

# Human-Environmental Interactions: Earth and Environmental Sciences applied to the Anthropocene Epoch | PICO

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Although the term "Anthropocene" has still not been formalized as a new geologic epoch, scholars informally refer to this term to indicate a new geological system in which the intensity of human activity strongly impacted the Earth Systems balances. Throughout human civilization, people have established and developed communities and societies in locations that allowed them to take advantage of the resources and strategic locations afforded by the action of natural and geological processes. However, the lack of scientific knowledge during the urbanization and industrialization of our societies created negative effects on the whole environment where the processes that create the aforementioned benefits become hazards. Nonetheless, on the one hand, the exploitation of resources, the increase in emissions of greenhouse gases, and the introduction of pollutants in groundwaters and soil matrices (contamination by heavy metals, pesticides, hydrocarbons, microplastics, among many other substances), of both natural and anthropogenic origins, are leading environmental issues and hazards in which biodiversity, climate, and public health and safety are at stake. On the other hand, due to the acceleration of global population growth and urbanization, human settlements are expected to be increasingly exposed to natural hazards. Global climate changes, intensified natural hazards, and extreme events drive new challenges globally by affecting millions of people annually. Human-driven changes cannot be understood in terms of a simple cause-effect paradigm. They cause multiple effects that cascade through the Earth System in complex ways. These effects interact with local- and regional-scale changes in multidimensional patterns that are difficult to understand and even more difficult to predict. Earth System dynamics is characterized by critical thresholds and abrupt changes. Human activities could inadvertently trigger such changes with severe consequences for Earth's environment and inhabitants. Human activities have the potential to switch the Earth System to alternative modes of operation that may prove irreversible and less hospitable to humans and other life. The probability of a human-driven abrupt change in Earth's environment has yet to be quantified but is not negligible. Accordingly, this session welcomes contributions on Earth and Environmental Sciences, Geophysics, Geochemistry, Ecology, Geological Medicine, and Climatology applied to the Anthropocene Epoch.