



An integrated approach to the study of climate change on major city environments using CORDEX-CORE simulations



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Why a focus on cities

- Large cities encompass a large and ever increasing fraction of the total World population and economic activities
- Large cities, especially in developing countries, can be particularly vulnerable to climate change because of the presence of a substantial segment of poor population living in degraded conditions
- The vulnerability of cities increases in coastal environments due to sea level rise

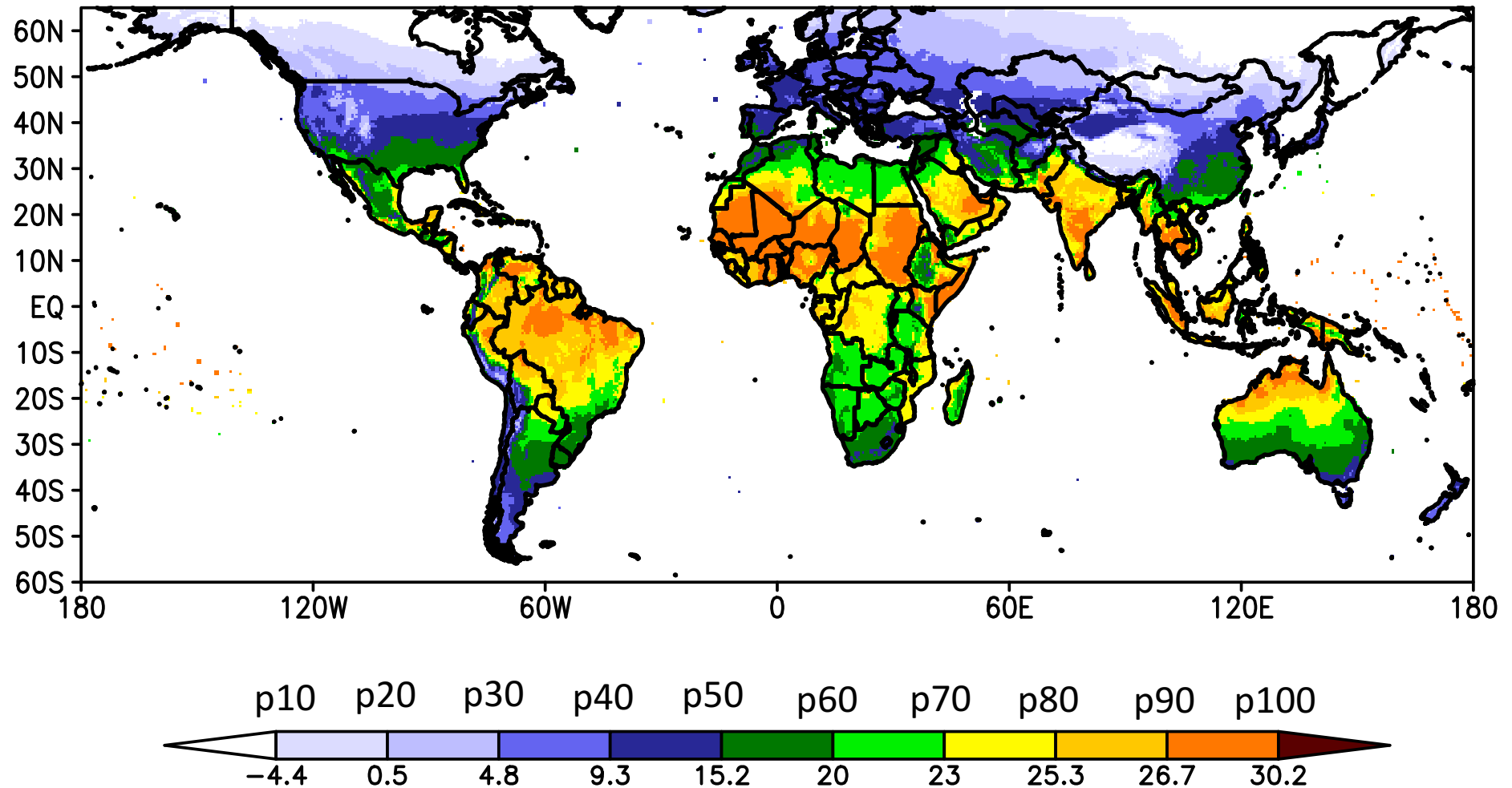
Purpose of the study

- Develop an integrated index of vulnerability including climate, population and sea level rise information
- Apply this index to the CORDEX-CORE set of experiments to assess the vulnerability of city environments to climate change
- Use the city-analogue approach to gain information of management of future cities
- VERY MUCH WORK IN PROGRESS

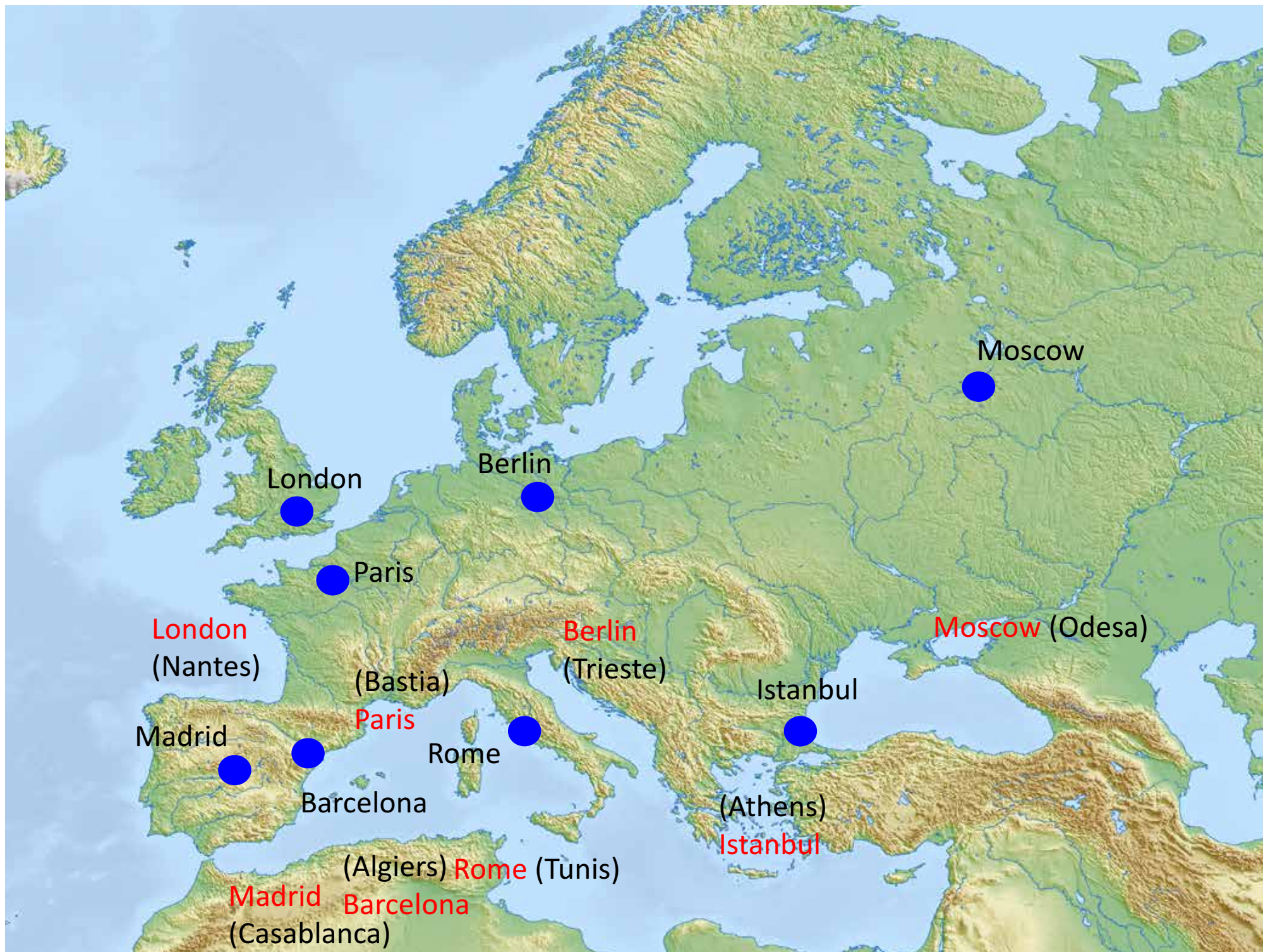
Climate Index

- Based on mean annual temperature and precipitation
 - Calculate the percentile distribution of temperature and precipitation from gridded observations
 - Apply a Delta T and Delta P method to the observations
 - Calculate the closest grid point to the “future” climate based on the minimum distance in terms of percentiles

Temperature Percentiles distribution CRU Dataset (1901–2017)







London

Berlin

Moscow

Paris

London
(Nantes)

Berlin
(Trieste)

Moscow (Odesa)

(Bastia)

Istanbul

Madrid

Paris

Rome

(Athens)

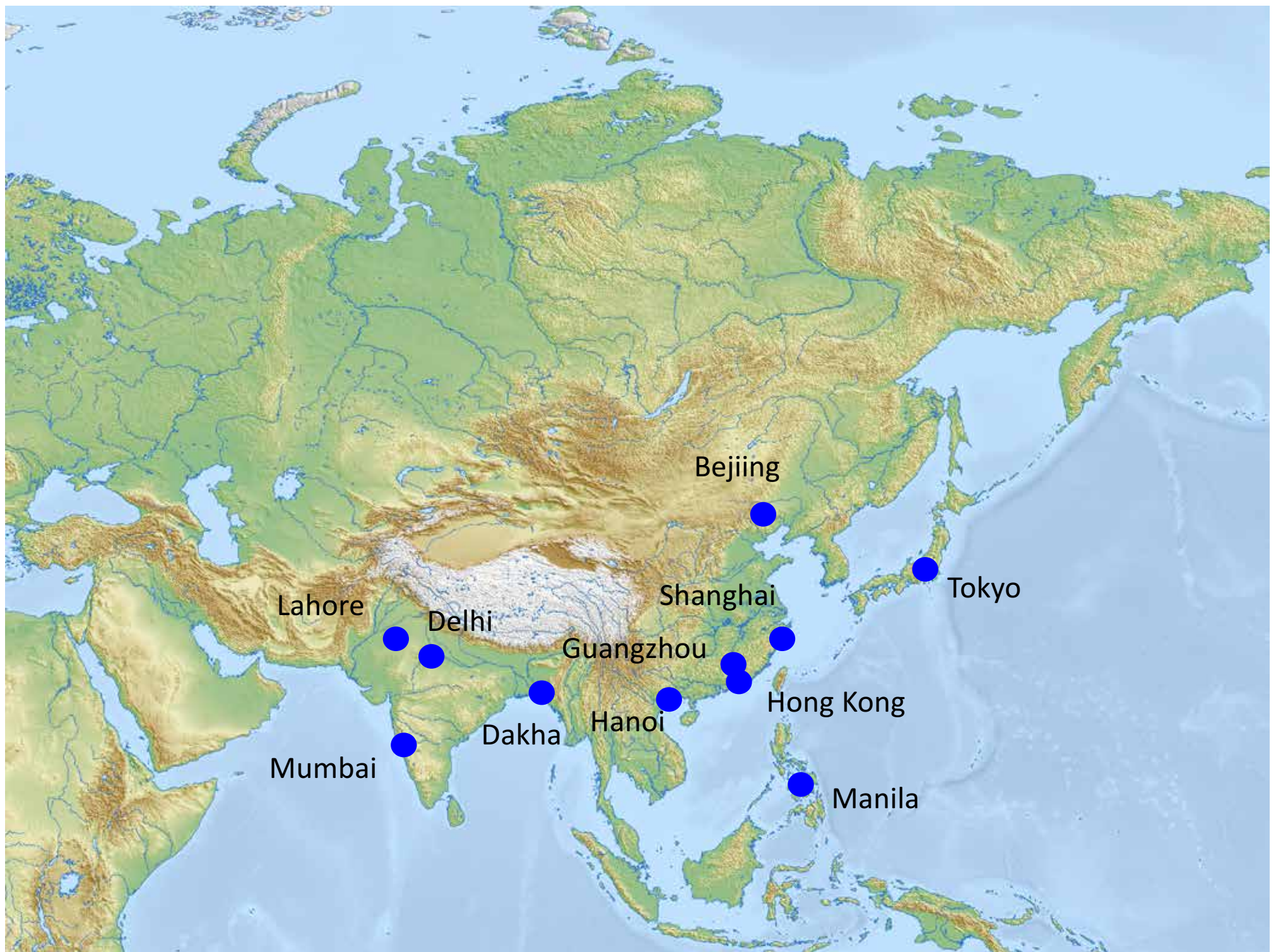
Barcelona

Istanbul

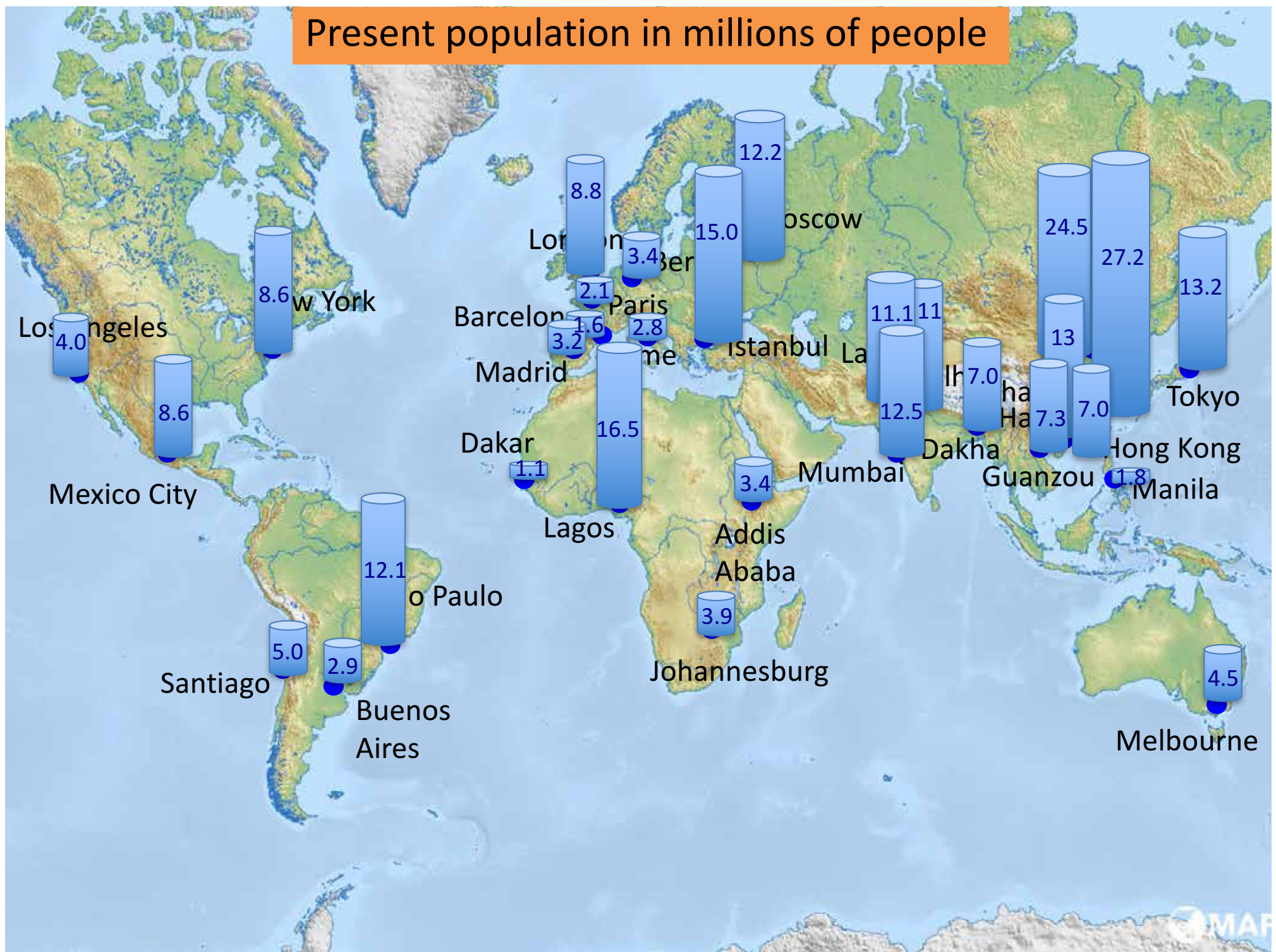
(Algiers) Rome (Tunis)

Madrid Barcelona
(Casablanca)

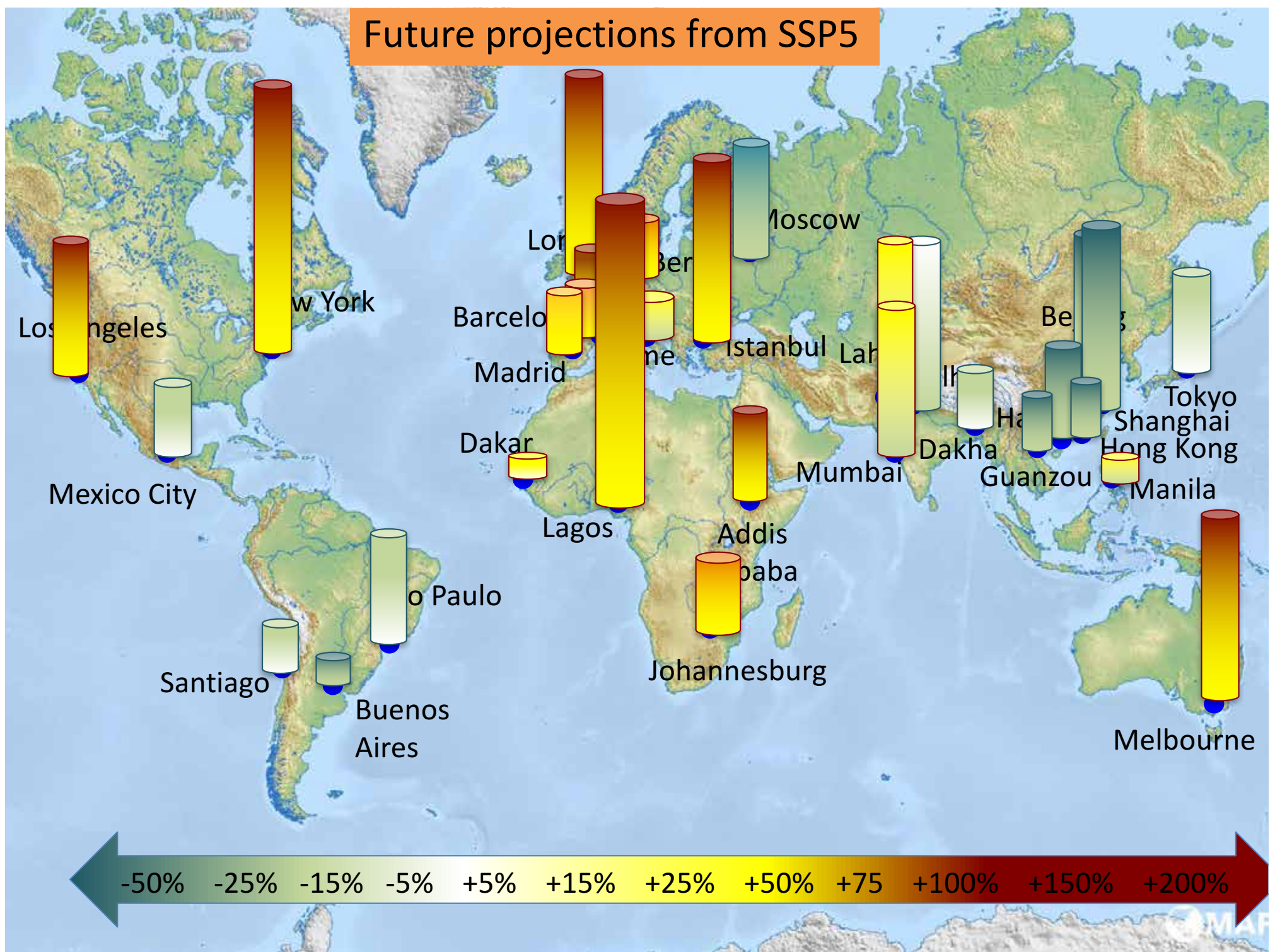




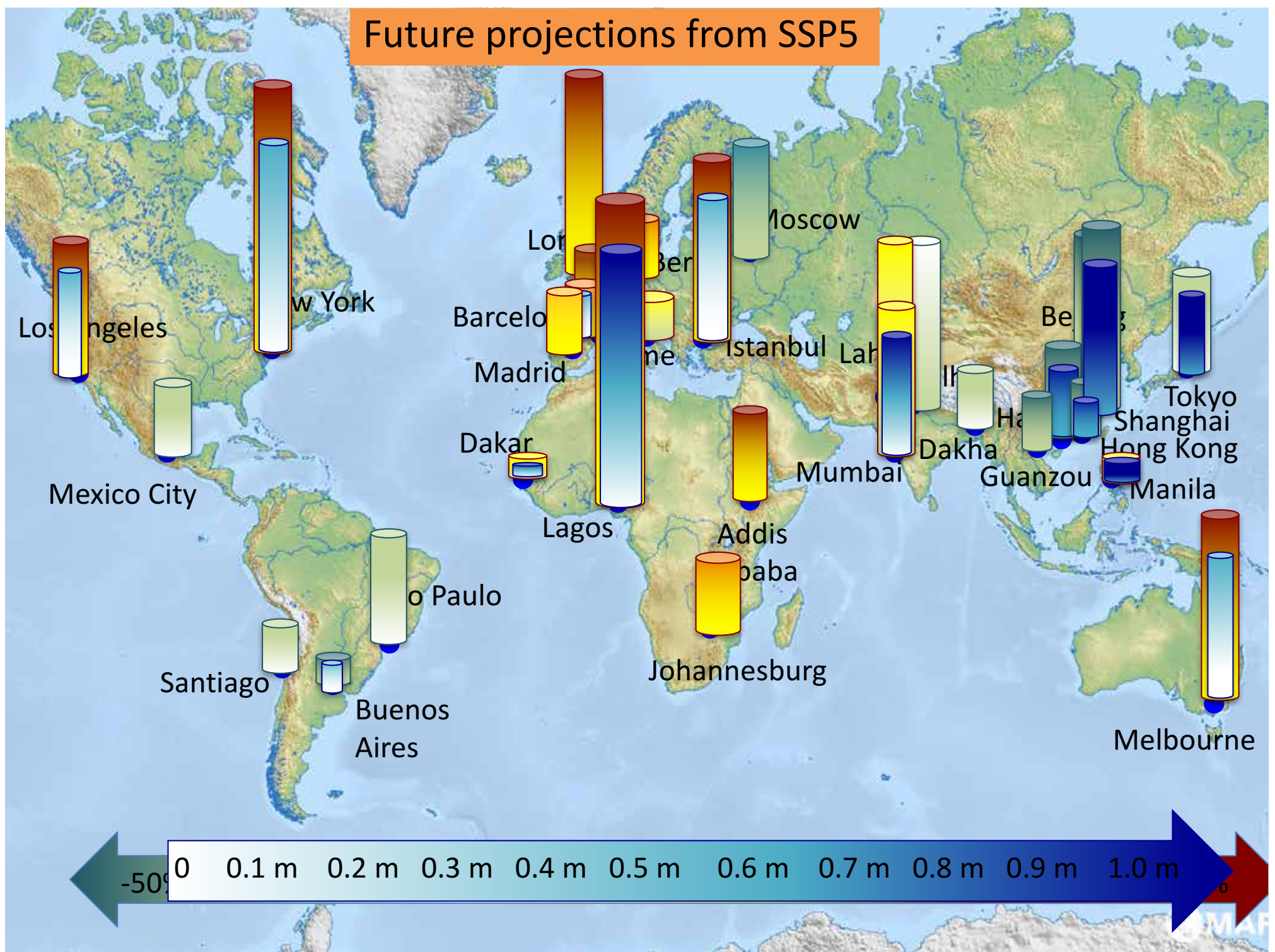
Present population in millions of people

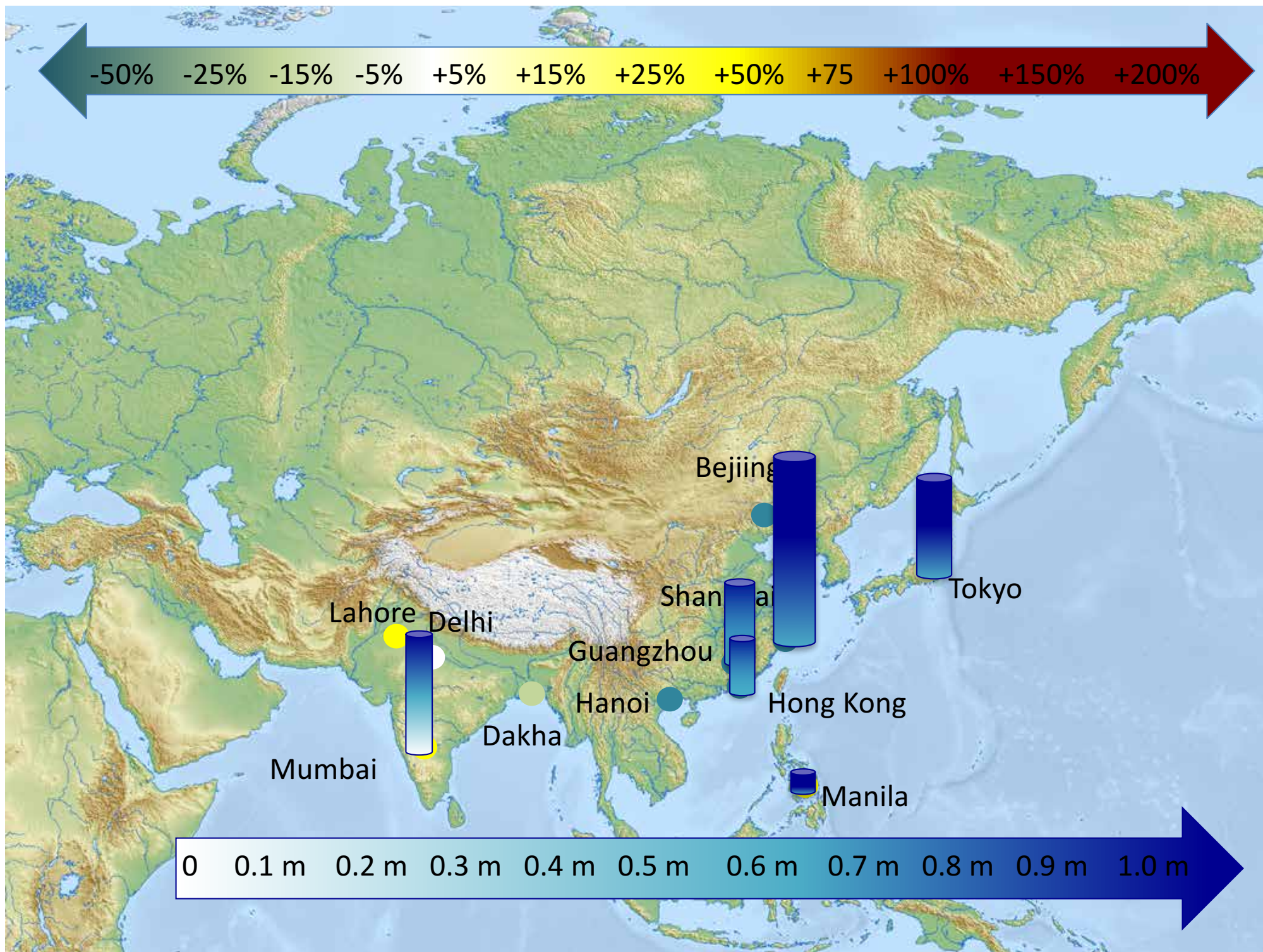


Future projections from SSP5



Future projections from SSP5





Some ideas for continuing this work

- Identify a quantitative index including climate-population and sea level rise
- Calculate climate-population fluxes to estimate migration potential
- Estimate vulnerability based on climate-population-sea level change information
- Learn about management of future cities based on present city analogue (based on the integrated index rather than climate-only)
- Will report in the future when these ideas are better developed.