Global Challenges: Weapons of Mass Destruction and Climate Change

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POLI 150

30 April 2024

Announcements

- Final Exam to be available from 12 AM on April 30 through 11:59 PM on May 3. Cumulative, 15-20 multiple choice questions, open-note and open-book, 2 hour 30 minute time limit.
- Prompts 12 and 13 due on April 30.

This Week's Class

- Weapons of Mass Destruction
  - Defining WMD
  - Nuclear deterrence
  - Preventing nuclear proliferation
- Climate Change
  - Patterns of international cooperation over climate change
  - Collective action problems review and application
  - Conflicts of interest in the environment

Key Terms

- WMD
- MAD and mutual deterrence
- Non-Proliferation Treaty
- Coercive disarmament
- Climate change
- Common-pool resources
- Tragedy of the commons

Central Question

How should the world address the threat of global challenges, such as WMD and climate change?

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- **Biological**: weaponized bacterium, virus, or other biological agents (e.g. anthrax in 2001).
- **Nuclear**: explosive device that uses nuclear reactions (fission or fusion) (e.g. Hiroshima and Nagasaki).

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- **Social norms**: to some extent, what is and is not a WMD is socially constructed.

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- Over time, these have changed from simple containers of deadly gas to nearly undetectable nerve agents.
- Used by states (Syrian government) and terrorist groups (Aum Shinrikyo in Tokyo in 1995).
- Chemical Weapons Convention (1997) outlaws production and stockpiling; 97% of the worlds' stockpiles have been destroyed since then.
- Organization for the Prohibition of Chemical Weapons is the organization implementing the CWC.

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- Developed further for use during the World Wars.
- Used by states (Japan in WWII) and by terrorist groups (1984 Oregon Salmonella attack).
- Biological Weapons Convention (1972) bans use and stockpiling, but some states maintain or are alleged to maintain an offensive capacity.

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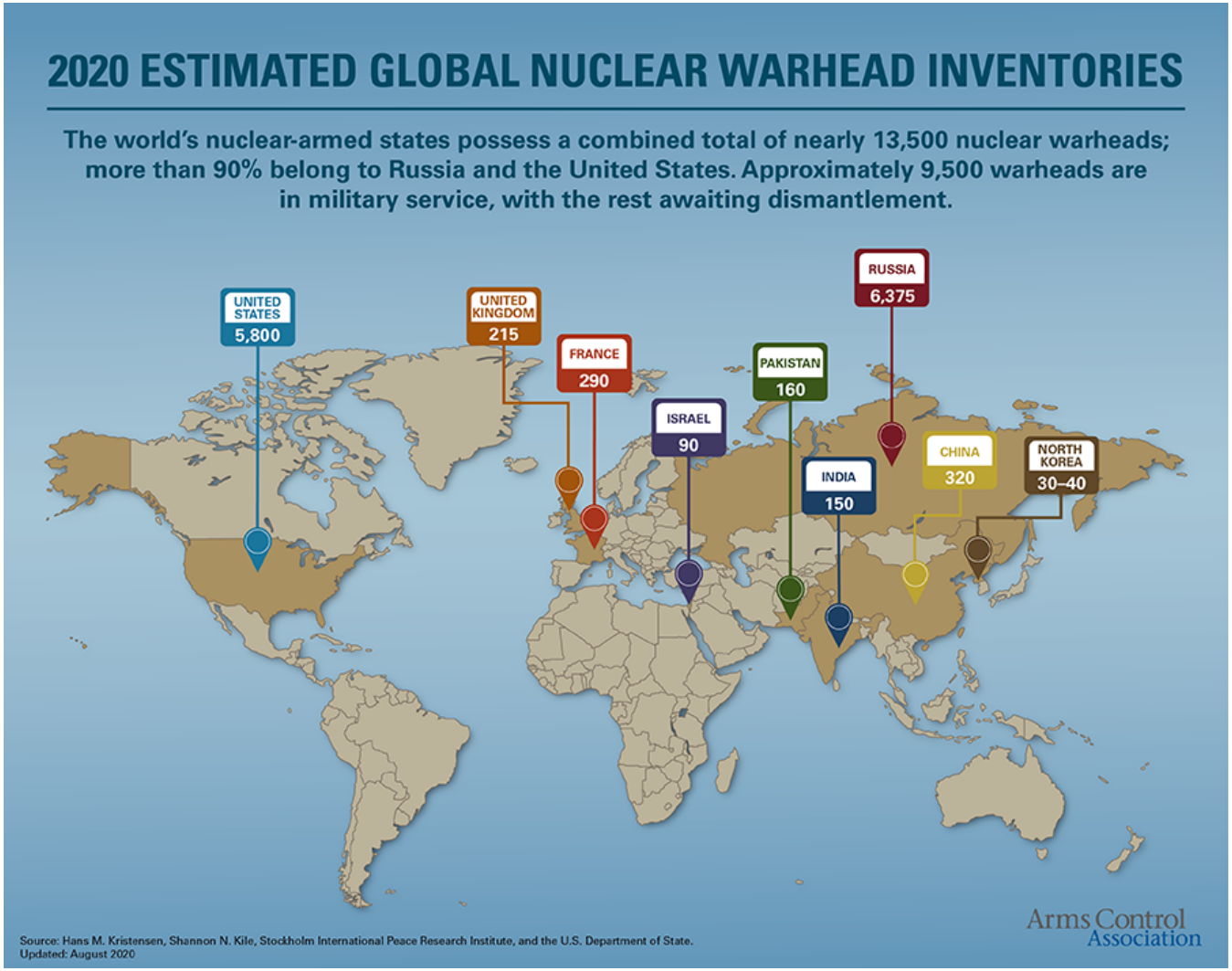
- Non-Proliferation Treaty (1968) bans development and spread, but with mixed results.

Nuclear Powers 2020



Nuclear Powers 2022

World nuclear forces, January 2022

Country	Deployed warheads[a]	Stored warheads[b]	Total stockpile[b]	Total inventory 2022[b]	Total inventory 2021[b]
United States	1 744	1 964	**3 708**	**5 428**	**5 550**
Russia	1 588	2 889	**4 477**	**5 977**	**6 255**
United Kingdom	120[e]	60[f]	**180[f]**	**225[f]**	**225**
France	280	10	**290**	**290**	**290**
China		350[g]	**350[g]**	**350[g]**	**350**
India		160	**160**	**160**	**156**
Pakistan		165	**165**	**165**	**165**
Israel		90	**90**	**90**	**90**
North Korea	..	20[h]	**20[h]**	**20[h]**	**[40–50][h]**
Total	**3 732**	**5 708**	**9 440**	**12 705**	**13 080**

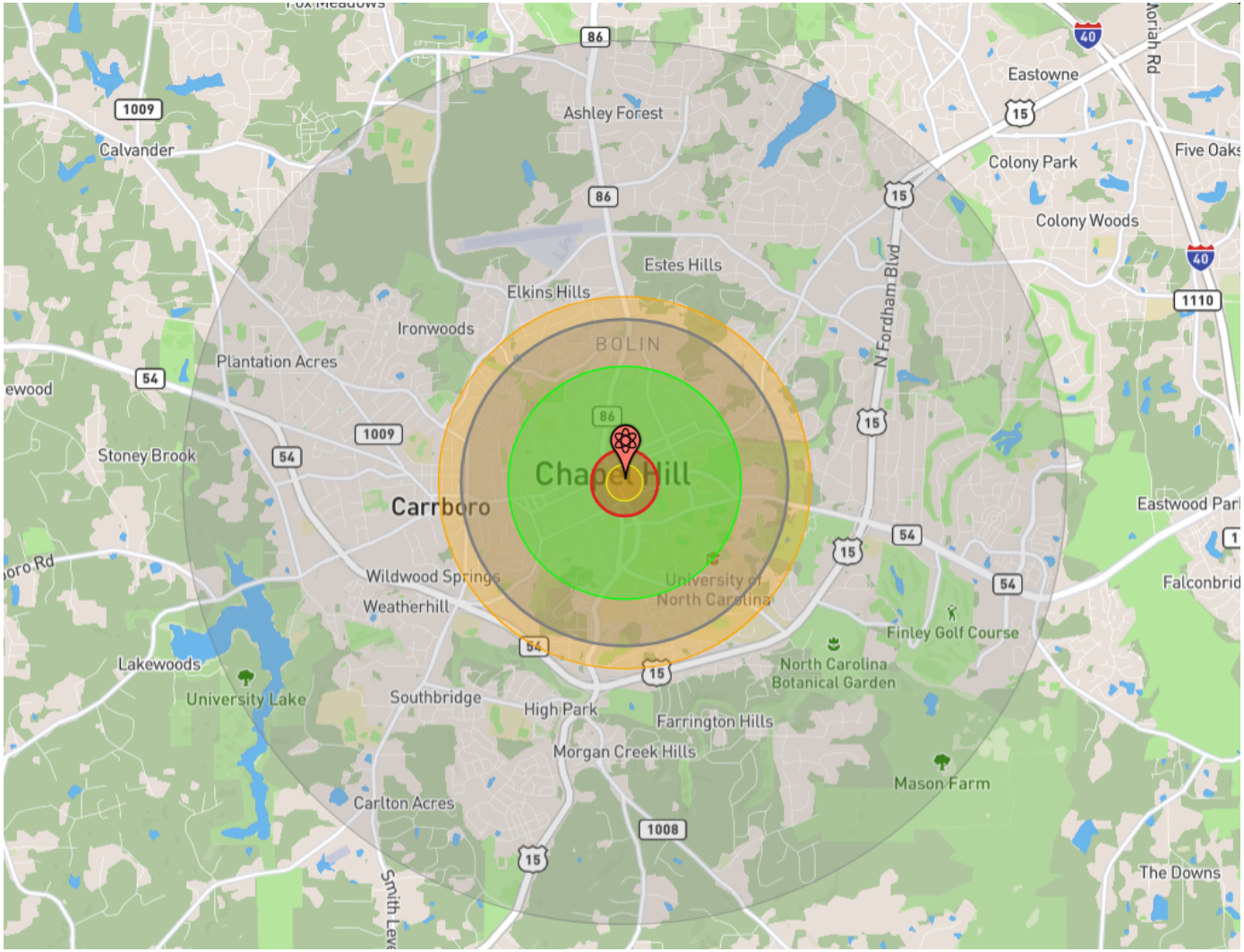
Source: SIPRI Yearbook 2022

World nuclear forces, January 2023

Country	Deployed warheads[a] 2023	Stored warheads[b] 2023	Total stockpile[c] 2022	Total stockpile[c] 2023	Total inventory[d] 2022	Total inventory[d] 2023
United States	1 770	1 938	3 708	**3 708**	5 428	**5 244**
Russia	1 674	2 815	4 477	**4 489**	5 977	**5 889**
United Kingdom	120	105	225[e]	**225**	225	**225[f]**
France	280	10	290	**290**	290	**290**
China	–	410	350	**410**	350	**410**
India	–	164	160	**164**	160	**164**
Pakistan	–	170	165	**170**	165	**170**
North Korea	–	30	25	**30[g]**	25	**30[g]**
Israel	–	90	90	**90**	90	**90**
Total	**3 844**	**5 732**	9 490	**9 576**	12 710	**12 512**

Modern-Day Nuclear Simulation 1

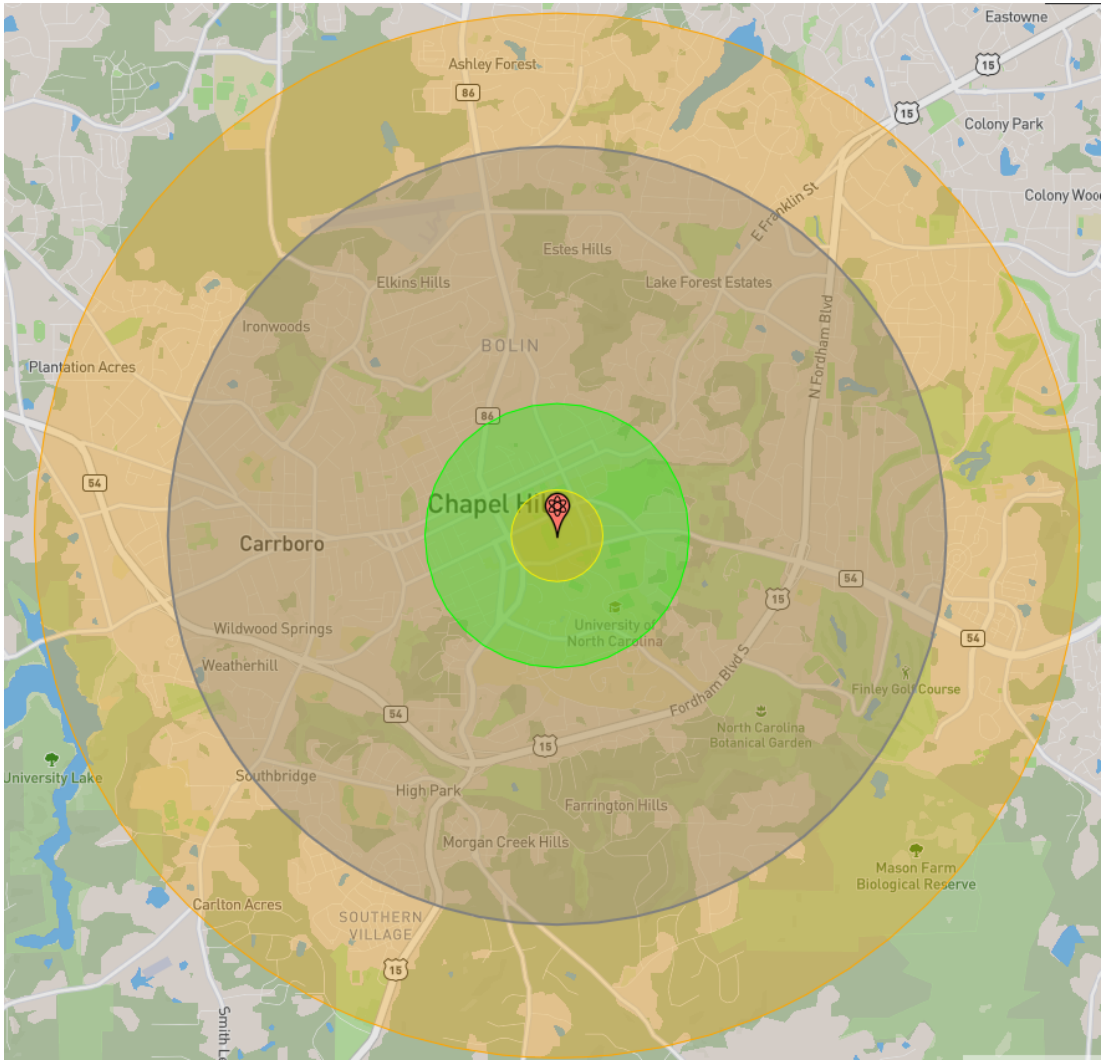
Modern-Day Nuclear Simulation 2



Effects of Nuclear Weapons

- Prior slide shows impact of 15-kiloton bomb (same as used at Hiroshima) if dropped on our classroom. Source: Nukemap.
- Circle keys, from innermost:
  - Fireball radius: instant death.
  - Heavy blast damage radius: instant death.
  - Radiation radius: fatalities from blast; fatal due to radiation in about a month.
  - Moderate blast damage radius: Widespread building damage; high fatalities.
  - Thermal radiation radius: Third-degree burns if exposed at this range.
  - Light blast radius: survivable with moderate to minimal injuries (but probably affected by radiation).
- Total deaths: at least 25,000. About 35,000 more injured.

Modern-Day Nuclear Simulation 3



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- Why are states often unwilling to disarm?
- Why is monitoring of stockpiles and development so difficult?

Nuclear Proliferation

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- Given the destructive capacity of nuclear weapons, many argue that the international community may be safer without them.
- However, it is possible to argue that nuclear proliferation is a force for peace and stability...

Theoretical Considerations

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- Nuclear war is arguably the worst possible outcome for a state.
- In the language of the bargaining model of war, nuclear weapons mean that the costs c become essentially infinite, removing any possibility of gains from war.
- Mutually assured destruction is one proposed solution to this.

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- **Mutually Assured Destruction**: guaranteed destruction if two nuclear-armed adversaries use their nuclear weapons on each other.
- MAD should create an environment of **mutual deterrence**: neither side will attack the other, forcing them to find other means of resolving disputes.

Mutual Deterrence Requirements

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3. Weapons not be easily subject to accidental launch.
4. Easy to determine origins of any given attack.

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- **Mistakes happen!**

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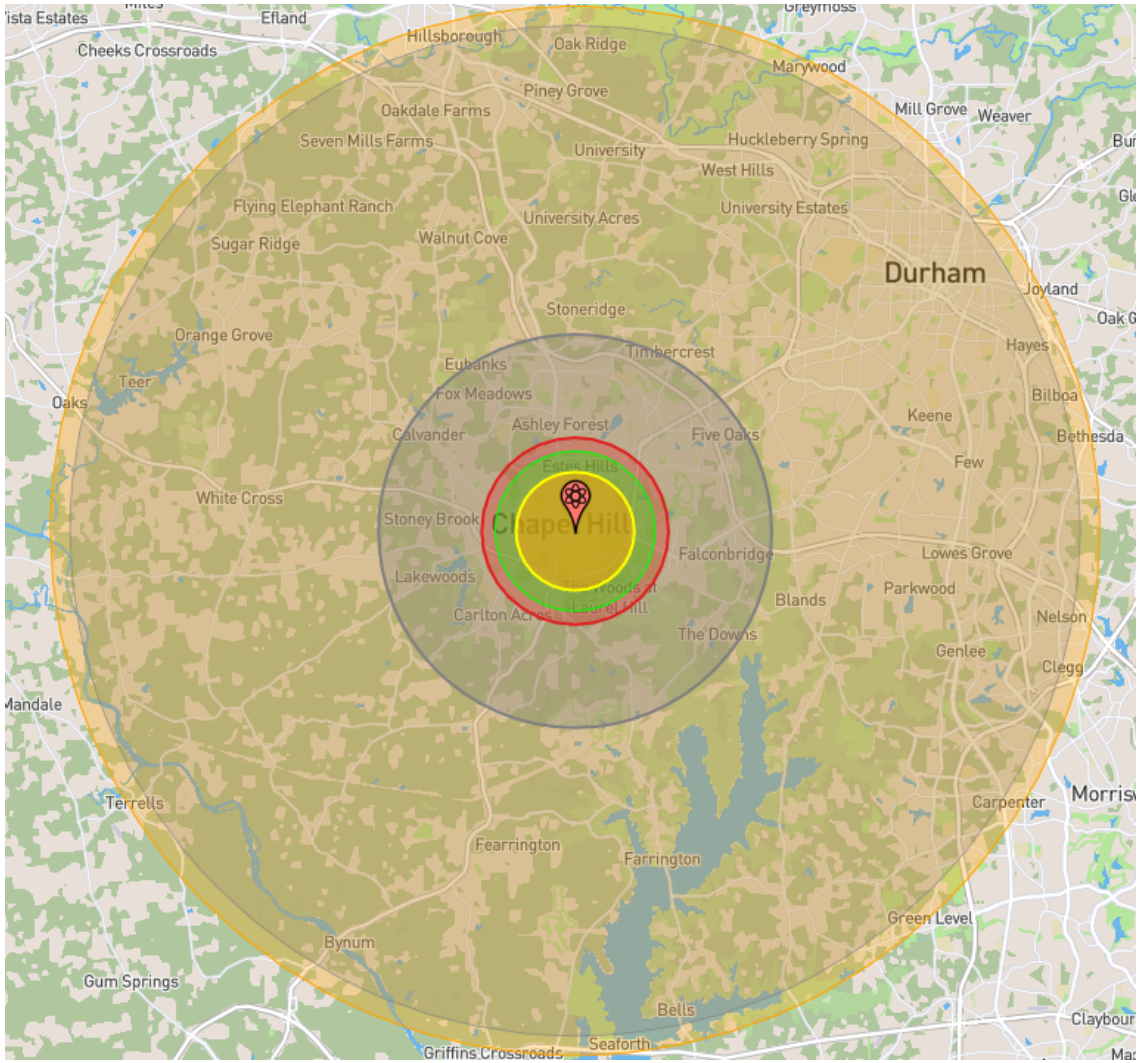
- This isn't even the only nuclear accident involving US nuclear weapons (list).
- USSR also made mistakes.

Goldsboro Accident Bomb Size



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1. Altering incentives
2. Preventing actors from accessing nuclear materials

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- States attempt to acquire nuclear weapons out of insecurity due to anarchy.
- This implies that guaranteeing their security can prevent them from seeking weapons of their own.

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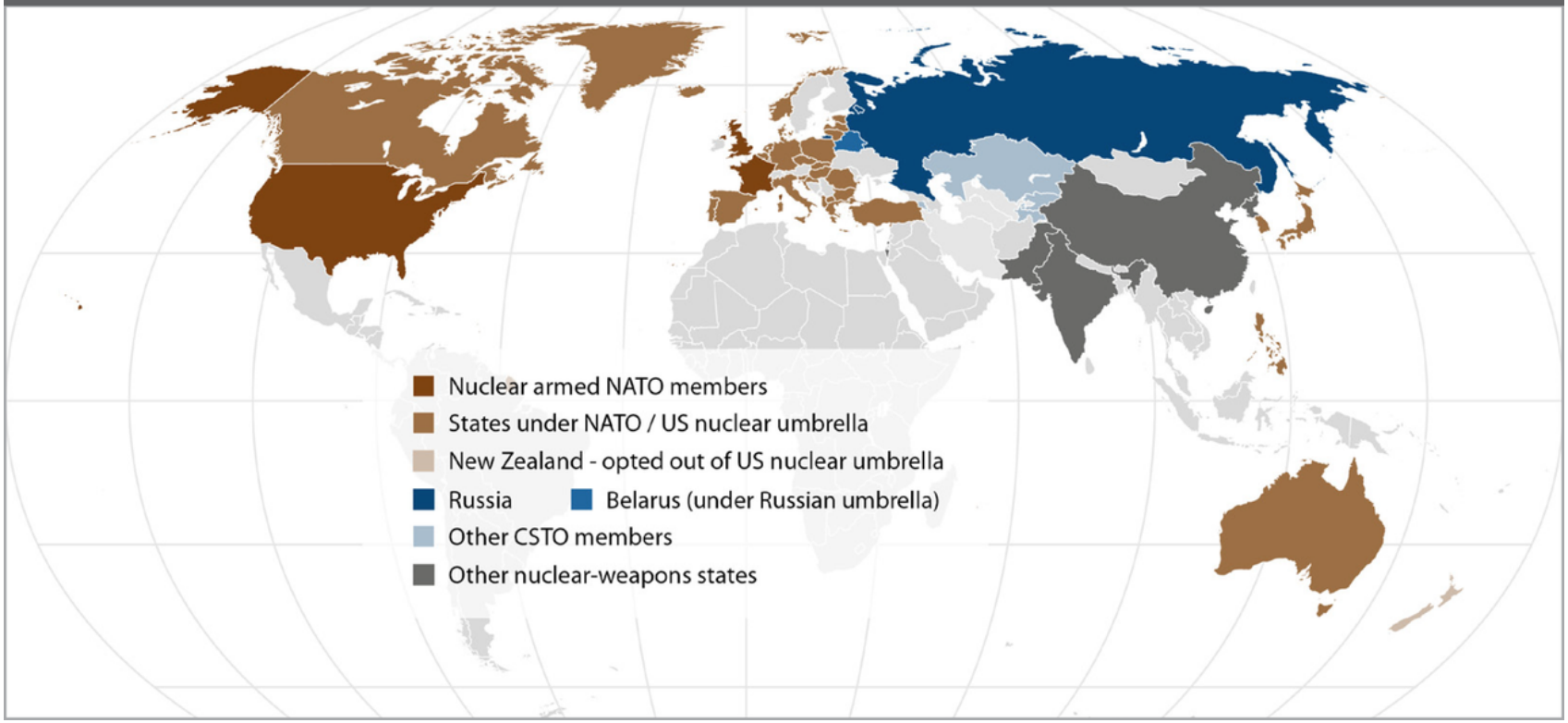
- Credible nuclear defensive alliances are one way to guarantee security for a state without that state having to acquire nuclear weapons of its own.
- Successful example: NATO. Less successful example: Ukraine.

Nuclear Umbrella

FIGURE 1

OVERVIEW OF NUCLEAR UMBRELLAS



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- States may also create monitoring and tracking efforts to prevent nuclear material and information from going to either rogue states or non-state actors, sometimes supported by international agreements such as the nuclear **Non-Proliferation Treaty (NPT)**.

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- US withdrew from the JCPOA in 2018, effectively killing it; Iranian progress towards nuclear weapons has since resumed.

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- Has the NPT been successful? Somewhat.

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- Is this possible? Desirable?
- Can the US credibly lead a disarmament movement?

To Ponder...

Is the world safer with or without nuclear weapons?

What would it take to get to a world without nuclear weapons?

Climate Change Definitions

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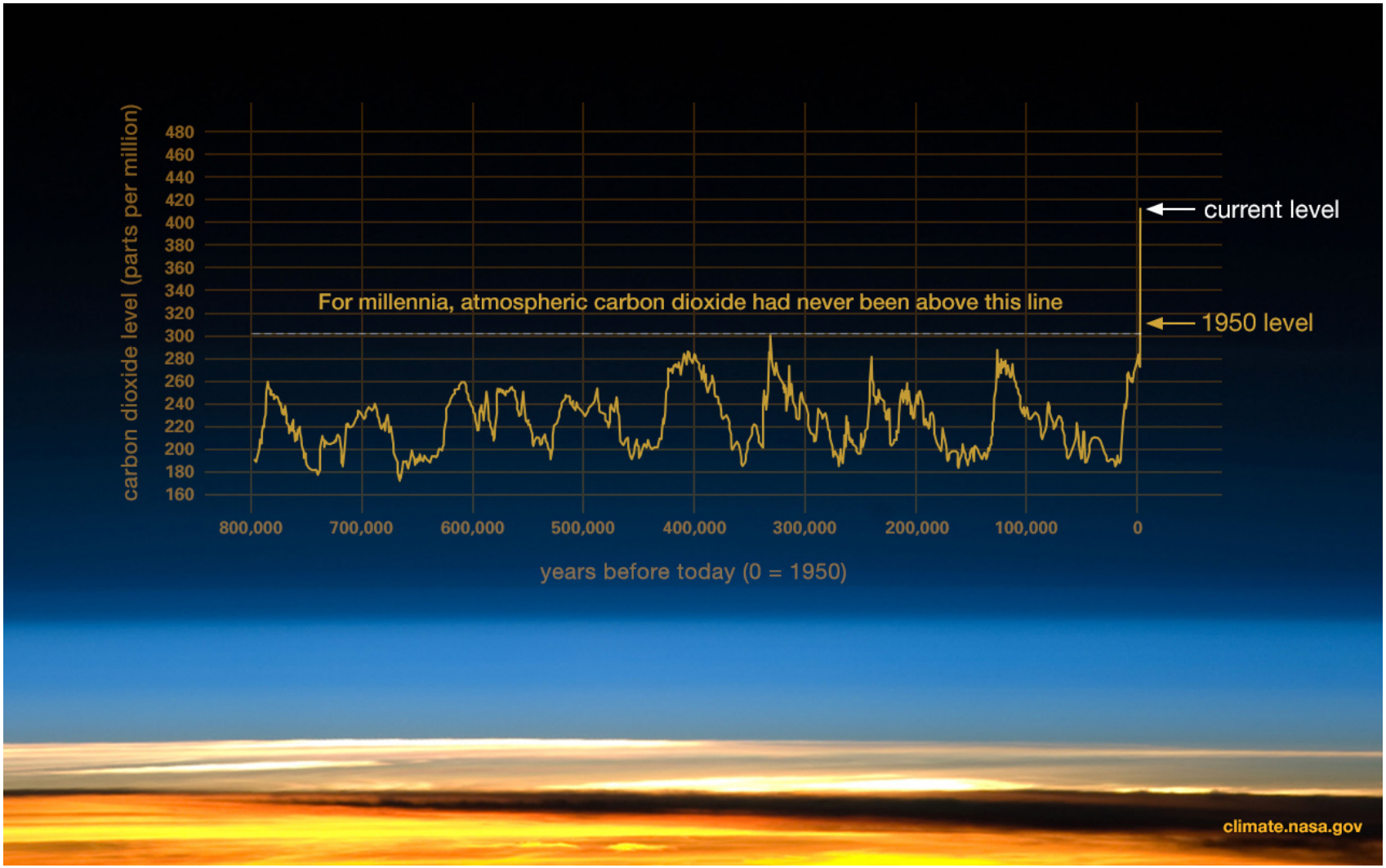
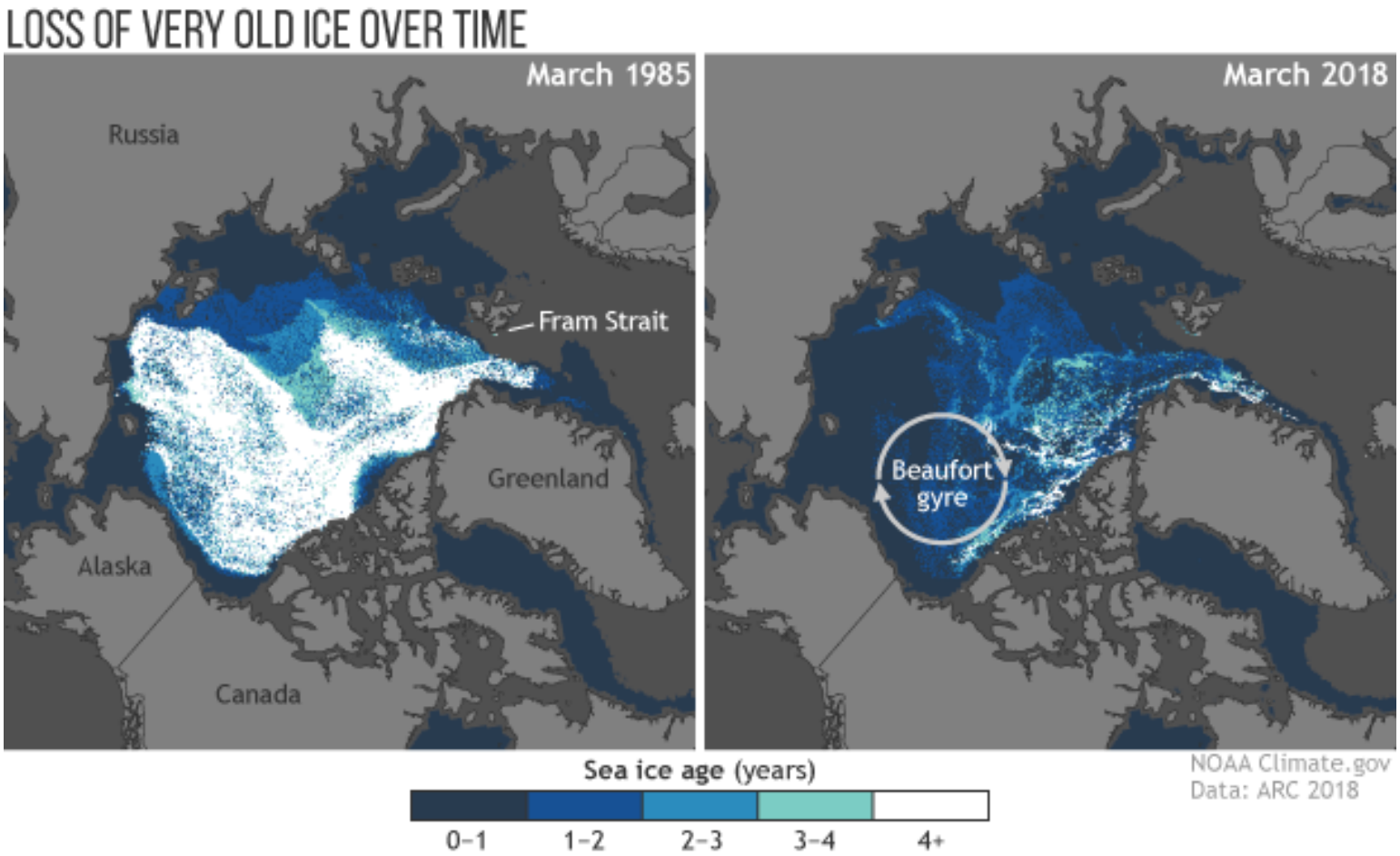
- This is distinct from (and more extreme than) the natural changes to Earth's climate (e.g. start and end of ice ages).
- "Scientific evidence for warming of the climate system is unequivocal." - UN's Intergovernmental Panel on Climate Change (IPCC site)
- See NASA for more details and evidence.

Atmospheric CO2



Arctic Sea Ice Shrinkage



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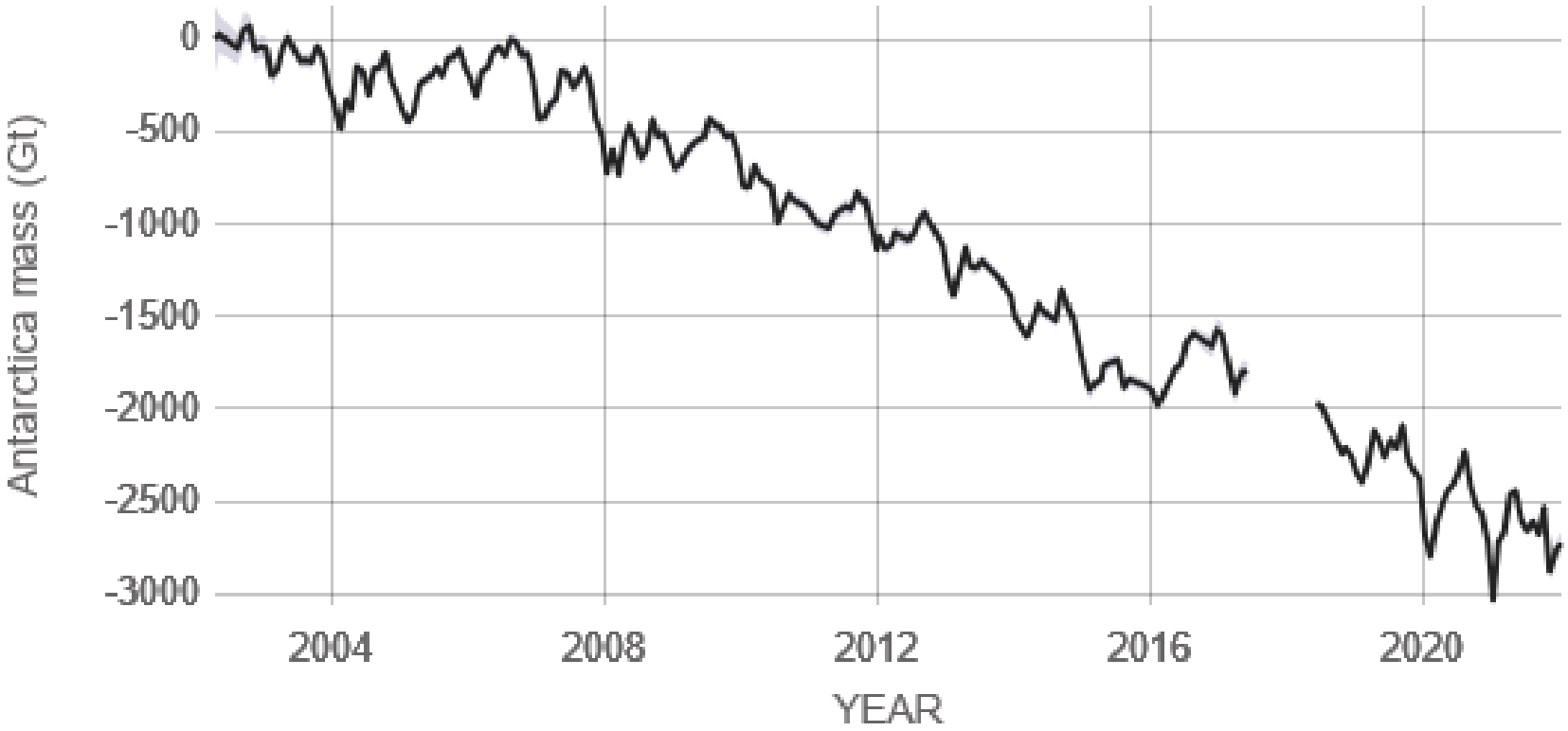

Source: climate.nasa.gov

Politically Salient Impacts

List drawn partially from NASA.

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- Weather changes also disrupt agricultural patterns (esp. in poorer, warmer countries).
- IR experts believe these effects of climate change will make conflict more likely (UNSC).

Climate Change and Conflict

FIGURE A ***Global Temperature Deviation and Conflict, 1946–2014***

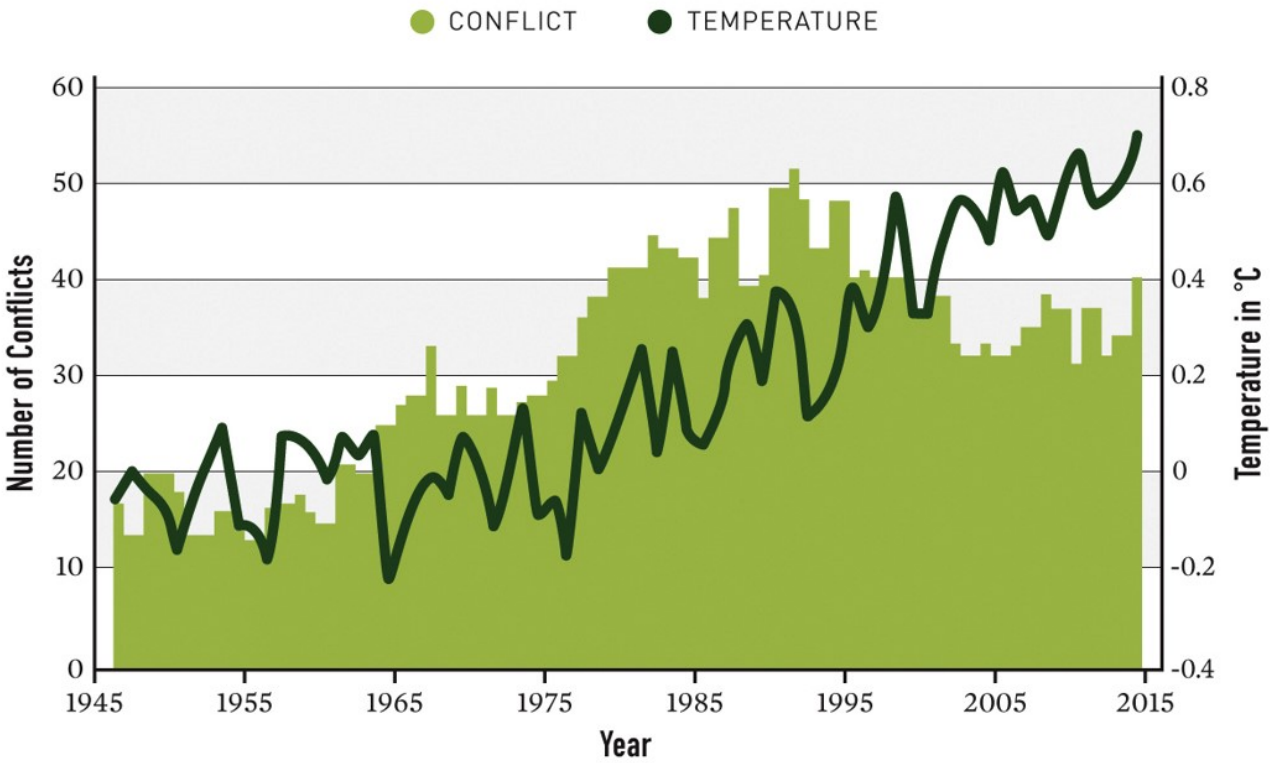

Figure source: Halvard Buhaug, PhD, "Globalt Tempuraturavvik Og Konflikt, 1946–2014," in Nils Petter Gleditsch, *Mot en mer fr edelig verden*? [Towards a more peaceful world?] (Oslo: Pax, 2016). Reprinted with permission.
Note: Conflict data are from the UCDP/PRIO database; temperature data, from http://data.giss.nasa.gov/histemp. The temperature deviations are measured from the average for the period 1951–80.

International Cooperation

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- **Paris Agreement (2016)**: commitments from 196 countries to reduce emissions.

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- Problem: Individual actors might have interests in improving the environment, but individual action has little effect.
- Example: 15-20 countries account for 75% of carbon dioxide emissions, but not a single country accounts for more than 30%.
- This phenomenon relating to global cooperation over the environment is often likened to the **Tragedy of the Commons**.

Tragedy of the Commons Definition

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- Examples:

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- The tragedy of the commons explains why states struggle to maintain global **public goods**.

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- Rivalrous: consumption by one actors reduces the amount available for others to consume.

Types of Goods

	EXCLUDABLE	NONEXCLUDABLE
RIVAL	Private goods	Common-pool resources
NONRIVAL	Club goods	Public goods

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- In a CAP, actors must work together to provide the good. In a TOC the good exists already and actors must coordinate on its use.

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- Common-pool resources fall victim to the tragedy of the commons.
- Public goods are subject to collective action problems.
- Rational actors have (short-term) incentives to engage in self-interested behavior that ultimately has negative impacts on both public goods and common-pool resources.

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- **Intensity Disparity**: more affected parties are more likely to bear costs of solutions, if they can.

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- US left under Trump then rejoined under Biden, but the framework may be of limited viability if it becomes a revolving door...

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- Additional problem: this does not necessarily eliminate emissions!

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- Creates an incentive to develop green technologies.

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- Consumers also benefit from lax environmental policies, as prices are lower.
- Thus, much like the politics of trade, environmental regulations produces winners and losers, which structures domestic political interactions.

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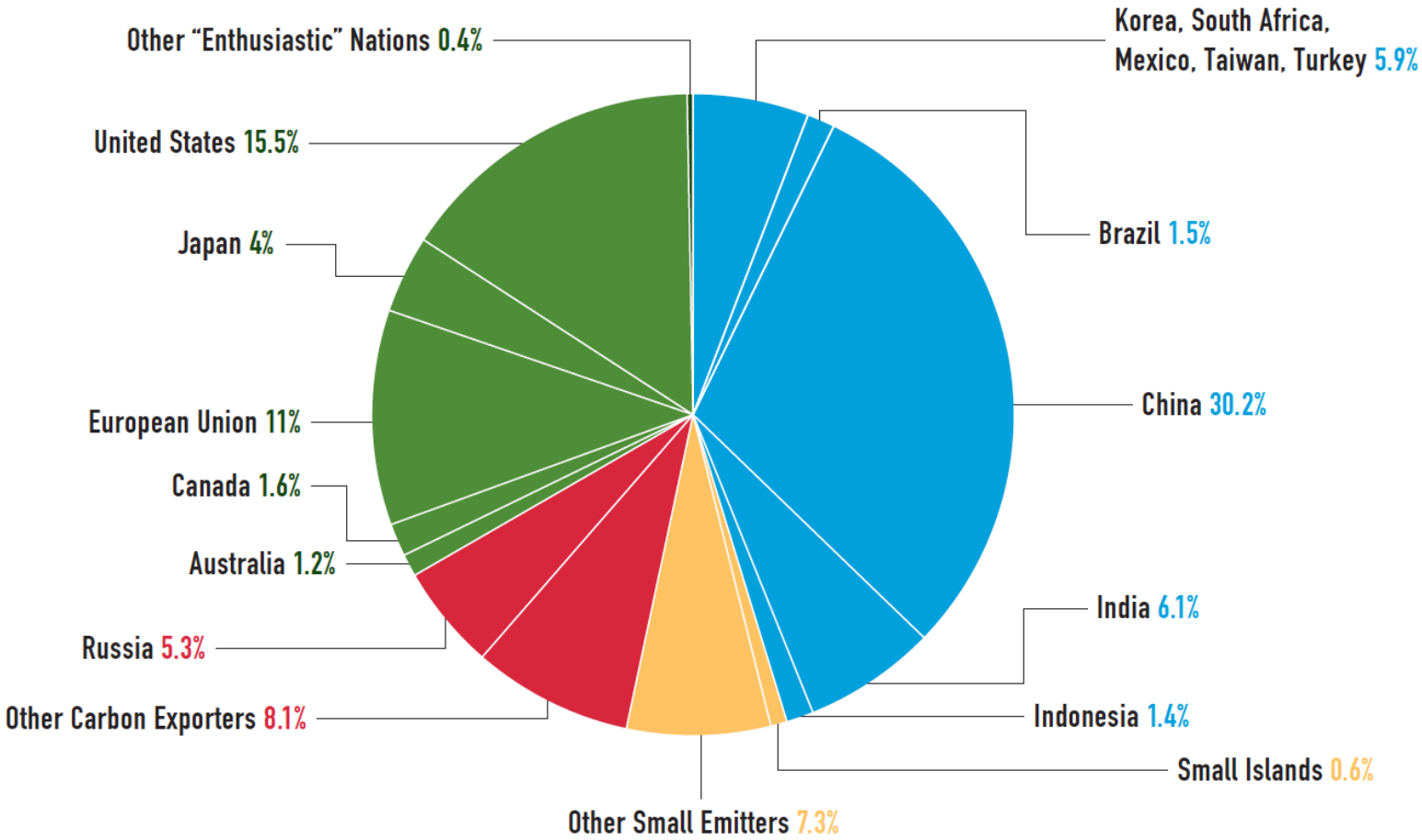
- Why don't we see more green policies? Firms' interests are better organized, and are better able to press the government for lax policies.
- Very similar to protectionist industries' influence over trade policy.
- Furthermore, some firms *benefit* from climate change (e.g. Exxon-Mobil and Arctic oil deposits).

International Variation in Emission



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- Most states increase their pollution as they develop until they hit a threshold of relatively high development, then become interested in controlling pollution.
- In the future, increases in emission will come from today's developing countries.
- Globally, there are incentives to enact environmentalist policies; at the state level, these developing states may disagree if such policies limit their development.

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- These efforts are complicated by the size and complexity of the issues.
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- Some international treaties provide cause for hope?