

Abolishing nuclear weapons

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References listed in the final slide.

About SGR

- Scientists for Global Responsibility is:
 - UK organisation of 750 scientists, engineers and others
 - Promotes science, design and technology which contributes to peace, social justice and environmental sustainability
- Published reports, books and articles on threats from nuclear weapons since 1980s

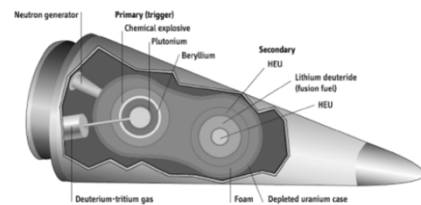


- During 1980s, we were known as Scientists Against Nuclear Arms – merged with other organisations in 1992 to form SGR

The threats from nuclear weapons

What is a nuclear weapon?

- Nuclear weapons harness forces deep inside atoms to create huge explosions
- Nuclear warheads
 - ‘Critical mass’ of ‘fissile material’ is brought together to create ‘nuclear chain reaction’
 - Critical mass is **few kilograms**
 - Fissile material is commonly **plutonium** and/or **uranium**
- Modern warheads are very sophisticated



For more details, see: SGR (2017)

How does a nuclear weapon kill?

- Heat
- Blast
- Radioactivity
- Also
 - Blinding flash of light
 - Electromagnetic pulse
- Weapon of mass destruction



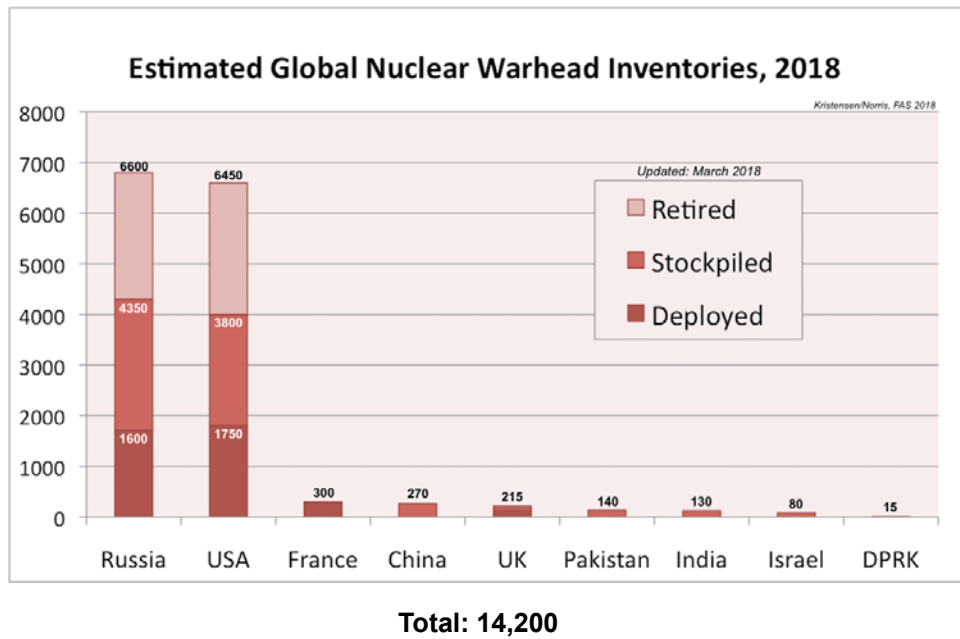
For more details, see: SGR (2017)

What damage could 1 medium-sized warhead do?



- One medium-sized warhead has explosive power equivalent to 100,000 tonnes of TNT
- Example: UK Trident warhead – about seven times bomb dropped on Hiroshima
- In less than one minute of devastation: approx. 81,000 dead, 212,000 injured – many of the injured would die within a few months
- Damage zone radius of about 10km
- For more details, see: SGR (2016)

Nuclear arsenals



Federation of American Scientists (2018)

Nuclear winter

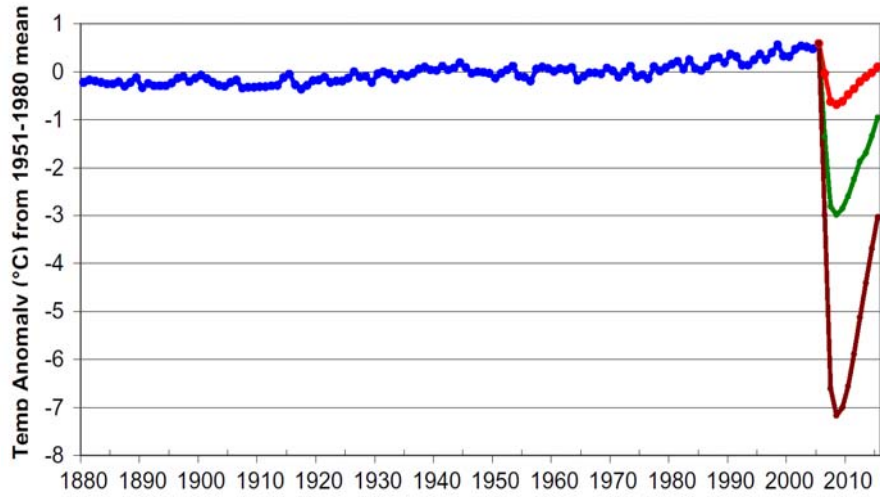
- Huge fires caused by nuclear war would inject plumes of smoke into stratosphere
- Major reduction in sunlight
- Major damage to ozone layer
- Even 'small' nuclear war involving less than 1% of global nuclear arsenal would cause unprecedented climate change
 - Crops yield down by 20%-40% for a decade
 - Up to 2 billion at risk of starving to death

For more details, see: Robock (2015)

Nuclear winter

GISS Global Average Temperature Anomaly

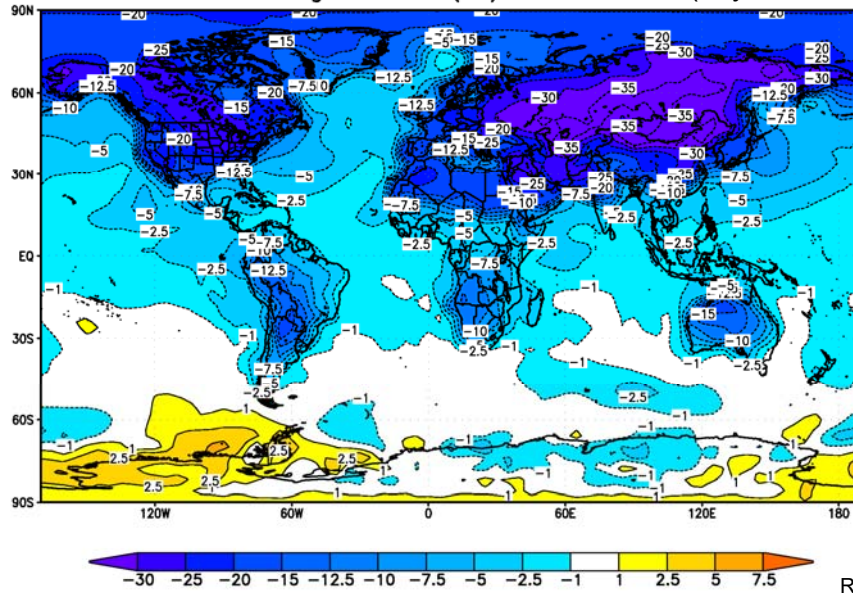
+ 5 Tg, 50 Tg, 150 Tg smoke in 2006



Robock (2015)

Nuclear winter: regional temperature changes

Change in SAT (°C) JJA Year 0 (days 17-109)

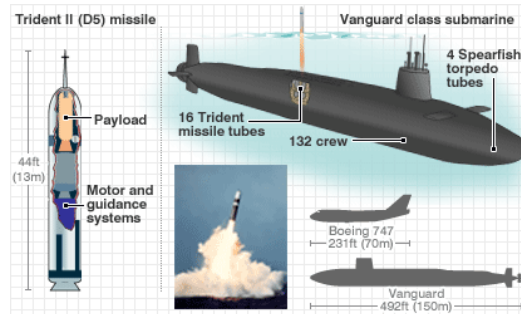


Robock (2015)

- Change in surface air temperatures in summer soon after medium-sized nuclear war

UK nuclear weapons system: Trident

- 4 submarines
 - one on constant patrol
- 1 submarine carries:
 - Up to 8 missiles
 - Up to 40 warheads
- Approval given in 2016 to build 4 replacement 'Dreadnought' submarines
 - Total lifetime costs: around £200bn
 - Designed to remain operational until 2060s



- For more details, see: SGR (2016)
- Cost estimate by CND (2016), compiled from Ministry of Defence data.

What could **1 Trident submarine** do?

- Total explosive power of 40 warheads is equal to:
 - 4,000,000 tonnes of TNT
 - about 300 Hiroshima bombs
 - more than all bombs dropped in World War II
- Would produce enough smoke to cause a 'nuclear winter'
 - catastrophic climate cooling



- SGR (2016)

‘Near nuclear use’

- Declassified files show how close we have come to nuclear war
- 1962-2002: ‘Near nuclear use’ happened on average ***once every three years***
 - Political/ military confrontations
 - Technical faults
 - Human error
- Cyber-security (hacking) threat increasing
- Terrorism



- Data from: Lewis et al (2014)
- On cyber-security threat, see also: British American Security Information Council (2016).
- Nuclear warhead labs or warhead convoys also at risk – see: ICAN-UK (2016)

Current flashpoints

- US-Russia 'high alert' nuclear weapons
 - About 1,800 nuclear weapons capable of being launched within 10s of minutes
- Korean peninsula
 - No peace treaty between North and South Korea
 - US nuclear capable bombers on patrol
 - North Korea nuclear tests
- Indian sub-continent
 - Historic animosity between India and Pakistan
 - Pakistan especially vulnerable to instability

- Contributing to all these tensions are active nuclear weapons 'modernisation' programmes in the nine nuclear weapons nations
- Latest US Nuclear Posture Review calls for smaller 'more useable' nuclear weapons
- For more information, see (for example): SGR (2017); Webber (2018)

Disarming the nuclear threat

Disarming the nuclear threat

1. The myth of reliable nuclear deterrence
2. Historical successes in nuclear arms control and disarmament
3. New nuclear ban treaty: TPNW
4. Campaigning

Nuclear deterrence: claims

- Advocates claim
 - Nuclear weapons have kept the peace between the major powers since 1945
 - ‘Ultimate guarantee’ of national security

For example, see: Webber (2018)

Nuclear deterrence: some flaws

- 'Sprinkling aftershave on my lawn'
- 'Proxy' wars during the Cold War
 - Approx 11 million dead in 16 wars involving Western and Eastern blocs, e.g. Korean War
- Non-violent explanations for decline in interstate war
 - Post-World War II exhaustion
 - Growing trade interdependence
 - Declining public support for major war
 - Arms control/ disarmament treaties
 - 'Nuclear taboo'

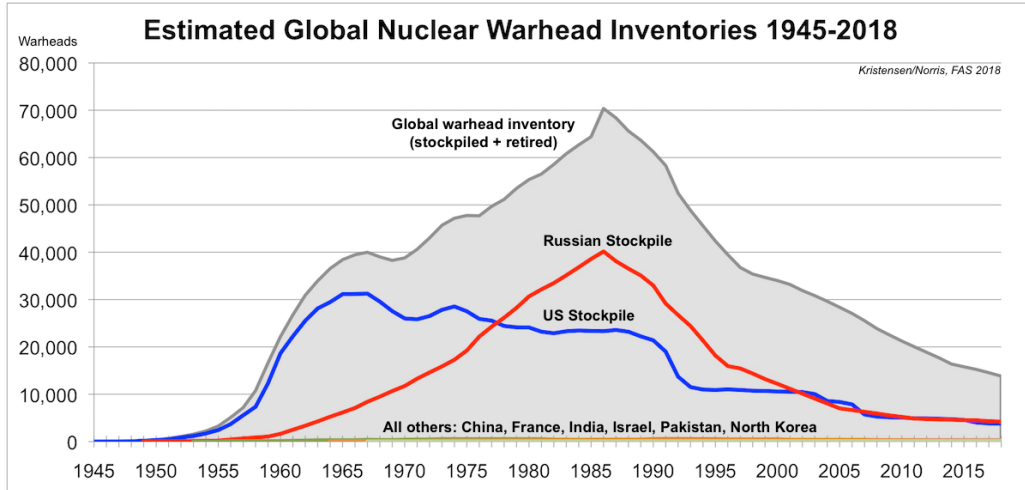
- War casualty figures: pp.474-475 of White (2011)
- See also Webber (2018)

Nuclear deterrence: more flaws

- Nuclear weapons cannot deter:
 - Nuclear accidents
 - Miscalculations
 - Cyber-attacks
 - Terrorists
 - Irrational behaviour

Webber (2018)

Nuclear warhead numbers



Federation of American Scientists (2018)

Arms control: 1962 and beyond

- Crisis/ threat
 - Cuban Missile Crisis – USA/ USSR nuclear crisis
- Positive changes/ transitions
 - Partial Nuclear Test Ban Treaty, 1963
 - Nuclear Non-Proliferation Treaty (NPT), 1968
 - Several other nuclear arms control treaties in late 1960s/ early 1970s
 - Outer Space Treaty (1967), first nuclear weapons free zone (1967), Seabed Arms Control Treaty (1971), ABM Treaty (1972)

- Cuban Missile Crisis – several near misses: Soviet submarines armed with nuclear torpedoes; shooting down of US U-2 spy plane; UK nuclear forces on alert
- Partial Nuclear Test Ban Treaty - Ban on nuclear weapons testing in atmosphere
- NPT - Ban on new states developing nuclear weapons
- See, for example: Lewis et al (2014)

Disarmament: 1983 and beyond

- Crises/ threats
 - Serpukhov-15/ Able Archer-83 – USA/ Soviet Russia nuclear crises
- Positive changes/ transitions
 - Reykjavik Summit: Presidents Reagan/ Gorbachev, 1986
 - Intermediate-range Nuclear Forces (INF) Treaty, 1987
 - Large falls in nuclear arsenals
 - 30,000 warheads dismantled in 10y
 - Helped contribute to end of Cold War

- Serpukhov-15 – Soviet early warning system falsely detected US nuclear weapons attack
- Able Archer-83 – NATO military exercises falsely seen by Soviets as prelude to major attack
- NATO did not immediately realise how perilous the situation was – hence Reagan announced 'Star Wars' program in 1984, and it wasn't until Gorbachev became Russian leader in 1985 that the political situation changed
- INF Treaty - Ban on all intermediate-range nuclear weapons – leading to large reductions in Europe
- See, for example: Lewis et al (2014); Federation of American Scientists (2018)

Giving up nuclear weapons

- Nations that have given up nuclear weapons
 - South Africa
 - Kazakhstan
 - Belarus
 - Ukraine
- A few other nations have given up nuclear weapons development programmes

Military analysts were concerned that as many as 30 nations would have nuclear weapons by 1970s

Immediate steps needed to reduce current threat

- De-alert US/Russian nuclear weapons
- Enact 'no first-use' policies
- Reinstate US-Russia nuclear treaties, eg INF
- Remove US weapons from Europe (esp. Turkey)
- Preserve Iran nuclear deal
- Progress negotiations on:
 - Denuclearised Korean peninsula
 - Denuclearised Indian sub-continent
 - Middle East WMD-free zone

Treaty on the Prohibition of Nuclear Weapons (TPNW)

- Agreed July 2017 by 122 nations
- Bans development, deployment, assistance, threat of use, use of nuclear weapons
- Will come into force when ratified by 50 nations
- Based on treaties banning chemical weapons, biological weapons, landmines & cluster bombs
- ICAN – international civil society campaign – was key in success



- Text of TPNW: United Nations (2017)
- Status of TPNW as at 10/4/2018: 57 nations signed; 7 nations ratified – ICAN (2018)
- ICAN awarded 2017 Nobel Peace Prize; SGR is a partner organisation

UK campaign activities

- Support ICAN/ CND/ SGR etc initiatives in support of TPNW
 - Awareness raising of the threat from **all** nuclear weapons and potential of TPNW
 - Write to MPs: sign Early Day Motions
 - UK government currently opposes TPNW
 - Support demos/ sign petitions
- Don't Bank on the Bomb – divestment campaign
 - Boycott of banks that finance nuclear weapons
- Support abolitionist political parties/ politicians

- Early Day Motions – no.374: support TPNW; no.243: peace on Korean peninsula; no.1122: support NPT (CND, 2018)
- UK-based banks which exclude nuclear weapons financing: Co-operative (PAX, 2018)
- UK-based banks which include nuclear weapons financing, include: Barclays, HSBC, Lloyds, RBS (PAX, 2018)
- Abolitionist parties: Green Party, SNP, Plaid Cymru; Liberal Democrats favour 'steps down the nuclear ladder'
- Abolitionist politicians: Caroline Lucas, Johnathan Bartley; Jeremy Corbyn; Nicola Sturgeon; Leanne Wood

Reasons for hope

- Crises have helped to spur disarmament
- Nuclear proliferation has been curbed and some countries have completely disarmed
- Rapid large-scale disarmament has happened
- Civil society campaigns have had major successes
- TPNW offers credible future path
- UK has abolitionist parties/ politicians with significant power

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