

J. Hansen's Work in 1987-1988; Origin of the Current Problem of Global Warming

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In 1987, Hansen and Lebedeff derived global mean surface air temperature changes from 1880 to 1985 on the basis of data from available meteorological stations(1). These observations are not uniformly distributed both in space and time. Hansen and Lebedeff gave a detailed description of their method for obtaining annual mean values of surface air temperature for respective years. The results are shown in figures where annual mean temperatures are plotted against time for their global average, and for their regional average as well. These figures or some others equivalent to them have been referred to as a lead to recognizing global warming by 0.6 degrees in the past 100 years. However, the global average annual mean surface air temperatures are far from a steadily increasing trend. From 1880 to around 1940, it shows an increase, which is followed by a phase of gradual cooling. It turns to an increase again at about 1965. Hansen and Lebedeff give a full description of this result(1). In addition, it is important to note that the appreciable decrease in temperature between 1940 and 1965 was not of a global occurrence. From figures showing temperature changes in northern and southern hemispheres given in their paper, it is evident that the decrease took place only in the northern hemisphere. In their paper, temperature changes are also given for the eight latitude zones. These figures provide strong evidence that the decrease in temperature up to 1.2 degrees went on in the Arctic Zone. Even in the northern hemisphere, a decrease in temperature can hardly be indicated for lower latitude zones. Hansen and Lebedeff fully recognize these facts. Furthermore, it is revealed that the rise in temperature from 1880 to 1940 recorded in the global average figure is attributed to the sharp increase in temperature in the Arctic Zone while the rise in other latitude zones is not so remarkable. In this way, it is confirmed that air temperature changes are not necessarily uniform over the entire surface but their trend can be regionally different. Having a look at the figure showing the temperature change in the Arctic Zone suggests that the change is not likely represented by a smooth sinusoidal curve but can be regarded as a transition from a linearly increasing state to a linearly decreasing state and vice versa. These must be the conclusion that should be derived from Hansen and Lebedeff's analysis. Under such a situation, a researcher will give himself the task of elucidating the nature of a dynamical system in which such spatial and episodic characteristics are involved. Hansen did not take such an approach. From the comparison of the 1880-1885 mean with 1980-1985 mean, Hansen and Lebedeff concluded that the evidence from the meteorological station records supported the estimate of a global warming of approximately 0.5 degrees in the past 100 years. Hansen solely made it his concern to invite people's attention to a global mean temperature rise in the past 100 years. At the U.S. Senate held in August of the ensuing year, 1988, Hansen gave testimony that the frequent occurrence of abnormal weather, especially of hot summer, was related to the global warming. He declared that this recognition was valid at the confidence level of 99%. The global warming issue came into being as the severe environmental crisis to humankind. The IPCC was launched in November 1988. The rate of global temperature rise 0.6 degrees per 100 years has taken root in IPCC's reports. It has been attributed to a human-induced increase in carbon dioxide in the atmosphere. However, the inadequate approach taken in the early stages of investigations should not be overlooked.

(1)Hansen, J. and S. Lebedeff (1987), Global Trends of Measured Surface Air Temperature, Jour. Geophys. Res., Vol.92, No.D11, pp13,345-13,372