Headline: Mayon, geoengineering and climate change

Byline: Laurence Delina

Published Date: 05:06 AM January 30, 2018

Section: opinion

Word Count: 4116

Content:

Mount Mayon's eruption is not only a geologic event; it also brings to fore the narrative of climate geoengineering, an option for mitigating climate change impacts. Geoengineering is a combined term for climate-altering technologies. Prominent among these technologies are those that promise to remove carbon dioxide from the atmosphere, and those that aim to place an atmospheric "protective cloud" through the intentional emission of sulphate aerosols, an approach known as solar radiation management (SRM).

SRM has gained prominence in the modeling community, and was even described as effective and affordable by the UK Royal Society in its 2009 report. The technology tries to replicate the artificial mechanism of temporary global cooling that occurs after volcanic eruptions. The 1991 eruption of Mount Pinatubo has served as a peg on which geoengineering proponents often hang this argument. Pinatubo's eruption blasted 20 million tons of sulphur dioxide into the stratosphere. As these particles reflected the sunlight back into space, global mean temperatures fell by half a degree Celsius.

Harvard University's David Keith is among the most vocal advocates of serious research into geoengineering, which he describes as "cheap and technically easy." Keith's proposal involves deploying a fleet of 20 Gulfstream G650 jets to inject tons of sulphuric acid vapor into the stratosphere in a growing volume year by year: 25,000 tons in Year 1, 50,000 in the next, 250,000 after a decade, then a million after a half-century. Keith estimates that this will cost less than $6 billion for a decade—an amount, according to his computation, less than the $300 billion spent per year on sustainable energy technologies.

Despite their potential for climate mitigation, geoengineering technologies are not yet widely demonstrated. One primary reason is the huge associated risks of interfering with the climate. Studies demonstrate that SRM, for instance, could reduce summer monsoon precipitation over China and India, and bring about drought in Asia and Africa, ozone depletion, and rapid warming. There are also such factors as human error, commercial control, and military use of technology. Keith himself acknowledges the potential repercussions of putting a million tons of sulphur into the stratosphere, which could result in thousands of air pollution deaths a year.

SRM could also result in system failure, ushering in abrupt climate change. When deliberately terminated, climate sinks and climate-carbon cycle feedbacks could be weakened. This could likely accelerate emissions leading to extremely high rates of temperature rise of up to plus 4 degrees Celsius per decade.

The risks are further increased with the conspicuous absence of adequate scientific backing and a governance framework for geoengineering technologies. Should these many negative consequences occur, causality and liability will be impossible to attribute, and can result in international conflicts and strains in international relations. As with nuclear waste, the technological shelf life of geoengineering technologies also far exceeds the intent of its contemporary engineers. This has long-term consequences about how it should and could be monitored, managed, and administered.

Given the high risks associated with geoengineering, decarbonizing energy systems—the principal contributors to human-induced climate change—through a rapid transition to a

100-percent-renewable-energy future, alongside changes in our consumption behaviors, remains our best shot for mitigating the impacts of climate change.

Dr. Laurence Delina (), of South Cotabato, is a sustainability scientist at Boston University where he leads a research project on the future of energy. His latest books are “Accelerating Sustainable Energy Transitions in Developing Countries” and “Strategies for Rapid Climate Mitigation: War Mobilisation as Model for Action?” (both from Routledge-Earthscan).