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Better data for assessing local climate policies

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Introduction

There is a growing recognition that successfully managing the transformation towards a net zero carbon world as established through the climate goals of the recent Paris Agreement is an exercise of multi-level governance. Only through strong action at all levels, with close coordination across actors from the international scale down to countries, firms and individuals, might such ambitious goals be met (figure 1). Triggered by the slow progress in international climate policy over the last two decades, cities and local governments have teamed-up to combat climate change from the bottom up: thousands have developed and implemented local climate action plans. Yet, little is known about the impact those measures had on reducing emissions (Seto *et al* 2014).

Data is a constraint for understanding local climate action

Despite significant progress, the availability of comparable data remains among the biggest constraints for better understanding (the effectiveness of) local climate action as highlighted in recent urban climate change assessments (Grubler *et al* 2012, Seto *et al* 2014). Researchers have compiled a few comprehensive and comparable sets of local emissions inventories, but in most cases these are *small-N* samples for a single point in time. Those datasets usually do not allow for any meaningful statistical analysis. By providing a *large-N* sample of comprehensive, consistent and comparable emission inventories for the largest metropolitan areas in the US, Markolf *et al* (2017) tackle a crucial issue that has hindered progress in learning about local climate action to date. The resulting data set includes not only a nice cross-section with 100 metropolitan areas, but also spans the period 2002–2014 allowing us to track progress over time. They compile these inventories from publicly available sources, allowing the data to be regularly extended and updated in the future. As such

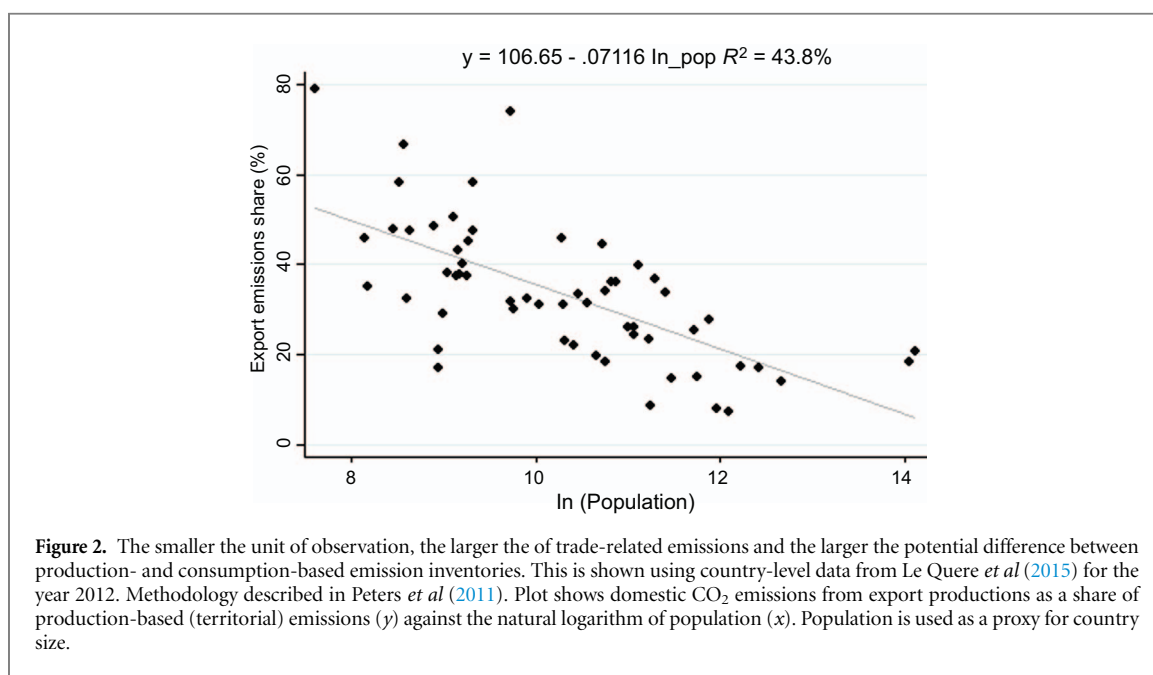
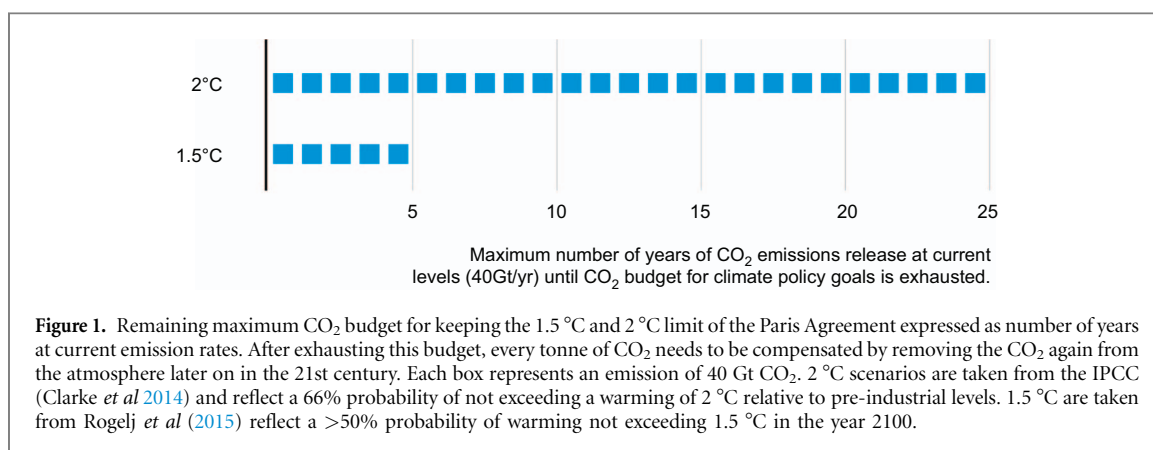
this dataset promises to be of high value for empirical urban climate change research in the future.

How we account for emissions matters for results

Markolf *et al* (2017) find large variations in CO₂ emissions across metropolitan areas that can range from just over 5 tCO₂/cap to over 60 tCO₂/cap. This is due to the production-based inventory method used that accounts for all CO₂ emissions arising from the respective metropolitan territories. For example, emissions from a coal-fired power plant or a steel plant are fully assigned to the metropolitan area where it is located even though most or some of the output might be consumed in other areas. As major industrial activities are often highly concentrated in space, the authors find some metropolitan areas with much higher per capita CO₂ emissions levels than most others.

The literature shows that alternative consumption-based CO₂ inventories that assign emissions from the production of exports to the consuming area provide a much more levelled picture across areas (Minx *et al* 2013). Hence, the choice of accounting approach becomes increasingly influential for emission benchmarking exercises as unit observations decline in geographical size (e.g. metropolitan areas rather than federal states or countries), because specialization and trade dependence increases (figure 2).

While the questions of how to draw adequate system boundaries for local emission inventories and what constitutes an adequate benchmark for comparing different local areas have been of great concern in the urban climate change discussion (Grubler *et al* 2012, Kennedy *et al* 2010, Seto *et al* 2014), providing this data set as a production-based inventory is a prudent choice. It provides all the major reporting items most local governments routinely collect and therefore meets a critical policy demand. Moreover, production-based inventories are also a good starting point for changing the scope towards hybrid or fully-fledged consumption-based inventories. It is desirable to have such complementary inventories and on the



back of this contribution this can now be fairly easily achieved.

Focus towards assessing local climate policies empirically

Compiling emission inventories is very resource intensive. This, in fact, has not only diverted scarce resources from practical climate policy considerations in local governments, but equally in research where an empirical understanding of alternative local climate policies is still missing. To make better progress in the future there is a real need for similar research efforts to compile similar *large-N* samples of urban emission inventories across time from readily accessible data in other countries. But above all, researchers need to start using these data-sets in order to understand local climate policies: what instruments and measures have worked under which conditions. Such research is the prerequisite for learning at the science-policy interface. Otherwise, the role and contribution of local govern-

ments to the global fight of climate change will be a story of anecdotal evidence and will essentially remain unknown.

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