

CO₂ EMISSIONS BY ECONOMIC ACTIVITIES ARE NOT REALLY RESPONSIBLE FOR THE GLOBAL WARMING: ANOTHER VIEW

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1. Introduction

Since the industrial revolution human beings have been emitting a huge amount of CO₂, due to massive fossil fuels consumption combined with intensive use of limestone. Meteorologists have called for the reduction of amount of CO₂ emissions that remain in the atmosphere, after being emitted by human activities, which are allegedly causing global warming. They have urged humankind to take effective measures in order to avoid catastrophic events in the future. In response to these serious concern, economists proposed various political and economic measures to reduce CO₂ emissions and many national governments, excluding, among others, the USA, ratified the Kyoto protocol in February 2005, which assigned target CO₂ emission reduction levels to each participating country.

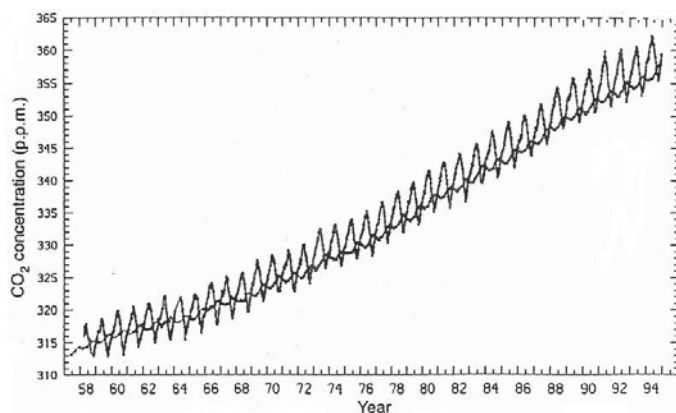
However, in my view, the CO₂ based global warming theory is wrong (Tsuchida, 2006). It is of course true that the concentration of CO₂ in the atmosphere has increased and that the earth is in a phase of the global warming. But it should be noted that the concentration of CO₂ in the atmosphere has increased, not because of CO₂ emissions (as presumed under the popular view), but because of a massive CO₂ release from the oceans, which has occurred during the warming period. So, the cause and the effect should be reversed accordingly: the popular view is wrong.

Economists have mostly followed the popular view, leading to irrevocable

consequences, such as the closing of precious coal mines that could have been operated for another millennium, and the increasing of the stock of radioactive waste from the nuclear power generation plants, which surely also increases the risk of nuclear power related accidents. If scientists uncritically believe in the alleged theory that global warming has been caused by CO₂ emissions, they are not real scientists. They just believe in a myth, parading under the cloak of science. The vogue of this myth has led people to overlook the threat of global cooling, the most formidable challenge looming in our near future.

2. Economic activities are not the cause of increase in CO₂ concentration in the atmosphere

Increase in CO₂ concentration in the atmosphere is really happening. The concentrations of CO₂ are steadily increasing despite the pronounced seasonal cycle shown in Figure 1. CO₂ concentration was 315ppm in 1960 when Keeling started observing the data. It increased by 65ppm, reaching at 380ppm in 2005. The average temperatures observed at various parts of the world have increased by 0.5 degrees Celsius since 1960. There is no doubt that the concentration of CO₂ in the atmosphere is related to the average temperatures.



Source: Keeling, C. D. 1995. Nature, vol. 375, p. 667, Fig. 1a

Figure 1. CO₂ concentration changes in Hawaii and the South Pole

Temperature changes, CH₄ concentration and CO₂ concentration over the past 220,000 years have been derived through the analysis of the ice core record at Vostok,

Antarctica: there is a strong interplay among these three variables. However, the interplay was originally presented in the following order (Figure 2): (1) CO₂ concentration; (2) temperature changes; and (3) CH₄ concentration. It was alleged that CO₂ concentration changes cause temperature changes, followed by CH₄ concentration changes.

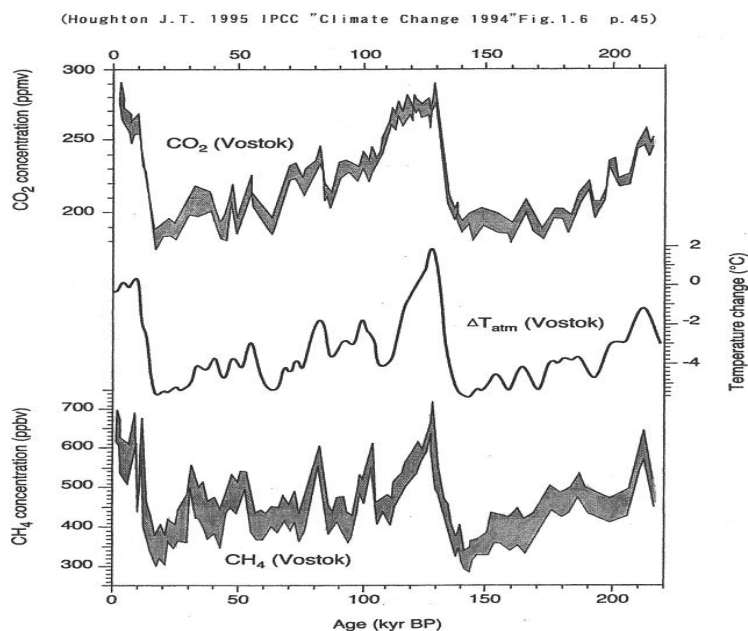


Figure 2 Temperature anomalies and methane and CO₂ concentrations

However, human (economic) activities in ancient times were negligible, so there is no other source to which to attribute CO₂ concentration changes except to attribute them to changes in temperature. Thus, in the ancient times, temperature changes caused changes in CO₂ and CH₄ concentrations. The three variables should have been arranged in the following order: (1) temperature changes; (2) CO₂ concentration; and (3) CH₄ concentration. The CO₂ based global warming hypothesis was misled by the inappropriate ordering of the three variables, as shown in Figure 2.

The study of this problem, made by Keeling's team, seems to support the explanation given above. If the hypothesis, that 58 percent of the CO₂ emissions attributable to fossil fuel combustion between 1960 and 1987 remains in the atmosphere,

is assumed to be true, then the actual CO₂ concentration over time matches the theoretical pattern outlined above (Keeling et al., 1989). Keeling's research team changed this percentage to 55.9% in the paper published in *Nature* in 1995 (Keeling et al., 1995), but the basic rationale remained unchanged; see Figure 3. The smooth line based on Keeling's theory, and the actual atmospheric concentration of CO₂, seem to enjoy almost perfect coincidence. A well know Japanese economist, H. Uzawa states in the following, after being impressed with the perfect coincidence between the theory and the data: "it is natural in my view to conclude that 58% of the CO₂ emissions remains in the atmosphere and the rest, 42%, is being absorbed by the ocean and the forests" (Uzawa 1995).

Source: Keeling, C. D., *Nature* 375, pp. 667 Fig 1b.

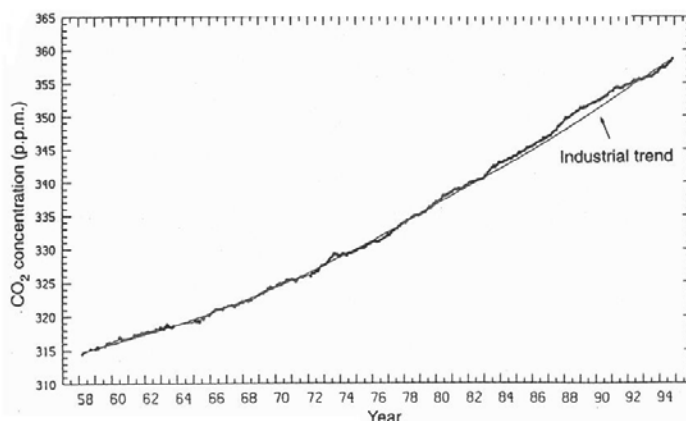
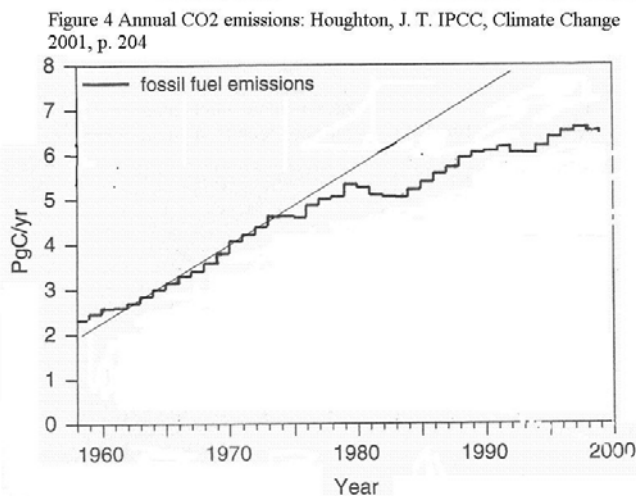


Figure 3 CO₂ concentration and fossile fuels consumption

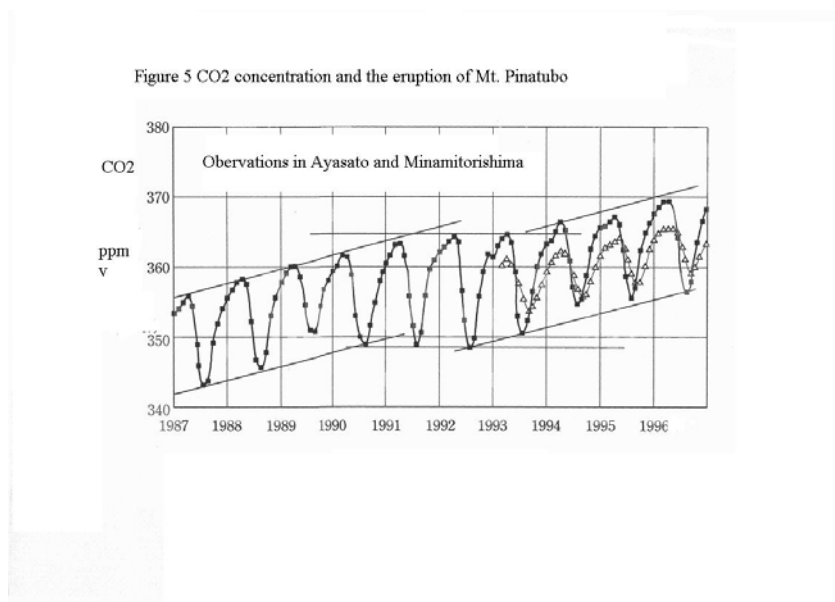
Most meteorologists and economists, as well as lay persons, accepted the alleged fact that CO₂ concentration increased due to fossil fuel consumption, and then temperature increases followed, as is typically argued by those referencing Keeling's research result. Thus global warming by CO₂ emissions became a commonly accepted theory.

However, as we all know, economic activities have booms and slacks; CO₂ emissions arising from economic activities cannot be represented in a smooth curve like the one shown in Figure 3. In fact, since 1980, due to the global economic recession and to energy substitution, CO₂ emissions attributable to fossil fuel consumption did not

follow the projected trend. As is shown in Figure 4, CO₂ emissions from the use of fossil fuels had been increasing at the annual rate of 140 million tons per annum until 1980, but after 1980 the rate of increase decreased to a rate of roughly 70 million tons per annum. After 1990 the average annual rate of increase in CO₂ emissions decreased still further. On the other hand, the rate of increasing concentration of CO₂ in the atmosphere is reflected by a clear and strongly positive and accelerating trend: 1.3ppm in 1980, 1.55ppm in 1990, and 1.8ppm in 2000. So, there is no definite relation between anthropogenic CO₂ emissions and CO₂ concentration in the atmosphere. It seems that increasing CO₂ concentrations in the atmosphere have not been directly related to the growth rate of CO₂ emissions attributable to human activities. Therefore, it is not clear whether or not the reduction in CO₂ emissions assigned by the Kyoto Protocol is really impacting the CO₂ concentration in the atmosphere. It might be said that many economists such as Uzawa uncritically took the smooth curve depicted by Keeling's research team at face value.



The further telling fact that further undermines the claim that human based CO₂ emissions are responsible for the global warming is shown in Figure 5. This figure shows that the trend of increasing CO₂ concentration in the atmosphere flattened out for two years following the eruption of Mt. Pinatubo in 1991, which was one of the largest scale eruptions of the 20th century. We know that humans did not stop using fossil fuels between 1991 and 1993. So we continued emitting CO₂ during this same period. If we assume that global warming is really caused by CO₂ emissions attributable to human



activities, all the anthropogenic CO₂ emissions must have disappeared to somewhere. So, the commonly accepted theory does not make sense at all. In order to understand the information revealed by Figure 5, we should correctly reason that CO₂ emissions are absorbed by the ocean. However, if this reasoning is accepted, the commonly accepted theory is no longer tenable.

As a matter of fact, there is a serious problem with the hypothesis that about the half of CO₂ emissions attributable to human activities remain in the atmosphere.

According to the commonly accepted CO₂-based global warming theory, CO₂ concentration in the atmosphere has increased by 65ppm over the past 45 years. The calculation is based on the assumption that every year 55.9 percent of CO₂ emissions remain in the atmosphere. So, the amount of CO₂ remaining in the atmosphere is equivalent to 25.2 (45 x 0. 559) years of CO₂ emissions.

According to IPCC (2001), the annual amount of CO₂ deposited to the atmosphere *attributable to human economic activity* is 730Gt. Out of 730 Gt of CO₂, 120Gt is exchanged with the land and 90Gt is exchanged with the ocean every year. Namely, about 30 percent of the 730 Gt is absorbed in land or in ocean. About 70 percent is supposed to remain in the atmosphere, according to IPCC.

Out of CO₂ emissions due to human activities, 30 percent is absorbed in land

and ocean and 70 percent is supposed to remain in the atmosphere. It should be noted that the percentage, 70, is larger than the 55.9 percent that is assumed in the CO₂-based global warming theory.

However, out of the 70 percent of anthropogenic CO₂ remaining in the atmosphere, 49 percent will remain in the following year. Thus, the maximum amount of additional CO₂ that would remain in the atmosphere in any one given year is as follows:

$$0.7 + (0.7)^2 + (0.7)^3 + \dots = 0.7 / (1 - 0.7) = 2.333 \dots$$

Therefore, the total amount of anthropogenic CO₂ that can remain in the atmosphere is equivalent to 3.33 years of CO₂ emissions including the CO₂ emissions for the first year.

Sixty-five ppm of increased CO₂ over the past 45 years corresponds to 25.2 years of CO₂ emissions. 3.33 years is only 13 percent of 25.2 years. Thus, only 9ppm (65 x 0.13) of the CO₂ increase is attributable to human activities. *The remaining 56ppm is the result of CO₂ released from the land and the ocean: not the result of human activities.*

The human activities-based CO₂ in the atmosphere is a relatively small amount. It is not plausible to allege that fossil fuel consumption is responsible for the observed increases in temperature. The theory of CO₂-based global warming is a grand superstition based on pseudo-science.

3. Even in the modern times temperature increase is the cause for CO₂ concentration increase

In the ancient times, according to the commonly accepted theory, temperature increase was the cause and the CO₂ concentration increase followed. However, according to the commonly accepted theory, after the industrial revolution, CO₂ emissions by human activities became the real cause of the global warming and resulted in temperature increase. Therefore, the theory must explain two things: (1) what is the CO₂ concentration level that reverses the relation between the cause and the effect?, and (2) why this particular CO₂ concentration level triggers the reversal of the cause and the

effect relation? The general public accepted the theory without raising these two crucial questions. The commonly accepted theory took it for granted that CO₂ emissions are the real cause of the global warming without closely examining the real data, thus avoiding their proper interpretation.

Keeling noticed this important point and analyzed the relationship between temperature change and CO₂ concentration change shown in Figure 6. As clearly indicated in this figure, temperature change precedes CO₂ concentration change by about one year. Namely, Keeling published the result showing that temperature change is the cause of CO₂ concentration change. If researchers accepted Keeling's result, the commonly accepted theory would have been rejected.

Source: Keeling, C. D. 1989. in Peterson D. H. (ed.) Geophysica Monograph 55, p. 210, Fig. 63

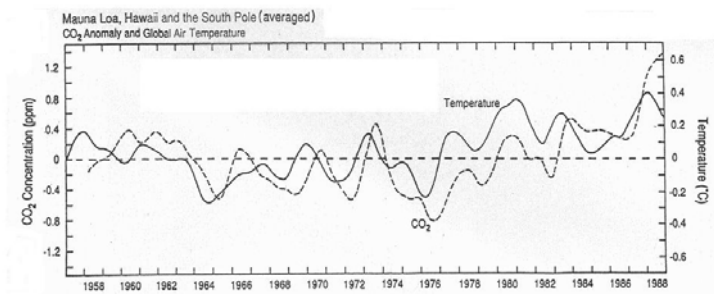


Figure 6 Comparison of internal variability in anomalies of surface air temperature and atmospheric CO₂

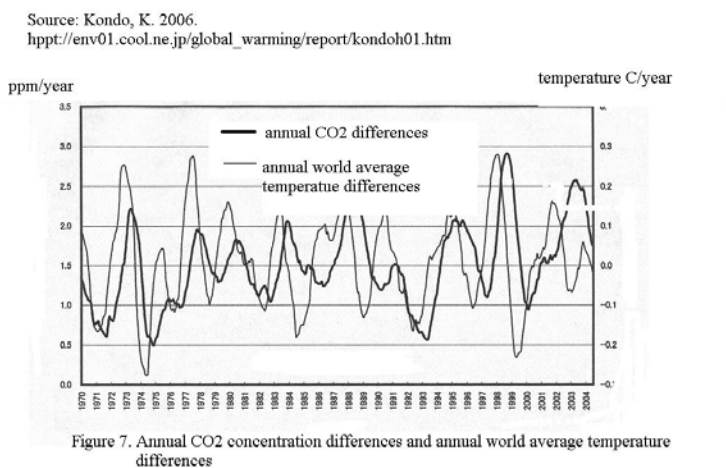
However, it should be noted that in his paper on this issue Keeling explained that temperature change was responsible for changing the source and sink of CO₂ on the surface of the earth. He offered no other explanations.

Since Keeling's result was quite shocking to meteorologists who believed the CO₂ based global warming hypothesis, it seems that they did not want to refer to Keeling's work. For example, even after Keeling's report was referred to in *Super-Abnormal Weather*, written by J. Nemoto in 1994, meteorologists seem to have ignored Keeling's 1989 research results.

However, many people who happened to read Keeling's report (1989) began to question the validity of the commonly accepted theory. Finally in 2005, 16 years after the publication of Keeling's report, an article was published in Tenki (Weather) (the official journal of Meteorological Society of Japan) acknowledging the fact that temperature change precedes CO2 concentration change (Kawamiya, 2005). However, Kawamiya never mentioned that temperature change is the cause of CO2 concentration change and affirmed the commonly accepted theory by indicating that Keeling's report omitted the long-run trend of the relationship between temperature change and CO2 concentration change.

In my view, there is no evidence that, according to the long-run trend, CO2 concentration change is the cause and temperature change the effect. Kawamiya has not given any scientific explanations for the long-run trend.

However, K. Kondo reported annual changes of temperature and annual changes of CO2 concentration based on CO2 concentration data measured in Hawaii, as well as temperature and surface sea water temperature in the world, published by the Japan Meteorological Agency, shown in Figure 7 and Figure 8 (Kondo, 2006).



According to Kondo's report, temperature change and surface water temperature change have a good overall correspondence, with the exception of some minor points. Namely, temperature change is accompanied by surface water temperature change. Temperature change and surface water change precede CO2 concentration change in the

Source: Kondo, K. 2006. http://env01.cool.ne.jp/global_warming/report/kondoh01.htm

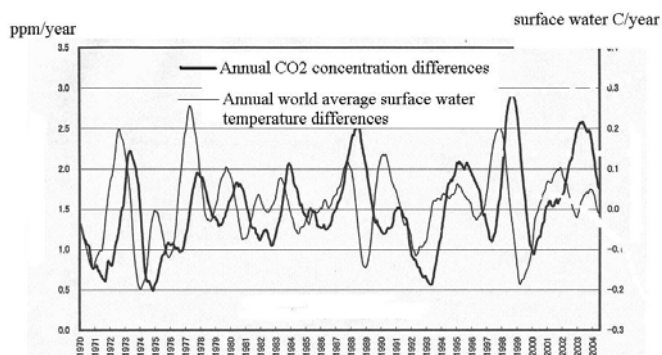


Figure 8. Annual Co2 concentration differences and annual world average surface water temperature differences

atmosphere by about one year. Kondo's report strongly indicates that temperature change or surface water temperature change is the cause and the CO2 concentration change the effect.

Keeling also reported the fact that El Niño preceded CO2 concentration increase by about one year (Keeling, 1995, Fig. 1c). This figure is too complicated to understand, so Kodo presented the same content in an easily understandable form shown in Figure 9. El Niño is the phenomenon that the surface water temperature around the equator increases. So, if we imagine that CO2 was emitted from the ocean around the area where El Niño's impact is considerable, the phenomenon is easily understandable. That is, the surface temperature increase is the cause, and CO2 concentration increase is the result. There are two exceptional years for this explanation: 1964 and 1992. In these years CO2 concentration did not increase even after El Niño occurred. These two exceptional years can be explained by the influence of the eruptions of Gunung Agung in Malaysia in 1963 and of Mt. Pinatubo in the Philippines in 1991. Figure 9 clearly indicates that the presumption of CO2 based global warming is misleading.

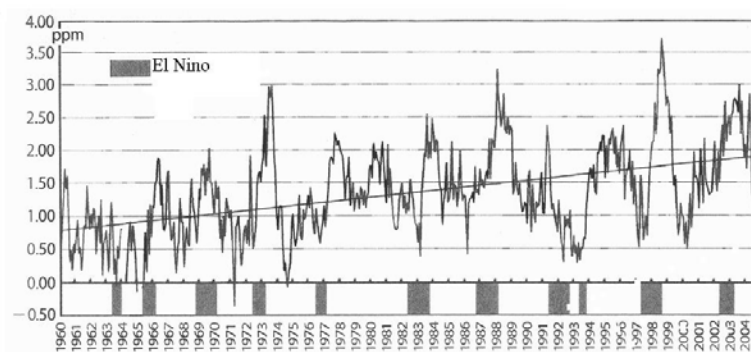


Figure 9. El Nino and CO2 concentration changes

There is no definite scientific evidence that increasing CO2 concentration is the cause and temperature increase is the result. Meteorologists claim that computer based calculations can create results that demonstrate that anthropogenic CO2 emissions induce temperature increases. However, with such models, almost any result that researchers want to have can be easily obtained by changing values of a set of model parameters. Unless there is definitive corroborating evidence, based, on empirical scientific considerations and facts, the type of results claimed by these meteorologists cannot be tenable.

As a matter of fact, the projected future scenarios of CO2 based global warming will never come to pass. For example, CO2 increase of course induces changes in n ecosystems. These changes in the two types of ecosystems of course have an impact on the climate. Neither of these changes can be correctly calculated in quantitative terms (Nakamoto, 2006). It is very dangerous to count on future predictions generated by computer simulation that are based on the presumption of CO2-based global warming. In spite of the dubious credibility of the commonly accepted theory, through the framework of the Kyoto Protocol, human beings have determined to make the reduction of CO2 emissions the highest priority strategy for global warming prevention.

Here, it should be recalled that Keeling is the very person who claimed, in 1960, that “about half of CO2 emissions from economic activities remains in the atmosphere”

and who reported, in 1963, to nature conservation societies that “doubling CO₂ in the atmosphere increases the world temperature by 4 degrees Celsius” (Weart, 2003). However, it is none other than Keeling himself who finally reported that temperature increase is the cause and CO₂ concentration increase is the result (Keeling, 1989).

His report triggered a considerable amount of chaos among the people who had been advocating the CO₂ based global warming theory. Strangely enough, IPCC members, as well as meteorologists throughout the world, (perhaps except in Japan), continue ignoring Keeling’s recent research results concerning CO₂ concentration changes and temperature changes. As a result, the researchers believing in the modern myth of CO₂ based global warming have swept the facts under the seemingly scientific carpet.

4. The water planet earth

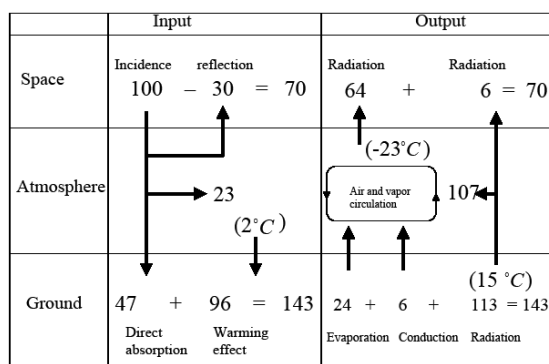
So, the next question is to investigate the mechanisms by which temperature on the earth is regulated (Tsuchida, 2006). The first factor is the amount of solar radiation absorbed by the earth. If all the solar radiation were to heat up the solid earth, the average temperature would be 5 degrees Celsius on average, according to the Stefan-Boltzmann law. If 30 percent of the radiation were reflected, the average temperature of the solid earth would be minus 18 degrees Celsius.

However, since the earth is covered by the atmosphere, 6 percent of the solar radiation is released from the earth surface and 64 percent from the atmosphere of higher altitude. So, altogether 70 percent of the solar radiation is lost by heat release to the outer space. Thus, the temperature at the higher altitude becomes minus 23 degrees Celsius, as shown in Figure 10 and Table 1.

Radiated energy cal/cm ² min	Absolute temperature K °C
0.70 (143)	304 (31)
0.67 (137)	301 (28)
0.55 (113)	288 (15)
0.49 (100)	278 (5)
0.34 (70)	255 (-18)
0.31 (64)	250 (-23)

Numbers in the parentheses in the radiated energy column show radiated energy values in terms of the average incoming solar energy as 100

Table 1. The Stefan-Boltzmann law:
Radiated energy = $(8.2 \times 10^{-11} \text{ cal/cm}^2 \text{ min deg}^4) \times K^4$



The average heat balance of the earth (0.343 kw/m²) = 100

Figure 10 The heat balance sheet on the earth

The temperature, minus 23 is an important numerical value that determines the highest possible average temperature on the earth's surface. When the minus 23 degrees Celsius air of higher altitude is adiabatically compressed and transported to the ground (1013 hPa), the temperature of the air becomes 35 degrees Celsius. This temperature is called the potential temperature. The potential temperature of 35 degrees Celsius is a theoretical standard of the average surface temperature on the earth. Thus the average surface temperature cannot exceed this potential temperature. If the average surface temperature exceeds this value, the temperature difference will disappear due to dramatic heat convection. As shown in Figure 10, the actual surface temperature is determined by the four factors: (1) the solar energy incidence; (2) the warming effect; (3) the conduction to the atmosphere; and (4) the cooling through evaporation. If the average heat balance of the earth (0.343 kw/m²) is regarded as 100, 143 heat energy stays at the ground level shown in Figure 10. If all of this heat energy were radiated

back, the temperature would be 31 degrees Celsius. However, because of conduction to the atmosphere and cooling through evaporation, the average surface temperature becomes 15 degrees Celsius.

Water vapour is the most important component among the warming gases. The present value of CO₂ concentration in the atmosphere is about 380ppm. However, saturated vapour concentrations are, respectively, 42,000ppm at 30 degrees Celsius, 23,000ppm at 20, 12,000ppm at 10, and 6,000ppm at zero: much higher than the current CO₂ concentration. CO₂ based global warming underestimates the warming gas effect of water vapour in the atmosphere.

The second most important condition determining the surface temperature of the earth is that the earth is a water planet and that the surface of the earth is cooled by air convection. Water vapour's molecular weight is 18, lighter than that of air, which is 29 on average. At the same time, the air becomes lighter after absorbing heat on the surface earth because of the warming effect of vapour. When warmed surface air goes up to the higher altitudes, the air becomes even lighter, due to additional heat being released through the process of rain and snow condensation. Therefore, the atmosphere containing water vapour becomes an ascending current and the surface temperature goes from 31 degrees to 28 degrees, due to this air cooling mechanism.

When the surface water on the earth is evaporated into the atmosphere, additional heat is also absorbed through the water cooling effect. The surface temperature on the earth ends up being 15 degrees Celsius on average: 13 degrees lower than 28 (Figure 11).

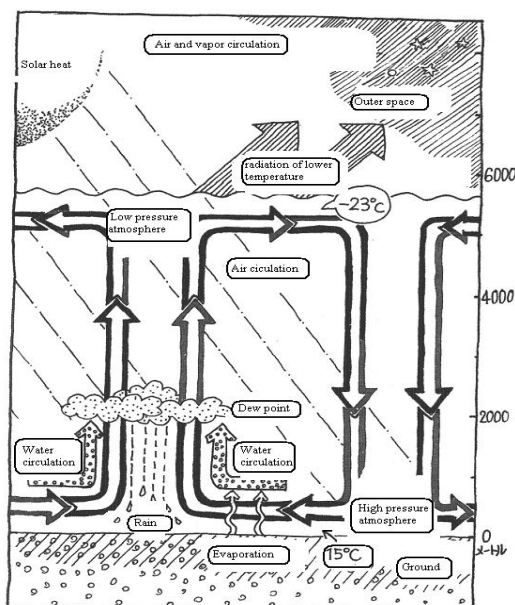


Figure 11. Air and water circulation

As is now clear, the CO₂ based global warming theory completely ignores water and the air cooling mechanisms associated with water. This theory also underestimates the warming effect of water vapour. Thus the theory is far from satisfactory for discussing the mechanisms determining temperature on the earth. Unfortunately, although it is a great pity, such a poor theory has been leading the global discussion on climate change, including the Kyoto Protocol.

It is true that CO₂ is a warming gas, so the secondary effect of increased CO₂ concentrations cannot be ignored. The reason is that a spectrum of far-infrared rays (those with wavelengths of between 8 and 12 microns), cannot be absorbed or released by the so called 'window of atmosphere', i.e., by water vapour alone. As shown in Figure 10, all 143 percent of heat (compared with the total incoming solar radiation) is not absorbed by water vapour in the atmosphere. 6 percent of the 143 is radiated back directly from the surface of the earth into outer space. This is the process of radiant cooling, which also helps to make the surface temperature lower.

If the warming effect of CO₂ emissions has a harmful impact on the window of atmosphere, the process of radiant cooling might also cease to work properly. This impact would then induce temperature increases in the sub-frigid zone, and in the temperate zone in winter, where water vapour concentrations are relatively low.

However, there would be no impact in the tropical zone or in the temperate zones in summer. As water vapour concentration in the atmosphere becomes more dense, due to evaporation from surface waters, a substantial amount of water vapour clusters around dusts and chemicals in the air, which play an important role in fostering the formation of minute water droplets, even under conditions where air pressure is below the saturated vapour pressure. Far-infrared rays of all wavelengths are absorbed or scattered by these droplets. Because the infra-red rays do not escape the lower altitudes through their normal route of direct radiation, the warming effect is further enhanced]. Metaphorically speaking, the window of atmosphere is closed by the water droplets and the greenhouse effect of CO₂ is null. Under such conditions, CO₂ concentration increase does not have the opportunity to induce additional temperature increase. Because the heat is already failing to escape from the earth system, due to failures in the air, water and radiant cooling mechanisms, there is no un-captured heat remaining, which could then be kept in the earth system by the excess CO₂. Recent increases in the occurrence of typhoons or tropical cyclones is due to global warming that is not attributable to increased concentrations of CO₂ in the atmosphere.

5. Air pollution and global warming: the phenomena of heat islands

The air in urban areas is polluted by chemicals and minute dust particles. While white dust radiates sunlight back into the outer space, dark dust and coloured chemicals, such as NO₂, absorb sunlight. As already mentioned before, when water vapour clusters around minutes particles of dust, all far-infrared rays released from the surface of the earth are absorbed or scattered. Temperature (correctly speaking, potential temperature) of the polluted air in urban areas at higher altitude becomes so high that the air in urban areas cannot ascend toward the higher altitude atmosphere, as shown in Figure 12.

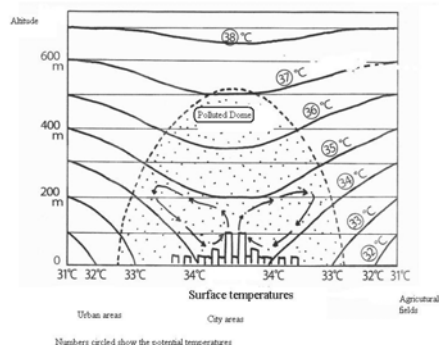


Figure 12. An imaginary chart of the polluted air in terms of the potential temperature

As a result, since the mechanisms of air and water cooling are hampered and radiant cooling mechanism is also damaged by this dirty air, the temperature in urban areas increases accordingly. This situation in urban areas is said to be the heat island phenomena.

This type of air pollution is found in all corners of the world. Dusts and chemicals form a polluted layer that is drifting in the higher altitude atmosphere. This polluted layer of dust and chemicals is heated from below, absorbing sunlight and far-infrared rays released from the surface of the earth, resulting in an increase in the temperature at this higher altitude. The air of increased temperature at higher altitude in turn pours heat back toward the surface of the earth, through the air and water cooling convection channels described above, and the temperature on the earth's surface increases.

6. Global warming as natural phenomena

Some meteorologists allege that the global warming phenomenon we are witnessing now is intrinsic to modern societies. However, the earth's history includes examples of past global warming that are comparable with the current period. One such period happened between 700 and 1000 C. E. But it should be noted that Figure 13 shows a much quicker temperature increase during this earlier period, as compared with the present global warming period.

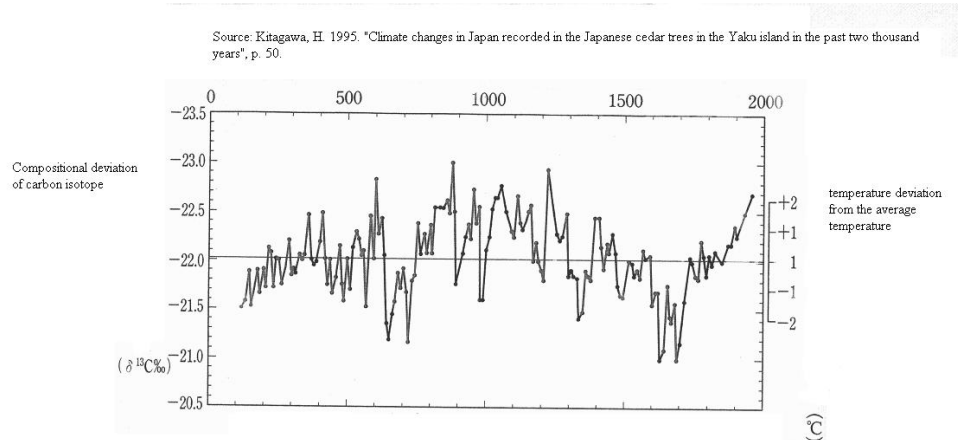


Figure 13. Climate changes in Japan in terms of carbon isotope compositional deviation recorded in the Japanese cedar trees in the Yaku Island over the past 2000 years

According to the pollen analysis of ancient temperature curves (Figure 14), the temperature at 7.5 kyr BP was higher by about 2 degrees, as compared with present temperature. After that, the temperature chart shows a more or less downward trend and cooling periods appear more often after 3.3 kyr BP. The summary is given in Table 2. We are currently moving into or in the early stages of a cooling period.

7,900-4,600 bce	3,300 years of the first Jomon era (warming period)
4,600-4,400 bce	200 years of the first Jomon era (coolong period)
4,400-3,300 bce	1,100 years of the second Jomon era (warming period)
3,300-2,600 bce	700 years of the second Jomon era (cooling period)
2,600-1,900 bce	700 years of the Yayoi era (warming period)
100-700 ce	600 years of the Kofun era (cooling period)
700-1,200 ce	500 years of the Nara and Heian era (warming period)
1,200-1,900 ce	700 years of the Kamakura and Edo era (cooling period)
1,900-Present ce	100 years of the modern era (warming period)

Source: Sakaguchi, Y. 1993

Table. 2 Warming period alternated with cooling period in the Japanese history

7. Global cooling with desertification: more serious issue for the future

As already touched upon in Figure 2, the temperature at Vostok, Antarctica was analyzed over the past 220 kyr BP based on the ice core record there. Figure 2 shows that there are alternate periods of cooling and warming: a cooling period of about

Source: Sakaguchi, Y. 1993. "Climate changes in Japan over the past 8000 years: changes and human history", *Senshu Jinbun Ronbun Shu*, vol. 51.

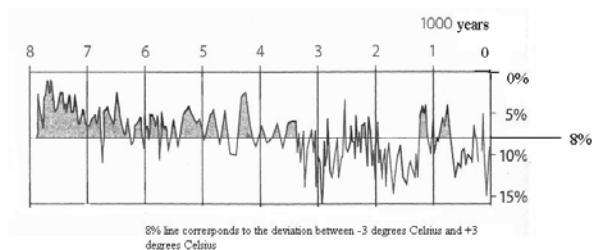


Figure 14. The temperature changes over the past 8000 years in Japan by means of the pollen analysis

100,000 years with 6 or 10 degrees lower than that of the present temperature, and a warming period of about 10,000 years with temperatures similar to the present warming trend. Since we are now in a warming period that has continued for about 9,000 years, we are also in the process of entering into the next cooling period.

It is absolutely necessary to have three or four months with temperature higher than 15 degrees Celsius for grain production. The present average temperature is about 15 degrees Celsius, so grain production is possible even in the areas of between 40 and 60 degrees latitude. In fact, the main production areas of wheat are North America and North Europe, both falling mainly within this latitude band.

As exemplified by past famines, if the average temperature drops by 2 degrees Celsius, occurrence of a stable 15 degrees Celsius in summer, within the temperate zone, for a period of three or four months is unlikely and a serious food shortage could result.

Desertification in the tropical, sub-tropical and temperate zones is spreading rapidly, making conventional methods of agriculture in these regions almost impossible. Grain production in many areas of the world would be in trouble if global cooling begins any time soon.

If such a situation arises, the phenomena of going southward looking for additional sources of food, which has been practiced by humans in the past, might

trigger a series of wars. People in the colder areas of North Europe and North America should reconsider their future fate instead of disseminating the alleged threat of the global warming.

What is important is to stop the global warming argument and to take effective measures against the forthcoming global cooling period. Since the global cooling is a natural phenomenon, it is impossible to prevent this natural phenomenon from happening in the future. We have to accept global cooling. In order to have a sufficient amount of food in case of emergency, we must orient farming systems toward self-sufficiency as much as possible. At the same time, measures to reverse desertification must be introduced in order to recover the more temperate arable land.

The present wave of desertification is clearly being fostered by over-production from the more southerly land in the rich countries, facilitated by technological efficiency improvements. For example, the land in the south and the middle part of the USA is disastrously in the process of desertification. Temporary productivity increases, due to technological efficiency improvements, induced price decreases for grains and many bankrupted farmers had to leave their land.

The industrial nations are selling surplus food, supported by substantial subsidies for their farmers, to the developing countries through free trade systems. Consequently, the farmers in the developing countries cannot survive economically and leave their home lands, entering into urban areas with a lot of slums. Food export from the developed countries resulted in exporting unemployment into the developing countries. Farm land deserted by farmers in developing countries is also often in the process of desertification (Tsuchida, 2002).

Therefore it is necessary to reconsider the uncritical use of technological fixes and the ideology of free trade dogma, as part of a concerted effort to stop the spread of desertification and to recover precious farming land. CO₂ based global warming is an insidious theory. It prevents us from considering the global cooling problems that are approaching in the future and diverts our attention away from putting the highest priority on combating these serious desertification issues.

8. The effectiveness of prevention measures to combat the alleged global warming

Before concluding this paper, a few other important issues in relation to global warming should be touched upon. Those issues are concerned with the effectiveness of planned prevention measures, such as the Kyoto Protocol, which are intended to combat the alleged global warming. All these measures would have harmful impacts, both on the human society and on the natural world, in my view.

8.1 The Kyoto Protocol: the mission impossible to achieve

The Kyoto Protocol took effect in February 2005. In this protocol a 6 percent reduction of CO₂ emission by the year 2012, as compared to the 1990 CO₂ emission level, was assigned to Japan. However, even if the Japanese GNP growth rate per year is 1 percent, more than 26 percent reduction must be achieved by the year 2010, for example, to comply with the Kyoto Protocol. The Japanese delegates to the Kyoto convention in 1997 must have recognized that such a fantastic promise would never have been fulfilled. Japan, as the chair country of the convention, chose to sign the treaty just to save face. For some European countries it was relatively easy to sign the treaty and to comply with the Kyoto Protocol, since many of the coal-fired power generation plants used there in 1990s could be easily replaced by natural gas fired power plants. Japan, however, now far from complying with the targets it accepted, will be condemned in 2012 for having signed the Kyoto Protocol.

8.2 The deserted coal mines: the permanent loss of precious resource

The Kyoto Protocol calls for the energy transformation from coal to natural gas. Many coal mines in the world are being closed one after another. Once coal mines are closed, they are to be submerged, pits are to be collapsed, and the coal in these mines would never be recovered.

For example, many coal mines, that would have produced coals for more than 200 years, were discarded in Japan when the energy transformation from coal to oil was accomplished in 1960s or so. After this period, Japan started to be entirely dependent on the resources provided by other countries. The Japanese's stupid experience is almost forgotten by other nations that are now going to lose access to this same precious mineral resource.

8.3 Photovoltaic power generation: additional oil squandering

The price of electricity by photovoltaic power generation is very high, since a huge amount of electricity is used during the process of producing the semiconductors. Photovoltaic power generation is a wasteful process that requires a great deal of electricity. It is supported by a lot of government subsidies, combined with the high prices of photovoltaic cells and equipment. Unfortunately, what is unintentionally being pursued is promotion and development of the semiconductor industry, by placing an additional financial burden on the general public. CO₂ emissions are added during the production of semiconductors. Additional CO₂ emissions are induced after tax payment for subsidies have been released into the economic process. In the end, CO₂ emissions increase.

8.4 Wind power generation: a fake eco-friendly idea

Because electricity is not constantly generated by wind power, due to periodic lack of suitable wind, equivalent power generation equipment, in terms of electricity generation must be employed in conjunction with windpower. So, an over-investment, in the form of ancillary equipment must be made, resulting in wasteful use of oil and in additional CO₂ emissions.

8.5 The nuclear power industry: a tactician behind the CO₂ based global warming

In my view, the CO₂ based global warming theory was contrived to revive a nuclear power generation industry that suffered from high cost infrastructure and from a bad public image after the disastrous Chernobyl accident in 1986. This contrivance was effective and appears now to be achieving its aim. There is a boom in the construction of nuclear power generation plants taking place in some developing countries. The nuclear industry in developed countries is very happy with the construction boom in developing countries. In 2006 the UK announced its plans to resume construction of the country's nuclear power plant infrastructure. Unfortunately, we are once again moving in the direction of leaving a negative inheritance of radioactive wastes to future generations.

Uneasiness with potential nuclear plant accidents will increase. The serious influences of radioactive substances released from the Chernobyl accident in 1986 are now clearly evidenced. The official number of the nuclear accident victims reported by

the Ukrainian government is about 2.6 million. And, because a large proportion of the fallout spread across neighbouring Belarus, a country for which such statistics are less readily available, this staggering number is also a substantial underestimate. As a common sense view would indicate, passage of the ten year gestation period for thyroid gland syndrome and of the 20 year gestation period for cancer related syndromes was required before it was possible to clearly identify the human harm attributable to the release of radioactive substances. The promotion of nuclear power generation plants, based on the CO₂ oriented global warming theory, is a motivated crime in my understanding, since the plausible damages can be foreseen.

8.6 CO₂ sequestration technology: a sham

Projects to recover and dispose of CO₂ are in progress. But additional consumption of oil is an unavoidable by product of efforts to recover and dispose of CO₂. Thus, in these practices additional CO₂ emissions from oil consumption is guaranteed: reduction in CO₂ emissions cannot happen through this method.

The Kansai Electric Group and the Mitsubishi Heavy Industries firm in Japan are the two leading companies that are making research and development investments to produce CO₂ by burning fuels and to recover fuels by sequestering CO₂. This attempt is nothing but a modern version of a perpetual motion of the second kind, which is against the law of Entropy. Unfortunately, there are some corrupted 'scientists' under the control of people with political power who cannot provide proper advice to big companies about what would really constitute useful long term energy policy.

8.7 Emission trading and joint investment scheme with developing countries

Under the Kyoto Protocol not all countries are held to the same emission standards. For example, within the framework of the Kyoto Protocol no emission reduction quota is assigned to Russia or to the Ukraine. If a country with a zero emission reduction requirement fails to achieve a sufficient level of economic growth, it can sell emission trading rights to developed countries, including Japan. Theoretically speaking, these countries could make a profit through the emission trading scheme of the Kyoto Protocol without any special effort.

Reduction of CO₂ concentration through international co-operation among

developed and developing countries is a good excuse for facilitating financial investment into developing countries. This financial investment is effective in fostering the joint economic growth of developing and developed countries, giving rise to still further increases in overall CO₂ emissions.

9. Conclusion

After ancient civilization, human beings enjoyed their life in the warming period, as compared with that in the cooling period. As examined in this paper, the potential tragedy facing us is to accept the myth of CO₂ based global warming, rather than to prepare for the forthcoming cooling period that will give us a harsher time in the future.

Of course, choosing to pursue reduction of CO₂ emissions associated with economic activities is an appropriate decision for mitigating the climatic changes we are experiencing. However, unfortunately, the two strategies are not compatible with each other: promoting economic growth of developing and developed countries on the one hand, and reducing CO₂ emissions, on the other hand. To achieve a situation, where the level of production of goods and services is considerably lower than the current level, thus reducing consumption of fossil fuels and emissions of CO₂, is the only solution left for us. This situation of so called recession is an ominous one for the vast majority of voters in the modern world. So, CO₂ emissions reduction is pretty much difficult to achieve.

Perhaps what we can do most for future generations is to prepare for the forthcoming cooling period and to reconsider the possible images of human life on this planet in the post-petroleum society: looking for a more or less not unhappy society with less production and consumption (Tsuchida, 1999; 2002).

Acknowledgements: This paper is based on the final lecture of mine given at Meijo University on January 14, 2006. The author would like to give sincere thanks to Dr. K. N. Farrell and Dr. K. Mayumi for English translation of this paper.

References

Bacastow, R.B., Carter, A.F, Keeling, C.D., Heimann M., Monk W.G, Piper S.C., Roeloffzen H., and T.P. Whorf. (1989). "A Three-dimensional model of

atmospheric Co₂ transport based on observed winds: 1. Analysis of observational data”, in D.H. Peterson (ed.), *Aspects of Climate Variability in the Pacific and Western Americas: Geophysical Monograph 55*, p. 165-236.

Houghton, J. T. (1995). *Climate Change 1994*, Cambridge University Press, New York.

Houghton, J. T., Ding, Y., Griggs, D. J., Noguer, M., van der Linden, P.J., Dai, X., Maskell, K. and C.A. Johnson (2001). *Climate Change 2001*, Cambridge University Press, New York.

Ishi, H. (1988). *Report on the Earth Environment* (in Japanese), Iwanami, Tokyo.

Kawamiya, M. (2005). “Why temperature changes precede CO₂ concentration changes?” (in Japanese), Meteorological Society of Japan, *Tenki*, vol. 52, pp. 507-508.

Keeling, C.D., Wahlen M., van der Plicht, J., and T.P. Whorf. (1995). “Interannual extremes in the rate of rise of atmospheric carbon dioxide since 1980”, *Nature*, vol. 375, p. 666-670.

Kitagawa, H. (1995). “Climate changes in Japan recorded in the Japanese cedar trees in the Yaku island over the past 2000 years” (in Japanese), in Yoshino, M. and Yasuda, Y. (eds.), *History and Climate*, Asakura, Tokyo.

Kitano, Y. and M. Tanaka. (1990). *A Quick Guide to the Global Warming* (in Japanese), Macmillan Research Institute, Tokyo.

Kondo, K. (2005). Personal communication. [online] URL:
http://env01.cool.ne.jp/global_warming/reprot/kondoh01.htm, 06/04/17.

Kondo, K. (2006). Personal communication. [online] URL:
http://env01.cool.ne.jp/global_warming/reprot/kondoh01.htm, 06/04/17.

Nakamoto, S. (2006). A speech at “A panel discussion on the global warming”, February 18, 2006. Tokyo.

- Nemoto, J. (1994). *Super-anomalous climates* (in Japanese), Chuoukoron-shinsha, Tokyo.
- Sakaguchi, Y. (1993). "Climate changes in Japan over the past 8000 years: changes and human history" (in Japanese), Senshu Jinbun Ronbun Shu, vol. 51, pp. 79-113.
- Tsuchida, A. (1992). *A New Formulation of Thermodynamics* (in Japanese), Asakura, Tokyo.
- Tsuchida, A. (1998). *Merits and Demerits of Ecological Myths* (in Japanese), Hotaru Book Company, Kyoto.
- Tsuchida, A. (1999). "Five conditions for sustainable living system: from the physics of open systems to ecological economics" in Mayumi, K. and Gowdy, J. (eds.) *Bioeconomics and Sustainability: Essays in Honor of Nicholas Georgescu-Roegen*, Edward Elgar, Cheltenham, pp. 352-379.
- Tsuchida, A. (2002). *Essays on the petroleum based civilization* (in Japanese), Rural Culture Association, Tokyo.
- Tsuchida, A. (2006). *The Fallacy of CO2-based Global Warming* (in Japanese), Hotaru Book Company, Kyoto.
- Tsuchida, A. (2007). "Reducing CO2 emissions is a remedy for the global warming?" (in Japanese), Butsuri (Physical Society of Japan), vol. 62, pp. 115-117.
- Uzawa, H. (1995). "Essays on the Global Warming" (in Japanese), Iwanami, Tokyo.
- Weart, S. R. (2003). *The Discovery of Global Warming*, Harvard University Press, Cambridge, Mass.