

Chapter 2

Historical Times and Turning Points in a Turbulent Century: 1914, 1945, 1989 and 2014?

Hans Günter Brauch

Abstract This chapter discusses six historical times. *Cosmic* and *geological* time are concepts used in the context of the history of the universe and earth. *Technical* and *structural* times (in the framework of ‘technical revolutions’ and ‘international orders’) can hardly be modified by governments and policymakers. *Conjunctural* time (in economics and politics) and short-lived *events* have in some cases become triggers for turning points. They fundamentally change global *structures* that are usually beyond the influence of policymakers in office. These six historical times and changing global contexts, political turning points, global transformations and transitions are discussed for international orders in the twentieth century. The chapter argues that the Industrial Revolution triggered the silent transition in geological time that resulted in the global transformation of technological, economic and political systems and of international relations. The catastrophe of 1914 led to World War I and the order of Versailles collapsed with the outbreak of World War II. The global peaceful change of 1989 resulted not in a period of sustainable peace but in a new global disorder and in global environmental challenges. It is uncertain whether humankind will understand the consequences of a situation where “we are in the Anthropocene” and “we are the threat” and “we alone can become the solution”.

Keywords Cosmic time • Geological time • Technical time • Structural time • Conjunctural time • Events • Turning point • Neolithic revolution • Industrial revolution • Holocene • Anthropocene • Global transformation

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2.1 Introduction

The author's conclusion is thus that "we are the threat" to our own survival as a species but also that only we as human beings can be and become the solution. This is provided that humankind becomes fully aware of the revolutionary consequences of the silent transition, a transition that has taken place since the 'Industrial Revolution' and that has accelerated during the seventy years since the end of World War II. The powerful economic and political interests and ideologies supported by adherents of *business as usual*, and trivialization by elements of the mass media—all these have ignored, ridiculed or attacked and attempted to counter these revolutionary insights and their conceptual consequences. The many turning points in the political history of events during the short twentieth century and during the young twenty-first century, as we see daily in the news, conceal the fact that humankind may, during the twenty-first century, face for the first time a global "survival dilemma" (Brauch 2008). A conceptual debate is needed among social scientists, especially from those who specialize in ecology and peace issues, as we seem to be slowly and silently undermining the very conditions of our human existence.

In this much broader scientific context, this chapter focuses on 'time' in *cosmic*, *geological* and *human history* and on specific 'turning points' in political history since the end of the 'long nineteenth century' (1789–1914) and during the 'short twentieth century' (1914–1989/1991).¹ The latter period started with the outbreak of World War I in July 1914, the catastrophe. A major turning point was the German attack on Poland on 1 September 1939 that triggered World War II, a war which resulted in global political and economic transformation since its end in 1945. The century symbolically ended with the fall of the Berlin Wall in 1989 and the implosion of the Soviet Union in 1991 that terminated the cold war (1947–1989/1991).

A century after the outbreak of World War I and about twenty-five years after the end of the cold war, humankind has seen no 'peace dividend', and no lasting or 'sustainable' peace has emerged. Rather, 'new wars' (Kaldor 1997; Münkler 2004) have replaced the 'proxy wars' of the superpowers in the global South. Numerous new insecurities have been observed, and a reconceptualization of security has occurred (Brauch et al. 2008, 2011; Brauch et al. 2009). Peace research has thus not become obsolete. However, many new global political, economic, and environmental challenges require a conceptual rethinking of 'peace and security' as well as

¹Inspired by Fernand Braudel's idea of the 'long sixteenth century' (c.1450–1640), the concept of the 'long nineteenth century', was according to Eric Hobsbawm the period between the years 1789 and 1914 that he had analysed in *The Age of Revolution: Europe 1789–1848* (1962), *The Age of Capital: 1848–1875* (1975), and *The Age of Empire: 1875–1914* (1987). In *The Age of Extremes: The Short Twentieth Century, 1914–1991* (1994), Hobsbawm discussed the short twentieth century (1914–1991). See for the German historical debate: Bauer (2004), Kocka (¹⁰2002), Osterhammel (2009).

of ‘ecology’ and ‘peace’ in a new era of earth and human history, the Anthropocene.

The thesis of this chapter—inspired by Crutzen (2002, 2011)—is that humankind has become aware of a far more fundamental turning point in earth history, with the transition from the geological period of the ‘Holocene’ to the ‘Anthropocene’. This transition is an outcome of the first major human intervention in the earth system, as a result of human consumption of fossil energy sources since the Industrial Revolution and most particularly during the past seventy years, through the burning of coal, oil and gas. Humankind is starting to understand that “we are in the Anthropocene!” and that “we are the threat!” caused by the societal outcomes of the physical impacts of anthropogenic global environmental and climate change. But “we can and must also be the solution”, in order to avoid the long-term negative and potentially violent consequences of global environmental and climate change by the end of this century.

The social construction of this new global reality has gradually been ‘scientized’ since the 1970s, ‘politicized’ since 1988, and ‘securitized’ since the early twenty-first century (Brauch 2002, 2009). The implication of this ‘silent transition’ may require a new ‘scientific’ or ‘Copernican revolution’ (Kuhn 1962), with a new ‘world view of sustainability’ (Clark et al. 2004) or a ‘new social contract for sustainability’ (WBGU 2011).

The discussion of the impact on issues of security of this silent transition to the Anthropocene era of earth history (Dalby 2013a, b, 2014, 2015) and on ‘sustainable peace’ (Brauch 2016; Chap. 7 in this book) is gradually emerging in the social sciences in general and in ecology and peace studies in particular. But the initial conceptualizations of ‘peace ecology’ (Kyrou 2007; Amster 2014) do not yet reflect the need for the framing of a new ‘peace ecology in the Anthropocene’ (Oswald Spring et al. 2014).

The human-induced silent transition in geological time from the Holocene to the Anthropocene also requires a fundamental rethinking of the ‘role of time’ in the natural and social sciences and in the humanities, including peace research (Reychler 2015a, b), as well as in the political, social and economic systems and on the part of its key actors. This is addressed in the *Handbook on Sustainability Transition and Sustainable Peace* and discussed below in “Building Sustainable Peace by Moving towards Sustainability Transition”.

This chapter is structured in ten parts. After this introduction six historical times and changing global contexts are introduced (2.2), then the chapter discusses political turning points, global transformations and transitions for international orders in the twentieth century (2.3), examines the Industrial Revolution as a trigger for the silent transition in geological time (2.4) that resulted in the global transformation of technological, economic and political systems and of international relations (2.5), where the catastrophe of 1914 led to World War I (2.6) and the order of Versailles collapsed with the outbreak of World War II (2.7). The uniquely peaceful global change of 1989 did not, however, result in a period of sustainable peace but in a new global disorder with new asymmetric wars and new global environmental challenges (2.8). A century after 1914, the present is not a turning

point and it is still uncertain whether humankind, as represented by its governments and policymakers, will understand the consequences of a situation where “we are in the Anthropocene” (2.9) and that “we are now the threat” and that “only we can become the solution” (2.10).

2.2 Historical Times and Changing Global Contexts

In the natural and social sciences six historical times with different turning points can be distinguished that have triggered numerous contextual changes. However, it is unlikely that a century after the catastrophe of 1914 a similar turning point can be observed in 2014 or 2015 (as was the case in 1914, 1945 or 1989), nor whether the new conflict between Russia and the West over the annexation of the Crimea and Russia’s role in the Ukraine or the role of the new *Islamic Caliphate* (IS) in parts of Syria and Iraq will fundamentally change international relations.

The American–Chinese climate initiative of 2014 and the change to more sustainable energy policies announced by Presidents Hollande (July 2014) and Obama (August 2015) have contributed to overcoming the paralysis of global climate diplomacy that has lasted from the *Conference of Parties* (COP: COP15) of the *United Nations Framework Convention on Climate Change* (UNFCCC) in 2009 in Copenhagen to COP21 in Paris in December 2015. If the Paris Agreement (2015) should fail to be implemented nationally as no legally binding climate agreement has evolved, humankind may well face a 4 °C world (Schellnhuber et al. 2012, 2016) with ‘catastrophic climate change’ (Schellnhuber et al. 2006), and this would significantly raise the economic costs of non-action (Stern 2006, 2009).

2.2.1 The Term and Concept of ‘Time’

The ‘term’ and ‘concept’ of time (*chronos* vs. *kairos* [Greek], *tempus* [Latin], *temps* [French], *Zeit* [German]) has been widely used with a range of meanings in everyday speech and in scientific analyses in different disciplines (natural sciences [relativity, cosmology, physics, biology], geology [stratigraphy], humanities [philosophy, history] and in the social sciences [political science, economics]).

The *Shorter Oxford English Dictionary* (2002, volume 2: 3272–3273) defines ‘time’ as a “finite extent of continued existence; e.g. the interval between two events, or the period during which an action or state continues” ... “a period in history, a period in the existence of the world; an age, an era”; as “a point in time; a space of time treated without ref. to duration”; and in a generalized sense as “duration conceived as having a beginning and an end; finite duration distinct from eternity”.

The *Encyclopaedia Britannica* (¹⁵1998, volume 28: 662–673) notes that “one facet of human consciousness is the awareness of time. ... People feel, think, and act in the time flow”. The essay discusses the role of “time and its history of thought and action” ... “the contemporary philosophies of time”, and “time as systematized in modern scientific society”. The latest edition of the German *Brockhaus Enzyklopädie* (²¹2006, volume 30: 486–495) distinguishes in its survey between philosophical considerations of the nature of time, time in classical mechanics and in the era of the theory of relativity, the start and end of time, time arrows, time in religion and in consciousness, and social time.

The ‘historical dictionary of philosophy’ (*Historisches Wörterbuch der Philosophie*, volume 12: 1185–1262) reviews the development of the concept of time from the pre-Greek period, through the Greek–Roman era, the Middle Ages, Humanism and the Renaissance to Kant and Heidegger, as well as the use of time in physics, society and culture and concepts of time in cultures outside Europe (India, China, Japan).

In this chapter different concepts of time are used, according to their duration:

1. *Cosmic time*, used in models of *physical cosmology* (since Max Planck), and referring to time since the Big Bang about 13.8 billion years ago; this is beyond the scope of any collective human impact.
2. *Geological time*, which describes the timing of and relationships between events throughout the earth’s history of about 4.54 billion years; its scales are adopted by geologists and earth scientists and defined by members of the *International Commission on Stratigraphy*. Its most recent accepted epoch is the *Holocene*, the period since the retreat of the Quaternary Ice Age some 12,000 years ago that made the rise of human civilizations possible.
3. The time of the *technical revolutions* (the ‘Neolithic’ or ‘agricultural’ revolution of 10,000–6,000 BCE, and the ‘Industrial Revolution’ from about 1750 CE and its different phases of innovation).

In claiming that “we are in the Anthropocene”, Crutzen stated that since the Industrial Revolution humankind has for the first time directly interfered in the earth system, triggering complex processes of global environmental (soil, water, biodiversity) and climate change.

In human history the French social historian Fernand Braudel in his masterpiece *The Mediterranean and the Mediterranean World in the Age of Philip II* (1946, 1969, 1972) distinguished between three historical times: (a) long duration (*la longue durée*), (b) repeating historical cycles (*histoire de conjuncture*), and (c) events (*l’histoire événementielle*). Braudel’s periodization is extensively used in history and in the social sciences (political science and economics). Other periodizations are common in economic history and theory (e.g. mercantilism, capitalism, socialism, neo-liberalism) and in feminist discourse (e.g. emergence of patriarchy, see: Oswald Spring 2016).

2.2.2 *Cosmic Time: Beyond Human Intervention*

According to the *Encyclopaedia Britannica* (¹⁵1998, volume 28: 663–664) a cyclic view of *cosmic* and human history prevailed among the Hindus, pre-Christian Greeks and Aztecs.

The Chinese, Hindus, and Greeks saw cosmic time as moving in an alternating rhythm, classically expressed in the Chinese concept of the alternating between Yin, the passive female principle, and Yang, the dynamic male principle ... In the philosophy of Empedocles ... the equivalents of Yin and Yang are Love and Strife. ... Plato and Aristotle took it for granted that human society, as well as the cosmos, have been, and will continue to be, wrecked and rehabilitated any number of times.

In modern physics *cosmic time* has been identified with the time since the Big Bang; it is commonly used in the Big Bang models of physical cosmology. It is defined for homogeneous, expanding universes as follows: Choose a time coordinate so that the universe has the same density everywhere at each moment in time (the fact that this is possible means that the universe is, by definition, homogeneous).²

Recently *physical cosmology* has been described as:

the study of the largest-scale structures and dynamics of the Universe and [is] concerned with fundamental questions about its origin, structure, evolution, and ultimate fate. ... Physical cosmology, as it is now understood, began with ... Albert Einstein's general theory of relativity, followed by major observational discoveries in the 1920s: [by] Edwin Hubble ... work by Vesto Slipher and others showed that the universe is expanding. These advances ... allowed the establishment of the Big Bang Theory, by Georges Lemaitre, as the leading cosmological model. ... Cosmology draws heavily on the work of many disparate areas of research in theoretical and applied physics. Areas relevant to cosmology include particle physics experiments and theory, theoretical and observational astrophysics, general relativity, quantum mechanics, and plasma physics.³

This *cosmic time* that refers to the 'Big Bang' of about 13.8 billion years ago is beyond any human impact and will thus not be considered further.

2.2.3 *Geological Time: Transition from the Holocene to the Anthropocene*

By claiming at a conference around the turn of the millennium in Cuernavaca (Mexico) that "We are in the Anthropocene!", the Nobel chemistry laureate Crutzen (2002, 2016) challenged the *geological time scale* (GTS) geologists and Earth

²See "Cosmic time"; at: https://en.wikipedia.org/wiki/Cosmic_time.

³See "Physical cosmology"; at: https://en.wikipedia.org/wiki/Physical_cosmology. See also: *Encyclopaedia Britannica* (¹⁵1998, vol. 28: 665–667); Balbi, Amedeo: "Cosmology and time"; at: <http://arxiv.org/pdf/1304.3823v1.pdf>; Rugh, S. E.; Zinkernagel, H.: "On the physical basis of cosmic time"; at: <http://philsci-archive.pitt.edu/4020/1/CosmicTime.pdf> (10 August 2015).

scientists have used to describe “the timing and relationships between events that have occurred throughout Earth’s history” by relating “stratigraphy to time”. According to the definition of the *International Commission on Stratigraphy*,⁴ during the *Holocene* (from 11,700 BP to the present) these events have occurred:

Quaternary Ice Age recedes, and the current interglacial begins; rise of human civilization. Sahara forms from savannah, and agriculture begins. Stone Age cultures give way to Bronze Age (3300 BC) and Iron Age (1200 BC), giving rise to many pre-historic cultures throughout the world.⁵

From a geological perspective, the *Holocene*

encompasses the growth and impacts of the human species worldwide, including all its written history, development of major civilizations, and overall significant transition toward urban living in the present. Human impacts of the modern era on the Earth and its ecosystems may be considered of global significance for future evolution of living species, including approximately synchronous lithospheric evidence, or more recently atmospheric evidence of human impacts.⁶

The *International Commission on Stratigraphy* has not yet approved the concept of the ‘Anthropocene’, but in 2008 it set up a study group to examine it. For geologists the

Anthropocene is an informal geologic chronological term for the proposed epoch that began when human activities had a significant global impact on the Earth’s ecosystems. The term ... was coined ... in the 1980s by ecologist Eugene F. Stoermer and has been widely popularized by ... Paul Crutzen, who regards the influence of human behaviour on the Earth’s atmosphere in recent centuries as so significant as to constitute a new geological epoch for its lithosphere. ... The Anthropocene has no precise start date, but based on atmospheric evidence may be considered to start with the Industrial Revolution.⁷

A proposal was presented to the Stratigraphy Commission of the Geological Society of London in 2008 “to make the Anthropocene a formal unit of geological epoch divisions”, and the Stratigraphy Commission set up an independent working group of scientists from various geological societies “to determine whether the Anthropocene will be formally accepted into the Geological Time Scale” with the aim of reaching a decision by 2016.⁸

⁴See for background on the “geological time scale”, at: http://en.wikipedia.org/wiki/Geologic_time_scale (21 January 2015).

⁵See at: http://en.wikipedia.org/wiki/Geologic_time_scale, based on these sources: “NASA Scientists React to 400 ppm Carbon Milestone” (15 January 2014).

⁶For the Holocene, see at: <http://en.wikipedia.org/wiki/Holocene>; Roberts (1998); Mackay et al. (2003).

⁷For the “Anthropocene”, see at: <http://en.wikipedia.org/wiki/Anthropocene>; (Crutzen and Stoermer 2000; Crutzen 2002; Steffen et al. 2011; Zalasiewicz et al. 2008, 2010).

⁸See: “Anthropocene”, at: <http://en.wikipedia.org/wiki/Anthropocene>; see the Working Group on the ‘Anthropocene’, International Commission on Stratigraphy (ICS); at: <http://quaternary.stratigraphy.org/workinggroups/anthropocene/>; see also the most recent “Newsletter of the Anthropocene Working Group”, September 2014; at: <http://quaternary.stratigraphy.org/workinggroups/anthropo/anthropoceneworkinggroupnewslettervol5.pdf>.

Crutzen (2011: 3–4), in “The Anthropocene: a geology of mankind”, summarized his observations on the human-induced interventions in and impacts on the earth system:

Considering these and many other major and still growing impacts of human activities on earth and atmosphere, and at all scales, it thus is more than appropriate to emphasize the central role of humankind in the environment by using the term ‘Anthropocene’ for the current geological epoch.

The impact of current human activities is projected to last and even expand over long periods.

In a more recent joint contribution Steffen et al. (2007: 614) argued:

The term Anthropocene ... suggests that the Earth has now left its natural geological epoch, the present interglacial state called the Holocene. Human activities have become so pervasive and profound that they rival the great forces of Nature and are pushing the Earth into planetary terra incognita. The Earth is rapidly moving into a less biologically diverse, less forested, much warmer, and probably wetter and stormier state.

Steffen et al. (2007: 616–618) distinguished two stages of the Anthropocene: (a) the *industrial era* (1800–1945), and (b) the *great acceleration* (1946–2015) (documented in Fig. 2.1):

From 1950 to 2000 the percentage of the world’s population living in urban areas grew from 30 to 50 % and continues to grow strongly. ... The pressure on the global environment from this burgeoning human enterprise is intensifying sharply. Over the past 50 years, humans have changed the world’s ecosystems more rapidly and extensively than in any other comparable period in human history ... The Earth is in its sixth great extinction event, with rates of species loss growing rapidly for both terrestrial and marine ecosystems ... The atmospheric concentrations of several important greenhouse gases have increased substantially, and the Earth is warming rapidly ... More nitrogen is now converted from the atmosphere into reactive forms by fertilizer production and fossil fuel combustion than by all of the natural processes in terrestrial ecosystems put together. ... The Great Acceleration took place in an intellectual, cultural, political, and legal context in which the growing impacts upon the Earth System counted for very little in the calculations and decisions made in the world’s ministries, boardrooms, laboratories ... The exponential character of the Great Acceleration is obvious from our quantification of the human imprint on the Earth System, using atmospheric CO₂ concentration as the indicator ... Although by the Second World War the CO₂ concentration had clearly risen above the upper limit of the Holocene, its growth rate hit a take-off point around 1950. Nearly three-quarters of the anthropogenically driven rise in CO₂ concentration has occurred since 1950 (from about 310 to 380 ppm), and about half of the total rise (48 ppm) has occurred in just the last 30 years (Steffen et al. 2007: 616–618).

Steffen et al. (2007: 619–620) distinguished three philosophical responses: (a) *business as usual*, (b) *mitigation*, and (c) *geoengineering*, any of which “can raise serious ethical questions and intense debate”, given “the possibility for unintended and unanticipated side effects that could have severe consequences. The

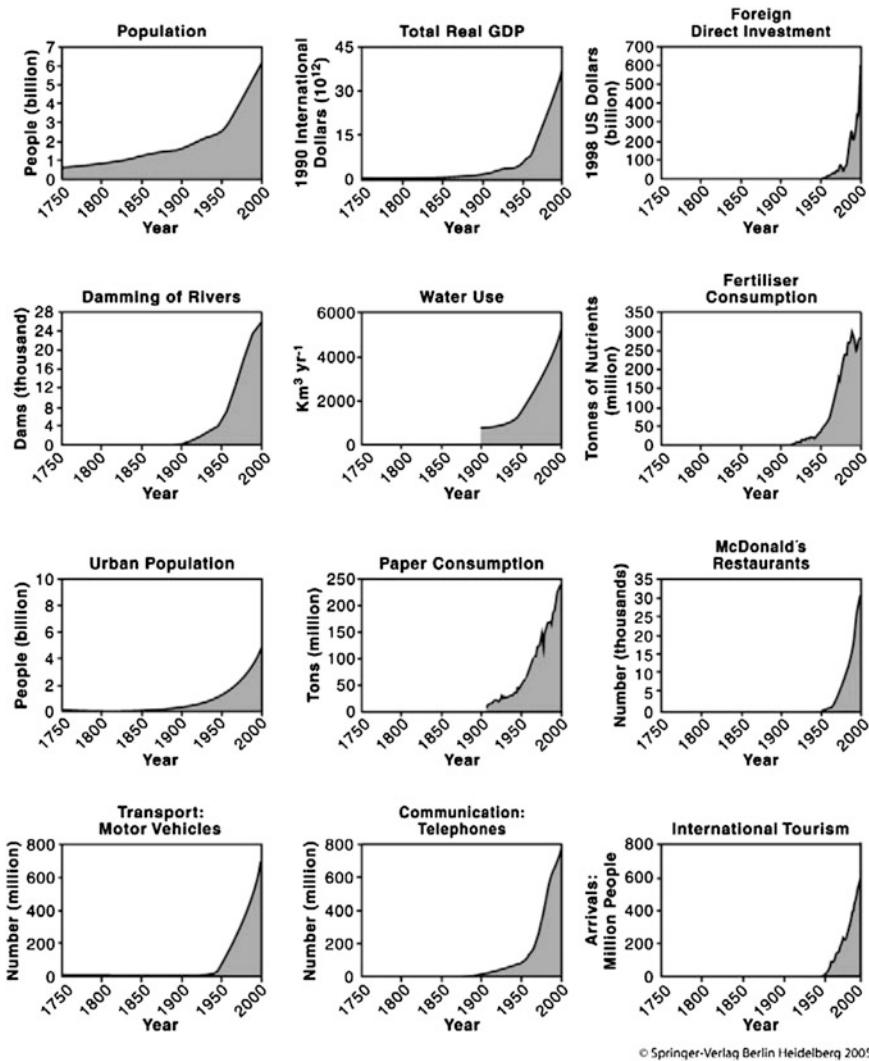


Fig. 2.1 The change in human enterprise from 1750 to 2000. The *great acceleration* is clearly shown in every component of human enterprise included in the figure. Either the component was not present before 1950 (e.g. foreign direct investment) or its rate of change increased sharply after 1950 (e.g. population). *Source* Steffen et al. (2007: 617), based on © Springer-Verlag (2005)

cure could be worse than the disease.” They concluded that “The Great Acceleration is reaching criticality”, but pointed to “evidence for radically different directions built around innovative, knowledge-based solutions”.

2.2.4 *Technical Time: Agricultural and Industrial Revolutions*

The new concept of *technical time*, referring to the two major *technical revolutions*, has not yet been conceptualized by archaeologists, philosophers and historians of science and technical innovation. The concept of *technical time* refers to the numerous technical innovations and societal, economic and political changes brought about by the two major technical revolutions in human history so far, the *Neolithic* or *Agricultural Revolution* and the *Industrial Revolution* (1750–present), which have both caused ‘great transformations’ (Polanyi 1944).

The concept of the ‘Neolithic Revolution’ was coined by V. Gordon Childe in 1936 by analogy with ‘Industrial Revolution’, a term used by Friedrich Engels and L. A. Blanqui and given its present meaning by the British historian Arnold Toynbee, who used it to refer to the period of accelerated technological, economic and social change from 1769 onwards (Watt’s invention of the steam engine) and to developments in Great Britain from 1785.

In the Holocene, the ‘Neolithic’ or ‘first agricultural revolution’ referred to the transition “from nomadic hunting and gathering communities and bands to agriculture and settlement”⁹ that took place between twelve and six thousand years ago, first in the Fertile Crescent (Mesopotamia, Anatolia, Levant) and later in Europe. These changes meant the adoption of new farming techniques, crop cultivation, and the domestication of animals, and this fostered the development of permanent or semi-permanent settlements. The concept of land ownership emerged, as did a hierarchy in society; towns were founded and trading communities helped to feed them with the ‘surplus production’ from increasing crop yields while craftsmen such as potters supplied the needs of the evolving urban settlements and city-states and kingdoms.

According to Harlan (1992) the *Neolithic Revolution* took place for three reasons: domestication was brought about (a) for religious reasons; (b) because of crowding and stress; and (c) through discoveries made by the food-gatherers. Archaeologists distinguish three routes for the start of *Neolithization* in central Europe: (a) the classical route from the Near East via south-eastern Europe to central Europe, (b) from the steppes of Asia through the Russian forests to northern Europe with its ceramic traditions and (c) the western route across the Mediterranean to Europe (Gronenborn/Terberger 2014: 7; Sirocko ³2012; Zimmermann 2009; Schmidt 2009).¹⁰

During the Neolithic age three agricultural crops developed as the basis for the diet of several advanced civilizations: cereals (wheat) in the *Fertile Crescent* from 9,000 BCE (Ethiopia, Egypt, Mesopotamia, Anatolia, Levant), rice in south-east Asia and in China from 8,000 BCE, and maize (corn) from 3,500 to 2,500 BCE in

⁹See “Neolithic Revolution”; at: https://simple.wikipedia.org/wiki/Neolithic_revolution (12 August 2015).

¹⁰Gronenborn/Terberger (2014), Sirocko (³2012), Zimmermann (2009), Schmidt (2009).

Meso-America (Mexico). With the division of labour (including that between men and women) a hierarchization of societies (including patriarchy) emerged, as well as writing and scripts, in Mesopotamia, China and Meso-America.

While human activities had an impact on the local environment, and the overuse of scarce water often contributed to the collapse of advanced civilizations (Egypt, Meso-America, China), these local impacts did not affect the earth system nor the global climate, as the greenhouse gas concentrations in the atmosphere remained stable throughout the Holocene era. This situation fundamentally changed due to the impact of the ‘Industrial Revolution’ during the ‘industrial era’ (1750–1945 or to the present) and the ‘nuclear era’ (1945–present).

The term ‘Industrial Revolution’ was coined by French diplomat Louis-Guillaume Otto (1799) and later used by Jérôme-Adolphe Blanqui in 1837 in his description of *la révolution industrielle*, while Friedrich Engels in *The Condition of the Working Class in England* (1844) referred to an Industrial Revolution which “changed the whole of civil society”. The term was popularized by lectures by Arnold Toynbee (1881), while several historians stressed a gradual evolutionary change (Clapham 1926, 1936). The ‘Industrial Revolution’ points to a

transition to new manufacturing processes ... from ... 1760 to ... between 1820 and 1840. This transition included going from hand production methods to machines, new chemical manufacturing and iron production processes, improved efficiency of *water power*, the increasing use of *steam power*, and the development of *machine tools*. It also included the change from wood and other *bio-fuels* to *coal*. ... The Industrial Revolution marks a major turning point in history ... [It] began in Great Britain, and spread to Western Europe and North America within a few decades. [Its] precise start and end ... is still debated among historians, as is the pace of economic and social changes.¹¹

Many historians and social scientists have distinguished different phases of the Industrial Revolution caused by different inventions and waves of technological innovation: (a) the initial phase triggered by Watt’s invention of the steam engine (1769) and its application in the textile industry (1760–1840) and (b) a second phase (1840–1870), “when technological and economic progress continued with the increasing adoption of steam transport (steam-powered railways, boats and ships), the large-scale manufacture of machine tools and the increasing use of machinery in steam-powered factories” (Ziegler 2009). Ziegler (2009) applied the term ‘Industrial Revolution’ to the period between 1760 and 1850, but he distinguished three phases of ‘industrialization’: (a) light industry, largely in the textile sector (1760–1840), (b) heavy industry, primarily railway construction (1830–1890), and (c) electrotechnical industries (since the 1890s).

The invention and application of electricity and of the telephone as well as the invention of the Otto motor and the car by Carl Benz (1886) and of new engines for ships and aircraft resulted in phases of energy, communication and transport

¹¹See “Industrial Revolution”, at: https://en.wikipedia.org/wiki/Industrial_Revolution.

revolutions. The process of technological innovation and its application accelerated during and in the immediate aftermath of World War II, with the USA as the model and pace-setter ('the American way of life'), until the European countries, Japan and (since Deng's reforms in the late 1970s) China became its competitors. As a consequence of these different phases of industrialization, a modern industrial society emerged during the twentieth century.

These changes in the economic system were accompanied by a 'scientific revolution', especially in the many disciplines of the basic natural sciences (physics, chemistry, biology) and in applied engineering (Jochum 2010); this triggered numerous changes in settlement patterns (the emergence of industrialized centres), in nutrition and diet, and in changing rhythms of life and work, and resulted in massive sociocultural processes of change. The social sciences and humanities focused increasingly on the related changes in societal relations, the value system and human behaviour in the industrial and nuclear era since 1945, once the atomic bomb and nuclear energy had added a new dimension to warfare and to the energy system.¹² This process increased the demand for imports of raw materials from all parts of the world and for the export of industrial mass production, and this intensified international trade and was an incentive for a revolution in the global system of transport.

The Industrial Revolution, the phases of industrialization and the waves of innovation (Fig. 2.2) were made possible by a shift from wood to fossil fuels (coal, oil and gas), and accompanied by an exponential increase in the consumption of fossil energy and (since the 1950s and 1960s) of nuclear energy as a source of electricity. The negative impacts on society have been gradually identified by natural scientists since the 1970s once they had started to analyse processes of global environmental change and climate change.

This debate has now resulted in a global consensus among the scientific community that 'anthropogenic' interventions in the earth system (IPCC 1990, 1995, 2001, 2007, 2014a) have brought about a fundamental change in earth history, and this is why Paul J. Crutzen has argued: "we are in the Anthropocene". Thus, for the first time in history, human activity, because of its impact during the Industrial Revolution (*technical time*), has triggered a change in *geological time*. As a result of an extended nuclear war, a 'nuclear winter' (Crutzen/Birks 1982) could also affect the atmosphere by darkening the sun with dust and thus cooling the earth, triggering bad harvests as happened after major eruptions of volcanoes throughout earth history. An example is the explosion of Krakatoa in Indonesia during the 1860s, which caused famine elsewhere.

¹²See the entries on: "Industrial Revolution" and "industrial era", in: *Brockhaus Enzyklopädie* (²¹2006, vol. 13: 260–261).

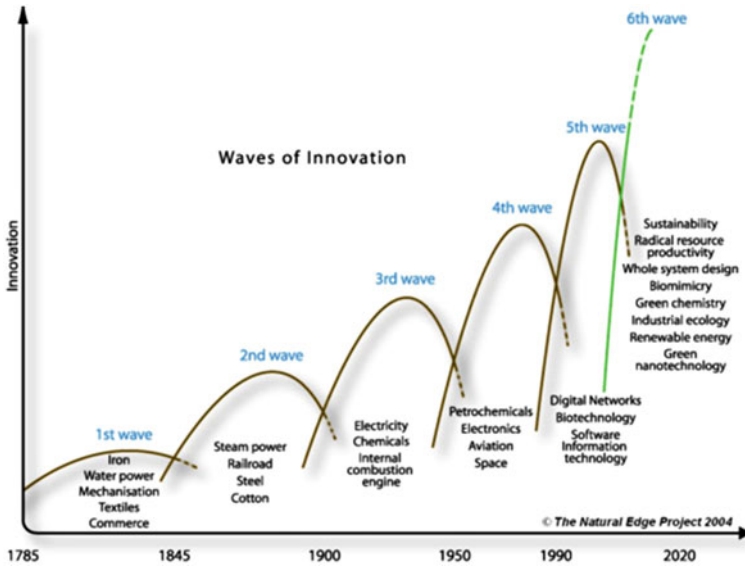


Fig. 2.2 Waves of Innovation. Source Hargroves (2016), with the author's permission

2.2.5 Braudel's Three Times of Human History

In his periodization of historical time Fernand Braudel was not aware of the changes in geological time, nor did he address the technical revolutions. Braudel (1969) mentions three historical times: (a) of the history of structures (*histoire de longue durée*), (b) of repetitive cycles (*histoire de conjuncture*), and (c) of events (*histoire événements*).

The first refers to “a history in which all change is slow, a history of constant repetition, ever-recurring cycles” (Braudel 1972, volume 1: 20–21). The second historical time has “slow but perceptible rhythms ... One could call it *social history*, the history of groups and social groupings” with the goal of showing “how all these deep-seated forces were at work in the complex arena of warfare”. The third historical time deals with “traditional history ... what [was] called ‘*l’histoire événementielle*’, that is the history of events. ... a history of brief rapid, nervous fluctuations, by definition ultra-sensitive ... But as such it is the most exciting of all, the richest in human interest, and also the most dangerous.”

Braudel's temporal trilogy will be discussed below in a different context with structural time (*histoire de longue durée*) used to refer to the *time of changes in national and international order* due to revolutions (American, 1776; French, 1789; Soviet, 1917; Chinese, 1949) and major wars resulting in the international orders of Vienna (1815), Versailles (1919), Yalta and San Francisco (1945), and the ‘new international disorder’ since the end of the cold war (Brauch 2008; Holsti 1991). The time of repeated cycles (*histoire de conjuncture*) will be applied to the periods

during which major elected policymakers (presidents, prime ministers, chancellors etc.) are in power, and the short time of events will focus on those (political, technical, economic) ‘structure-creating’ events that have fundamentally changed the existing global, international and national context or created a new one.

2.2.6 Kondratieff’s Long Cycles: Periodization of Economic History

In his discussion of industrialization, Osterhammel (2009) noted the different interpretations between economic historians influenced by *neoclassical* or *institutional* economics and those who interpreted industrialization in Europe as an expression of a *special European way* (*europäischer Sonderweg*). He argued that most classical theories have interpreted industrialization as part of a comprehensive socio-economic transformation, e.g. Karl Marx (from 1867), Kondratieff (1925) and Schumpeter (1922/1939 [1961]), Polanyi (1944), Rostow (1960), Gerschenkron (1962), Bairoch (1963), Landes (1969) and North and Thomas (1973).

Nikolaj Kondratieff and Joseph A. Schumpeter analysed industrialization as a “cyclically structured growth process of a capitalist world economy with changing lead sectors” (Osterhammel 2009: 913–914). The first Kondratieff (1780–1830) was triggered by the steam engine and its application in the textile industry; the second Kondratieff (1830–1880) was initiated by railways and steel applied in mass transport; the third Kondratieff (1880–1930) relied on electrification and chemicals also in mass transportation; the fourth Kondratieff (1930–1970) was influenced by automobiles and petrochemicals affecting individual mobility; the fifth Kondratieff (1970–2010) dealt with information and communication technology with key applications in these two sectors and finally the sixth Kondratieff (since 2010) was inspired by environmental innovations and by nano- and biotechnology and possibly also by health care.

However, none of the theories reviewed by Osterhammel addressed the long-term environmental costs of these industrial innovations and the impacts of these human interventions in the earth system (Stern 2006, 2007) caused by the exponential increase in global fossil energy consumption since 1800 (Fig. 2.3).

2.2.7 The Ecological Impact of the Great and Global Transformations

Polanyi (1944) addressed the ‘great transformation’ of Western societies caused by industrialization and the market economy, while Buzan/Lawson (2015) discussed the *Global Transformation* during the long nineteenth century and its impact on the *Making of International Relations*, arguing that this “transformation was profound,

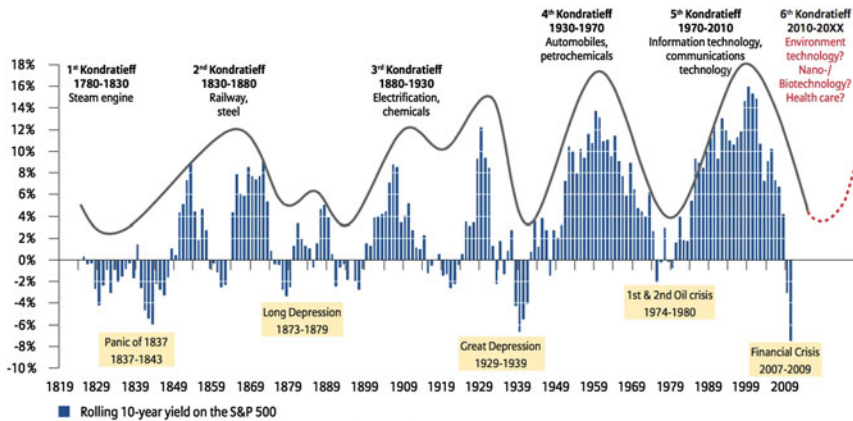


Fig. 2.3 An Interpretation of Kondratieff Waves. *Source* Naumer, Hans-Jörg; Nacken, Dennis; Scheurer, Stefan: “The sixth Kondratieff—Long waves of prosperity” (Frankfurt/M: Datastream and Allianz Global Investors Capital Market Analysis, January 2010). Permission was granted by Allianz Global Investors in August 2015

involving a complex configuration of industrialization, rational state-building and ideologies of progress” shifting from a “polycentric world with no dominant centre” to a “core-periphery order” but also “marking a shift in the distribution of power” that changed “the basic sources, or *mode of power*” (Buzan/Lawson 2015: 1).

They argue, with Osterhammel (2014: 393), that “the nineteenth century saw the birth of international relations as we know it today”, since the first effect of the global transformation was “to foster the emergence of a full international system, [and] the second effect was to generate a host of new actors. Rational nation-states, transnational corporations, and standing intergovernmental and non-governmental organizations [as] leading participants in international affairs” (Buzan/Lawson 2015: 2–3). They argue that the global transformation generated four linked changes in international relations: (1) industrialization and the extension of the markets; (2) processes of rational state-formation; (3) the new ideologies, e.g. liberalism, nationalism, socialism, scientific racism; (4) this tripartite configuration fostered a core-periphery global order and destabilized relations between the great powers.

However, the change in the modern international order since the end of the Thirty Years War (1618–1648) was closely related to the emergence of the modern Westphalian state and the thinking and practice of the principles and conventions of international law (Grotius 1625). It was, however, significantly influenced by the impact of the different speeds of industrialization and the emergence of powerful war industries from the 1870s and 1890s as well as from 1940 and 1950 when the United States adopted its first global military strategy (NSC–68), which required defence expenditure to be quadrupled. Following the massive mobilization of

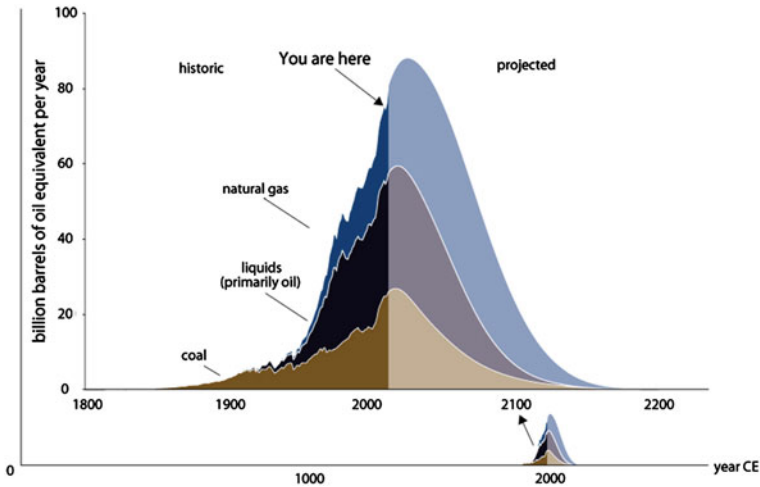


Fig. 2.4 Global production and projection of fossil fuels (1800–2200). *Source* Amory Lovins: *Reinventing Fire: Bold Business Solutions for the New Energy Era* (White River Junction, VT: Chelsea Green); at: <http://www.chelseagreen.com/reinventing-fire#sthashekkRAqOO.dpuf>

scientists into the war effort, the speed of innovation also partly benefitted from the spin-offs of military inventions, while in the era of *international relations* (IR) the military increasingly relies on technological break-throughs in the civil sectors. The accelerated speed of technological innovation has also resulted in an exponential increase in the consumption of fossil energy fuels (Figs. 2.1 and 2.4) and the related concentration of greenhouse gases in the atmosphere (Fig. 2.6).

2.3 International Order: Historical–Political Turning Points, Global Transformations and Transitions

From Braudel’s perspective, international order is a configuration of a longer duration or an object of structural history (*histoire de longue durée*). According to Hanagan (2012), international order refers “to the structure, functioning, and nature of the international political system” but many specialists in *international relations* (IR) “disagree on how order originates and how it functions”.

Since 1492, several changes in the dominant international order have occurred.

- The *Hispanic World Order*: expulsion of the Arabs and conquest of the Americas (1492–1618) by Spain and Portugal, resulting in a global order dominated by the Christian ‘civilized world’ that perceived the South as ‘primitive barbarians’;

- The *Peace of Münster and Osnabrück* (1648) after the Thirty Years War over religion (1618–1648), and the emergence of the Westphalian European order based on territorial states and an emerging international law;
- The *Utrecht Settlement* and the century of war and peace in the order of Christian princes (1715–1814).

After the independence of the United States (1776), the French Revolution (1789), the wars of liberation in Latin America (1809–1824) and the emergence of many new independent states (1817–1839), four major international orders can be distinguished. They result from

- The *Treaty of Vienna* (1815) and the European order of a balance of power based on a Concert of Europe (1815–1914) in an era of imperialism (Africa, Asia) and postcolonial liberation in Latin America.
- The *Peace of Versailles* (1919), with the collapse of the European world order, a declining imperialism and the emergence of two new power centres in the USA and the USSR with competing political, social, economic, and cultural designs; and a new global world order based on the security system of the *League of Nations* (1919–1939).

While in the first two international orders at the beginning and end of the ‘global transformation’ (Buzan/Lawson 2015) European powers still dominated, in the settlement of Yalta and San Francisco two new superpowers, the USA and the USSR, prevailed, while the UK and France were severely weakened:

- The *Political Settlement of Yalta* (February 1945) and the system of the United Nations discussed at the conferences in Dumbarton Oaks (1944) in Washington DC and in *Chapultepec* in Mexico City (January/February 1945), and adopted at *San Francisco* (April/June 1945) with the signing of the Charter of the United Nations.
- With the end of the cold war no new lasting international order emerged in the context of *The Political Agreement of Paris* (1990) within the framework of the *Organization for Security and Co-operation in Europe* (OSCE), which had hardly any impact on the subsequent ‘new global disorder’.

Thus, in modern history four major turning points in international order were triggered by

- *the French revolution* (1789) and the Napoleonic wars that resulted in the order of Vienna (1815), where the young revolutionary republic in North America was not yet represented;
- *the Russian revolution* (1917) and *World War I* (1918) that led to the order of Versailles (1919), where although US President Woodrow Wilson had played a major role in its design, the US never joined the *League of Nations* whose structure he had helped draft;

- *World War II* (1939–1945) that resulted in the order of Yalta (1945) that ensured that the order of the Charter of the United Nations of San Francisco (1945) could never materialize; and
- *The end of the cold war* as a result of a unique peaceful transition (1989–1991) that made the deterrence system obsolete but failed to prevent ‘new wars’.

The political, economic and military dominance of the US relied to a great extent on the global and regional institutions it had helped to set up at Bretton Woods (World Bank, IMF) and later the OEEC that became the OECD and NATO and the many other regional pacts (ANZUS, SEATO etc., OAS).

During the cold war (1946–1991) several phases could be identified that did not affect the institutional military structure, its strategies or the key foreign policies of both blocs:

- the *start of the cold war* from after World War II (1946/1947) until the Korean War (1950);
- the *first cold war* (1950–1963) when no substantial East–West cooperation took place;
- the *limited détente* (1963–1968) with bilateral, regional and global arms control treaties;
- the *bilateral détente* with US–Soviet arms control and confidence-building agreements that led to a multilateral détente process in Europe (CSCE, 1975) and that ended with NATO’s double-track decision (INF) and the Soviet invasion of Afghanistan in December 1979;
- the *second cold war* (1980–1986); and
- the brief *second détente period* (1987–1989) that ended with the fall of the Berlin Wall and a series of peaceful changes in Eastern Europe.

During the twentieth century, three major changes in international order took place. Two (1919, 1945) were the result of global wars and the third (1989) was a peaceful change in which several factors were instrumental:

- The high military cost of the cold war, up to 30 % of GNP for the USSR, together with the lack of economic and political attractiveness of the Soviet economic and political system;
- The increasing call for disarmament in Western Europe as well as during the 1980s for human rights in Eastern Europe from dissident citizen groups who called for the implementation of the human rights guaranteed in the final Act of Helsinki of August 1975.
- The efforts of the Soviet leadership under Gorbachev to reduce the costs of their war economy and to foster more openness (*glasnost*) and domestic reforms (*perestroika*).

All these structural changes were triggered, caused or influenced by specific events that initiated a series of subsequent developments, as with the murder of the Austrian Archduke Ferdinand in June 1914 by a Bosnian Serb in Sarajevo, or the

deliberate attack on Poland by Germany on 1 September 1939, or the accidental opening-up of the Berlin Wall on 9 November 1989 (Bender 1994).

However, in *geological time* in earth history, the transition from the Holocene to the Anthropocene went unnoticed until natural scientists started putting climate change on the scientific agenda from the 1970s onwards and until it became a political issue from the late 1980s onwards, and Paul J. Crutzen could claim “we are in the Anthropocene”.

2.4 The Industrial Revolution: Trigger for the Silent Transition in Geological Time

Following the exponential increase in the global production and consumption of fossil fuels (Fig. 2.4) from 1800 onwards and especially since the accelerated global industrialization after World War II (Fig. 2.1), a ‘silent transition’ in geological time has occurred, which is why Crutzen (2002) announced that “we are now in the Anthropocene”. The impact of this new social construction of reality is not yet reflected in most publications in the social sciences, political science, international relations or security, peace, environment and development studies. It is not yet well understood in the global political discourse, which fails to recognize that now “we are the threat”, and that we are members of the human species that has for the first time directly interfered in the earth system.

2.4.1 Changes in CO₂ Concentration in the Atmosphere

Since the end of the glacial period some 12,000 years ago, an increase of global average temperature of about 4 °C has occurred in the Holocene. This fostered the development of advanced civilizations in the *Fertile Crescent*, in south-east and east Asia (China), in Meso-America (Mayas, Aztecs) and in South America (Incas), as a direct consequence of the Neolithic or agricultural revolution. During the Holocene, warmer periods (climate optima, e.g. during the Roman empire and the medieval period) alternated with colder periods (collapse of the Roman empire, massive movements of peoples and a thousand years later the ‘Little Ice Age’) (Fagan 2000, 2004; Glaser 2001, 2013; Fig. 2.5).

Figure 2.6 shows the wide fluctuations in temperature during the Holocene as well as the minor change in CO₂ concentration in the atmosphere, which oscillated between 260 *parts per million* (ppm) and 280 ppm until the start of the ‘Industrial Revolution’. In the first 200 years following the start of the Industrial Revolution, CO₂ concentration in the atmosphere rose from about 279 ppm (in 1750) to 315 ppm (in 1958). However, there was a significant change from 1958 onwards;

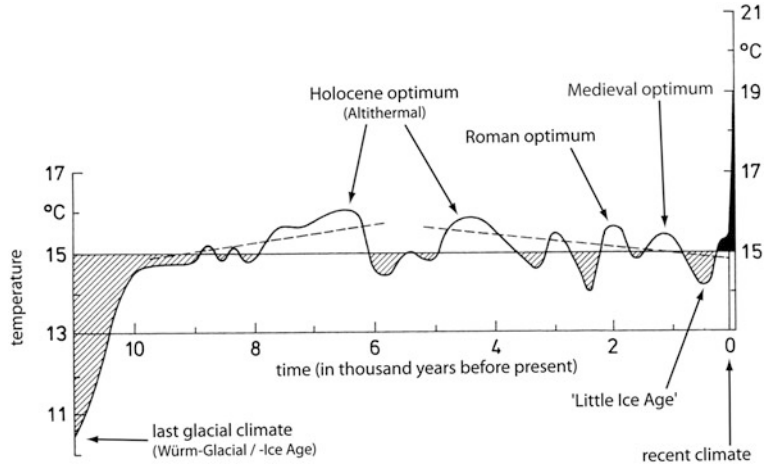


Fig. 2.5 Reconstruction of the Holocene climatic fluctuations. *Source* Blümel (2009; 104), adapted from Schönwiese (1995); reproduced with the author’s permission

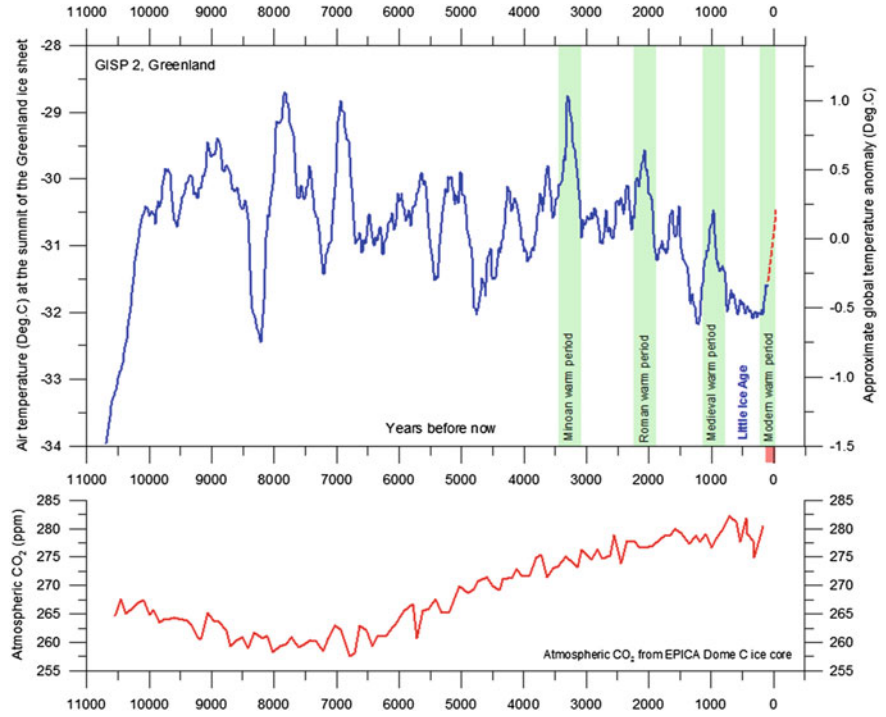


Fig. 2.6 The Holocene era of earth history. *Source* US National Oceanic and Atmospheric Administration (NOAA): GISP 2 and EPICA Dome C. This figure is public

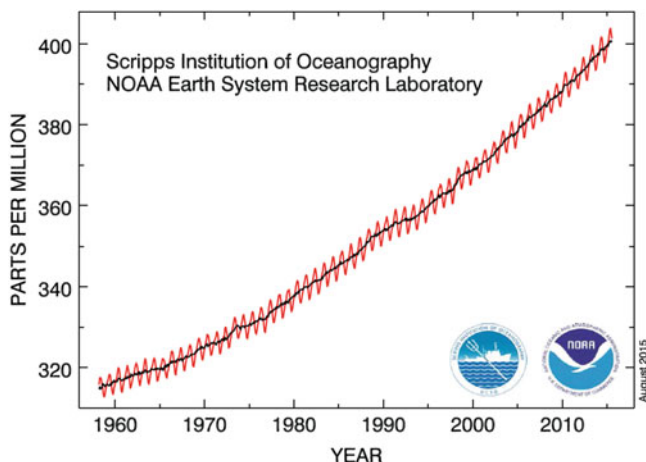


Fig. 2.7 Change in Atmospheric CO₂ at Mauna Loa Observatory. *Source* National Oceanic and Atmospheric Administration (NOAA)—Monthly Data for the Atmospheric CO₂ Since 1958 until July 2015; at: <http://co2now.org/Current-CO2/CO2-Trend/> (15 August 2015). This figure is in the public domain. In June 2016 this figure rose to 406.81

by July 2015, CO₂ concentration had increased to 401.30 ppm.¹³ While over 208 years (from 1750 to 1958) CO₂ concentration had risen by 36 ppm, between 1958 and July 2015 it increased by 86 ppm.

This rate of increase is more than double the increase in the 1960s (Fig. 2.7). The seasonal fluctuations from 2010 to 2014 already crossed the 400 ppm boundary.¹⁴ The official US NOAA noted that the “atmospheric CO₂ is accelerating upward from decade to decade” and that “for the past ten years (2005–2014)”, the average annual rate of increase is 2.11 parts per million (ppm). NOAA website stated that “before the Industrial Revolution in the 19th century, global average CO₂ was about 280 ppm. During the last 800,000 years, CO₂ fluctuated between about 180 ppm during ice ages and 280 ppm during interglacial warm periods. Today’s rate of increase is more than 100 times faster than the increase that occurred when the last ice age ended.”¹⁵ NOAA stated that CO₂ is “increasing at an accelerating rate. ... because fossil fuels are being burned at an enhanced rate, the ending of the long-term trend of increasing carbon efficiency of economies, and the ocean’s diminishing absorption of CO₂” (Canadell et al. 2007).

¹³See: NOAA; at: <http://www.esrl.noaa.gov/gmd/ccgg/trends/> (13 August 2015).

¹⁴Seasonal fluctuation in atmospheric carbon dioxide (CO₂) at the Mauna Loa Observatory. Monthly data for the Atmospheric CO₂ Since 1958. *Source*: National Oceanic and Atmospheric Administration (NOAA); at: <http://co2now.org/Current-CO2/CO2-Trend/> (21 January 2015).

¹⁵See: NOAA Media Release: “Carbon Dioxide at NOAA’s Mauna Loa Observatory reaches new milestone: Tops 400 ppm”, 19 May 2013; at: <http://www.esrl.noaa.gov/news/2013/CO2400.html>.

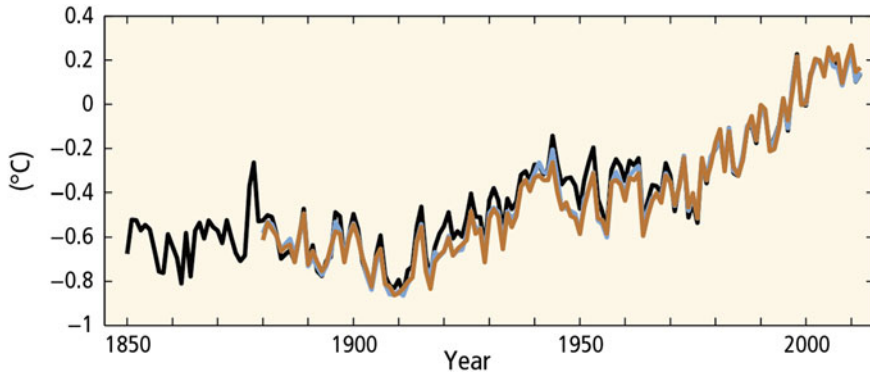


Fig. 2.8 Globally averaged combined land and ocean surface temperature anomaly (1870–2012). Source IPCC (2014a: 3); at: <http://www.ipcc.ch/report/graphics/index.php?t=Assessment%20Reports&r=AR5%20-%20Synthesis%20Report&f=SPM>. The figure is in the public domain for scientific purposes

2.4.2 Fifth Assessment Report of the IPCC (2013/2014)

In its Fifth Assessment Report, the *Intergovernmental Panel on Climate Change* (IPCC 2014a) summarized the observed global changes in combined land and ocean surface temperatures (1850–2012), noting that between 1900 and 2010 the global average temperature increased by about 1 °C (Fig. 2.8).

The cause has been the rapid increase since 1970, caused by combustion, in *greenhouse gases* (GHG), particularly CO₂. Despite the UNFCC and its Kyoto Protocol, this has not slowed down since 1990, although the impact of the global financial and economic crisis in 2008 had some moderating effect on GHG emissions in 2009 and 2010.¹⁶ Depending on the chosen climate model with regard to the increase of anthropogenic CO₂ emissions, the IPCC considered an increase of more than 2 °C up to 4.5 °C above the global average temperature of 1870 as possible (Fig. 2.9).

The “Summary for Policy Makers” of the IPCC’s Synthesis Report (2014a) of its Fifth Assessment stated:

- Continued emission of greenhouse gases will cause further warming and long-lasting changes in all components of the climate system, increasing the likelihood of severe, pervasive and irreversible impacts for people and ecosystems. ...
- Surface temperature is projected to rise over the 21st century under all assessed emission scenarios. It is *very likely* that heat waves will occur more often and last longer, and that extreme precipitation events will become more intense and

¹⁶See “Total annual anthropogenic GHG emissions by gases (1970–2010)” (IPCC 2014a: 5).

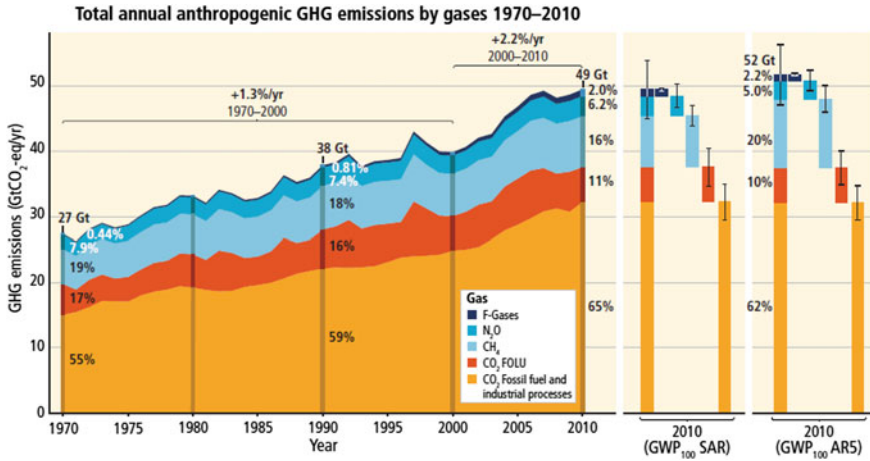


Fig. 2.9 Annual anthropogenic CO₂ emissions (1970–2010). *Source* IPCC, Synthesis Report, Summary for Policymakers (2014: 14); at: https://www.ipcc.ch/pdf/assessment-report/ar5/syr/AR5_SYR_FINAL_All_Topics.pdf. The figure is in the public domain for scientific purposes

frequent in many regions. The ocean will continue to warm and acidify, and global mean sea level to rise.

- The increase of global mean surface temperature by the end of the 21st century (2081–2100) relative to 1986–2005 is *likely* to be 0.3–1.7 °C under RCP2.6, 1.1–2.6 °C under RCP4.5, 1.4–3.1 °C under RCP6.0, and 2.6–4.8 °C under RCP8.5. The Arctic region will continue to warm more rapidly than the global mean.
- Climate change will amplify existing risks and create new risks for natural and human systems. Risks are unevenly distributed and are generally greater for disadvantaged people and communities in countries at all levels of development (IPCC 2014b: 8–14).

If the present trend of relative lack of action to reduce global GHG emissions should continue, the worst outcomes may become possible; at present, the declared goal of a 2 °C world by 2100 appears to be unlikely. This may trigger unpredictable tipping points (Lenton et al. 2008).

While so far the implications of the four key physical effects of climate change (increase in temperature, change in precipitation, rise in sea level and increase in extreme events) for security issues (migration, conflicts and wars) may have been limited (Scheffran et al. 2012; Gleditsch 2012), in its assessment of the peer-reviewed social science literature on climate change and human security the IPCC (2014b) concluded:

- *Climate change will have significant impacts on forms of migration that compromise human security (high agreement, medium evidence). ... Many*

vulnerable groups do not have the resources to be able to migrate to avoid the impacts of floods, storms and droughts. Models, scenarios and observations suggest that coastal inundation and loss of permafrost can lead to migration and resettlement ... Migrants themselves may be vulnerable to climate change impacts in destination areas, particularly in urban centres in developing countries ...

- *Mobility is a widely used strategy to maintain livelihoods in response to social and environmental changes (high agreement, medium evidence).* ... Expanding opportunities for mobility can reduce vulnerability to climate change and enhance human security ...
- There is insufficient evidence to judge the effectiveness of resettlement as an adaptation to climate change. *Some of the factors that increase the risk of violent conflict within states are sensitive to climate change (medium agreement, medium evidence).* The evidence on the effect of climate change and variability on violence is contested ... Although there is little agreement about direct causality, low *per capita* incomes, economic contraction, and inconsistent state institutions are associated with the incidence of violence ...
- *People living in places affected by violent conflict are particularly vulnerable to climate change (high agreement, medium evidence).* Evidence shows that large-scale violent conflict harms infrastructure, institutions, natural capital, social capital and livelihood opportunities. Since these assets facilitate adaptation to climate change, there are strong grounds to infer that conflict strongly influences vulnerability to climate change impacts ...
- *Climate change will lead to new challenges to states and will increasingly shape both conditions of security and national security policies (medium agreement, medium evidence).* Physical aspects of climate change, such as sea level rise, extreme events and hydrologic disruptions, pose major challenges to vital transport, water, and energy infrastructure ...

The data on the CO₂ concentration in the atmosphere that have been collected since 1958 at the Mauna Loa Observatory, Hawaii (Fig. 2.7) provide accepted scientific evidence that “we are in the Anthropocene!” and the fifth scientific assessment (AR5) of the IPCC confirmed that this change has been ‘anthropogenic’ or caused by human intervention in the earth system:

Anthropogenic greenhouse gas emissions have increased since the pre-industrial era driven largely by economic and population growth. From 2000 to 2010 emissions were the highest in history. Historical emissions have driven atmospheric concentrations of carbon dioxide, methane and nitrous oxide to levels that are unprecedented in at least the last 800,000 years, leading to an uptake of energy by the climate system. Natural and anthropogenic substances and processes that alter the Earth’s energy budget are physical drivers of climate change. Radiative forcing quantifies the perturbation of energy into the Earth system caused by these drivers. ... Concentrations of carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O) have all shown large increases since 1750 (40, 150 and 20 %, respectively) ... CO₂ concentrations are increasing at the fastest observed decadal rate of change (2.0 ± 0.1 ppm/year) for 2002–2011 (IPCC 2014a: 44).

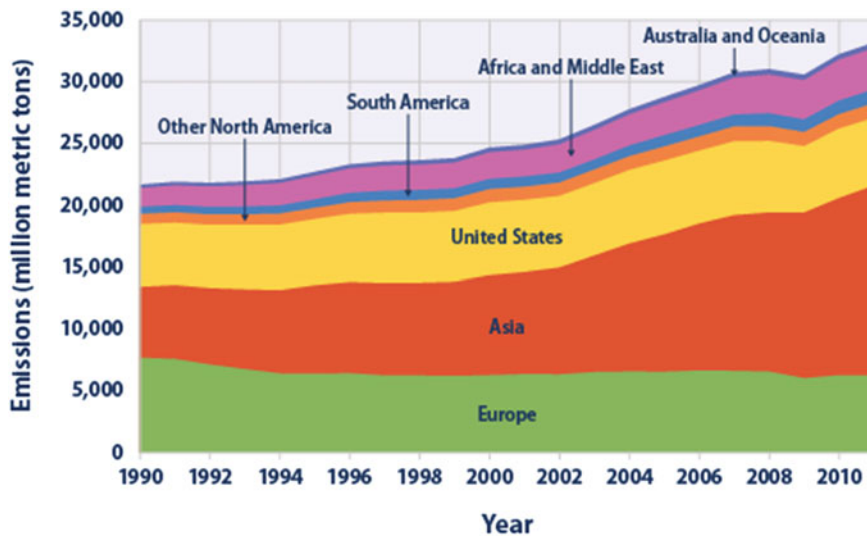


Fig. 2.10 Global carbon dioxide emissions by region (1990–2011). *Source* US EPA; at: <http://www.epa.gov/climatechange/science/indicators/ghg/global-ghg-emissions.html>. This figure is in the public domain

The UNFCCC (1992) counted in August 2015 195 countries and one regional organization (EU) as parties, and its *Kyoto Protocol* (KP) had 192 parties (191 countries, 1 regional organization). The US has never ratified the KP and Canada has been the only country to withdraw its ratification (in 2011). Since the reference year of 1990, global GHG and CO₂ emissions in particular have increased significantly. While most EU countries have implemented their legal commitments, many Annex 1 countries under the UNFCCC missed their targets, among them Australia and Japan. Five OECD countries had not accepted any legally binding commitments under the KP: South Korea, Turkey, Israel, Mexico, and Chile (Fig. 2.10).

Thus, governments face a ‘climate paradox’ (Brauch 2012). While climate change has been accepted in numerous resolutions and declarations and by the signing of legal and political instruments, the willingness to take on obligations and to fully implement them has been mixed, and in many cases governments and parliaments have given into the massive economic pressure of the carbon lobby, including the trade unions representing workers in the coal, oil and gas industries and in the other industries that have been major emitters of GHG. In December 2015, it will become clear whether a majority of governments will be ready to accept legally binding commitments, whether their parliaments will ratify them, and whether the governments will be willing to fully implement them in close cooperation with the industries affected. The degree of implementation of a possible new climate treaty and the initiation of unilateral initiatives towards a sustainability transition will become key indicators of whether the increase in GHG emissions can

be slowed down and the trend reversed during this century. It is uncertain whether the Paris Agreement (2015) may become a turning point in the Anthropocene.

The next sections will review the changes in international order (*structural time*) during the short twentieth century as the result of a few key triggering and causing events (*history of events*) that challenged and destroyed the old national order (system of rule) and international order. Most policymakers and governments (*conjunctural time*) could not fundamentally change the emerging order but only influence and slightly modify it.

Since the late 1950s economic development problems, since the early 1970s environmental issues, since 1987 sustainable development concerns and since the end of the cold war issues of global environmental and climate change have been put on the international policy agenda and have thus been ‘politicized’. Gradually linkages between peace, security, development and the environment, such as sustainable development (1987), human security (1994), and sustainable peace (Brauch 2016), have been recognized and addressed by (social) scientists and policymakers and increasingly by social groups and parts of the concerned business community.

Since 2000, the challenges for peace and ecology in the Anthropocene era of earth history have gradually been recognized and addressed by environmental and peace specialists. A discussion on ‘peace ecology’ is just starting to emerge (Kyrou 2007; Amster 2014) and has still to be developed in the framework of the Anthropocene (Oswald Spring et al. 2014).

2.5 The Global Transformations in the Long Nineteenth Century

The *Industrial Revolution* during the long nineteenth century (technical time) brought about a *great transformation* (Polanyi 1944) of the global economic and social system and also a *global transformation* of international order (Buzan/Lawson 2015: 17–18). Buzan and Lawson focus “on how global modernity constituted a transformation” in the ‘mode of power’, just as the Neolithic revolution constituted a transformation based on a change in the ‘mode of production’.

Both the Neolithic and the Industrial Revolutions triggered transformations: (a) a transformation in the “scale of social orders and their mode of organization” (social relations, hierarchies, social roles, collective power etc.); (b) “this configuration is produced and reproduced through inter-societal interactions” which gradually spread in space; (c) the development of new power configurations; (d) an increase in “productivity and population, plus an increase in the complexity of social orders and physical technologies, have produced a denser, more deeply connected international order” that has increased “the levels of interdependence within the international sphere” (Buzan/Lawson 2015: 19–20). These macro-transformations fostered “a new *mode of power*” that was driven by “capitalism, imperialism and

ideologies of progress”, but the process of spreading was uneven “as global modernity was uneven in both origins and outcomes” and has “produced larger, more complex social orders bound together in denser, more independent ways”, where “industrialization produced a single world economy for the first time”. While the ‘Neolithic Revolution’ took centuries or millennia to materialize, the ‘Industrial Revolution’ occurred within decades (Buzan/Lawson 2015: 21–23).

During the global transformation of the nineteenth century, “global modernity uprooted the basis on which social order rested”. This transformed the local into the global and gave a few Western states an unprecedented and temporary dominance and a hegemonic position over many “aspects of international relations” (new forms of organizations, ideas etc.), with an increased economic accumulation in the countries of the industrialized centre (Bairoch 1981). In seeking to interpret why this transformation occurred, Buzan and Lawson (2015: 28–30) distinguish four accounts in the literature: (a) economic accounts from liberal or Marxist perspectives; (b) political dynamics (state formation, institutional development, role of wars and preparation for war); (c) ideational schemas (the Enlightenment, religions (Protestantism, Calvinism)); and (d) the geographical, demographic and technological advantages of the West. They conclude that “global modernity arose from a configuration of industrialization, rational state-building and ideologies of progress”.

This global transformation, they argue, was a powerful “social invention” (Mann 1986: 525); the ‘European miracle’ was “capital-intensive, energy-intensive and land-gobbling” (Pomeranz 2000: 207) and “the uneven extension of the market through imperialism and finance capitalism generated a core-periphery order” whose fluctuations “controlled the survival chances of millions of people around the world”. Industrialization was accompanied by the rational state that launched major improvements in infrastructure while ideologies (e.g. nationalism) influenced why and how wars were fought.

Buzan/Lawson (2015: 43–45) point to three impacts of the global transformation in international relations: (a) the spread of “industry, finance, railways and the telegraph, along with practices of colonialism”; (b) the development of a strong core and weak peripheral relations in trade, and (c) upheaval among the great powers (Britain, Germany, USA, Japan) who led the transformation as well as among those who tried to postpone it (China, Russia, Ottoman Empire). They concluded that “the global transformation ... profoundly influenced the construction of the modern international order”, setting the “material conditions under which a global international system came into being”.

They analyse a classic theme of IR in a chapter on the “transformation of great powers” and “great power relations and war”, and they address the implications of the global transformation due to industrialization, the rational state and ideologies with a change from ‘centred’ to ‘decentred globalism’. But in the whole book and in their concluding chapter on “Rethinking international relations”, the environmental consequences of the global transformation, including the silent transition from the Holocene to the Anthropocene, are not discussed or even noted.

2.6 The Changes of 1914 and 1919: Triggered by World War I

In 1914, the long nineteenth century ended and the short twentieth century started with World War I, when the old international order of Vienna collapsed and five years later the short-lived international order of Versailles evolved. While the order of Vienna prevented a major war in Europe that would have drawn in all the major European powers, the long nineteenth century coincided with the colonial and imperialist period, when European colonial powers (Spain, Portugal, Britain, France, Belgium, the Netherlands, Germany, Italy, Denmark) used their scientific and technological superiority to exploit the natural resources and the people of Latin America, Africa and Asia.

The United States and Japan were latecomers in extending their respective zones of economic (open-door), political and military influence. Following the Monroe Doctrine of 1823, the US intervened militarily in Latin America many times, and expelled Spain from Cuba (1898) and the Philippines (Blechman/Kaplan 1976); Japan occupied parts of China from 1931, and expanded its military influence to South East Asia during World War II.

In June 1914, the murder of Archduke Ferdinand triggered a chain of events that tumbled the Vienna order. Within a few weeks most European powers were at war, a war that resulted in total mobilization and the industrialization of and a revolution in warfare. Four years later, four empires (Russian, Austrian, German and Turkish) had collapsed and twenty million people had died.

Holsti (1991: 211) noted that “the scientific peace of 1919 created as many problems as it solved”. The peace of 1815 had ignored or even suppressed the problems “of nationalism and the search for statehood”, while the territorial settlement of 1919

created economic improbabilities, security problems, restive minorities, and irredentist movements throughout Eastern Europe. Many of the armed conflicts of the 1920s and 1930s were to derive from the territorial settlements of 1919. ... The German settlement greatly increased the probabilities that the peace of 1919 would be the father of later tragedy (Holsti 1991: 211–212).

The ‘order of Versailles’ gradually collapsed because of the actions of three revisionist powers (Japan, 1931; Italy, 1935 and Germany, 1938/1939), the self-isolation of the USA, and ‘appeasement’ by Britain and France. The rise of fascism in Italy and national socialism in Germany, and the systemic competition between the USA and the Soviet Union (who both remained outside the League of Nations) had prevented that the first collective security system of the League of Nations from establishing a new stable international order. With the German attack on Poland and the outbreak of World War II, the various visions of the founders of the system of Versailles became obsolete (Holsti 1991; Brauch 1996): American idealism (Woodrow Wilson), French realism (Georges Clemenceau) and British pragmatism (Lloyd George).

The political impacts of the global economic crisis of 1929 furthered the aims of the totalitarian revisionists in Japan (invasion of China) as well as the occupation of Ethiopia by the Italian Fascists, and also benefitted the Nazis in Germany, whose war economy had harshly ended the Franco-German diplomatic reconciliation of the late 1920s initiated by Gustav Stresemann and Aristide Briand; it also ended the relevance of the so-called *Kellogg-Briand Pact* (1928), which renounced war as an instrument of national policy.

Influenced by the pacifist and idealist Wilsonian tradition, peace research began to emerge in the US, in the UK and in Germany (Wright 1942), as an alternative to the geopolitical (Haushofer 1932) and geostrategic (Mahan 1890, 1897) realist tendencies in international relations and in war and peace. After World War II, there was a realist backlash in the UK and in the United States, promoted by many European immigrants (Morgenthau 1948, 1951; Herz 1959; Kissinger 1994). During the 1940s, a major transformation had taken place in the US. It had undergone a transition from isolation to active global engagement, using its economic and military power and the political will to employ these power resources in setting up the post-war world (Brauch 1977).

2.7 The Changes of 1945: Triggered by World War II

During World War II the grand coalition of the United States, Britain, the Soviet Union and later France defeated the two major revisionist powers, Germany and Japan. However, the post-war collective security system promoted by Roosevelt and Churchill during the war was paralysed by the price they had to pay Stalin at Yalta in February 1945. This was the right of the five permanent members of the Security Council of the United Nations to veto its decisions.

From 1946 the rivalry between the USA and the Soviet Union resulted in a global bipolar power structure with two military alliances (NATO vs. the Warsaw Pact). This divided not only Europe but also most regions of the world; *proxy wars* were fought in the Third World by parties who were militarily and economically supported by one or the other alliance.

While American hawks claimed that US military and economic power was instrumental in the ending of the cold war (Anderson), the collapse of the Soviet Union and the dissolution of the Warsaw Pact, others claimed that it was learning from experience, a new way of thinking by the Soviet leadership under Gorbachev (Grunberg/Risse 1992),¹⁷ and the will of the people of Eastern Europe that brought about the first peaceful global change.

¹⁷Grunberg, Isabelle; Risse-Kappen, Thomas, 1992: "A Time for Reckoning? Theories of International Relations and the End of the Cold War", in: Allan, Pierre; Goldmann, Kjell (Eds.): *The End of the Cold War* (Dordrecht: Martinus Nijhoff Publishers): 104–46.

2.8 The Changes of 1989: Peaceful Change and New Wars

It was during the cold war period of 1946–1989 that global environmental issues gradually came to be seen as new political concerns, especially following the UN conference on the environment in Stockholm in 1972. Fifteen years later, the Brundtland Report called for a shift towards sustainable development and environmental security in the dominant economic path being followed. In June 1988, the Norwegian Prime Minister, Gro Harlam Brundtland, spoke of how climate change could pose a threat to security; in September 1988 the Reagan Administration put climate change on the agenda of the G7 in Toronto; in November 1988, Soviet president Gorbachev called for ecological security; and in December 1988 the UN General Assembly approved a mandate for the negotiation of a UN Treaty on Climate Change and set up the *Intergovernmental Panel on Climate Change* (IPCC).

The end of the cold war coincided with a growing awareness of new global environmental challenges that would require global cooperation. The increasing amount of new scientific knowledge on global environmental and climate change (*scientization*) was gradually perceived as a political challenge (*politicization*). Since 2004, possible links between climate change and security (*securitization*) have been addressed by the British (2004) and German governments (2007), as well as major military think tanks in the US (2007). They were placed on the agenda of the EU (2008a, b) and the UN (UNSC 2007, 2011; UNGA 2009; UNSG 2009; Brauch/Scheffran 2012; Gleditsch 2012), and research on these linkages was reviewed by the IPCC (2014b).

Three factors led to a reconceptualization of the state-centred, narrow, national concept of political and military security: the end of the cold war, the consequences of globalization, and concern over the impact of global environmental change (Brauch et al. 2008, 2009, 2011).

Unlike the situation after World War II, there was no agreed post-cold war planning for eastern and south-eastern Europe or for the rest of the world. In 1990 and 1991, the Soviet Union disintegrated, and was dissolved in late 1991, as was the Warsaw Pact. From 1991 Yugoslavia underwent a violent dissolution into five sovereign countries: Slovenia, Croatia, Bosnia-Herzegovina, Macedonia and Serbia. Kosovo (1999) left Serbia following a war, while Montenegro (2006) declared its independence following a referendum, and was recognized by Serbia.

The summit in Paris in November 1990, instead of discussing the post-cold war order of peace and security, was dominated by the US Administration's call for a war against Iraq that would end Iraq's occupation of Kuwait that had begun in summer 1990. Following an ultimatum issued to Iraq by the *United Nations Security Council* (UNSC), a war was launched in March 1991 and resulted in the defeat of Iraq.

Following the geopolitical changes in Eastern Europe in the autumn of 1989, in March 1990 Lithuania declared its independence from the Soviet Union. By the end of 1991, the Soviet Union had dissolved into its fifteen former republics. On 21

June 1991, Slovenia and Croatia declared their independence from Yugoslavia. This triggered a ten-day war in Slovenia and a bloody war between Serbia and Croatia (1991–1995), as well as in Bosnia (1992–1995) and later in Kosovo (1999). NATO, without a UN mandate, intervened twice against Serbia.

The political impacts of 1989 were mixed. The new global security environment facilitated a reunification of Germany in 1990 and the enlargement of the EU in 2004. The EU expanded to include three former Soviet republics (Estonia, Latvia and Lithuania), three former Warsaw Pact countries (Poland, Hungary and Czechoslovakia, which in 1993 had split peacefully into the Czech Republic and Slovakia), and the former Yugoslav republic of Slovenia.

A decade after the fall of the Berlin Wall, NATO gradually expanded. Poland, Hungary and the Czech Republic joined on 12 March 1999, followed on 29 March 2004 by seven additional East European countries: Bulgaria, Estonia, Latvia, Lithuania, Romania, Slovakia and Slovenia. On 1 April 2009 Albania and Croatia became NATO members and Montenegro, Bosnia-Herzegovina and Macedonia became candidates, while Kosovo, Georgia and Ukraine expressed an interest in joining NATO. Although in 2007 the parliament of Serbia expressed its military neutrality, in December 2014 the Ukrainian parliament declared its military neutrality obsolete.

South East Asia had been a battlefield for twenty-five years during the first (1950–1954) and second Indochina wars (1961–1975) that affected divided Vietnam, Laos and Cambodia. After 1990 gradual political unification has taken place within the framework of the *Association of Southeast Asian Nations* (ASEAN), and Vietnam (1995), Laos (1997), Myanmar (1997) and Cambodia (1999) became full members. Papua New Guinea has been an observer since 1976 and East Timor applied for membership in 2011.

With the attack on the World Trade Center in New York and the Pentagon in Washington on 9 September 2001, the United States was attacked on its own territory for the third time. The British had invaded from Canada in 1812, and the Japanese had attacked Pearl Harbour in 1941. This third attack was carried out by non-state, ‘invisible’, terrorist actors. A number of actions have contributed to a further destabilization of the Middle East: the response to 9/11 by US President George W. Bush with his ‘war on terror’ against al-Qaida in Afghanistan in the autumn of 2001, the attack on Iraq in 2003 that was based on falsified intelligence claims concerning Iraq’s weapons of mass destruction, and the bombing of Libya by NATO air forces in March 2011 in response to a UN call for a no-fly zone, and all this has fuelled the ‘hate’ of radicalized Muslims around the world against the West. Israel carried out two disproportionate reprisals against Gaza in retaliation for attacks by Hamas activists in December 2008 and again in July/August 2014, killing thousands of Palestinian civilians. Since 2011, the civil war in Syria and the US withdrawal from Iraq in December 2011 have created a new military challenge to both governments and a humanitarian tragedy for religious and ethnic minorities. The challenge is posed by the jihadists of ‘Islamic State’ (IS), which has radicalized many young Islamists in Europe, with the resultant terrorist attacks in France in January and November 2015 and in July 2016 in Nice.

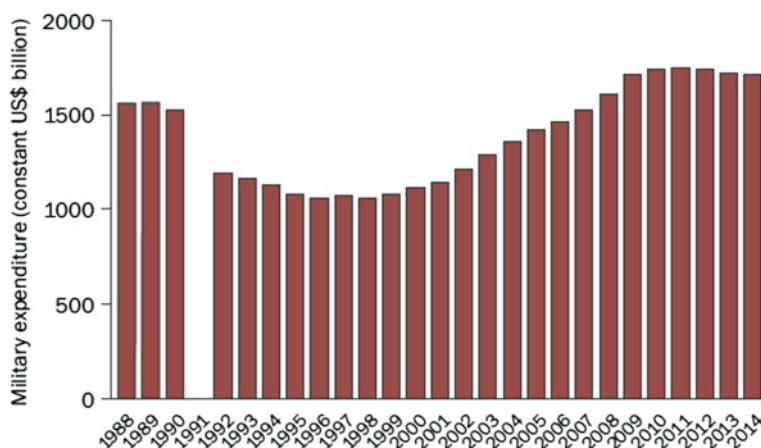


Fig. 2.11 World military expenditure (1988–2014). *Source* Stockholm International Peace Research Institute (SIPRI 2014); at: <http://books.sipri.org/files/FS/SIPRIFS1504.pdf> (14 August 2015). Permission to use this figure was granted by SIPRI in November 2015

Since 1990 a transformation of conflict has taken place, from the dominant bipolar rivalry, arms competition and doctrines of deterrence to ‘new wars’ (Holsti 1996; Kaldor/Vashee 1997; Duffield 2001), and from states to ‘invisible’ asymmetric non-state actors (terrorists, warlords, drug cartels, organized crime). In addition, uncontrolled greedy financial speculators have made fortunes by speculating against selected countries. This has negatively affected the livelihood and well-being of millions of poor people and fostered increasing social inequality by making the rich richer at the cost of the states and their citizens (UNDP 2014).

According to the *Stockholm International Peace Research Institute* (SIPRI 2014), the end of the cold war resulted in a temporary decline in world military expenditure between 1988 and 1996–1998, but since 1999 global military spending has risen again (Fig. 2.11), reaching a level above that at the height of the cold war. Since 2012 military expenditure in the industrialized regions has declined, while in most developing regions it has risen.¹⁸ In 2014, nearly 80 % of global military expenditure was disbursed by fifteen states, led by the US with 37 %. The US remains the largest arms exporter. And so, twenty-five years after the end of the cold war in 1989, no ‘peace dividend’ has occurred globally.

The *Uppsala Conflict Data Program* (UCDP) of the Department of Peace and Conflict Research of Uppsala University has found that globally the number of wars

¹⁸See SIPRI (2014): “Changes of military expenditure by region (2012–2013)”; see also SIPRI Fact Sheet (April 2015): *Trends in World Military Expenditure, 2014*; at: <http://books.sipri.org/files/FS/SIPRIFS1504.pdf> (14 August 2015).

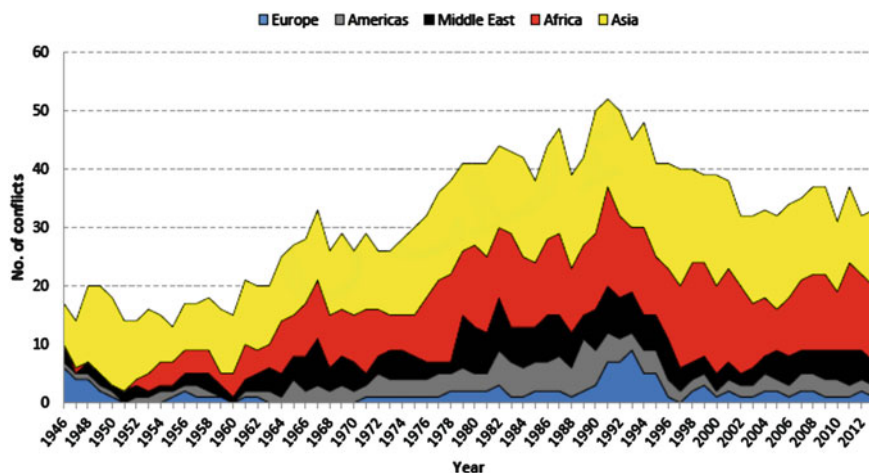


Fig. 2.12 Armed conflict by region (1946–2013). *Source* This figure was first published in an UCDP report on the UCDP website at: <http://ucdp.uu.se/?id=1> for which the authors hold the copyright and on 26 November granted the permission to use it in this publication. This figure was later included in: Themnér et al. 2014: “Armed Conflict, 1946–2013”, in: *Journal of Peace Research*, 51,4

and war-related deaths has declined since 1989 by intensity, by type and by region (Fig. 2.12).

While the number of major wars and intra-state conflicts fell, new asymmetric wars (Holsti 1996; Kaldor/Vashee 1998; Kaldor 1999, 2002; Duffield 2001) emerged, causing some authors to claim that “(1) the number of civil wars is increasing; (2) the intensity of battle is increasing; (3) the number of civilians displaced in civil wars is increasing; (4) the number of civilians killed in civil wars is increasing; and (5) the ratio of civilians to military personnel killed in civil wars is increasing” (Melander/Öberg/Hall, Uppsala Peace Research Papers No. 9: 3).

With regard to non-state actors, the UCDP observed that in the years between 1989 and 2013, non-state fatalities significantly increased between 1991 and 1993, and in 2013 they were higher than in 1988. The increase in the number of non-state conflicts took place primarily in Africa, where it rose from five in 1989 to thirty-five by the year 2000; in 2013 it was about twenty-eight. The number of conflicts remained below ten in Asia, but since 2007 has significantly increased in the Americas and since 2009 also in the Middle East (Fig. 2.13).

The first peaceful transition of international order in modern history has resulted neither in disarmament nor in a peace dividend. The number of inter- and intra-state wars and war fatalities has declined, but the number of non-state conflicts and non-state fatalities has remained high, especially in Africa, Asia, the Americas and the Middle East. In 2014 this was also the case in Europe as a result of the conflict between Ukraine and the Russian separatists. Thus, in the aftermath of the cold war, no lasting global or regional peace order has evolved.

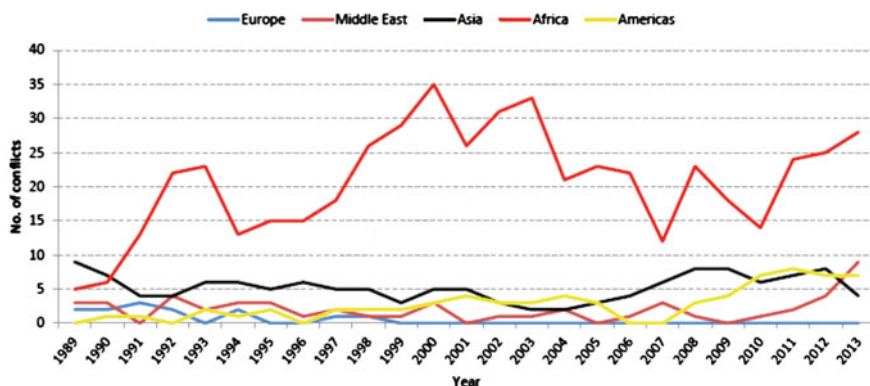


Fig. 2.13 Non-state conflicts by region (1989–2013). *Source* This figure was first published in an UCDP report (“*UCDP Non-state Conflict Dataset v. 2.5–2014 1989–2013*”) on the UCDP website at: <http://ucdp.uu.se/?id=1>, for which the authors hold the copyright and on 26 November 2015 they granted the permission to use it in this publication. This figure was later included in: Sundberg et al. 2012: “Introducing the UCDP Non-State Conflict Dataset”, in: *Journal of Peace Research*, March 2012, 49: 351–362

The collective security system of the UN was temporarily strengthened in 1990/1991 when the UNSC agreed to an ultimatum against Iraq. Among its regional arrangements and agencies (chapter VIII of the UN Charter) in Europe, the CSCE (which became the OSCE in 1994) extended its mandate between 1990 and 1992. But when the wars in Yugoslavia occurred in 1991, the CSCE/OSCE lacked the means to act, and in 1995 and 1999 NATO took the initiative, though without a mandate from the UNSC and in the face of opposition from Russia, and intervened militarily against Serbia. With the enlargement of NATO in Eastern Europe, NATO may have ignored political signals made by member countries towards Russia, and major governments ignored appeals made against this move by distinguished US security specialists.

Another setback occurred with the failure of international efforts to cope with the effects global environmental climate change. In the aftermath of the global financial crisis of 2008/2009, states spent billions to cope with the consequences of uncontrolled international financial markets (US stimulus plans, European efforts to counter speculation against the euro), but failed to adopt any legally-binding commitments to reduce their GHG emissions.

The international community failed to realize its policy goals under the UNFCCC (1992) and to implement its legal commitments under the Kyoto Protocol (1997). Leading democracies became climate change laggards (Fig. 2.14): Australia (+31 %), Spain (+20.2 %), Canada (+18.2 %; withdrew from the KP in 2011), Portugal (+13.1 %), Japan (+8.3 %) and the United States (+4.3 %; never ratified the KP).

Despite some changes during the first decade of the post-cold war era in the *security realm*: with a shift toward a wider and human-centred security concept, and

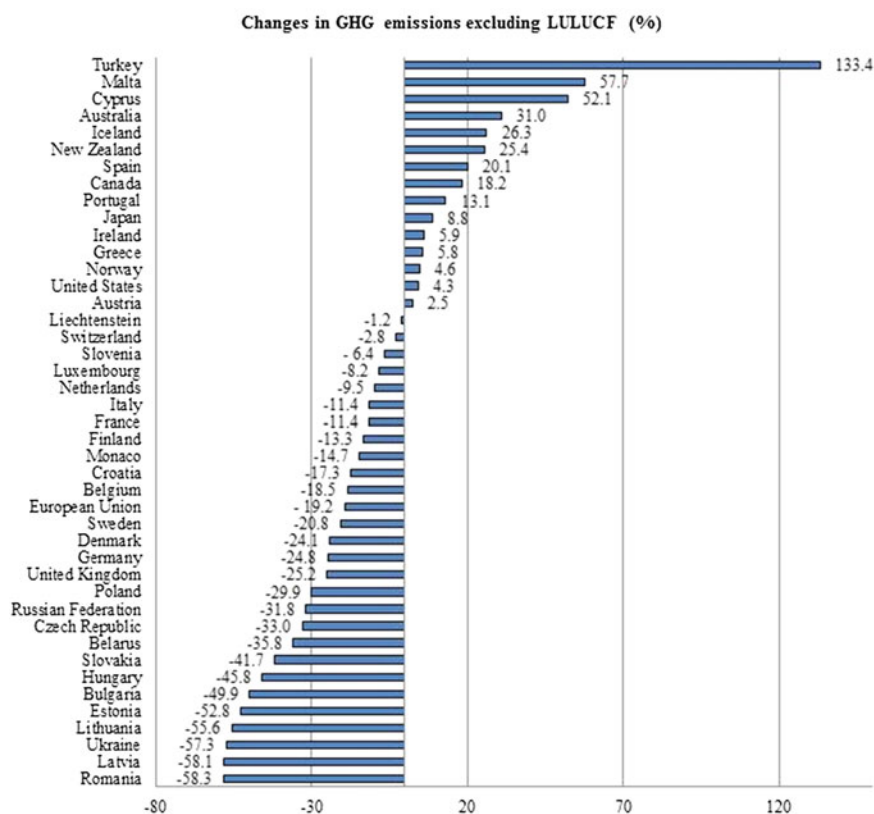


Fig. 2.14 Changes in greenhouse gas emissions excluding *Land Use, Land Use Change and Forestry* (LULUCF) from 1990 to 2012, by percentage. Source UNFCCC (2014), at: http://unfccc.int/files/inc/graphics/image/jpeg/total_excl_2014.jpg (24 January 2015)

in *global environment policy* with the initiative launched at the Earth Summit in Rio de Janeiro in 1992, twenty-five years after the global turn of 1989, a significant setback in both areas may be observed.

In the *security realm*, led by the US security elite and its national security apparatus, Hobbesian geostrategic thinking has returned and dominates the security policy of many countries, supported by the ‘war on terror’ during the Bush administration and the failure of the Obama administration to significantly revise its agenda. In some countries the military establishment has used the climate change–security nexus to legitimate its agenda, thus partially contributing to a ‘militarization’ of this emerging debate.

In Russia, in spring 2014, President Putin invaded, occupied and annexed the Crimea in Ukraine in clear violation of international law. Since summer 2014 in eastern Ukraine, separatist Russian forces with clandestine Russian military support have launched a new military confrontation that has challenged cooperative

relations between NATO and Russia and has caused new tensions between Russia and the West, in the Baltics and in Eastern Europe.

With regard to *global environment policy*, the economically and ideologically driven policy mindset of decision-makers, and the prevailing world view in the media and in the political, economic and scientific elite that favours short-term *business as usual*, has paralysed the chance of any real changes in the Rio regimes in the fields of climate change, biodiversity loss and soil degradation and desertification, as well as the chance of any legally binding commitments at Rio+20 in June 2012. The Paris Agreement on climate change (2015) is also not legally binding.

Since the end of the cold war ‘transition studies’ has emerged as a discipline in political science. It focuses on the transition of state-socialist political, economic and societal systems towards Western ‘neo-liberal’ market economies. The emerging scientific discourse on a transition to sustainability fundamentally differs from this narrow approach; it addresses transformations in scientific, societal, economic, and political systems, as well as a radical cultural transformation that will avoid catastrophic changes in climate, soil and water as well as major losses in biodiversity.

2.9 Was 2014 a Turning Point in World History as 1914 Was?

The year 1914 was a major turning point in modern history and signalled the end of the long nineteenth century with the collapse of the international security system adopted at the Vienna Peace congress in 1814/1815. The projections of Polanyi’s “Great Transformation” (1944), associated with his concept of a peaceful ‘market society’, had not materialized.¹⁹ The new rationality of the ‘market society’ did not constrain military planners in European countries prior to 1914. Rather, World War I resulted in the industrialization of warfare, where the technological innovations were used against human beings. Prior to and during World War I two revolutions occurred, in Mexico in 1912 and in Russia in 1917. But neither these two revolutions nor the Covenant of the League of Nations could achieve the goal of a national socio-economic and political transformation and of an international security system.

The chain of events in 2014 linked to the military conflict between Ukraine and the Russian separatists in eastern Ukraine who were supported by Russia, and the role of the jihadist and terrorist group of *Islamic State* (IS) in Syria and Iraq did not trigger any longer-term structural change but strengthened mainstream thinking on national security.

¹⁹See the discussion at: [https://en.wikipedia.org/wiki/The_Great_Transformation_\(book\)](https://en.wikipedia.org/wiki/The_Great_Transformation_(book)).

These events may have no impact on the legally nonbinding Paris Agreement that was adopted at COP 21 of the UNFCCC in Paris in December 2015. Some longer-term commitments were offered by China and the United States in Lima (2014), and in August 2015 President Obama announced a staged transition in the energy sector from coal to renewables. It is uncertain whether such unilateral announcements and legally nonbinding obligations will be supported by the next US President and Senate after the election in November 2016 or whether the obstruction will continue that prevented the ratification of the Kyoto Protocol during the Clinton Administration (1998–2000) and that foiled all ambitious climate bills put forward by the Obama Administration (2009–2014) in the House of Representatives and in the Senate.

In 2015 policy discussions on a decoupling of economic growth from fossil energy consumption (UNEP 2011) and on a green economy (OECD)²⁰ are continuing and long-term policy documents issued by the European Commission (EU 2010, 2011; Happaerts 2016) are being pursued. At the G7 meeting in Elmau (Germany), the heads of the major industrialized countries stated in June 2015:

We commit to doing our part to achieve a low-carbon global economy in the long-term including developing and deploying innovative technologies striving for a transformation of the energy sectors by 2050 ... To this end we also commit to develop long term national low-carbon strategies.²¹

These stated policy goals of a decarbonization of the economy were not included in the Paris Agreement in December 2015. Whether the adopted legally nonbinding commitments will be fully implemented will be seen in the years to come. Readers will be able to judge whether COP 21 in Paris in December 2015 will initiate and reinforce a policy transition towards a decarbonization of the economy or whether short-term economic and political interests in the framework of *business as usual* will prevail. Theoretical, empirical and conceptual debates on sustainability transition (WBGU 2011) have had no influence on political agenda-setting and policy implementation.

2.10 Conclusions

This chapter has reviewed the debate in several disciplines on *cosmic*, *geological* and *technical* and by Braudel of *structural* and *conjunctural time* and of the history of events. Stimulated by Paul J. Crutzen, the key argument has been that human-kind has directly interfered in the earth system since the Industrial Revolution by consuming fossil energy resources, and that this process has accelerated exponentially since 1945 with the result that “we are in the Anthropocene”; with our

²⁰See publications on: “Green growth and sustainable development”, at: <http://www.oecd.org/greengrowth/>.

²¹See G7 Leaders’ Declaration, Schloss Elmau, Germany, 8 June 2015; at: <https://www.whitehouse.gov/the-press-office/2015/06/08/g-7-leaders-declaration> (14 August 2015).

anthropogenic interventions in the earth system we have shifted the era of geological time by moving from the Holocene to the Anthropocene era of earth and human history.

This silent transition is not yet reflected in mainstream thinking in the social sciences, international relations (Buzan/Lawson 2015), peace studies or even the early studies of peace ecology (Amster 2014). The thinking on the turning points in the short twentieth century still focuses on the events that were triggered by the two world wars (1914, 1939) and the new international orders (Versailles and Yalta). However, with the end of the cold war in 1989 and the reunification of Germany and Europe (since 1990), the causes of the ‘silent transition’ and the impacts of global environmental change and climate change have for the first time been put on the policy agenda.

Despite the setback in Copenhagen in December 2009 at COP 15 of the UNFCCC, and despite slow-moving and partially paralysed global climate diplomacy, the outcome of COP 21 in Paris may give global climate diplomacy a new push. While this is necessary, it will not be sufficient. What is needed is a new “scientific revolution towards sustainability” (Clark et al. 2004), and a new scientific world view, as a driver for policies whose goals are sustainable development, supported by strategies aiming at a sustainability transition (see Chap. 7 below and Brauch 2016).

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