Integrated urban Greenhouse Gas Information System (IG^{3}IS): Advances in the urban GHG monitoring implementation plan and results of previous and current city-scale studies

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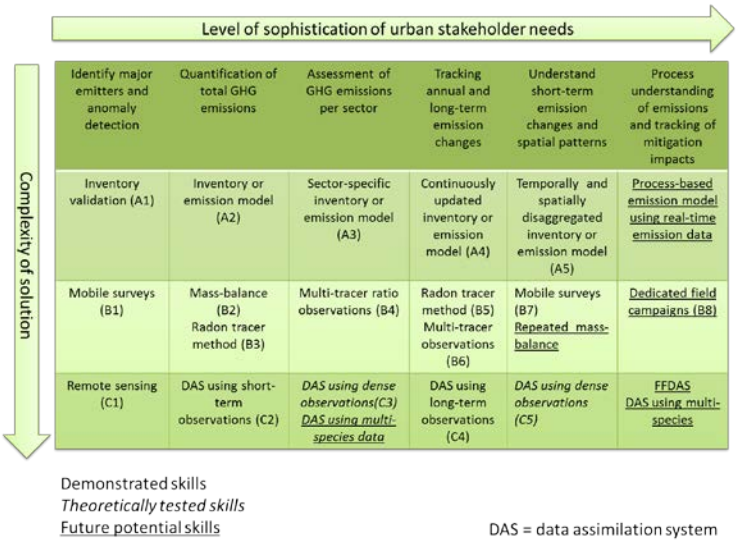
The Lima–Paris Action Agenda of the Paris Agreement has formalized a role for sub-national entities such as cities (large urban source regions) as leaders in greenhouse gas mitigation and climate adaptation. Currently, over half of the world's population lives in metropolitan areas and future population growth is also predicted to occur mostly in these urban centers. Therefore, the implementation plan of the Integrated Global Greenhouse Gas Information System (IG^{3}IS) of WMO/UNEP has identified urban GHG emission as a core action area where scientific information can be expected to respond to stakeholder needs in the near future. The IG^{3}IS activities aim to help create the framework to provide diagnosis of urban emissions at scales relevant to urban decision making and enable identification of low-carbon or carbon mitigation opportunities.



Here, we present the current status of the IG^{3}IS implementation plan and report on the identified (widely varying) needs of city stakeholders. IG^{3}IS will provide a tiered approach to help address those needs ranging from basic to most detailed emission information. Many research groups have worked on different data-driven, observational and (inverse) modelling techniques for city-scale GHG studies that can become core elements of a future IG^{3}IS framework after a harmonisation of techniques can be achieved. This study will also give a (short) overview of key elements of a potential tiered system and results from test-bed experiments e.g. Indianapolis, Paris, Recife, etc. where novel techniques (total column CO_2, lower-cost sensors, multi-species observations and modelling, etc.) have been tested.