Credit: A. Criscitiello

A half century of partnerships in ice core sciences

Evidence of progress and areas for improvement

Matt Osman, Bess Koffman, Ali Criscitiello, Sofia Guest

IPICS 2022

International Partnerships in Ice Core Sciences

A familiar image …

2004: IPICS inception & 1st workshop

1st IPICS OSM, ca. 2012, France

2nd IPICS OSM ca. 2016, Tasmania

3rd IPICS OSM

You Are Here

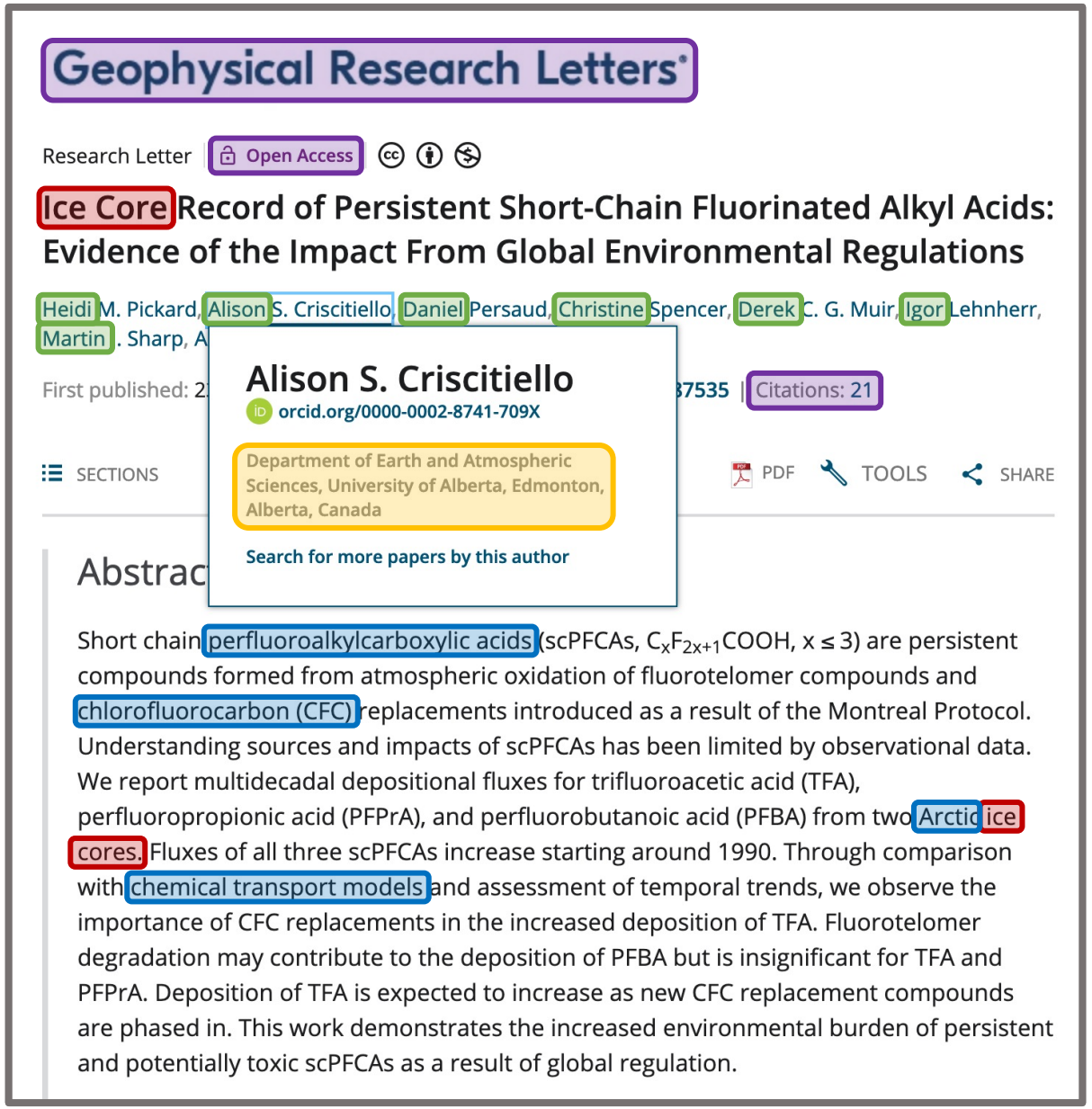
Our approach

Data-mined and vetted *n* > 3400 "ice core(s)"-related abstracts across >100 journals spanning back to [1]

What info can we get?

- Gender parity
- Scientific impacts / access
- Geographic representation
- Community foci & trends

E.g.



Geophysical Research Letters

Research Letter | Open Access

Ice Core Record of Persistent Short-Chain Fluorinated Alkyl Acids: Evidence of the Impact From Global Environmental Regulations

Heidi M. Pickard, Alison S. Criscitiello, Daniel Persaud, Christine Spencer, Derek C. G. Muir, Igor Lehnherr, Martin . Sharp, A

First published: 2 37535 | Citations: 21

Alison S. Criscitiello
orcid.org/0000-0002-8741-709X
Department of Earth and Atmospheric Sciences, University of Alberta, Edmonton, Alberta, Canada
Search for more papers by this author

SECTIONS PDF TOOLS SHARE

Abstrac

Short chain perfluoroalkylcarboxylic acids (scPFCAs, $C_xF_{2x+1}COOH$, $x \leq 3$) are persistent compounds formed from atmospheric oxidation of fluorotelomer compounds and chlorofluorocarbon (CFC) replacements introduced as a result of the Montreal Protocol. Understanding sources and impacts of scPFCAs has been limited by observational data. We report multidecadal depositional fluxes for trifluoroacetic acid (TFA), perfluoropropionic acid (PFPrA), and perfluorobutanoic acid (PFBA) from two Arctic ice cores. Fluxes of all three scPFCAs increase starting around 1990. Through comparison with chemical transport models and assessment of temporal trends, we observe the importance of CFC replacements in the increased deposition of TFA. Fluorotelomer degradation may contribute to the deposition of PFBA but is insignificant for TFA and PFPrA. Deposition of TFA is expected to increase as new CFC replacement compounds are phased in. This work demonstrates the increased environmental burden of persistent and potentially toxic scPFCAs as a result of global regulation.

[1] Dansgaard et al. (1969) *Science*

Our approach

Data-mined and vetted *n* > 3400 "ice core(s)"-related abstracts across >100 journals spanning back to [1]

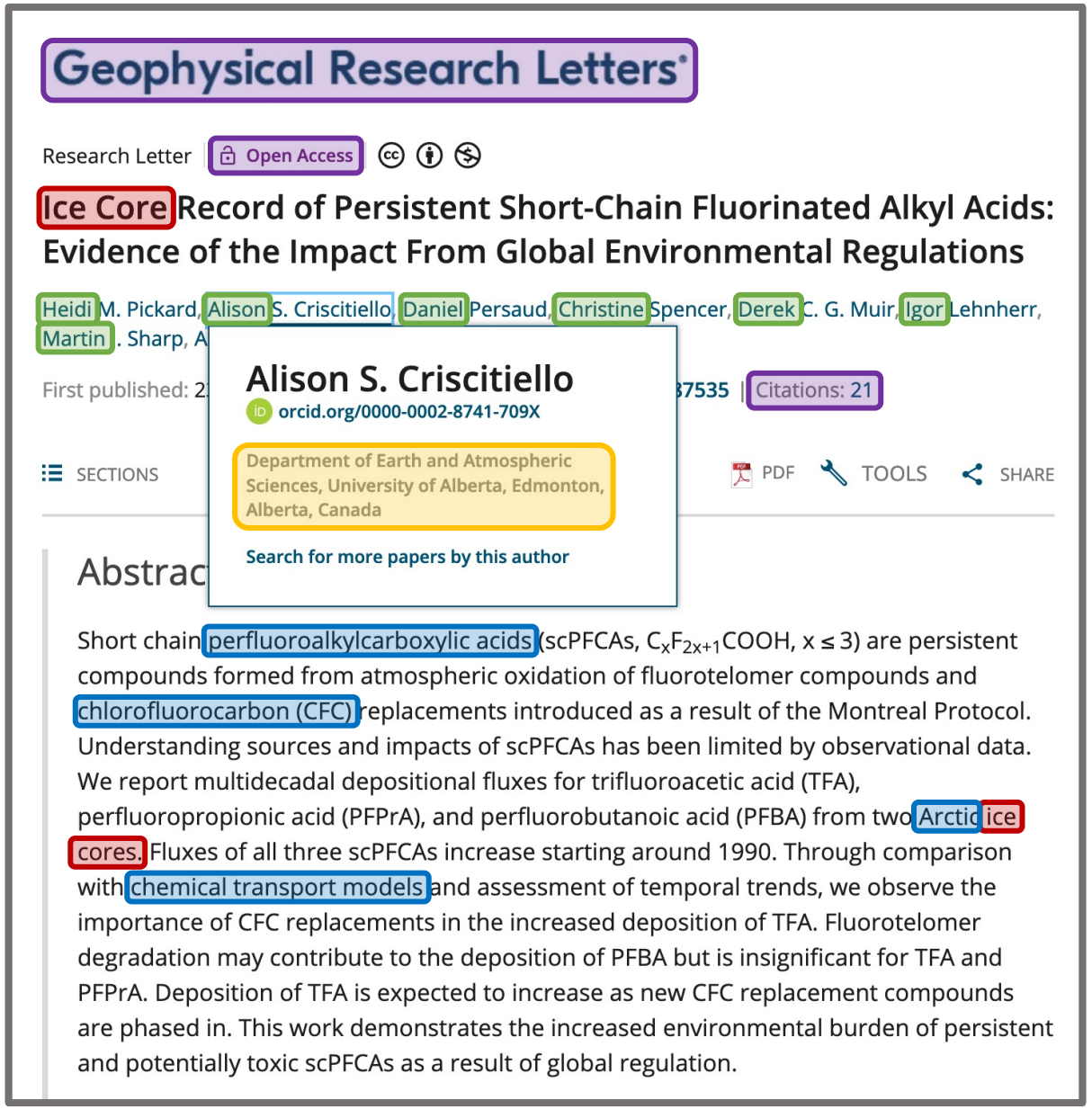
What info can't we get?

100% gender ID accuracy

c.f., *https://www.genderize.io*

Diversity* [broadly defined, e.g.: race, religion, ethnicity, orientation, age, (dis)ability, career-stage, background…]

E.g.



Geophysical Research Letters

Research Letter | Open Access

Ice Core Record of Persistent Short-Chain Fluorinated Alkyl Acids: Evidence of the Impact From Global Environmental Regulations

Heidi M. Pickard, Alison S. Criscitiello, Daniel Persaud, Christine Spencer, Derek C. G. Muir, Igor Lehnherr, Martin . Sharp, A

First published: 2 37535 | Citations: 21

Alison S. Criscitiello
orcid.org/0000-0002-8741-709X
Department of Earth and Atmospheric Sciences, University of Alberta, Edmonton, Alberta, Canada
Search for more papers by this author

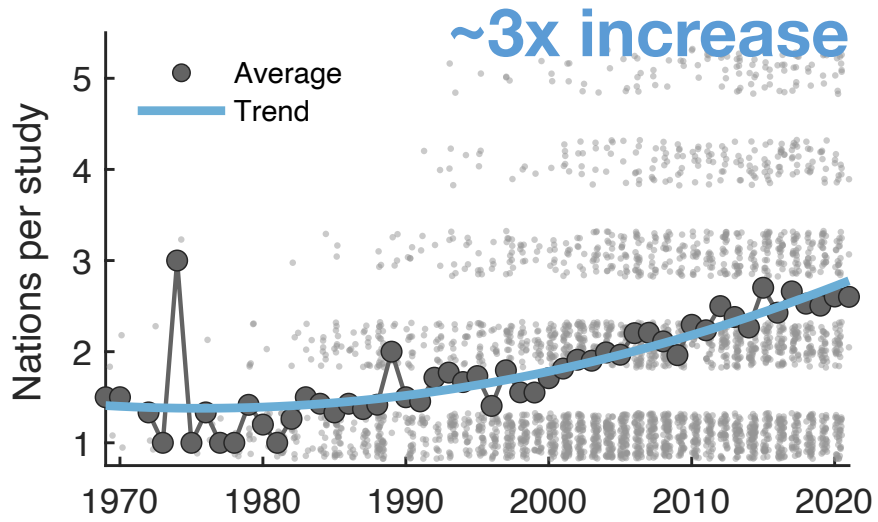
SECTIONS PDF TOOLS SHARE

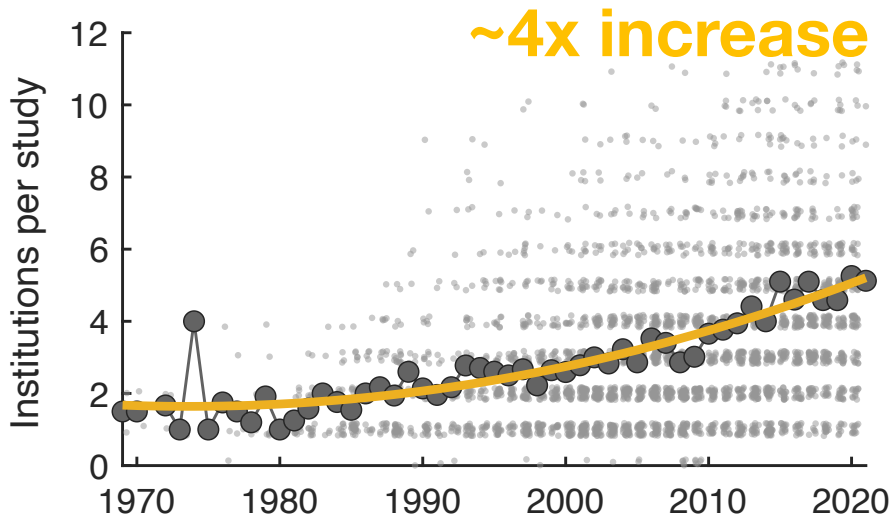
Abstrac

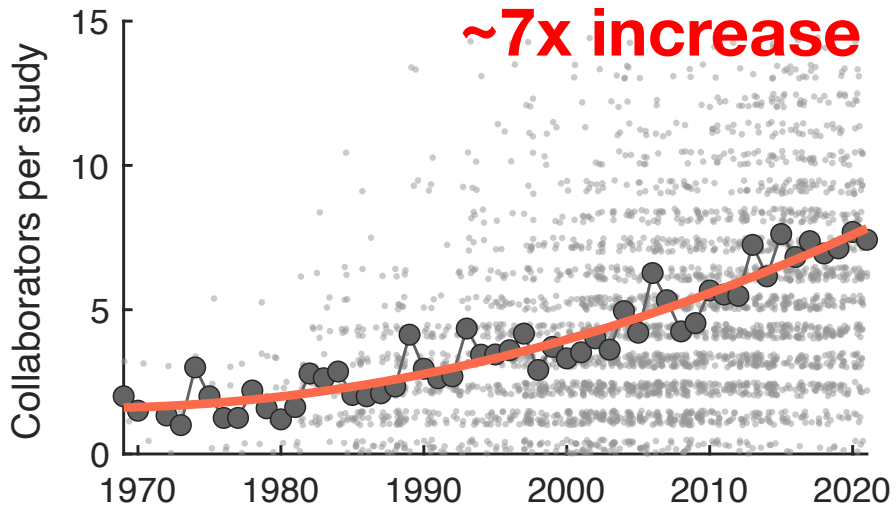
Short chain perfluoroalkylcarboxylic acids (scPFCAs, $C_xF_{2x+1}COOH$, $x \leq 3$) are persistent compounds formed from atmospheric oxidation of fluorotelomer compounds and chlorofluorocarbon (CFC) replacements introduced as a result of the Montreal Protocol. Understanding sources and impacts of scPFCAs has been limited by observational data. We report multidecadal depositional fluxes for trifluoroacetic acid (TFA), perfluoropropionic acid (PFPrA), and perfluorobutanoic acid (PFBA) from two Arctic ice cores. Fluxes of all three scPFCAs increase starting around 1990. Through comparison with chemical transport models and assessment of temporal trends, we observe the importance of CFC replacements in the increased deposition of TFA. Fluorotelomer degradation may contribute to the deposition of PFBA but is insignificant for TFA and PFPrA. Deposition of TFA is expected to increase as new CFC replacement compounds are phased in. This work demonstrates the increased environmental burden of persistent and potentially toxic scPFCAs as a result of global regulation.

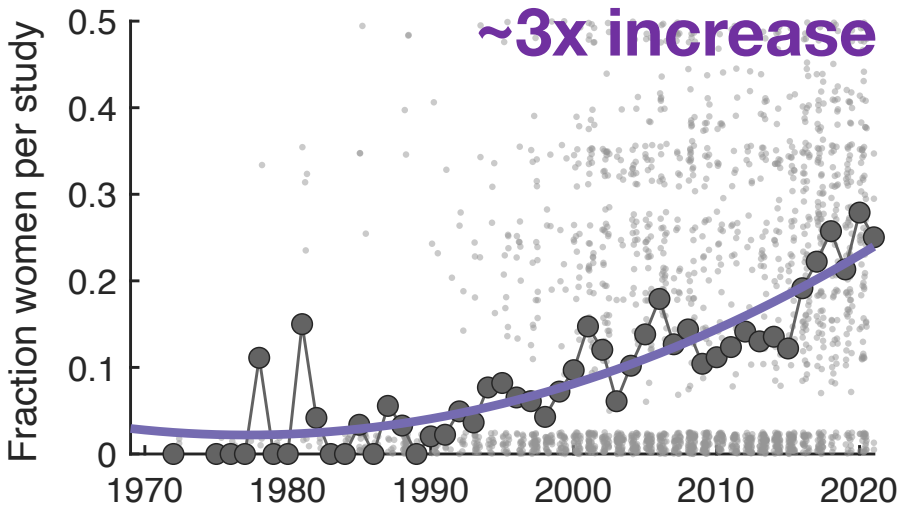
[1] Dansgaard et al. (1969) *Science*

A half-century of progress



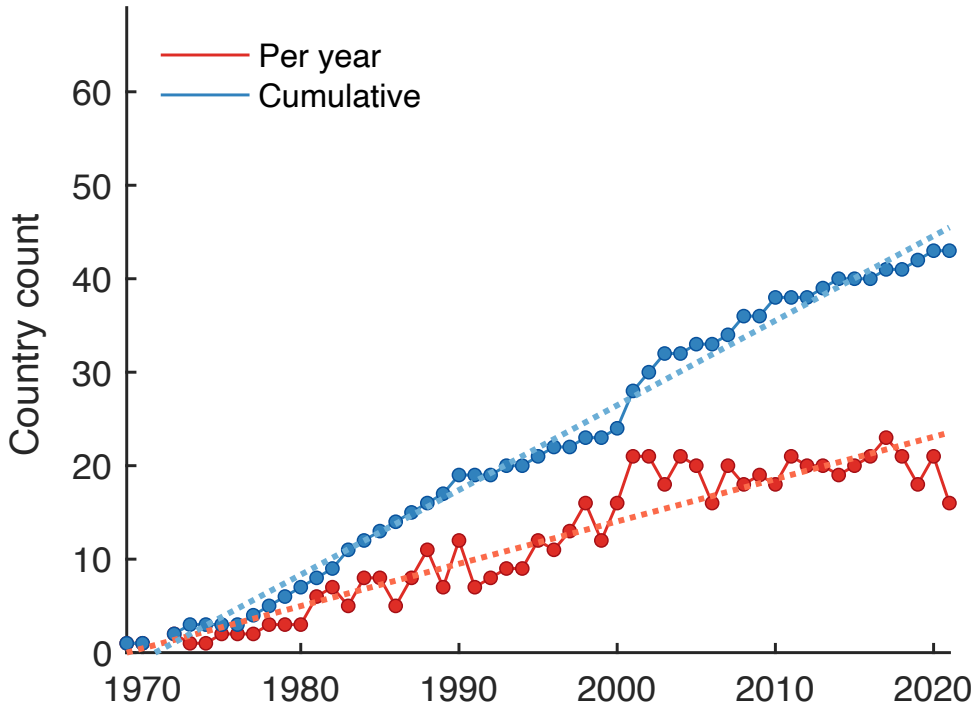




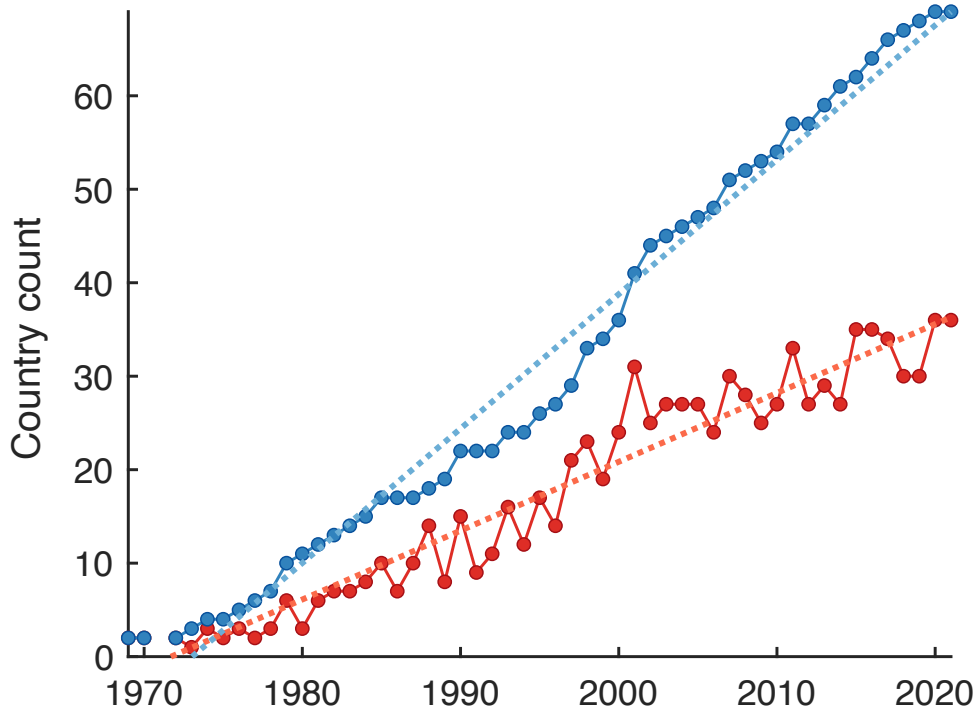


International representation is growing

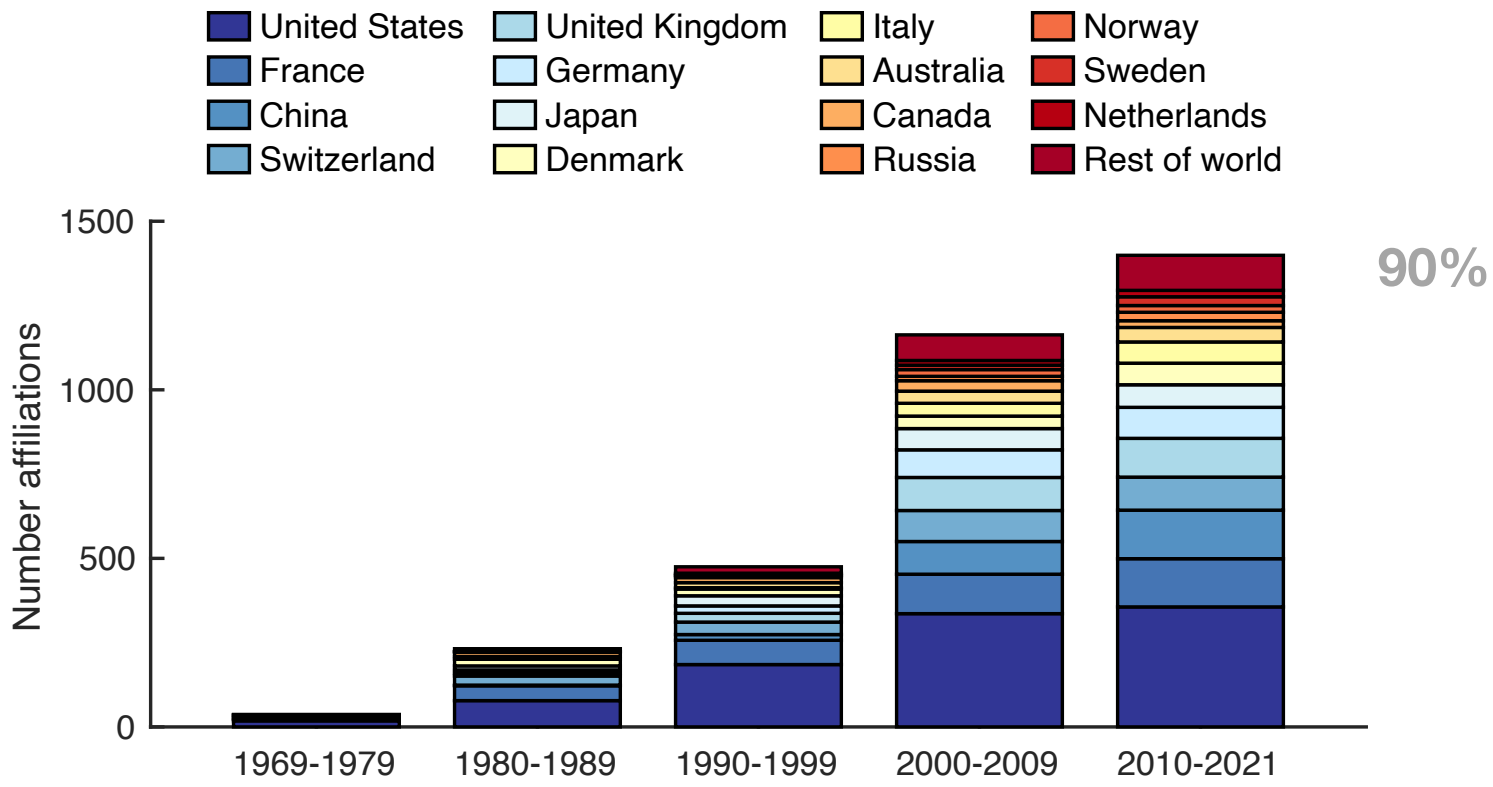
First author only



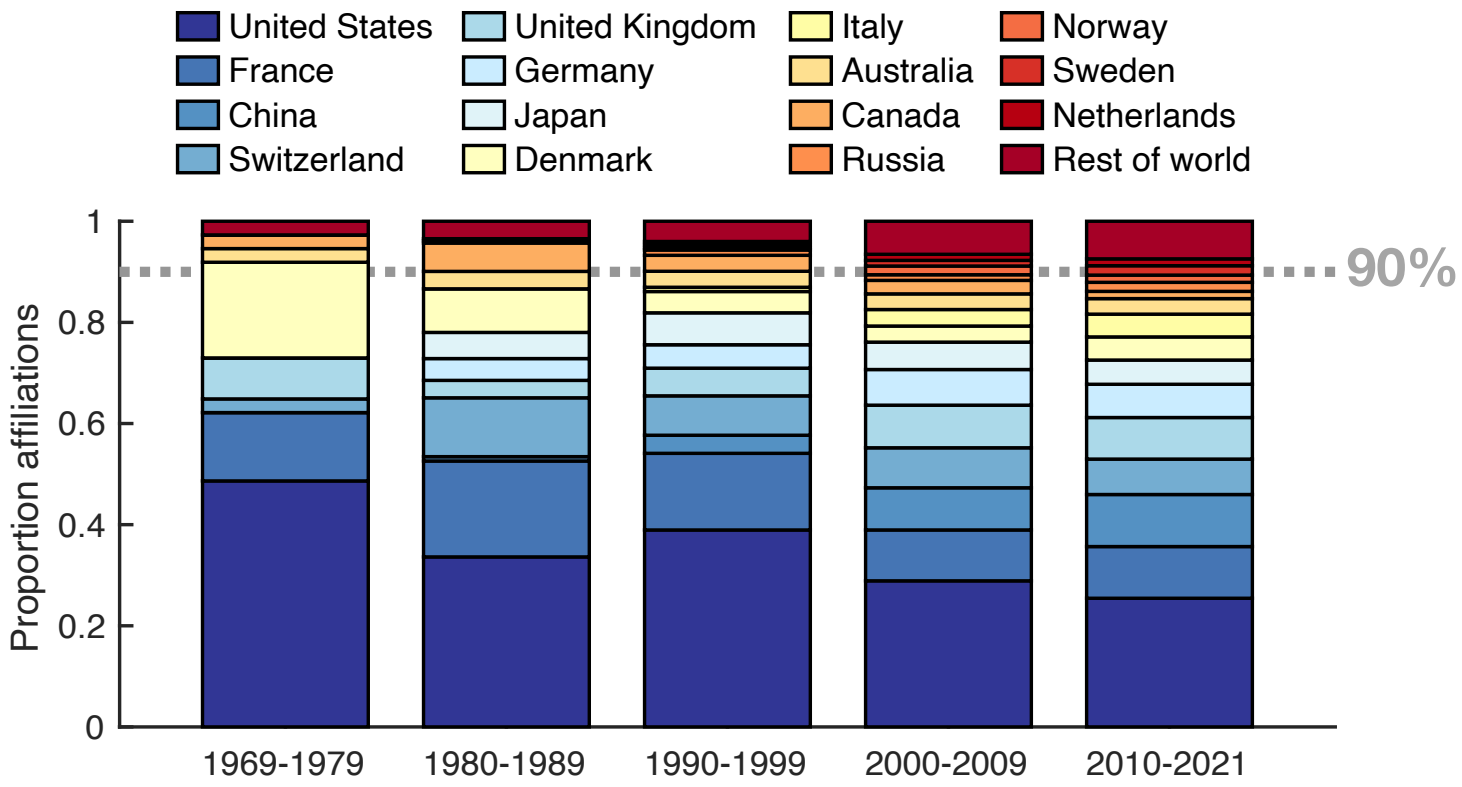
All collaborators



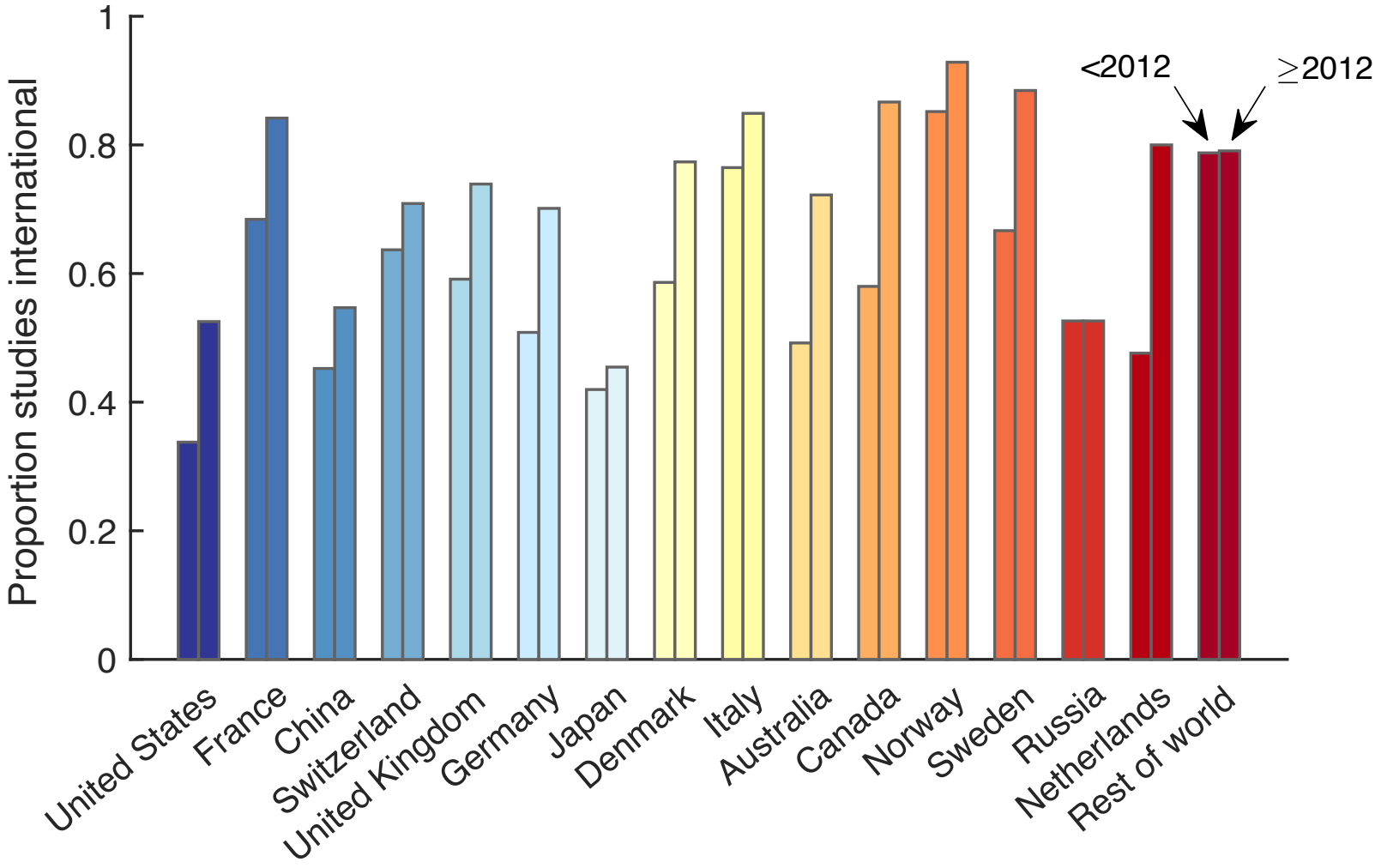
International representation is growing



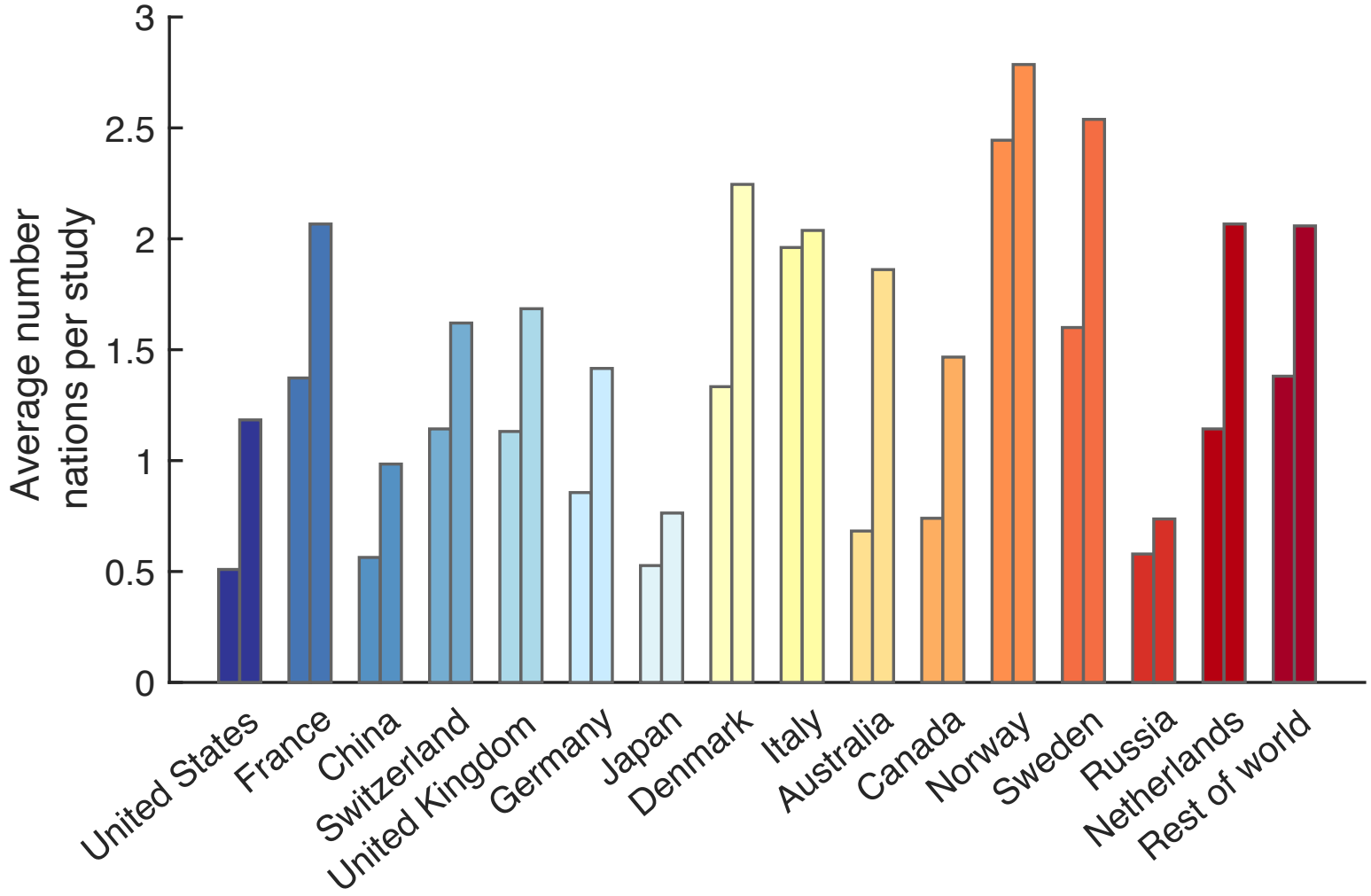
International representation is growing



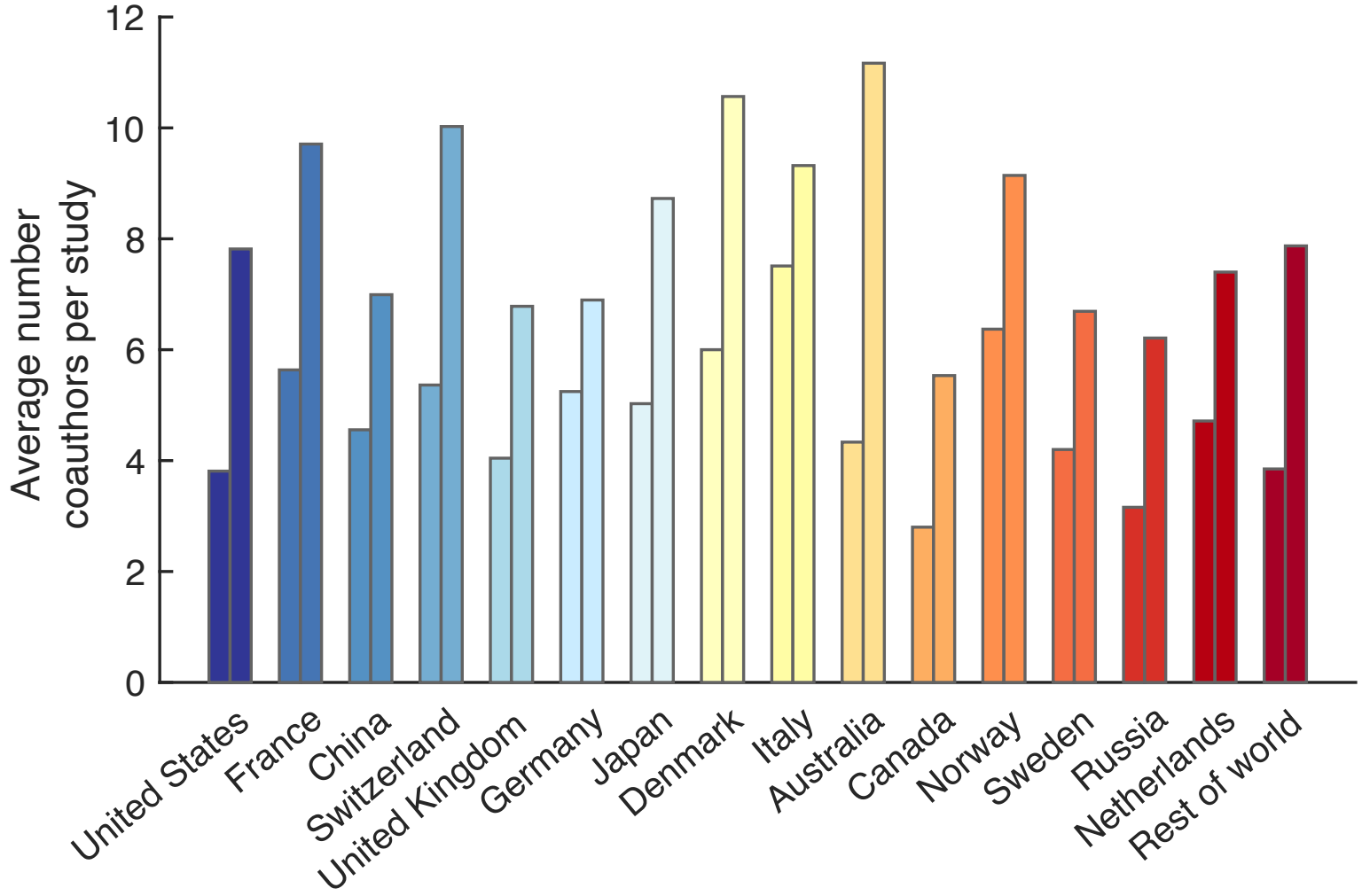
Nation-specific progress (pre vs. post IPICS1)



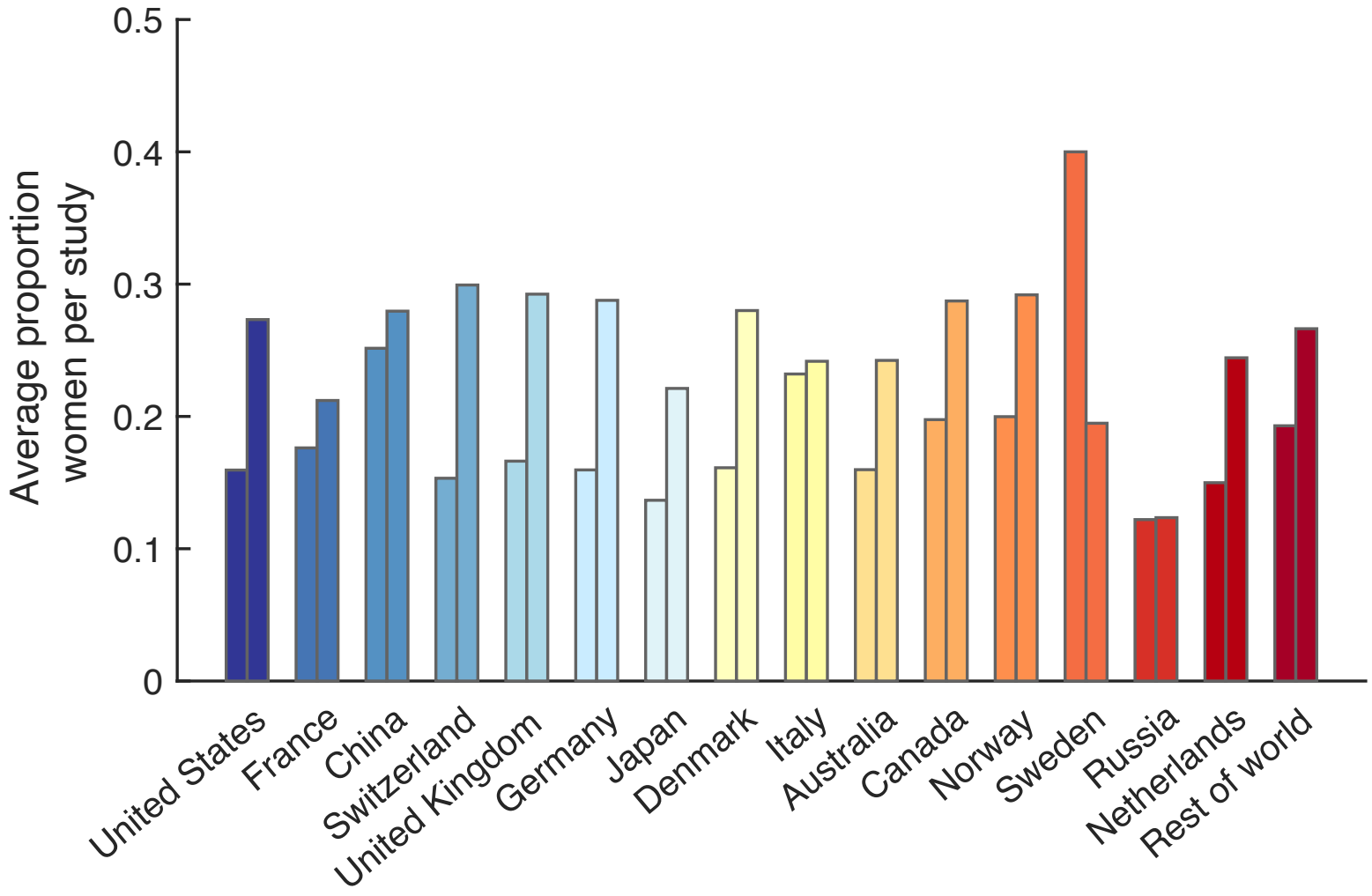
Nation-specific progress (pre vs. post IPICS1)



Nation-specific progress (pre vs. post IPICS1)



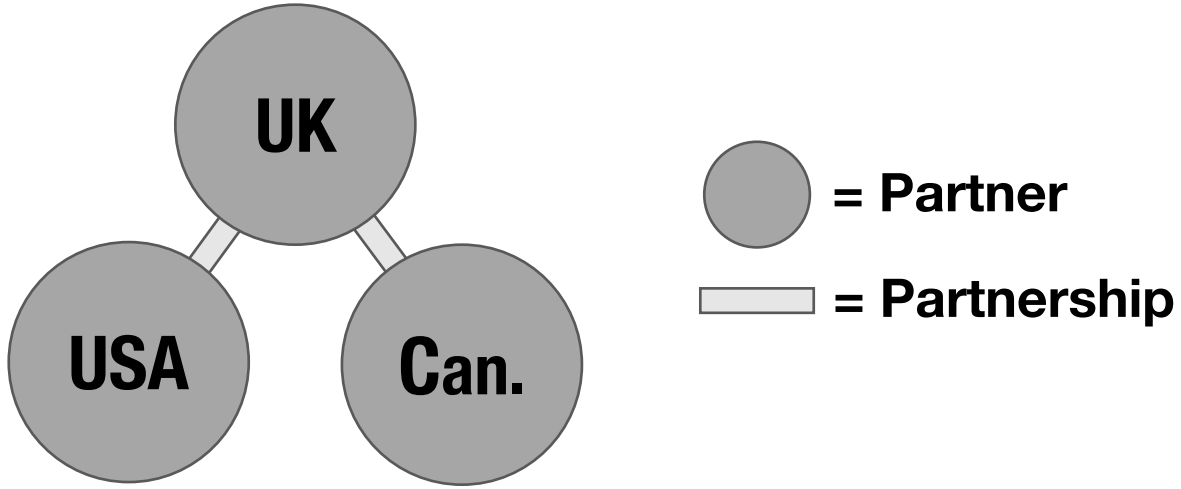
Nation-specific progress (pre vs. post IPICS1)



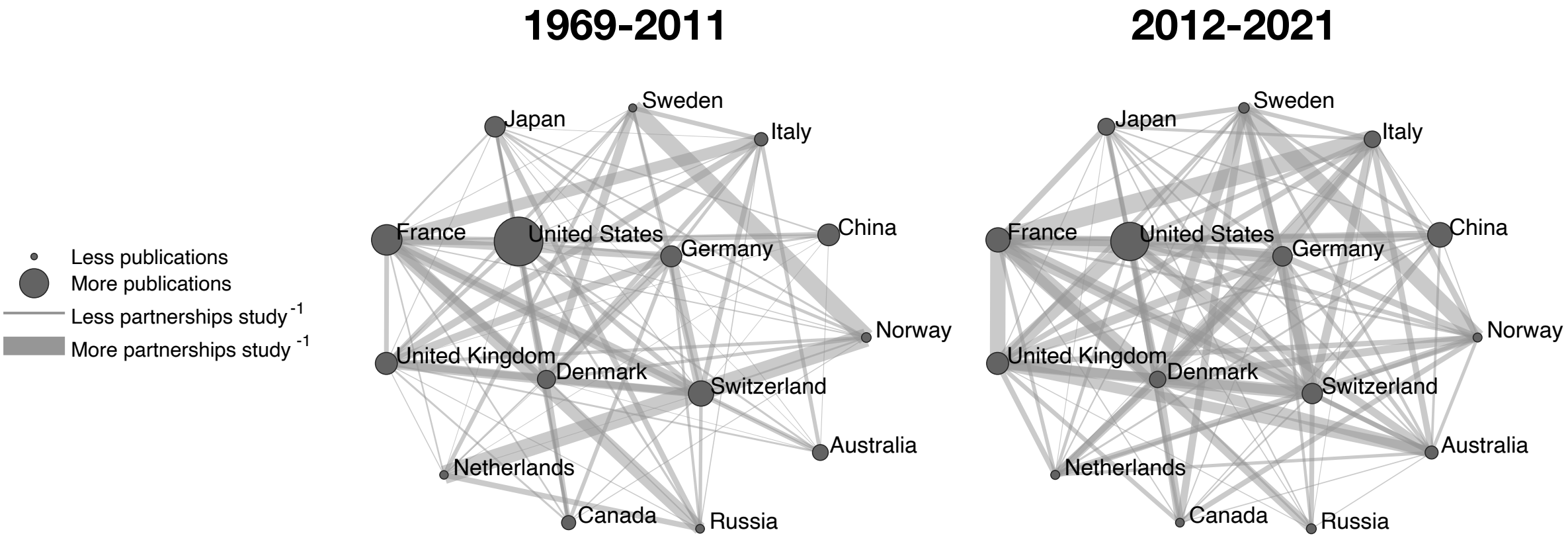
What constitutes an international partnership?

<This study as an example>

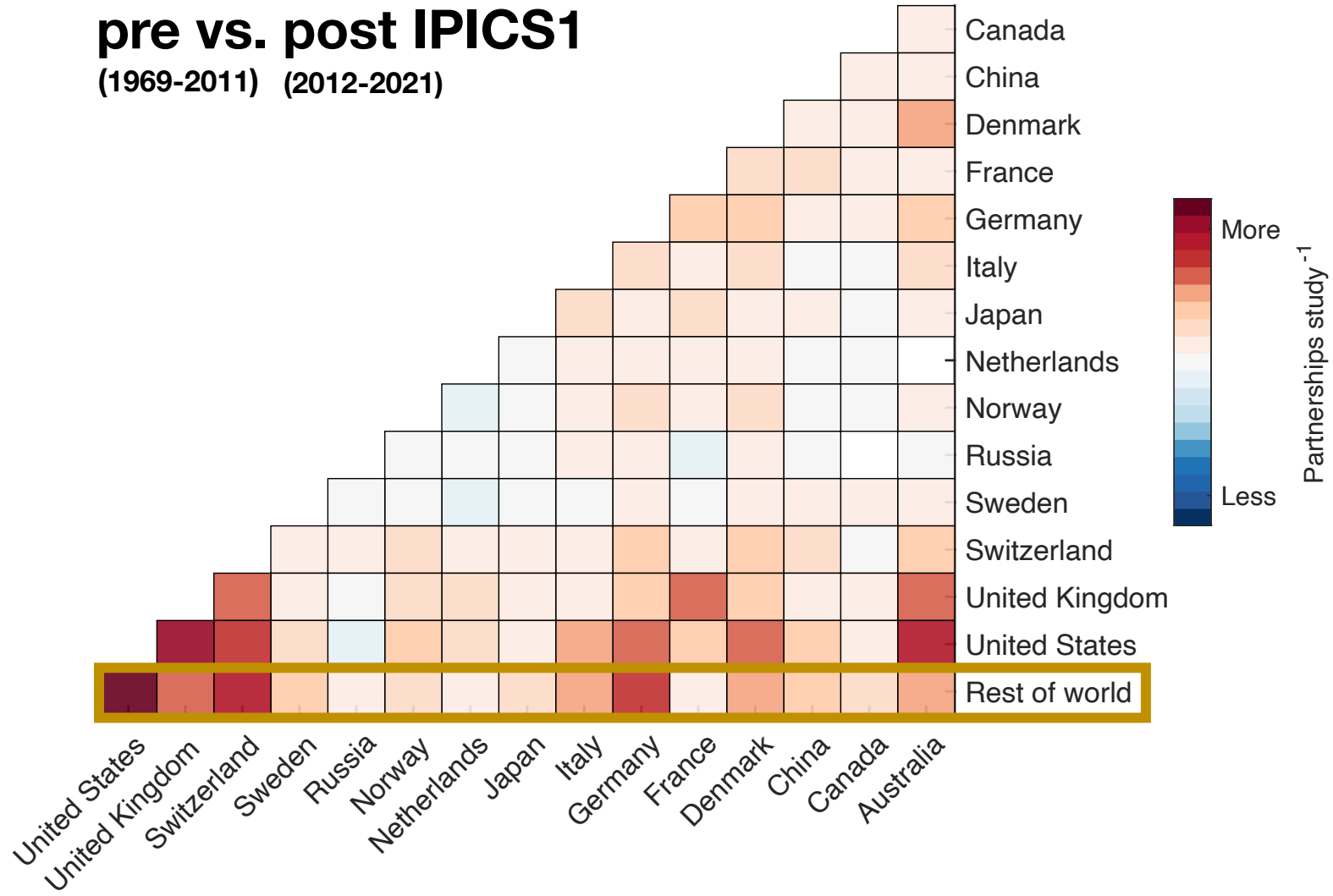
Matt Osman[1], Bess Koffman[2], Ali Criscitiello[3], Sofia Guest[3]
[1] UK
[2] USA
[3] Canada



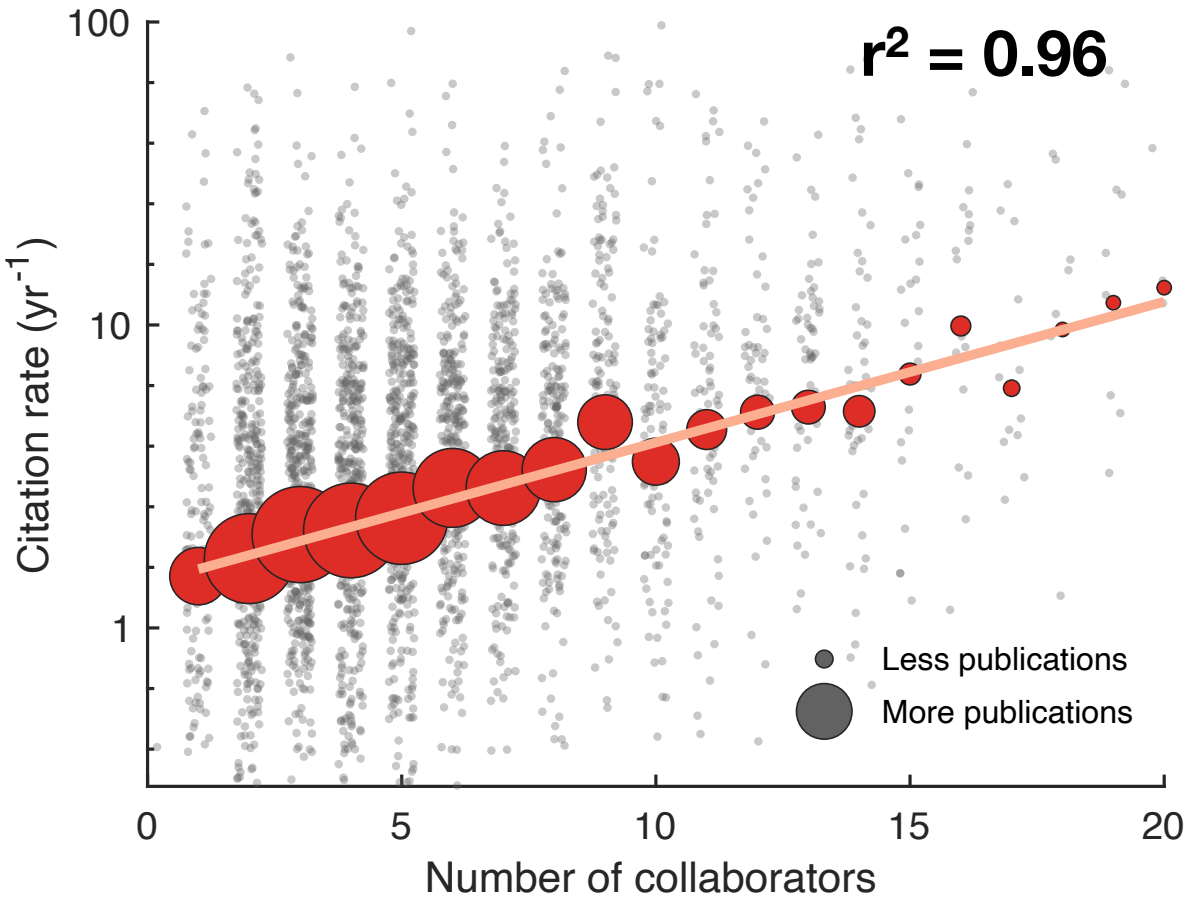
Expanding international partnerships



Expanding international partnerships



More partnerships lead to higher impacts



New partnerships start here, with each of us…

Evidence of progress:

- 3x increase in nations study^{-1}
- 4-5x increase in institutions study^{-1}
- 7x increase in collaborators study^{-1}
- 30% increase in women study^{-1}
- 2 → ~70 nations now represented
- Diversifying & strengthening international partnerships
- Strongest partnership growth with "Rest of world" nations

Areas for improvement:

- Close the gender gap
- Maintain pace of new nation inclusivity
- Survey metrics of diversity & inclusivity (race, background, career-stage, etc.)

Contact: Matthew Osman

- mattosman@arizona.edu
- www.osmanclimate.com