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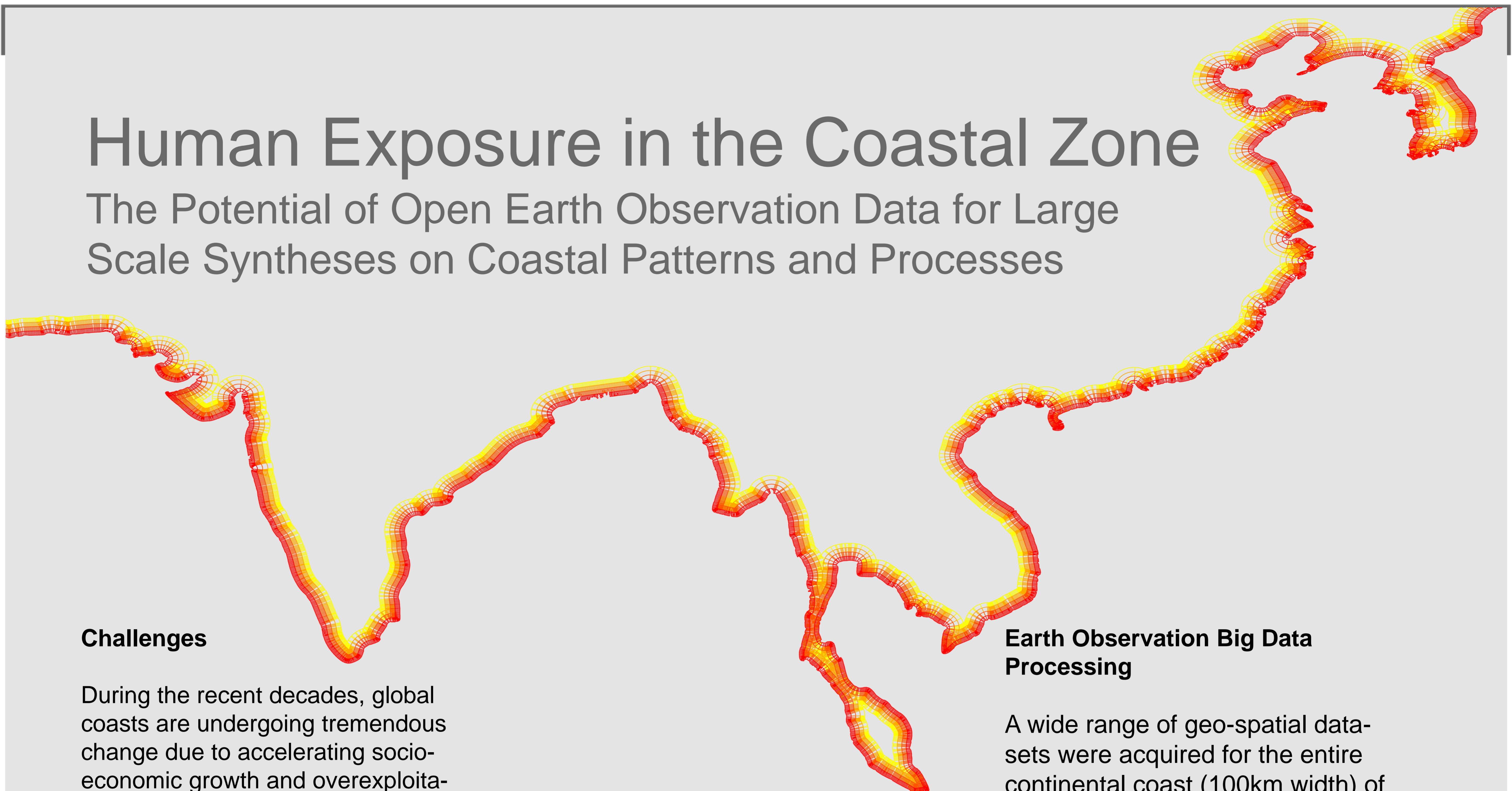
Human Exposure in the Coastal Zone
The Potential of Open Earth Observation Data for Large Scale Syntheses on Coastal Patterns and Processes

Challenges

During the recent decades, global coasts are undergoing tremendous change due to accelerating socio-economic growth and overexploitation, which have negative effects on the functioning and resilience of coastal systems. At the same time climate change, accelerating sea level rise, and increased occurrence of extreme events continuously aggravate coastal risks. In view of this, accurate, timely, and area-wide global information on natural as well as anthropogenic processes in the coastal zone are of paramount importance.

Objectives

- Are available open EO/GEO datasets suitable for global coastal monitoring?
- How can we add value to open EO/GEO data for investigations of social/biophysical coupling processes?
- How can these variables support international conventions and agreements?
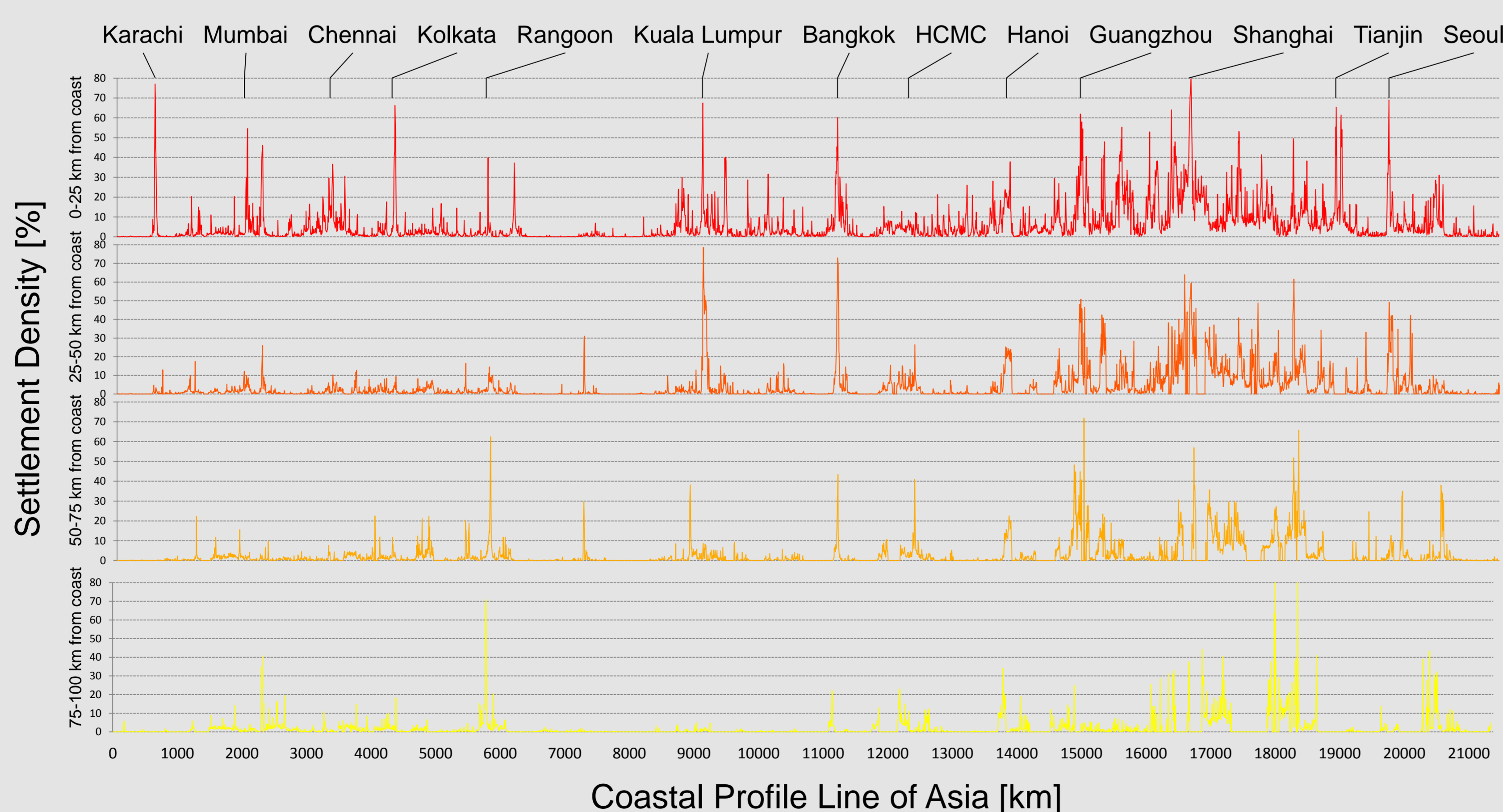
Earth Observation Big Data Processing

A wide range of geo-spatial datasets were acquired for the entire continental coast (100km width) of Asia. Spatially explicit and comparable metrics from available datasets were calculated for regular units every 5 km parallel and every 25km perpendicular to the coast line. An objective quantitative typology of coastal units is derived for preparation of large scale syntheses among various coastal themes that is meant to embrace wide scales of heterogeneity in physical-chemical forcing and socioeconomic drivers of change on coastal system structures/processes.
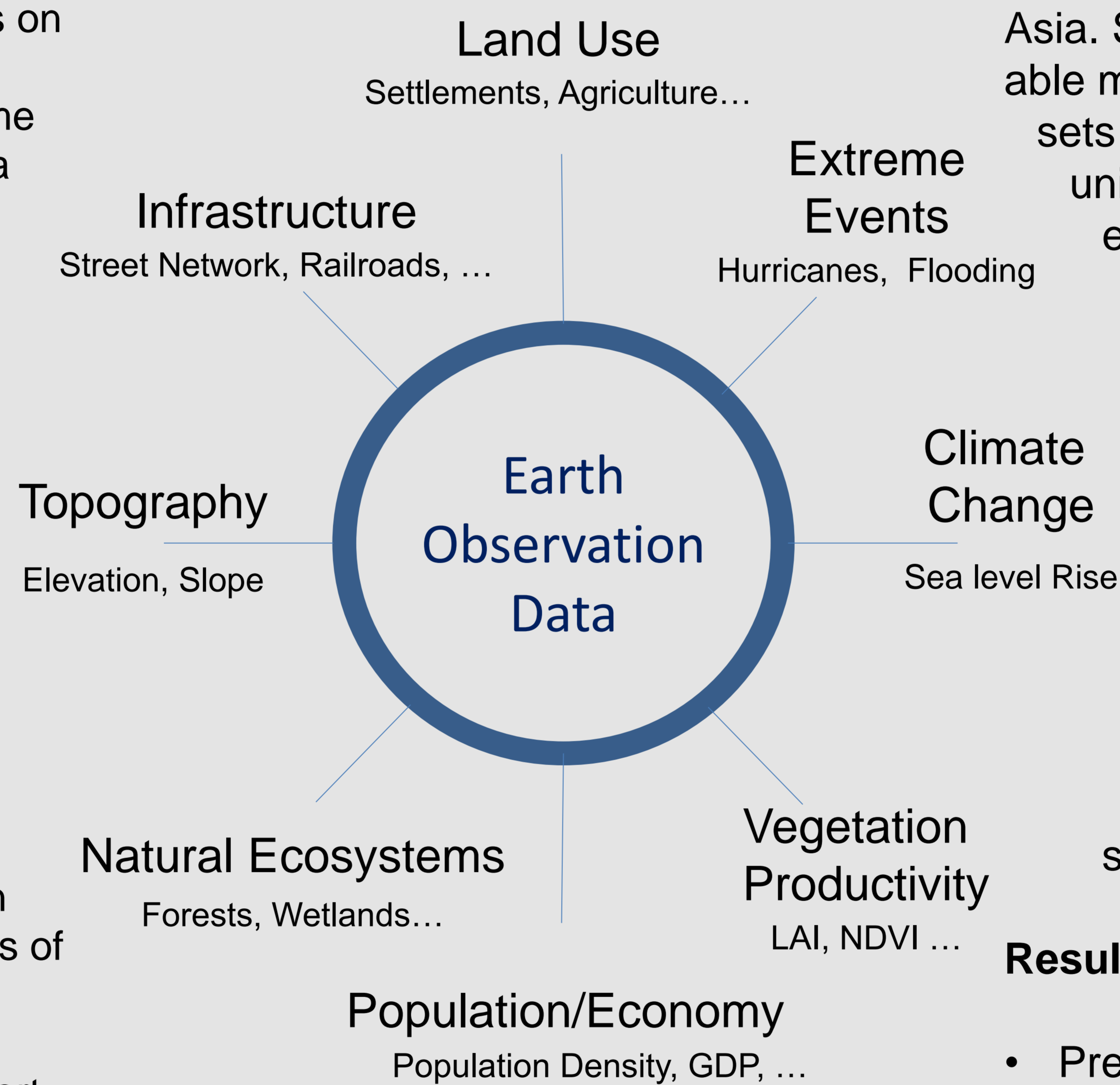
Results

- Preliminary results show highly unequal distributions of coastal development indicators in Asia, with large differences between and within different countries
- A clear trend of increasing anthropogenic structures is evident with decreasing distance to the coast
- Global products for comparable parameters can differ widely depending on definitions, derivation methods and scales
- Open EO/GEO data products have unexploited potential for developing indicators as basis for exposure monitoring and adaptation need assessment at continental/global scales

Land Use
Settlements, Agriculture…

Infrastructure
Street Network, Railroads, …

Extreme Events
Hurricanes, Flooding

Topography
Elevation, Slope

Earth Observation Data

Climate Change
Sea level Rise

Natural Ecosystems
Forests, Wetlands…

Vegetation Productivity
LAI, NDVI …

Population/Economy
Population Density, GDP, …

Settlement Density [%] — Coastal Profile Line of Asia [km]

Karachi Mumbai Chennai Kolkata Rangoon Kuala Lumpur Bangkok HCMC Hanoi Guangzhou Shanghai Tianjin Seoul

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