



## S. FRED SINGER

The Committee which you chair is a discordant voice on climate change: how is composed and how works the group N-IPCC? What are your points of disagreement with the conclusions of the IPCC?

Thank you very much, it's a pleasure to be here and to address what I think is the single most important question: is climate change primarily natural or is it human caused? That is an important question, because if it is natural, then there is very little we can do about it. Many people think it is human caused and particularly politicians, so they are trying to do something about it. But many scientists now feel that the causes of climate change are primarily natural and come from the sun. And, since we can't control what happens on the sun, we do not have any way of affecting. It is an important issue because no matter what is causing a change of the climate, we must adapt to the climate, whether it comes warmer or whether it comes colder. And the question naturally is: what kind of climate is better for us, a warmer climate or a colder climate? It depends on whom this question has been addressed to, but economists who have investigated it believe that a warmer climate is probably better than a colder climate. It is better to be in a warmer climate than to go back into ice age. Of course people adapted to an ice age, they lived in caves, but nowadays we can adapt to any kind of climate thanks to modern technology. The next question has to do with politics: how do we meet what people call the challenge of climate?

Well, as I explained if it is natural, there's very little we can do about it, but you would find that for example this week the heads of various governments are meeting and discussing in a very serious way what should we do about climate. Those of us who believe this is the sun are very amused by this kind of discussion but unfortunately we should not be amused because the actions that the politicians will take are usually very costly and involve great expense of tax money and that's our money we are talking about. So let me return to the science now in order to decide whether the climate change is due to nature or to human activities. Let me give you some examples. We hear that the ice of the arctic is shrinking; that may be very true but is completely irrelevant; why? Because we cannot tell you what the causes of the warming, every type of warming, are, whether natural or man made. Any kind of heating either natural or human caused will still cause melting of the ice. And then we hear again: "But carbon dioxide is a greenhouse gas". Certainly it absorbs thermal radiation, it is true, it increases in the atmosphere; it is true, we agree, this is related to human activities that burn oil, gas coal, but the question is: does it have an important effect on climate? The models say so, but the models do not adequately consider the effect of natural forces, and then we have to return to scientific issues. The correlation between carbon dioxide and temperature does not really tell us much. For example, Professor De Leo from USA, of Italian origin, has shown me that the climate has cooled over the past decade without any correlation with carbon dioxide which, on the contrary, is increasing; temperature is decreasing and carbon dioxide increases. As we have already heard this morning in one of the presentations, temperatures between 1940 and 1975 have been reduced, during which carbon dioxide has increased, so that a correlation does not exist.

So how do we know, if climate changes, that the general warming that has characterized the last century is both natural or caused by humans? We need to compare the detailed predictions of models with direct observation, and then we have to find the "fingerprints". The climate models, that have just been shown, are very detailed and sophisticated and can calculate to a certain level of detail the trends of temperature versus altitude and latitude. If we look at the results of the models, we realize that, if the cause is carbon dioxide and other greenhouse gases, then there should be an hot spot in the troposphere, at an altitude of about 10 km in tropical regions. In fact climate models typically have these hot spots, but the actual observations made from balloons and satellites do not confirm this, so there is a considerable discrepancy between the estimates you get with the models and direct observations.

We think that this is the most damning evidence against any appreciable contribution to anthropogenic global warming. I want to be very careful; we do not deny that there is a human contribution to climate change, there must be because after all the carbon dioxide is increasing, but it is a question of amount, of weight; how much is important the human contribution in relation to natural causes?

Prof. Franco Battaglia wrote a book with me that you will find out here, in Italian: "Nature, Not Human Activity, Rules the Climate". We have specifically evidence, derived from actual observations that solar activity is the main factor. Some articles have been published in "Nature" a major scientific journal, by Dr. Augusto Mancini, another Italian who works in Heidelberg, Germany, who has made some very specific measurements on stalactites found in caves, on the concretions in the caves. The author measured the isotopic composition of oxygen and carbon - carbon is an indicator of solar activity, while the oxygen is an indicator of climate and temperature. The author has found an almost perfect correlation over a period of 3,000 years, so a relationship year after year. These studies are published studies and have also been repeated with other measurements on other various stalagmites in caves throughout the world, confirming beyond any doubt that solar activity is a factor, perhaps the most important factor, for controlling the climate. But at this point we have to return to the measures, to what we can do, which clearly represents the most important issue to be addressed. Governments usually say: "We must control emissions of carbon dioxide to combat climate change, in order to prevent the Earth from overheating", but, it's our opinion that the Sun determines the heating; it is the Sun that controls climate change, and the weather is cooling down because there are no hot spots in our forecasts and it will continue to cool for another decade and maybe a few more years, then heat up again, etc... These are regular fluctuations taking place for millions of years and we finally have proof, the evidence of these fluctuations. We find them in marine sediments, lake sediments, in trees rings, stalagmites in the caves. Where geologists look there are always evidences of regular changes of climate and fluctuations between periods of heating and cooling. So to make an effort to reduce emissions of carbon dioxide, probably will not have a big effect on climate. What will it do: it will make our life particularly expensive and move us toward energy solutions, anti-economic, not only in Europe, where it all started, but also in the USA. We are building windmills for wind energy, we're making other things with the attempt to obtain small amounts of electricity that we can produce much more easily with coal and nuclear plants.

Unfortunately, public opinion is still very confused on this issue; there is also a strong opposition to nuclear power plants, for example, in Italy and also, for example, to coal plants in Germany, and this will have repercussions in USA, because, as you know, there is really a contagious infection of these trends that spread from country to country. So what are the predictions for the future? This week there will be a meeting of G20; it will discuss what will the U.S. do, what will propose the new American president, if he will assume what we define a leading position in this question. Because it would mean spending a lot of money that could be better spent for many other better purposes. What actually will happen is difficult to predict but my guess is that economic problems that are now sweeping through the world, which I'm not expert of, are so important that they would take the upper hand on the issue. As you probably know countries are going to meet in Copenhagen in December to try a new global regime for controlling the emission of carbon dioxide: my prediction is they will fail partly because of the lack of scientific evidence but mostly because of the economic situation. So I'm sorry to say that even though we think, we scientists, think that the science is very important and should be determinative of what is happening, what is really going to happen has to do more with the economic situation and very little with the science. But to us the science is important and we will continue to work to show through the detailed observations of sun that it is correlated directly with climate change and then we can solve the so called climate problem by better observations of the sun and a better theory of how solar activity affects the climate.