MANIPULATION OF THE ANTHROPOCENE THROUGH GEO-ENGINEERING

Civilization has affected the planet enough to initiate a new "geological" era, the Anthropocene. In it, human activity rivals nature in its impacts on global environment. Earth is not natural anymore, thanks to civilization, which is acting as a geological agent comparable to erosion or volcanic eruptions, and is already leaving a global stratigraphic imprint. It is clear that unless a global catastrophe, such as a large meteorite, occurs, mankind will remain as the greatest environmental force for millennia. Compared to the relatively stable environmental conditions of the Holocene, during which humans and society evolved, the Anthropocene would be a period of great instability.

The reality of the Anthropocene is being confirmed by the current global warming, produced by anthropic emissions of greenhouse gases. The alternatives to face the climate change are those of mitigation and adaptation. The first of them mainly consists in reducing and eventually eliminating greenhouse gas emissions, which would solve the essence of the problem. The second one involves defensive actions, such as building dams against the rise in the sea level. Unfortunately, the mitigations proposed within the framework of the Copenhagen Agreement are not sufficient and climatic models predict catastrophic increases in temperature during this century. This has given support to the strengthening of a third remediation option, based on geo-engineering, which consists in the "intentional alteration of the physical and biological systems on Earth to counter the global warming". The changes that characterize the Anthropocene were produced "involuntarily" and geo-engineering would give it an overdrive, with intentional actions to control the planet's climate. Clearly, the recognition of the Anthropocene implies that humans now share responsibilities with the forces of nature in protecting the planet.

The geo-engineering proposed solutions carry with them both uncertainties and severe risks of undesired consequences. large research efforts would be needed before proceeding with them, and to this end the Asilomar International Conference on Climatic Intervention Technologies was held on March 22-26, 2010. The basic objective was to develop guidelines for the geo-engineering research and tests, under the least dangerous and risky conditions possible. But, due to the private character (invitation of experts) of the Asilomar encounter, it has been criticized in an open letter signed by numerous environmental organizations and personalities. The fundamental criticism is that before proceeding to determine the basis of how to carry out research and tests, an agreement on the acceptability of geo-engineering as an option for climate control at the level of UN would be needed. But, how to know whether something is acceptable if research has not been carried out to determine its benefits and risks? Undoubtedly, the started polemic will continue. However, it is important to consider that the responses of the climatic system are not lineal and that abrupt changes can be triggered at any moment. It will be important to combat this eventuality with fast response options, widely investigated and tested if possible. The rapid response technology that has received the largest attention is that of increasing the Earth's albedo by means of injection into the stratosphere of sulfur compounds. In principle, this option has been "experimented" naturally during the large volcanic eruptions that produced substantial cooling a short time after their occurrence, which continued for several years. During those events other effects were produced on some ecosystems, which should be exhaustively evaluated.

Civilization generated the Anthropocene "involuntarily" and the impact of human activity on the planet becomes ever more notorious. Science and technology, through geo-engineering, could manipulate it intentionally to avoid extreme climate changes. The pertinent research activities ought to be supported and timely funded. As stated in Asilomar by Jane Long, Associate Director for energy and Environment at Lawrence Livermore National Laboratory, "searching for solutions is a moral imperative"

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