

Climate weapons – a new weapon of mass destruction?

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ABSTRACT

The traditional approach to the systematics of weapons of mass destruction (WMD) emphasises primarily chemical weapons as the most dangerous of modern means of destruction and also includes nuclear, biological and toxic weapons. This classification has been included in international conventions ratified by most countries around the world. This, of course, does not exclude attempts to illegally distribute, but also proliferate both ready-to-use components, materials, raw materials, devices and, above all, the knowledge in this field that is necessary to create them. Climate weapons, which are the subject of the research undertaken in this article, are technologies that influence natural phenomena. By analysing factual material relating to broadly understood geophysical weapons, the article attempts to theoretically and methodologically justify the existence of climate weapons, determine their place in the taxonomy of weapons of mass destruction, as well as the use of technologies and dissemination methods as a modern way of conducting new-generation wars, referred to in the literature as sixth generation wars.

KEYWORDS

climate weapons, sixth generation wars, geophysical weapons, weapons of mass destruction



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Introduction

At the outset, it is worth emphasising that military planners and designers regularly draw attention to the need to create global weapons that will be used to conduct so-called network-centric warfare (NCW). At the same time, world politics shows a tendency to withdraw from traditional weapons of mass destruction, which is facilitated by military technological progress. New forms and methods of armed struggle and warfare as a whole are being developed, where nuclear weapons are beginning to yield to technologically advanced weapons built on new physical principles. Therefore, as part of the research, the author will attempt to theoretically and methodologically justify the existence of “climate weapons”, determine their place in the system of weapons of mass destruction, usage in political technologies and methods of dissemination as a modern way of conducting new-generation wars (Fig. 1), and determine ways to prevent such use.

Despite these obvious facts, opinions on the existence and development of a new type of weapon – the “climate weapon” – are divided: some acknowledge its existence (Erokhin, Komendantova, 2024), others deny it (Ranguelov, 2023). Discussions continue on the existence and practical

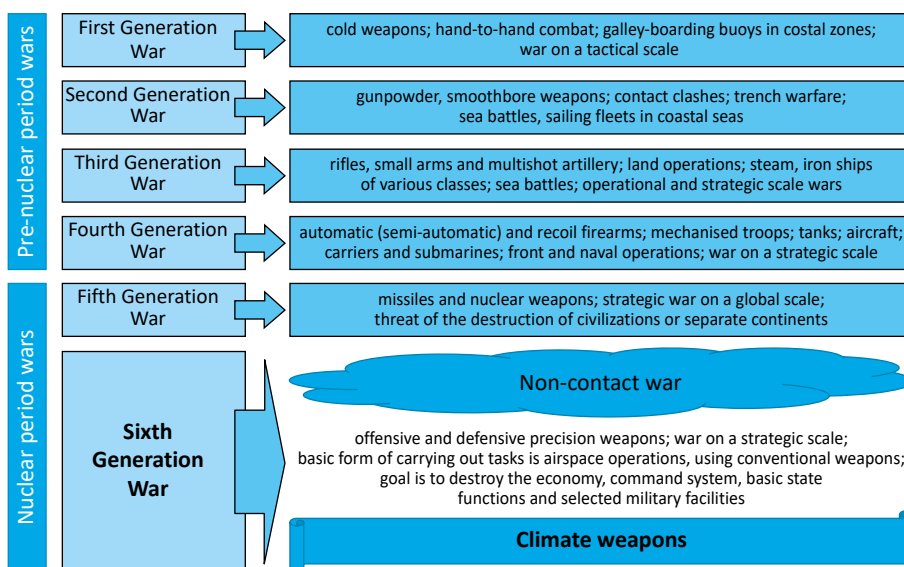


Fig. 1. Weapon generations

Source: own study based on (Sołkiewicz, 2009).

cases of the use of “climate weapons” by states. At the same time, they are accompanied by an increasing number of natural disasters since the beginning of the 21st century, which some experts consider indirect evidence of experiments using geophysical weapons, including “climate weapons”. Despite the signing of several international documents that directly prohibit the use and restrict the trade of various types of weapons of mass destruction, none of them was devoted to “climate weapons”. In this context, there is only the “Convention on the prohibition of military or any other hostile use of environmental modification techniques” adopted on December 10, 1976, as a Resolution of the United Nations General Assembly (United Nations, 1976).

However, practice shows that a ban on the use of weapons does not necessarily result in a ban on their development. Hence, there is still much controversy surrounding research projects and centres such as: High Frequency Active Auroral Research Program – HAARP (United States of America) (*About HAARP*, 2015) or the analogous European Incoherent Scatter Scientific Association – EISCAT (Sweden and Norway) (*Welcome to EISCAT Scientific Association*, 2023), Five-hundred-meter Aperture Spherical Telescope – FAST (China) (Gregersen, 2016) and SURA Ionospheric Heating Facility (Russia) (*About: Sura Ionospheric Heating Facility*, n.d.). In Russia, apart from SURA, near Nizhniy Novgorod, there are also similar stations in Khabarovsk, Tula, Irkutsk and Novosibirsk.

Rumours have been circulating for years about a mysterious military project that could control the weather and cause earthquakes. These relate to HAARP – a military scientific program that focuses its research on the impact of electromagnetic radiation on atmospheric phenomena. It is conducted jointly by the United States Air Force, United States Navy and Defense Advanced Research Projects Agency (DARPA) and built by British Aerospace Electronic Systems (BAE Systems). Research conducted as part of HAARP aimed to understand the impact of electromagnetic radiation on atmospheric phenomena, such as magnetic storms and the aurora borealis. This project uses the latest technologies and is one of the largest research projects in the field of atmospheric physics. Construction of the station began in 1993. The first functional facility was completed in the winter of 1994. An analysis of sources in the literature (National Research Council of the National Academies, 2014) concludes that HAARP is the world’s most capable high-power, high-frequency transmitter for studying the ionosphere. The High Frequency Active Auroral Research Program uses a large set of various diagnostic and transmitting devices that can

be used to simulate the impact of various radiation sources on the ionosphere. The transmitting set consists of 180 antenna elements (arranged in a rectangular form in 12 rows of 15 columns each) with a net emitting radiation power of 3.6 MW and an Effective Radiated Power (ERP) power of approximately 575 MW. The transmitting frequency is selected in the range from 2.7 to 10 MHz.

The second mentioned facility (EISCAT) was established in 1975 and operates three non-coherent radar systems distributed over northern Scandinavia and Svalbard. The devices are used to study interactions between the Sun and Earth, revealed by disturbances in the ionosphere and magnetosphere. The European Incoherent Scatter Scientific Association supports three of the world's ten incoherent scatter radars. These facilities of the highest standard are located in the Scandinavian sector, north of the Arctic Circle. They consist of two independent radar systems under the so-called "aurora oval" on the continent and another radar in the northern polar cap on the island of Spitzbergen in the Svalbard archipelago. It is worth emphasising here that the mentioned radars can only be used for civilian research. Referring to the latest EISCAT annual report (EISCAT Scientific Association, n.d.), the project's strategy is to conduct activities to understand the various forms of coupling between the Sun, Earth, interplanetary space, the Earth's magnetosphere, as well as the ionosphere and the atmosphere. All these efforts are being undertaken with the goal of acquiring the necessary knowledge, understanding, principles and techniques that will enable humanity to monitor, predict and mitigate these processes over the next 30 years.

In China, the world's largest single-dish radio telescope (Nan et al., 2011) with a diameter of 500 m was put into operation in Pingtang (Guizhou Province), which is larger than the previously largest Arecibo Observatory (*Arecibo Observatory*, n.d.) with a diameter of 305 m, and is three times more efficient. The construction of this structure was completed in July 2016. The Five-hundred-meter Aperture Spherical Telescope (FAST) is currently the most sensitive radio telescope operating at low radio frequencies. It has a stationary main antenna, but thanks to wave sensors that move above the antenna dishes, both radio telescopes can study objects beyond their zeniths, with FAST being able to study objects further from its zenith than the Arecibo radio telescope. FAST operates in the range of 0.07–3 GHz. The goals of the radio telescope's research are investigating concentrations of neutral hydrogen in the Milky Way and other galaxies, detecting pulsars, both in our galaxy and beyond, studying molecules in

interstellar space, searching for variable stars and searching for extra-terrestrial life. The Five-hundred-meter Aperture Spherical Telescope is expected to be able to detect signal transmissions from alien civilizations from more than 1,000 light-years away.

The Russian SURA meteorological facility is comparable in power to the American HAARP and is located in the central strip of Russia 150 kilometres from Nizhniy Novgorod. SURA began to be built in the late 1970s and was put into operation in 1981. The facility belongs to the Scientific and Research Institute of Radio Physics, one of the leading ones in the Union of Soviet Socialist Republics at that time. Today, SURA consists of a set of stands that are rusting and worn out due to a lack of money, but still functioning. Neat rows of 20-metre antennas stand on a square with an area of 9 ha. In the centre of this antenna field is a large tube – a radiation source – through which acoustic processes taking place in the atmosphere are studied. At the edge of the field is a building with a radio transmitter and a transformer substation, and further on, a laboratory and utility block. Thanks to its unique installations, extremely interesting results of the behaviour of the ionosphere were obtained. Among other things, scientists discovered the effect of generating low-frequency radiation by modulating ionospheric currents. Initially, experiments in SURA were largely financed by the Ministry of Defence, but after the collapse of the Union of Soviet Socialist Republics, the work was discontinued. Officially, its current research is intended to serve scientific purposes, and local scientists participate in international ionosphere research projects. The main difference between SURA and HAARP is that the Russian installations are located in mid-latitudes, not polar latitudes, where the aurora borealis phenomenon occurs. As indicated in the literature (Dockrill, 2018), this is important because the intensity lines of the Earth's magnetosphere meet in the north. By influencing them, the state of the magnetosphere can be changed and cause an artificial aurora borealis at a minimum, or in an extreme scenario, can lead to detuning of the electronic systems of artificial satellites and other equipment and block the operation of terrestrial electronic systems.

With reference to the described functionalities of structures implemented as part of projects officially aimed at conducting cognitive activities in the indicated research areas, it is worth citing, for contrast, data regarding the occurrence of weather anomalies. For example, the weather and climate disasters that hit the United States in 2022 cost over \$165 billion. The most destructive phenomena included Hurricane Ian, which razed parts of Florida at the turn of September and October, as well as a serious drought

in the western part of the country. The United States National Oceanic and Atmospheric Administration (NOAA) (National Oceanic and Atmospheric Administration, 2023) has summarised the losses caused by weather phenomena and climate change in 2022. The published report indicates that in 2022, there were as many as 18 disasters that caused damage worth at least one billion dollars each (Fig. 2). There were more such events in 2021 (20 disasters) and 2020 (22 events). Despite the project creators clearly contesting the accusations of interference in weather phenomena, a natural question arises whether there may be a connection between the indicated projects and the occurrence of anomalies?

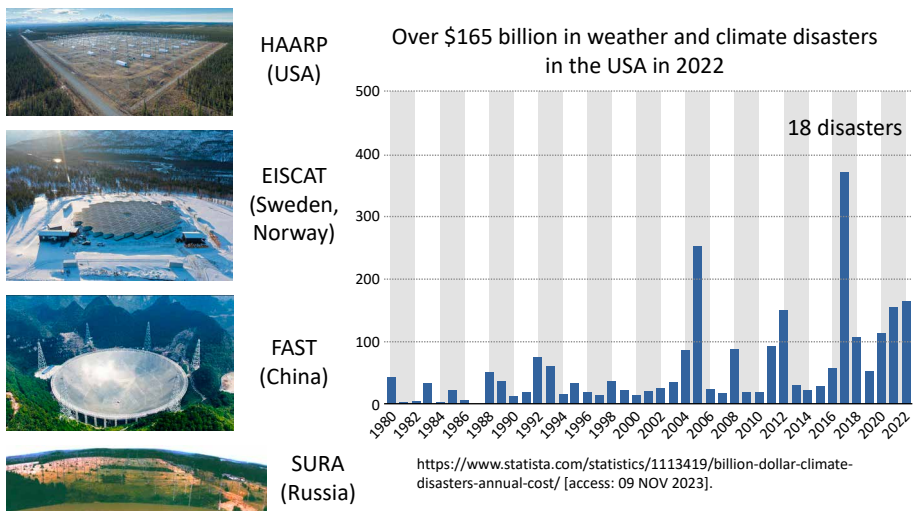


Fig. 2. Research projects vs. weather and climate disasters
Source: (Salas, 2024).

1. Development of geophysical weapons as climate weapons

The literature on the subject indicates that the topic of climate change has recently increased in popularity and has evolved from a purely environmental issue into a multi-faceted socio-political one (Vuong et al., 2023). The impact of global climate change on international security may be unprecedented, potentially surpassing historical global challenges such as nuclear proliferation, financial crises, and terrorism. The concept of weather warfare is also used as a type of modern conflict in which an opposing nation is conquered economically, tactically, and covertly through the use of deliberate

weather manipulation and geoengineering techniques. The idea is to prevent the opponent from fighting due to bad weather (Sajjad, Kiran, 2022).

Therefore, attempts to use climate-changing technologies as an object of offensive or defensive armed combat may be in the sphere of interest of military solutions aimed at using modern weapons, which can be termed climate weapons. However, methods of influencing nature through the use of artificially induced natural phenomena and processes for military purposes are currently usually referred to in science as “geophysical weapons” (Fleming, 2007) and are considered a non-traditional variety of weapons of mass destruction (Fig. 3).

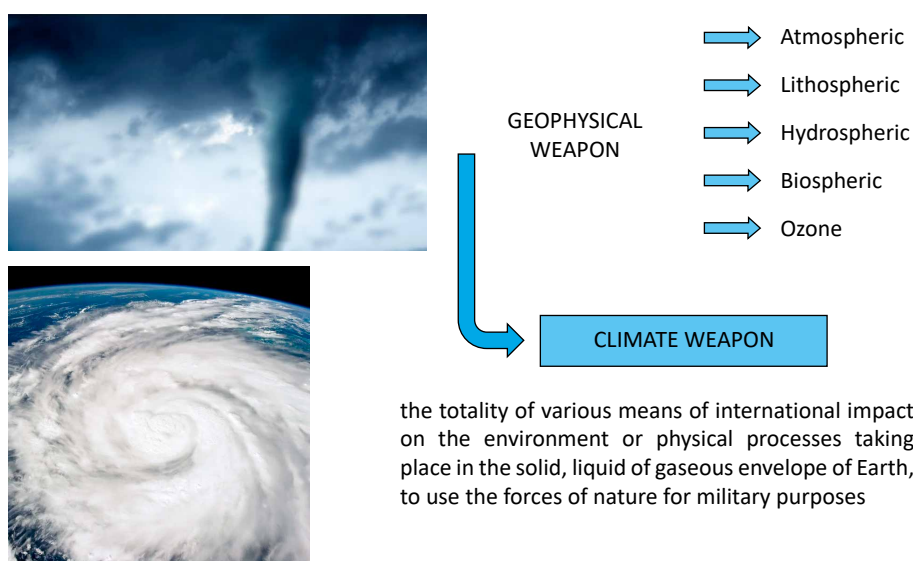


Fig. 3. Development geophysical weapons for use as climate weapons

Source: (Robock et al., 2007).

Geophysical weapons, depending on the environment in which the artificial phenomena and natural processes arise, are divided into: atmospheric, lithospheric, hydrospheric (Fig. 4), biospheric and ozone (Fig. 5) (Terebiński, November 17, 2023). In this case, the means of stimulating geophysical factors may differ, and the energy expended by these means is always inferior to the energy released by the forces of nature as a result of the induced geophysical process. While describing the characteristics of atmospheric (weather) weapons, the harmful factors include various types of atmospheric processes and related climate and weather conditions that affect life in some regions and across the entire planet.

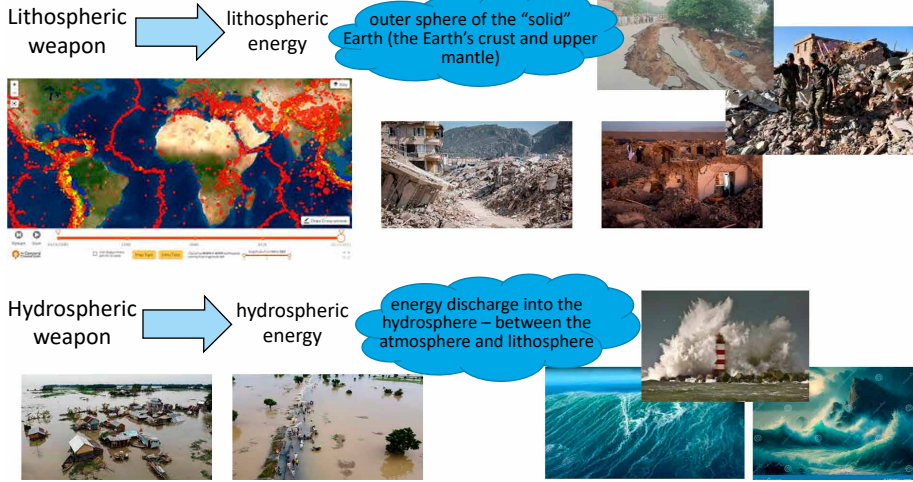


Fig. 4. Lithospheric and hydrospheric weapons

Source: (Terebiński, November 17, 2023).

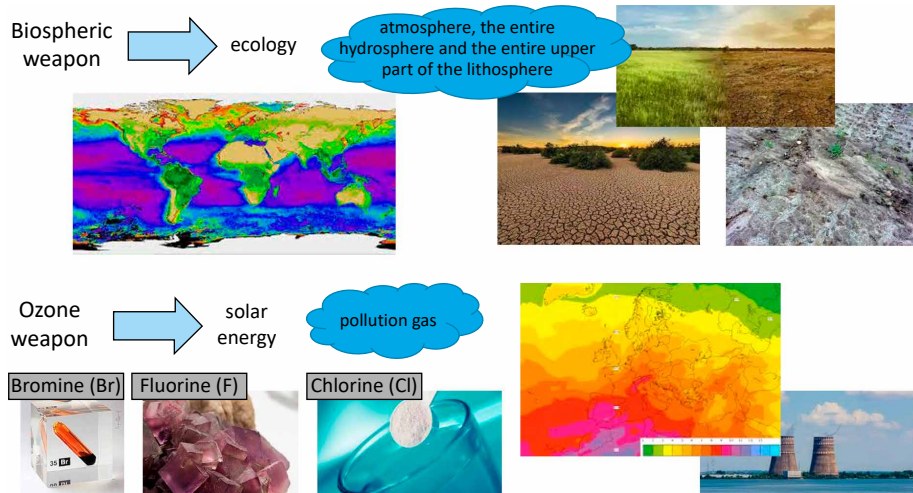


Fig. 5. Biospheric and ozone weapons

Source: own study based on <https://www.britannica.com>

Geophysical weapons are non-lethal weapons based on non-traditional, selective factors covering a wide range of technologies and effects (physico-chemical, biotechnical, electromagnetic, biological, meteorological, bioacoustic, etc.). However, if most of the directions of development of non-lethal weapons are intended to win direct combat operations, including damaging military equipment and neutralising enemy troops, the

remaining factors in the advanced aspects in the future will have unusual and damaging consequences (climatic, meteorological, informational, psychological, psychotropic and others) and might also be used in peacetime, creating zones of influence in specific regions of the given country through climate change, disturbing the mental balance of residents, destroying the energy and information space or carrying out large-scale terrorist attacks using nonlethal biological and chemical agents.

2. Characteristics of a “geophysical weapon” as a technological basis for climate weapons

It is worth starting the analysis by presenting the possibilities of using “atmospheric weapons”. Currently in the literature on the subject we can find, for example, information about factors such as iodine, which causes heavy rains over a large area of the earth when dispersed in clouds, and in areas with high humidity, it can change the water management of swamps, rivers, and lakes, deteriorating the patency and causing floods. In turn, reagents such as carbon dioxide, propane, and lead iodide contribute to the dispersion of fog, which may lead to drought in some areas. Generators on the ground and on-board equipment on rockets and aircraft can serve as emission sources.

There is also the concept of the “lithospheric weapon”, which is based on using the energy of the lithosphere (Bychkov, 2023). The use of this weapon entails the occurrence of catastrophic phenomena in the form of earthquakes, movement of geological plates, and volcanic eruptions, against the background of released tension in tectonically dangerous zones. In turn, “hydrosphere weapons” (Vasileva-Tcankova, 2022) use the energy of the hydrosphere; the energy discharge in the hydrosphere – between the atmosphere and lithosphere – artificially affects the Earth’s water resources and can cause high waves and floods.

“Biospheric” (ecological) weapons are associated with catastrophic changes in the biosphere, for example parts of the atmosphere, the entire hydrosphere and the entire upper part of the lithosphere, which are connected to each other by complex biochemical cycles of energy and substance migration. The use of special chemical and biological substances over large areas can lead to the destruction of vegetation and topsoil, contributing to the depletion of food supplies. The basis of operation of the “ozone weapon” is the use of the energy of ultraviolet solar radiation. The

depletion of the ozone layer using gaseous pollutants, including bromine, fluorine and chlorine, which can be delivered by planes, missiles and other means, causes the destruction of humankind, fauna and flora through the action of high doses of UV radiation.

3. Modern fighting method – climate weapons

The idea of using climate phenomena for military purposes appeared around the middle of the last century and immediately became popular both among military experts and even the general public. However, it is worth emphasising a fact related to the use of a modulated radio frequency beam and an ultraviolet beam. This phenomenon causes photoionisation of particles in the atmosphere and collects them, amplifying the initial beam over great distances. When the beam strikes the target, an extensive electrical discharge is created with thermal and photic effects. At lower power, it heats up the atmosphere and causes climatic disturbances (tornadoes, rains, etc.). In 1919, this technical invention, which could influence the weather, was patented. Its author was the French inventor Constantin Vaideanu, the patent was numbered FR36728 and given the name “Device for transmitting energy of enormous power over long distances” (Vaideanu, 1919).

The temptation to create and use “climate weapons” to facilitate warfare stems from the fact that introducing climate change into the territory of a given country or region may have a direct impact on the industry, economy and critical infrastructure (Fig. 6), which are strategic elements for conducting any kind of warfare.

Currently, there is a trend indicating the need to use all non-lethal types of weapons of mass destruction. And “climate weapons” are not intended to physically destroy the army, but to change the customary environment, which creates a serious obstacle for the opposing side. Since “climate weapons” can, at least hypothetically, be used not only during war but also in times of peace, the basic way of using them will be to influence specific regions of a country. The possible goals may include local climate changes, disturbance of the mental state of the population, and destruction of the natural environment, energy resources, information resources, economy and industry of a given country.

Typically, the term “climate weapon” is understood as the technology itself, which is affecting a specific natural phenomenon, or a set of tools

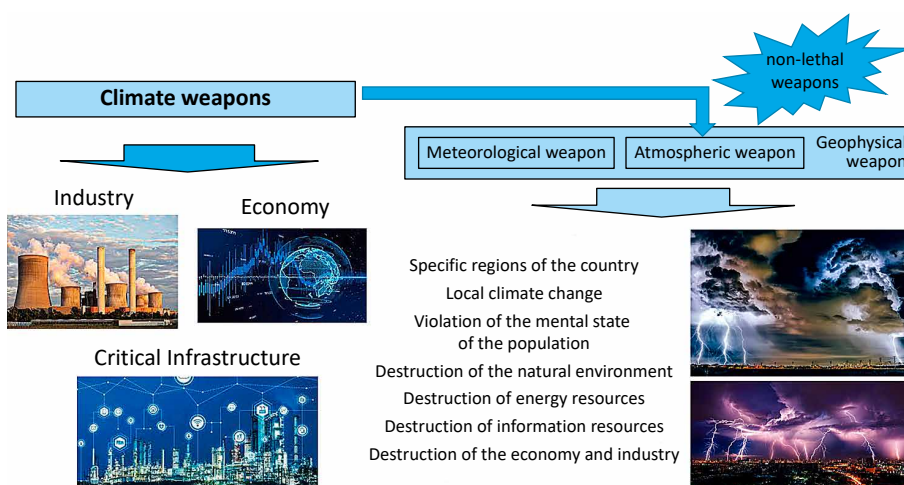


Fig. 6. Climate weapons as a modern fighting method

Source: own study based on <https://www.smithsonianmag.com>

(technologies) capable of affecting the atmosphere, hydrosphere and geosphere of Earth, causing catastrophic phenomena in a certain region of the planet.

It is worth noting that the “climate weapon” technology can also be implemented into traditional weapons and used to induce indirect impacts on the environment. Scientific research into the impact of external factors on the climate is expanding the existing body of knowledge and may constitute the basis for “climate weapon” technology. Research into “climate weapons” is ongoing. The best example here is the previously mentioned American HAARP system.

Despite the administrative transfer of operation of the research centre from the United States Air Force to the University of Alaska Fairbanks on 11 August, 2015, exploration into ionospheric phenomenology continues. According to the American institute, HAARP is the world’s most powerful high-power and high-frequency transducer for studying the ionosphere. The HAARP program together with the ionospheric research centre consists of a high-power Ionospheric Research Instrument (IRI) transmitter with emitters, operating in the high-frequency range that can be used to temporarily excite a limited region of the ionosphere, and a specialised set of instruments that can be used to observe the physical processes occurring in the excited region.

All these components fit into the technology used by the “climate weapon”, because if, for example, perpetrators cause constant rains or prolonged

drought, agricultural production is prevented or drinking water becomes scarce, the sanitary and hygienic situation may deteriorate, transport will be disrupted, and all this, in turn, will lead to the disorganisation of the potential enemy. In such a scenario, missiles and combat operations become unnecessary.

Despite the existence of a missile attack warning system, a system for preventing the use of “climate” (geophysical) weapons has not yet been developed, although the consequences of such use may be catastrophic. At the same time, no global system has been created to prevent natural disasters, the dynamics of which have been unprecedented in recent years. Therefore, counteracting the use of geophysical weapons and the nature of possible retaliatory actions should be considered a separate problem, which should include physical and technical measures to neutralise the impact of the combat systems and technologies used as well as responses to possible hostilities, and constitute the legal basis for this action (Fig. 7). It is believed that the human factor is responsible for most weather anomalies and disasters; research ignores new geopolitical realities, increased anthropogenic burden on the environment, and the possibility of taking into account the physics of catastrophic processes in the study of disasters. Even if there are suggestions of the use of “climate weapons” (geophysical ones) it is impossible to prove them because there are no technical means of monitoring and controlling such acts.

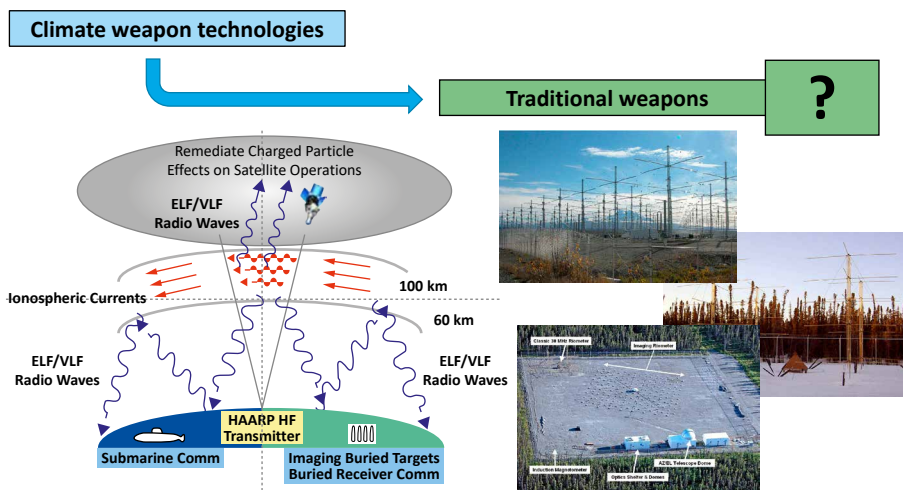


Fig. 7. Modern climate weapon technologies vs. traditional weapons

Source: own study based on <https://haarp.gi.alaska.edu/>

The Satellite Weather Modification System (SWMS) is also worth mentioning. It uses Earth's satellites to harness solar energy to modify the thermodynamics and composition of the Earth's atmosphere (Chen, 1999). The SWMS is comprised of three subsystems. The first consists of a network of Earth satellites called satellite engines, used to reflect or convert solar energy into other forms of energy beams discharged at specific locations. The centres in these places and the centres through which the energy beams pass absorb these energies and convert them into heat. The second subsystem includes a large network of remote sensing devices. These sensors are used to measure the composition of local media, dynamic parameters, and thermodynamic properties. Sensor measurements are implemented into the third subsystem, which includes a network of ground control stations, which provide energy beam guidance by estimating the characteristics of each beam and the trajectory of its aiming point as a function of time. The integration of these three subsystems establishes a guidance and control loop for the sensor feedback energy beam. Applications of SWMS for weather modification include rainfall modification, wasteland reclamation, severe weather damage reduction, and environmental improvement. Its non-weather applications include providing concentrated energy to electricity generating stations (solar, wind and hydro), high-latitude greenhouse farms, and solar-powered aircraft. The presented possibilities of using this system completely exhaust its potential use for military purposes as a climate weapon.

The problem of states' responsibility for the use of "climate" (geophysical) weapons under international law is very difficult. The Convention on the Prohibition of the Use of Technical Means of Impact on the Environment for Military or Any Other Hostile Purposes (Prohibition of "Ecological Wars") of December 10, 1976, to which several dozen countries are currently parties, does not provide for any liability for its violation (Fig. 8) (United Nations, 1976).

One possible reasonable solution would be to create a law or commission, under the aegis of the United Nations, which could make decisions about forecasting global disasters in general. It would be a major milestone in the creation of effective transnational structures and operational global civil society formations that support the peace and harmony, which serve to both cause and inhibit the chaos that is taking place.

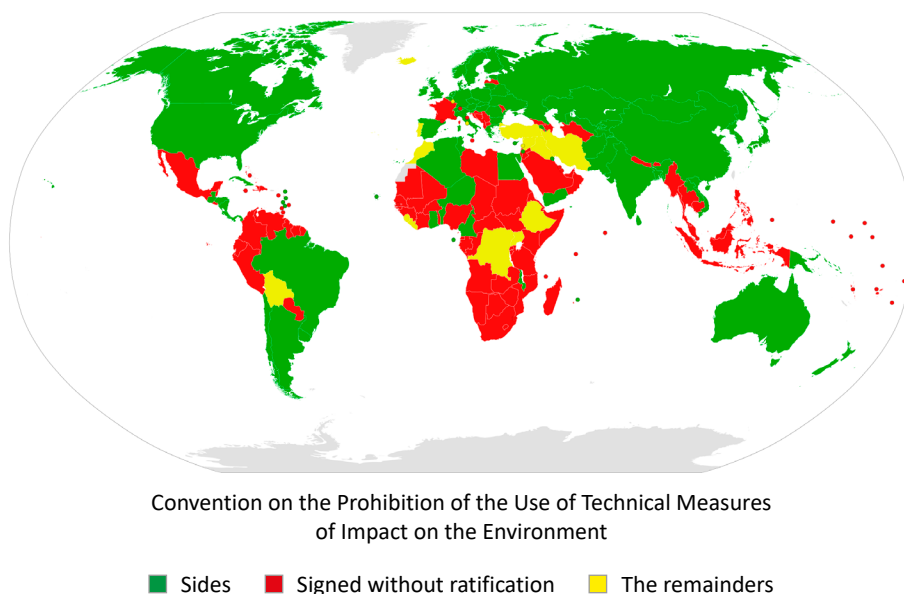


Fig. 8. Preventing the use of “climate weapons” and responsibility for their use
Source: own study based on (United Nations, 1976).

Conclusion

The history of international relations indicates that in the conditions of modern civilization, armed conflicts and wars are still constant companions of humanity, fulfilling the function of redistributing resources and spheres of influence, and sometimes contributing to a radical change in the geopolitical situation between the warring parties. A society developing asymmetrically and unevenly, in order to overcome external and internal conflicts, resorts to one of two ways of solving them within the political process – cooperation or confrontation.

Since there is a stable cause-and-effect relationship between war and politics, each civilization corresponds to a certain level of development of weapons and military equipment. The tendency of the 21st century to constantly accumulate and improve weapons, which began in the 20th century, has led to the creation of advanced technologies, forms and methods of armed combat.

In place of the “old” wars (Antczak, 2018), it is a time of new, so-called “sixth generation” wars (Alderman, 2015, May 12), based on advanced-technology weapons that reduce the degree of direct involvement

of soldiers by using physical, chemical and biological factors, and the natural environment, based on geophysical, information and network-centric weapons.

The concepts of cyber-war, war based on computer technology, emerged. Consequently, armed violence is no longer the dominant feature of war. The socio-political dimension of war is replaced by military-technical and informational-psychological capabilities. Therefore, it seems justified to define the concept of the “climate weapon”, which can be assigned to a new generation of weapons, for example non-traditional ones, as a type of geophysical weapon (Fig. 9). Moreover, “climate weapons” can be considered one of the most dangerous types of weapons of mass destruction, on a par with traditional forms (nuclear, chemical and biological) because their use can have global and largely unpredictable consequences, where a possible aggressor may later also be their victim.

In the current situation, the possibility of terrorist groups acquiring “climate weapons” or other types of weapons of mass destruction is becoming increasingly worrying, given the increased frequency and scale of the terrorist threat around the world. The potential use of such weapons to achieve political goals during armed conflicts could lead to mass accidents and put humanity on the brink of survival, not to mention the occurrence of a global environmental “apocalypse”. It cannot be ruled out that recent unusual forms of climate change may be linked to the hidden

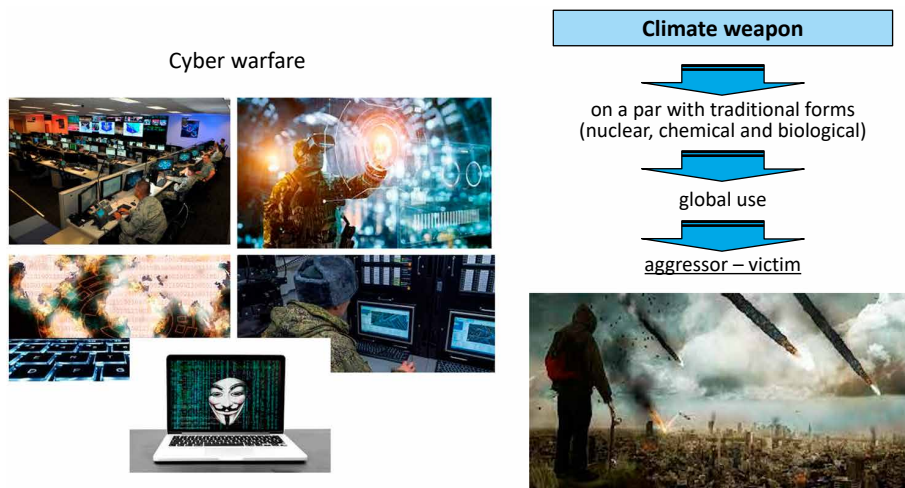


Fig. 9. Climate weapon – a new generation of weapons

Source: (Terebiński, November 17, 2023).

use of “climate weapons”, and the complete lack or unavailability of both analyses and information does not help to identify problems in this field or to find ways to effectively solve them.

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Bronie klimatyczne – nowa broń masowego rażenia?

STRESZCZENIE

W tradycyjnym podejściu do systematyki broni masowego rażenia (BMR), gdzie uwypukla się przede wszystkim broń chemiczną jako tę najniebezpieczniejszą ze współczesnych środków niszczenia, wskazuje się również na broń nuklearną, biologiczną oraz toksyczną. Taka klasyfikacja broni masowego rażenia została uwzględniona w konwencjach międzynarodowych ratyfikowanych w większości państw świata. Nie wyklucza to oczywiście prób nielegalnego dystrybuowania, ale i proliferacji zarówno gotowych do użycia komponentów, jak i niezbędnych do ich tworzenia materiałów, surowców, urządzeń i przede wszystkim wiedzy w tym


zakresie. Będąca przedmiotem badań podjętych w tym artykule broń klimatyczna to z kolei technologie mające wpływ na zjawiska naturalne. Na podstawie analizy materiału faktograficznego, odnoszącego się do szeroko rozumianej broni geofizycznej, w artykule podjęta została próba teoretycznego i metodologicznego uzasadnienia istnienia broni klimatycznej, określenia jej miejsca w taksonomii broni masowego rażenia, a także wykorzystania technologii i metod rozpowszechniania jako nowoczesnego sposobu prowadzenia nowych wojen pokoleniowych, określanych w literaturze jako wojny szóstej generacji.

SŁOWA KLUCZOWE broń klimatyczna, wojny szóstej generacji, broń geofizyczna, broń masowego rażenia

Biographical note

Lt. Col. Bartłomiej Terebiński, PhD Eng., gained his experience by taking subsequent positions in command support subunits as well as command and communication support cells, both in the country and abroad. At present, he is the head of the Department of Cybersecurity, Military Faculty of the War Studies University in Warsaw.

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Author contributions

The author contributed to the interpretation of results and writing of the paper. The author read and approved the final manuscript.

Ethical statement

The research complies with all national and international ethical requirements.