High-speed rail development and access equity: the case of Guangdong province, China

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In recent years, China has witnessed a nationwide and relatively fast development of high-speed rail (HSR) infrastructures, improving considerably accessibility between large cities. At regional scales, this however implies unbalanced development, as major poles were the priority of the 8+8 planning scheme at the national scale. In particular within mega-city regions, transport access equity becomes a central concern for future planning policies. This contribution focuses on the case of the Guangdong-Hong Kong-Macao Greater Bay Area, and more broadly on Guangdong province. Gathering socio-economic data and train timetables, we first build travel-time based and opportunity-based accessibility indices. We then estimate spatial interaction models using mobility data provided by Tencent, to build refined accessibility indices. These are applied to the current HSR network and to planning scenarios. We find that HSR considerably improved accessibility in most cities with average inter-city travel time reduced from 210 min to 168 min. This first development however increased polarisation around main corridors and increased access inequality. The mid-to-long term railway plan significantly flattens access differences and provides in particular a rebalancing between East and West of the region. This evolution can be understood as an example of transport network maturation at multiple spatial and temporal scales, and suggests a need for future research to understand the interplay between governance processes at different scales and the land-use transport interaction system.