

Humans have become a ‘planetary-scale force in a single lifetime’

The accelerated impacts of human activity on the Earth over the past 60 years have reached ‘planetary-scale’ proportions, in turn driving the earth into a new geological age, according to new research.



Credit: NASA

An international team of researchers found that of nine global-scale processes which underpin life on Earth, four have exceeded safe conditions, with two impacted so significantly as to pose serious risks to future human wellbeing.

‘Human activities could drive the Earth into a much less hospitable state – in this research we have more accurately assessed the risk of this happening,’ said lead researcher, Professor Will Steffen from The Australian National University (ANU) and the Stockholm Resilience Centre.

‘We are starting to destabilise our own planetary life support system.’

The first paper charts the ‘Great Acceleration’ in human activity since 1750 using a planetary dashboard of 24 global indicators. It is published in the journal *Anthropocene Review*.

‘We expected to see major changes since 1750, but what surprised us was the timing; dramatic increases have occurred since 1950,’ Professor Steffen said.

The research team compared 12 measures of human activity (such as economic growth, population, energy use) with 12 environmental factors, such as biodiversity, and the carbon and nitrogen cycles, and found they had all seen unprecedented growth in the latter half of the 20th Century.

For example, since 1950 urban population has increased seven-fold, primary energy use has quintupled and fertiliser use has increased eight-fold. In turn species are becoming extinct more than 100 times faster than the background rate,

and the amount of nitrogen entering the oceans has quadrupled.

‘We’ve now entered a new geological epoch, named the Anthropocene, in which the global economic system is the primary driver of change on Earth,’ Professor Steffen said.

‘We have become a planetary-scale force in a single lifetime.’

The second paper, published in *Science*, quantifies risks to nine global systems that regulate the stability of the Earth and provide ‘ecosystem services’ that societies depend upon, such as maintaining fresh water supplies, soil fertility and climatic stability.

The international team of 18 researchers say that four of the nine systems have already crossed planetary boundaries into risky territory.

The four are: climate change caused by carbon emissions; loss of biosphere integrity, resulting from high rates of species extinction; land system change; and altered biogeochemical cycles, with high levels of phosphorus and nitrogen flowing into the oceans following overuse of fertilisers.

The team found that climate change and loss of biosphere integrity are core planetary boundaries which, once crossed, risk shifting the Earth to a new state.

‘For climate change the risk to humans begins increasing as carbon dioxide rises above 350 parts per million (ppm). We’re now at nearly 400 ppm; we’re coping so far, but we’re seeing extreme weather events become worse, loss of polar ice and other worrying impacts,’ Professor Steffen said.

‘Our analysis shows that at 450 ppm the risks are very serious indeed.’

Professor Steffen says living within planetary boundaries will not necessarily compromise the prosperity and comfort of humans.

‘Experts from technology and engineering say we can prosper with nine billion people, and stay within the planetary boundaries,’ Professor Steffen said.

‘We have to be clever and we have to innovate, but they say we can do it.’

The team will present their findings in seven seminars at the World Economic Forum in Davos, which runs from 21 to 25 January.

Source: ANU

From ECOS online <http://www.ecosmagazine.com/?paper=EC14323>