



Progress towards comprehensive uncertainty estimates and emissions ensembles with the Community Emissions Data System (CEDS)

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- **CEDS** is an open source system (release Fall 2017 – soon!) for producing timely, consistent, and reproducible emissions trends
 - Annual estimates by country, sector, fuel from 1750 – last full year
 - Gridded data
 - **SO₂, NO_x, NH₃, CO, NMVOC, BC, OC, CH₄, CO₂**
- Next Steps: **Comprehensive uncertainty estimates** and producing **emissions ensembles** rather than point estimates
- Coupling uncertainty with emissions for **recent years** is critical

See Poster and CEDS Demonstration (Thursday 17:30)

GEIA Conference 2017

Hamburg, Germany

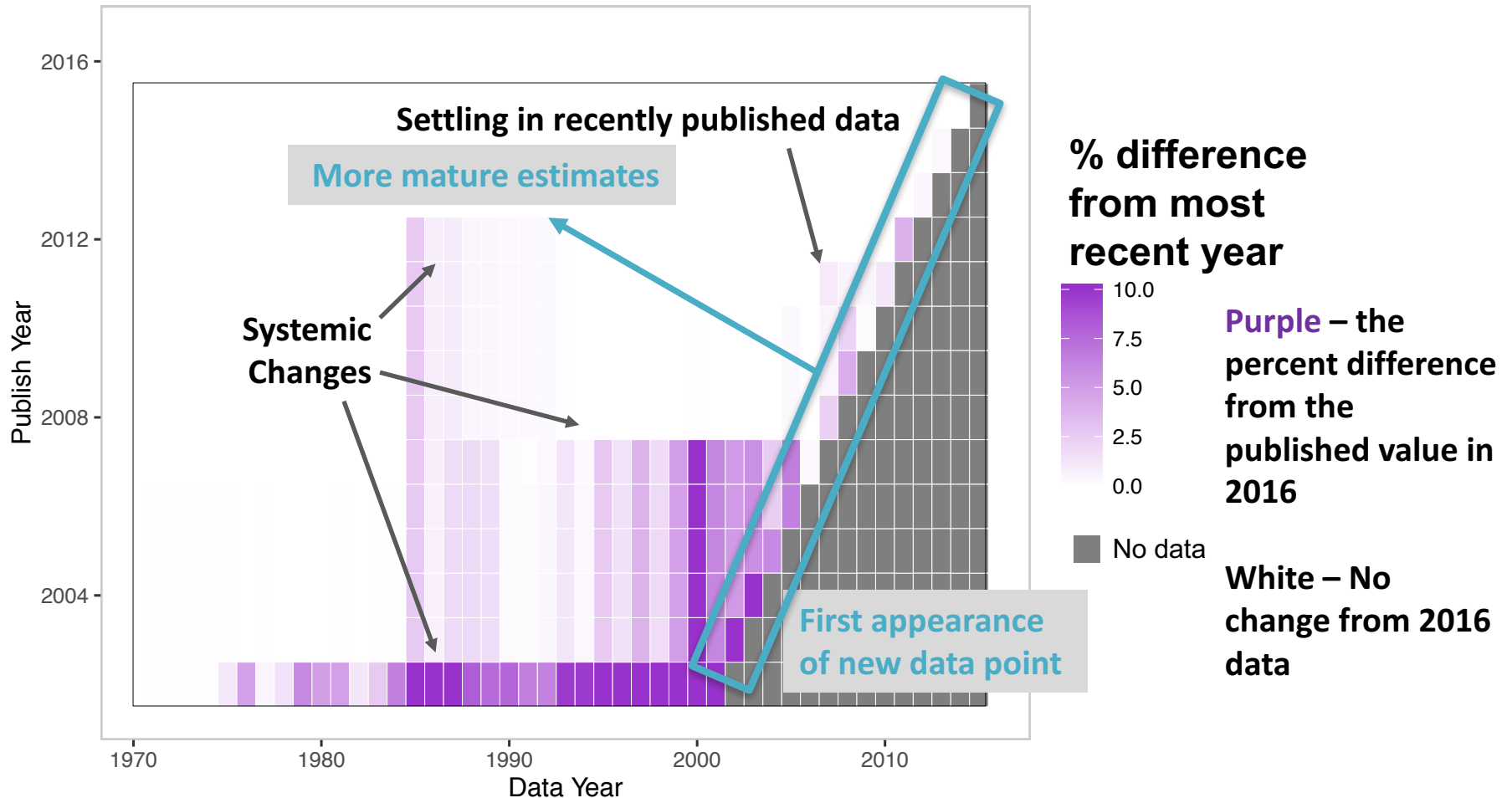


Uncertainty in Recent Year Energy Data

Gas Consumption in Canada

How do new energy estimates evolve overtime?

- Settling in recently published data
- System rewrites/corrections



BP Energy Statistics – Editions 2002 - 2016

Uncertainty in Recent Year Energy Data

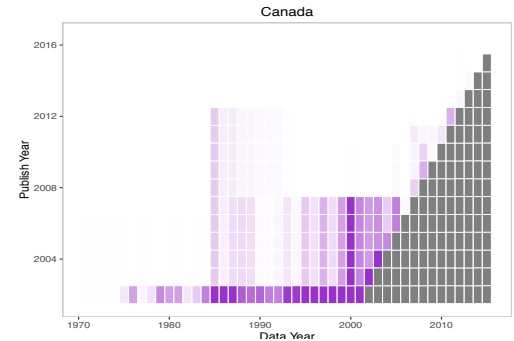
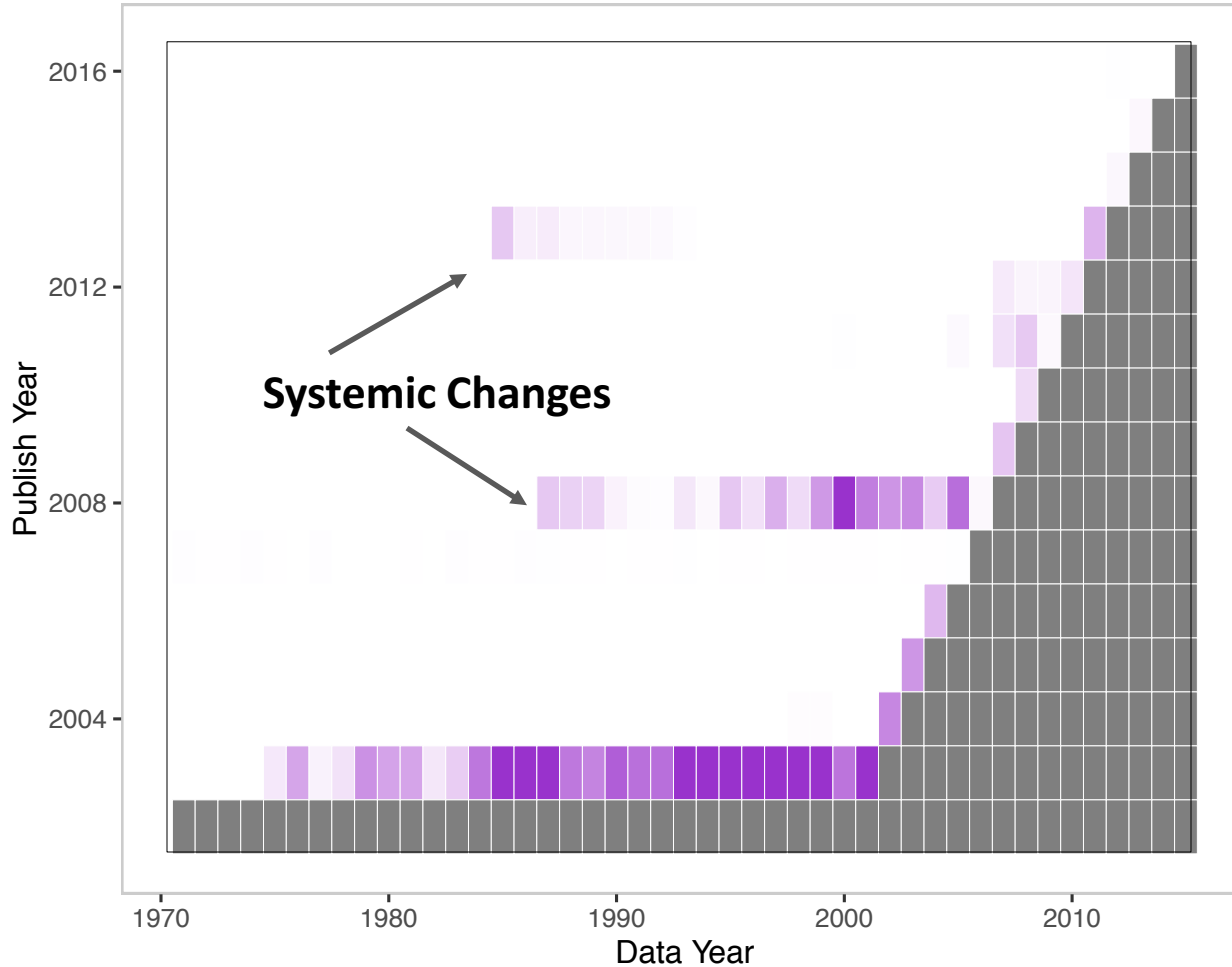
Gas Consumption in Canada



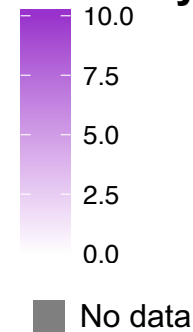
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Now look at how data points change from the previous year estimate.



**% difference from
previous year**



BP Energy Statistics – Editions 2002 - 2016

Uncertainty in Recent Year Energy Data

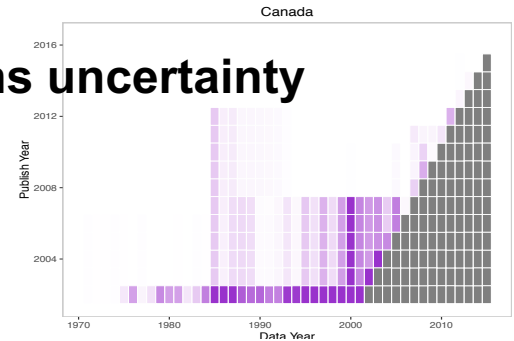
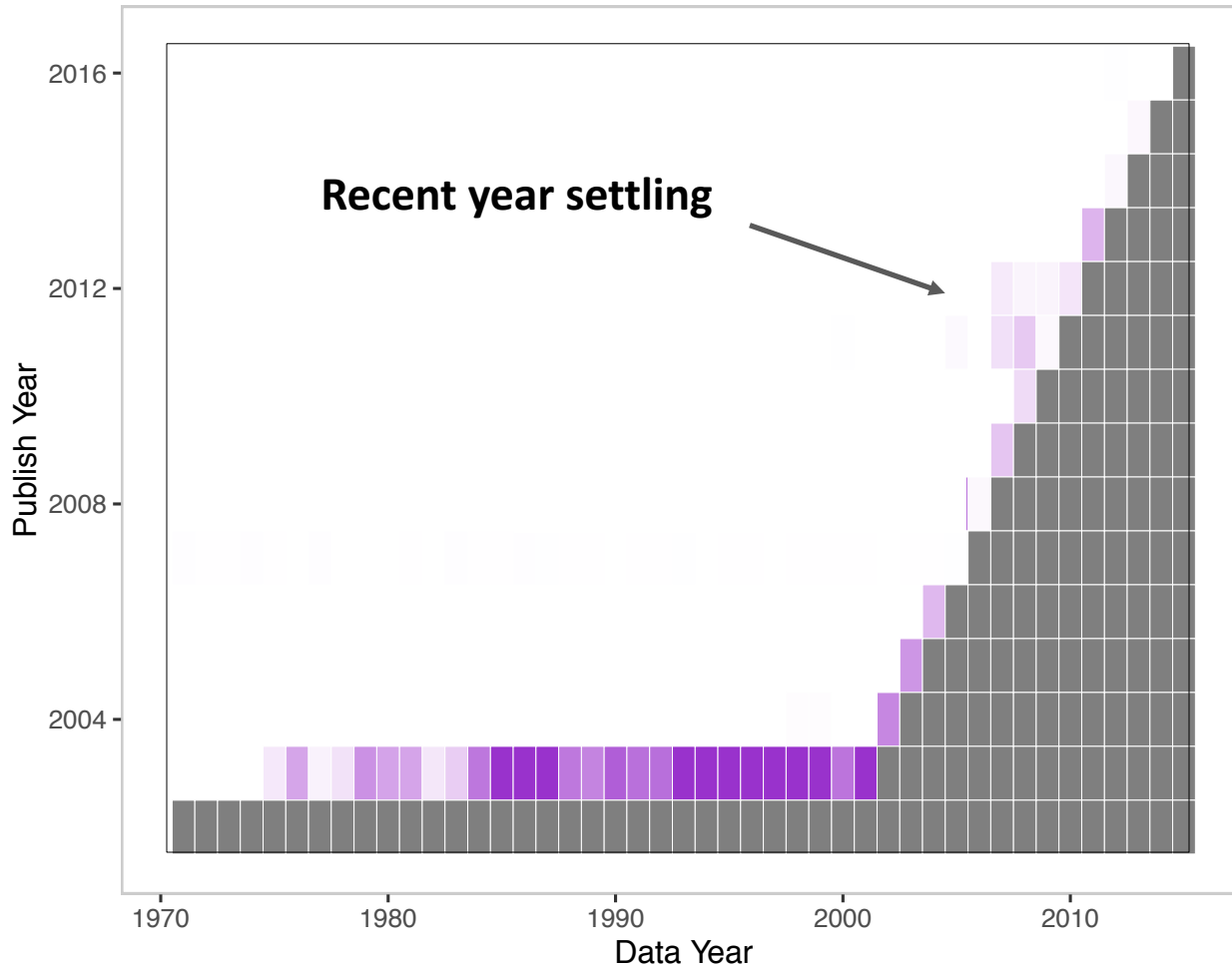
Gas Consumption in Canada



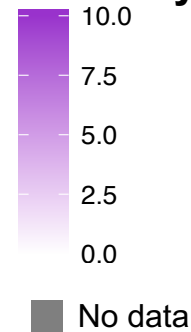
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Separate into 2 data sets – based on the kind of change
Develop distributions and probabilities to inform emissions uncertainty



% difference from
previous year

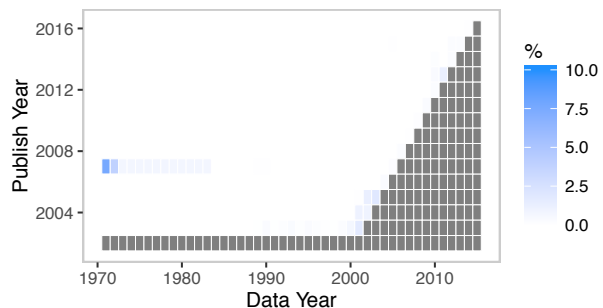


BP Energy Statistics – Editions 2002 - 2016

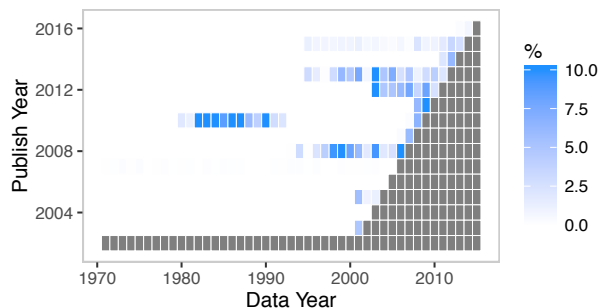
Uncertainty in Recent Year Energy Data

Coal Consumption

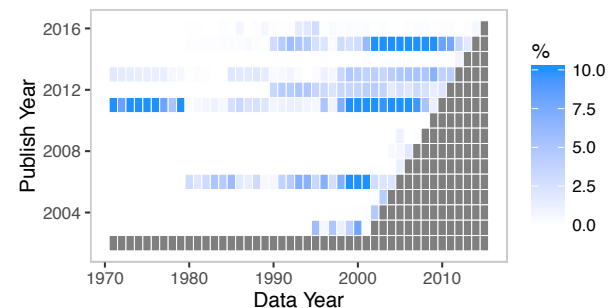
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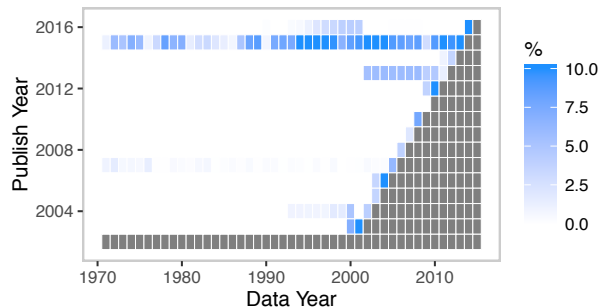
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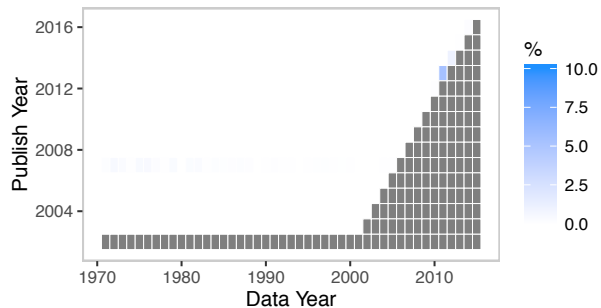
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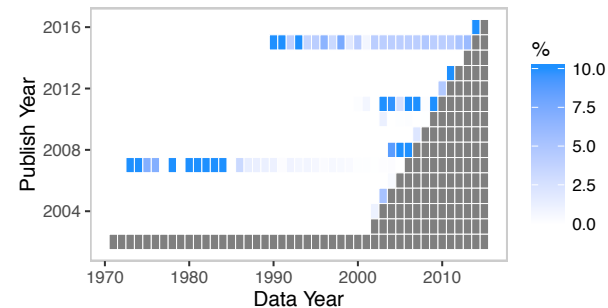
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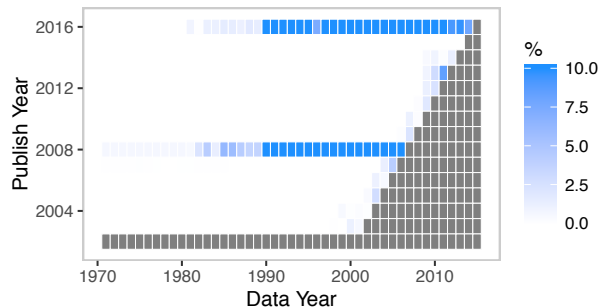
South Korea



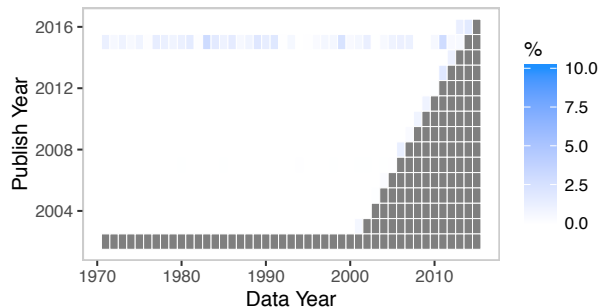
Indonesia



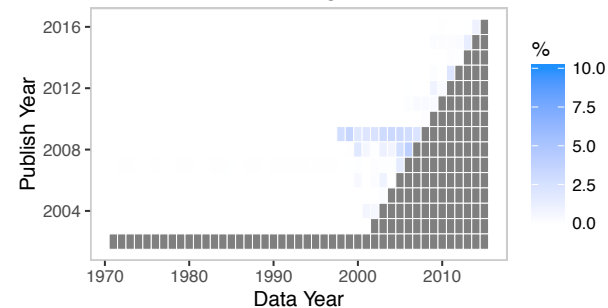
India



Germany



United Kingdom



Recent year uncertainty

- Similar analysis for other components of recent year emissions

Comprehensive uncertainty

- Guide assumptions with literature (including observational studies), comparisons between inventories, and comparisons within CEDS
- Reduce dimensionality by a “tiered” approach to group assumptions
Otherwise: 55 sectors X 200+ countries X 8 fuels X 9 emissions
- Consider correlations across sectors and countries (spatially)
- Result: **uncertainty ensembles** consistent across species, region, time

The data system and input data will be released as open source software

- Project Page: <http://www.globalchange.umd.edu/CEDS>
- Public Release: <https://github.com/JGCRI/CEDS>
- Scheduled release: Early Fall 2017
- Including capability of producing gridded emission datasets

See *Poster and CEDS Demonstration – Thursday 17:30*