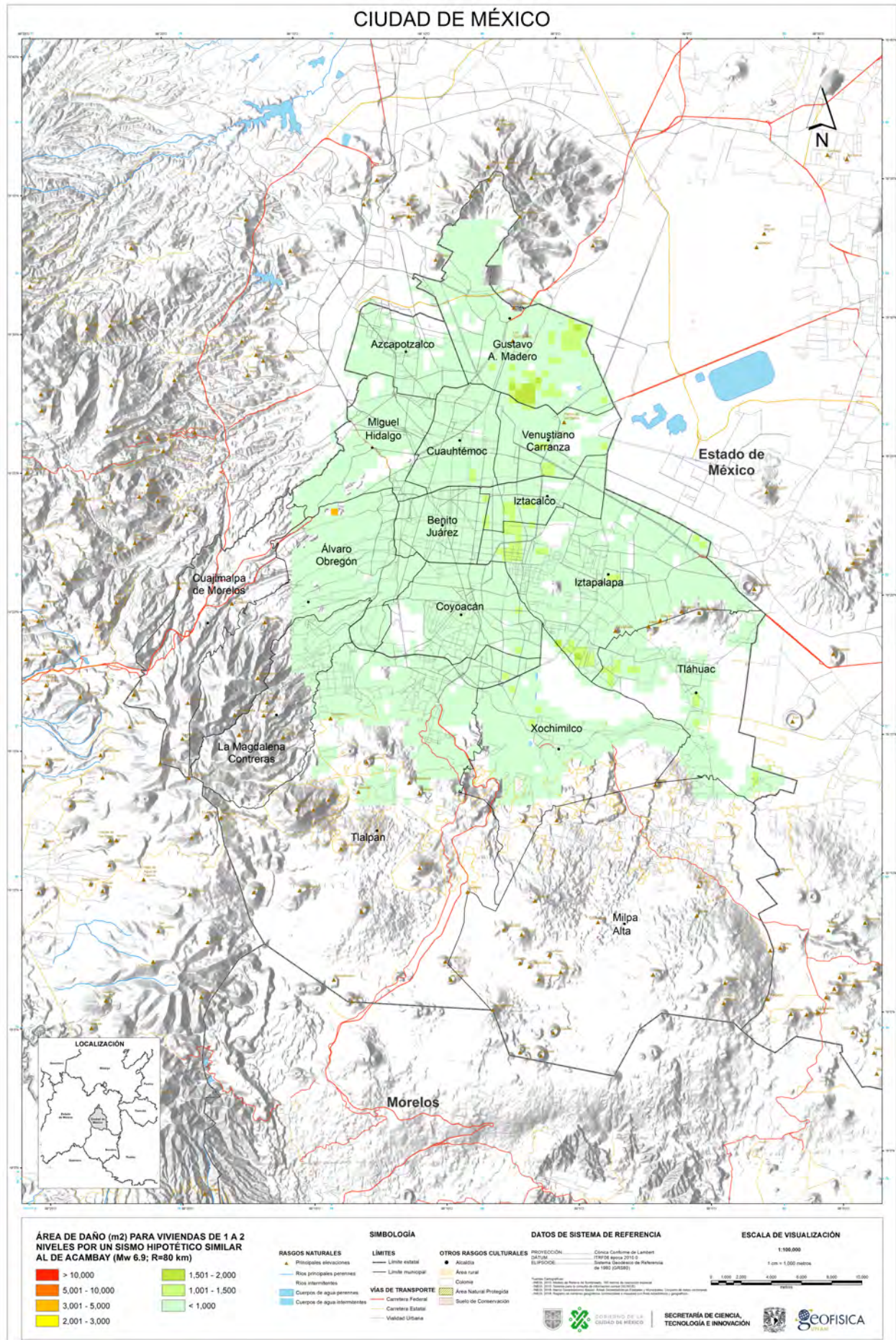
Map 93. Damage area (m²) for constructions of >20 stories from a hypothetical crustal earthquake similar to the Acambay (Mw 6.9; R=40 km).



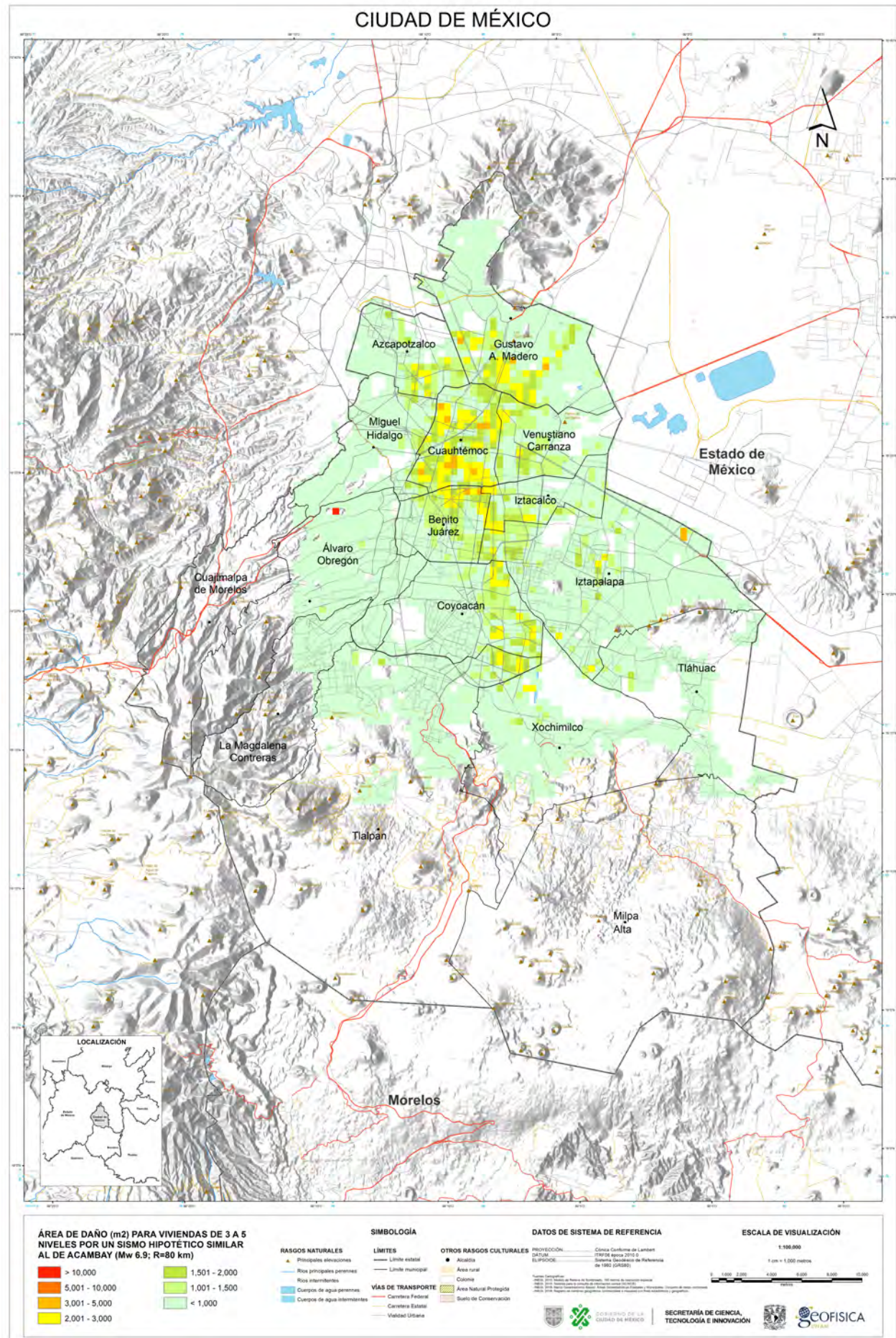
Map 94. Expected peak ground acceleration (PGA) (g) from a hypothetical crustal earthquake similar to the Acambay (Mw 6.9; R=80 km).



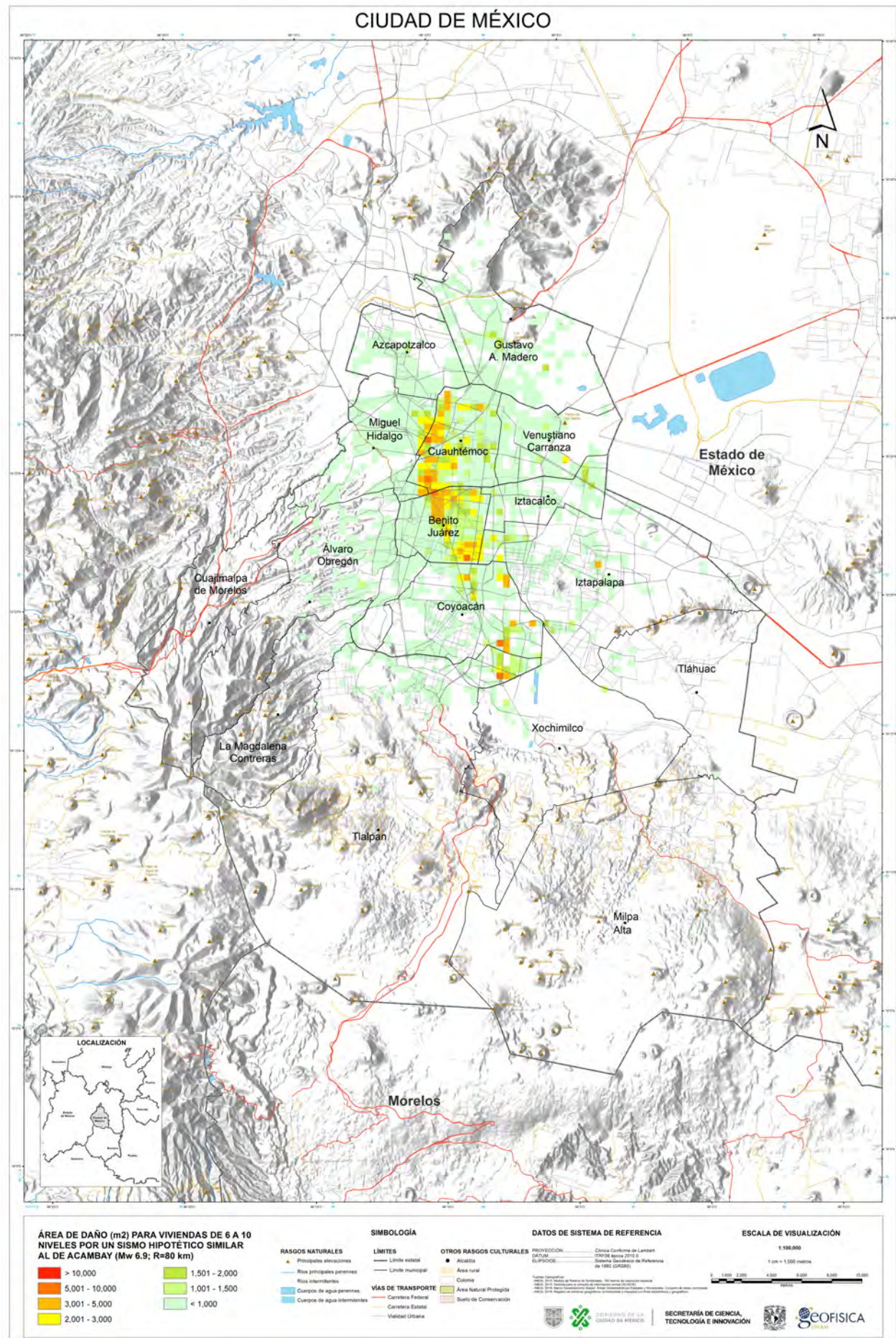
Map 95. Damage area (m²) for constructions between 1-2 stories from a hypothetical crustal earthquake similar to the Acambay (Mw 6.9; R=80 km).



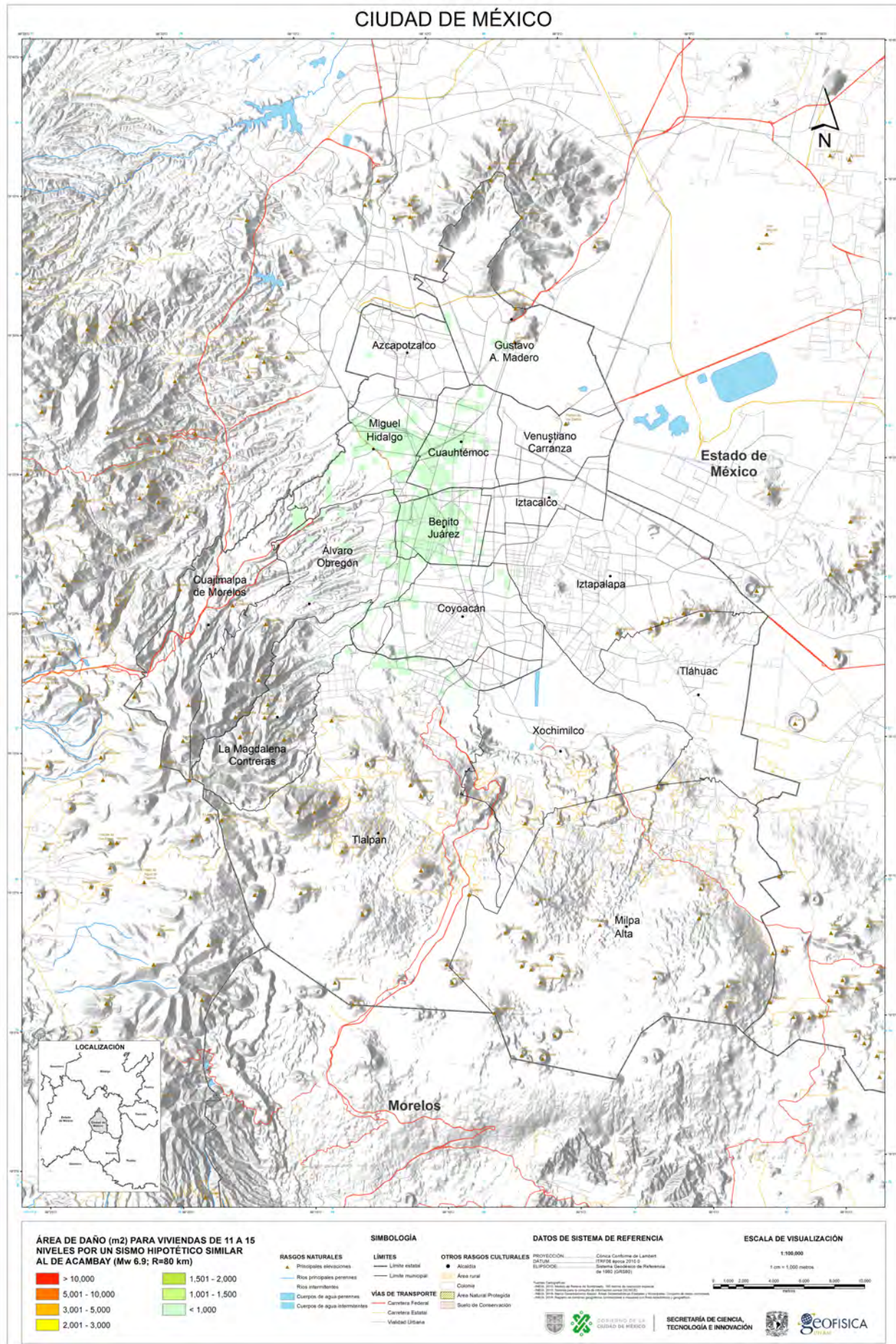
Map 96. Damage area (m²) for constructions between 3-5 stories from a hypothetical crustal earthquake similar to the Acambay (Mw 6.9; R=80 km).



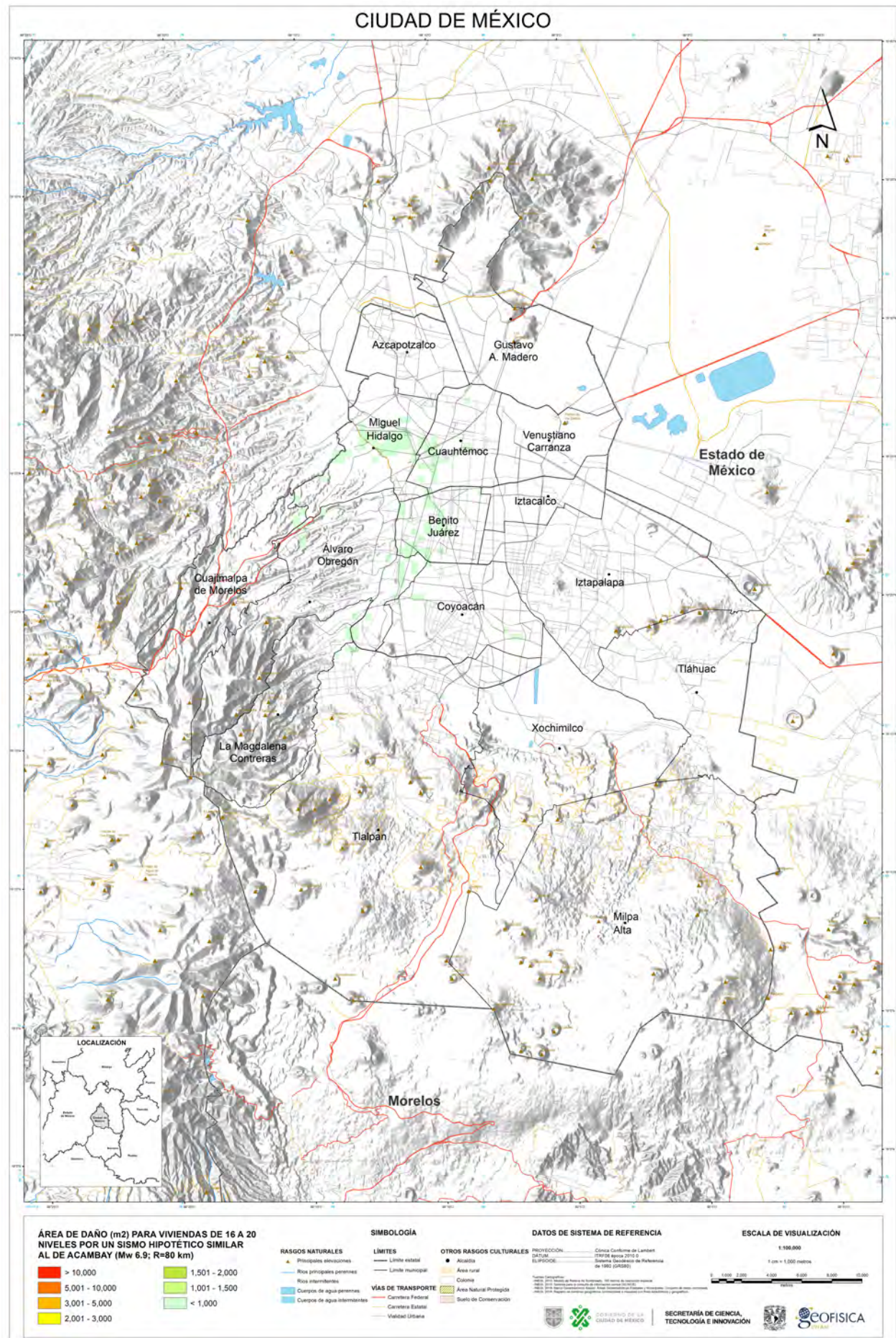
Map 97. Damage area (m²) for constructions between 6-10 stories from a hypothetical crustal earthquake similar to the Acambay (Mw 6.9; R=80 km).



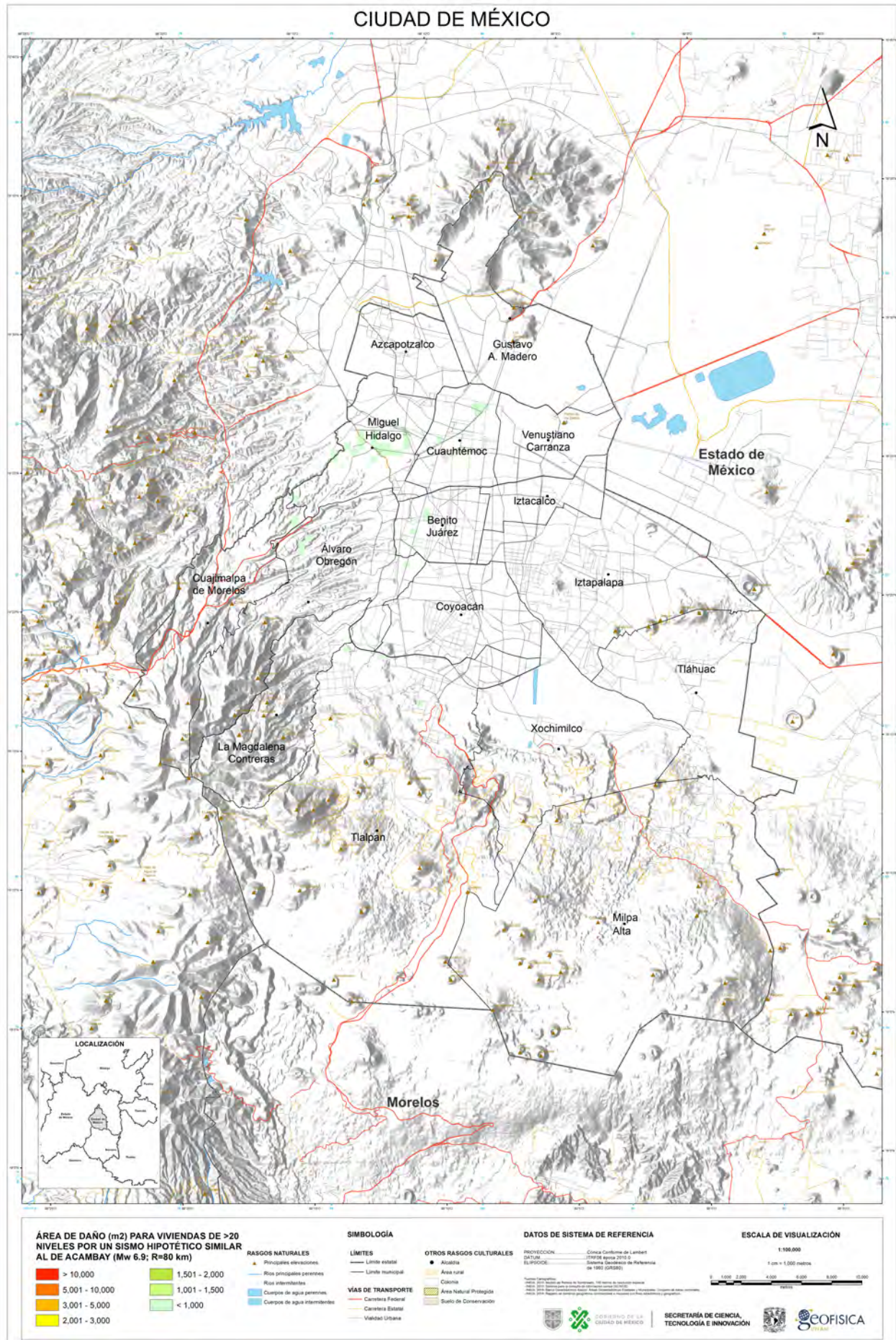
Map 98. Damage area (m²) for constructions between 11-15 stories from a hypothetical crustal earthquake similar to the Acambay (Mw 6.9; R=80 km).



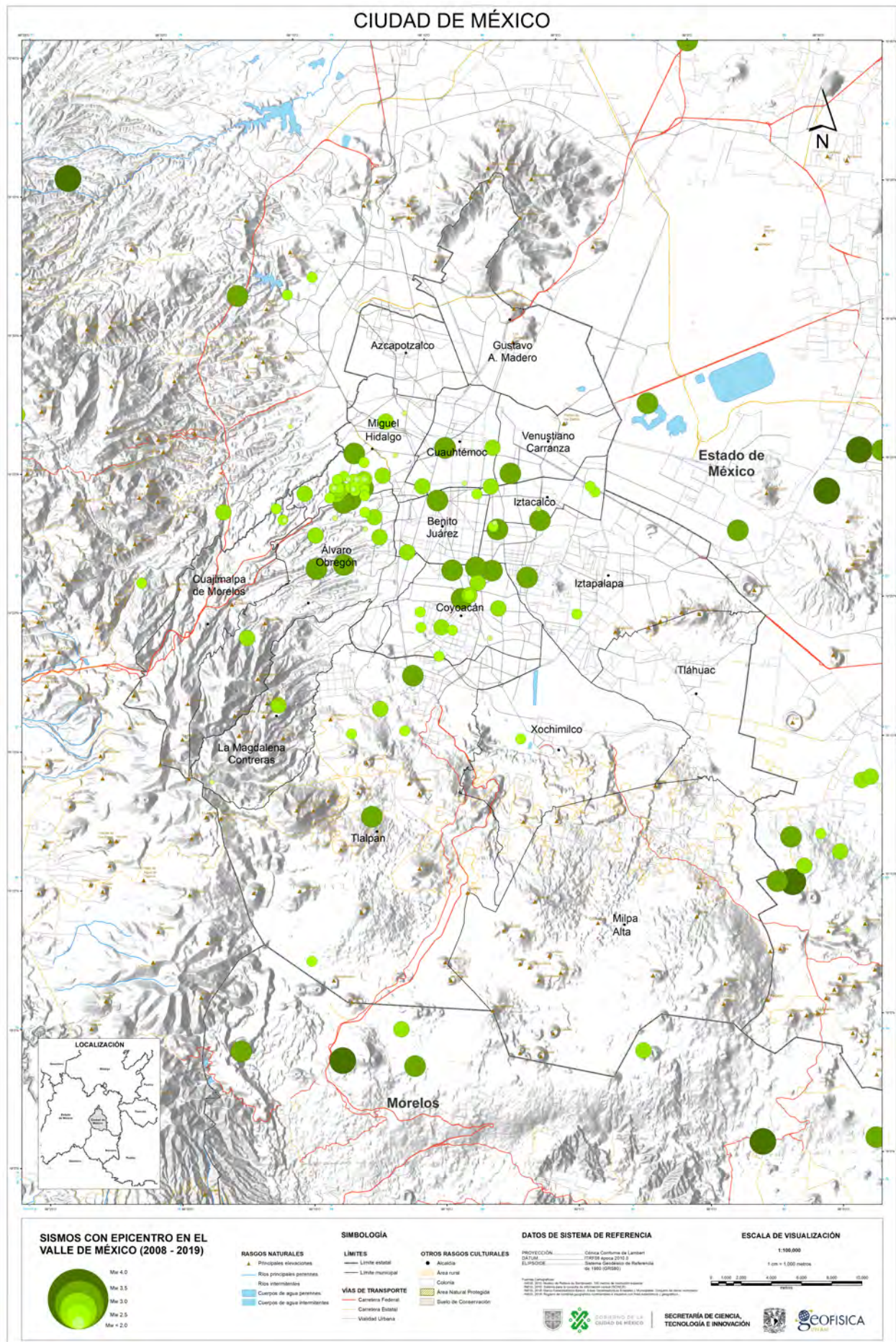
Map 99. Damage area (m²) for constructions between 16-20 stories from a hypothetical crustal earthquake similar to the Acambay (Mw 6.9; R=80 km).



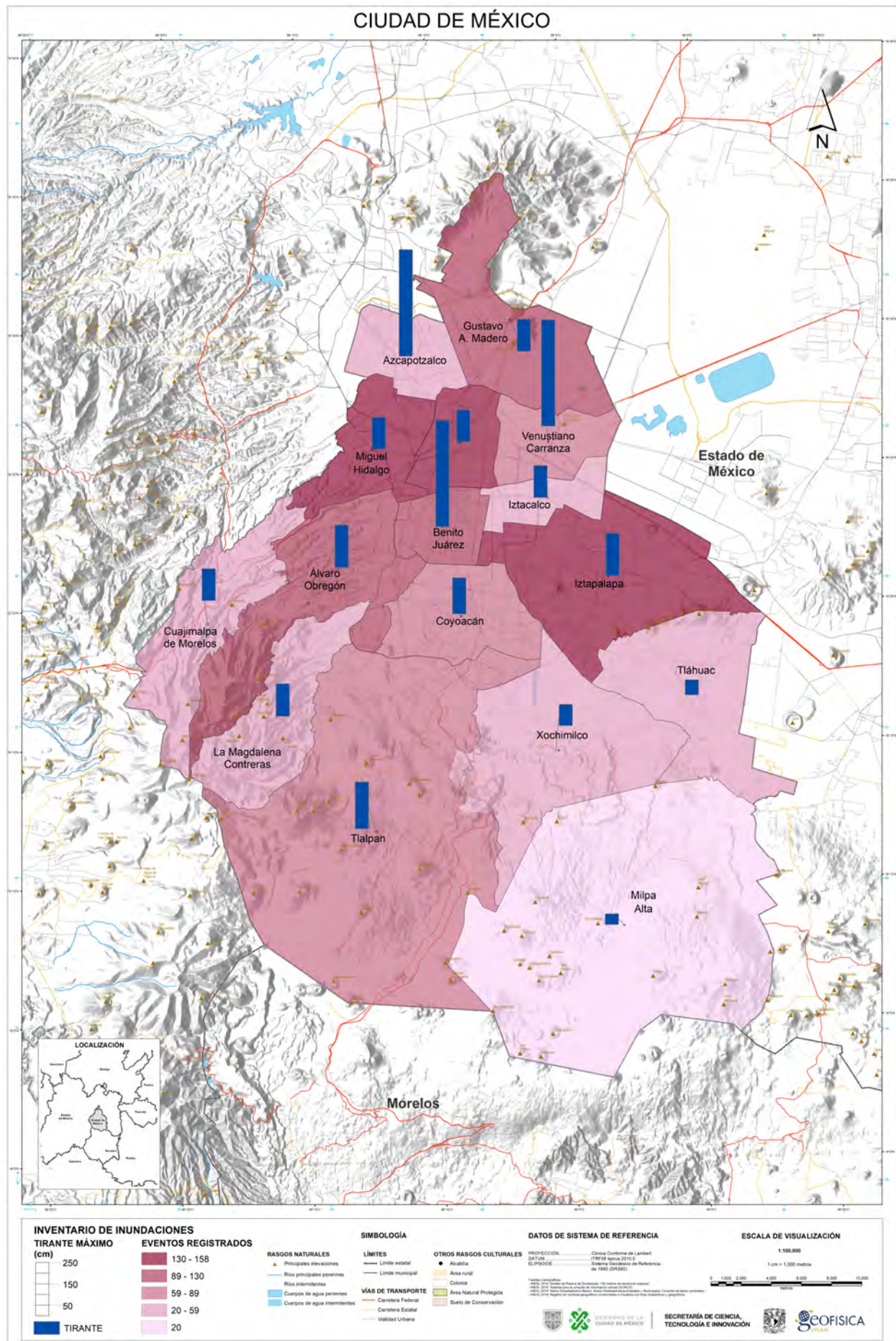
Map 100. Damage area (m²) for constructions of >20 stories from a hypothetical crustal earthquake similar to the Acambay (Mw 6.9; R=80 km).



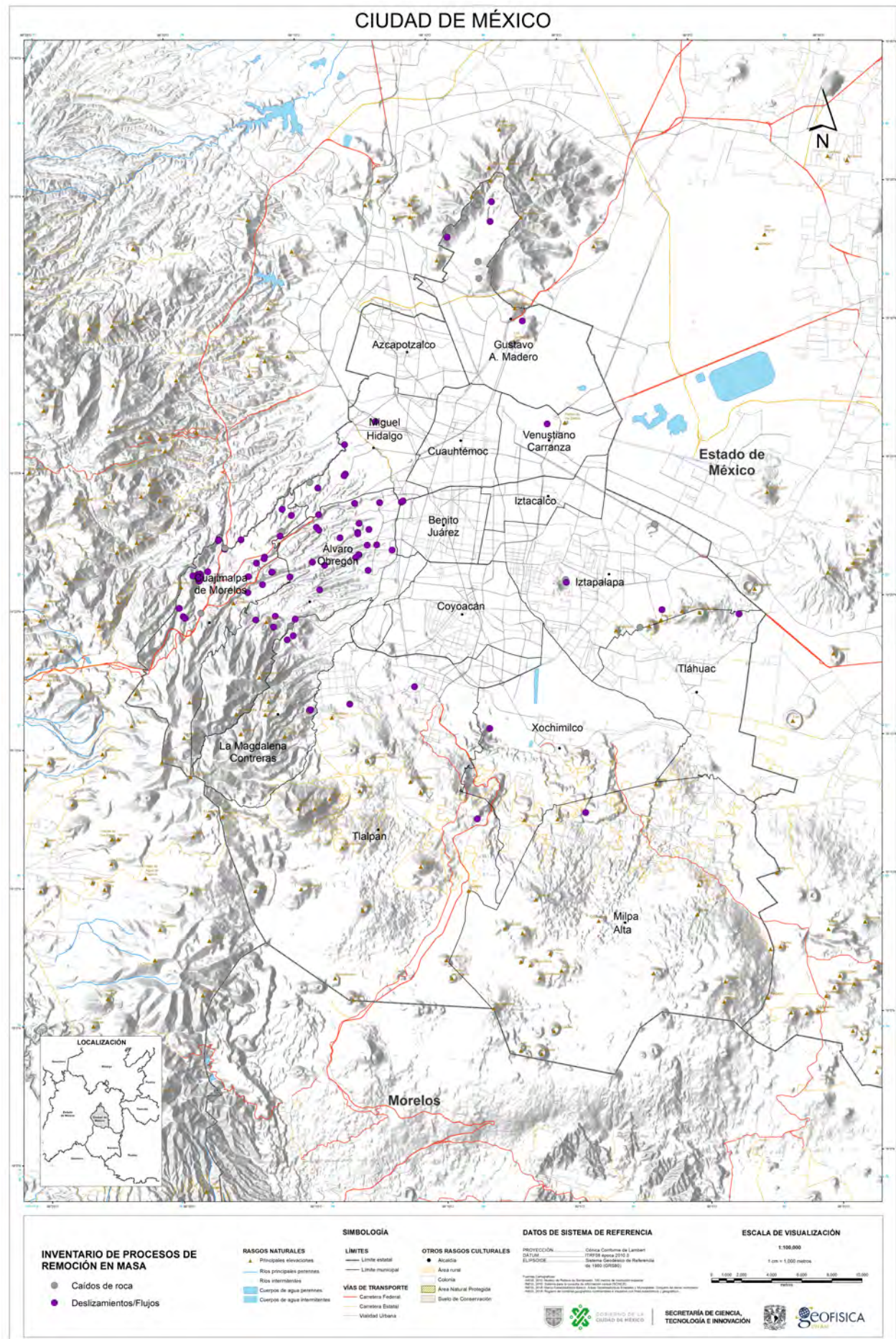
Map 101. Epicenters of earthquakes in the Valley of Mexico (2008-2019).



Map 102. Flood inventory (1920-2017).



Map 103. Landslide inventory (1972-2018).



Map 104. Forest fires inventory (2000-2019).

