

A CHANGE IN THE CLIMATE?

Very often, we read in the press sentences like "The traffic accidents were caused by the climatological conditions...". It is important to point out that by "climate" we mean the final result of the balance produced when the solar energy absorbed by our planet is distributed between the continents, the oceans and the atmosphere. This is expressed in average values –which remain practically constant over various decades– of meteorological variables, accompanied by seasonal variations and irregular, more sudden fluctuations. The climate, therefore, is the long-term weather. On the other hand, the term "climatological" can not be applied to short-term phenomena.

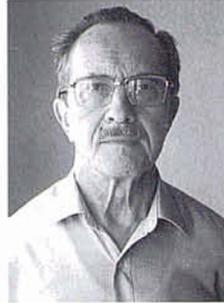
However, the situation as regards a change in the climate should be looked at closely, since at present there is a common belief that the climate is changing and, what is more, the several hot years during the eighties seem to support this idea. What truth is there to it?

In fact, the climate is constantly changing. During the Quaternary period there were a number of quasi-periodic changes and ice-ages with intervals of 100,000 years. The average temperature during the ice-ages was 6 – 8 °C lower than today.

Over the last century a certain rise in temperature has been observed, though with appreciable fluctuations. Climatic changes, then, are not unknown. They have been taking place slowly and today the general impression is one of rapid change.

No-one can deny that the climate has remained essentially unchanged over the last 10,000 years, a result of the natural effect known as the greenhouse effect: the Earth's atmosphere, which is almost transparent to the sun's radiation, absorbs a large part of the infra-red radiation given off by the Earth. In this way, this energy –which would otherwise be lost in space– is retained by the Earth-atmosphere system, which increases in temperature as a result. The effect gives a result of some 33 °C. Without the atmosphere, we believe the average temperature of the Earth would be –18 °C –a far less hospitable planet.

The atmospheric gases responsible are those that absorb infra-red: carbon dioxide (CO₂), water vapour and methane (CH₄). Although not very abundant, these



gases are natural components of the atmosphere.

Whatever the case, what is true is that the use of fossil fuels constantly adds to the amount of CO₂ in the atmosphere: between 1850 and 1989, the proportion rose from 280 parts per million (ppm) to 352 –in other words, the increase has been of the order of 25 %. At the same time, the methane has also increased,

from 0.75 ppm to 1.5 –100 %. Furthermore, new greenhouse gases (halocarbons), which are alien to the composition of the air, have appeared in the atmosphere as a result of industrial processes. We therefore predict an intensification of the "greenhouse effect" and, as a result, a rise in the global temperature of the planet. In other words, we are faced with an artificially provoked change in the climate. Thanks to physico-mathematical models of the atmosphere and to the use of improved computers –extrapolation is not enough–, it has been possible to arrive at the following conclusion: if the proportion of greenhouse gases is doubled, the average global temperature would rise by between 2.5 and 5.2 °C. This rise, though, would depend on the latitude, as the temperature would rise as the latitude increased. All this would, in the end, lead to a redistribution of rainfall around the world, and a whole series of other effects would be noticeable over the first third of the new century.

We can test this result, since the rise in temperature has been measured, using the models mentioned above, from the beginning of the industrial era. The results obtained vary between 0.5 and 1.3 °C. The situation is a delicate one: the "signal" (or message that interests us –in this case, the variation in temperature) is of the same order as the "noise", or fluctuation imposed.

Regardless of whether or not there is a change in the climate, it would be wise to take certain positive measures: halt the present overproduction of energy, improve the use and distribution of water, repopulate forestland and continue research with atmospheric models.

Wouldn't it be sensible to initiate these actions immediately and forcefully, while there is still time? □