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Urban landscapes and atmospheric GHG inversions: role of environmental and socio-economic drivers on evaluating mitigation policies.

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While networks of atmospheric greenhouse gas measurements are being deployed across various urban centers to support the assessment of greenhouse gas emissions, the socio-economic drivers, and hence the potential pathways toward emission reductions, vary widely between fast- and slow-growing cities. Vast conurbations in fast-developing economies tend to increase emissions despite current efforts to utilize energy-efficient technologies. By contrast, slow-growing cities tend to level-out or even reduce their carbon footprints, but the rapid extension of suburban areas poses a challenge to monitoring solutions and governing bodies as sources and sinks are displaced outside the city limits. We review here four different cases in widely different contexts, from single cities (Paris, Indianapolis, Mexico city) to conurbations in slow- (Los Angeles) and fast-growing (Jakarta) demographics. Urban system designs for atmospheric inversions are presented and discussed in the context of emission mitigation strategies and their manifestations at different spatial and temporal scales. In addition to ground-based networks, remote sensing solutions are evaluated (e.g. OCO-3) for similar applications shedding light on current technical limitations but also opportunities to support coherent and efficient mitigation strategies.