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Geoengineering Against Climate Change

Geoengineering is the future of the modern world as scientists work to reduce global warming and minimize its impact on the planet. There are several geoengineering technologies that have been developed in recent years that could help accomplish this ambitious goal. Some of these technologies are proving to be more promising than others as the state of North Carolina and others begin to explore the use and potential of these technologies. However, along with all this exciting new potential comes the possibility of unknown or negative impacts. Even though there is the possibility that this new technology could come with some challenges, there are also ways that one could address the challenges that come with these new technologies. Three geoengineering technologies that could be used to reduce global warming and minimize the impact of climate change are marine cloud brightening, enhanced photosynthesis, and cirrus cloud thinning.

Marine cloud brightening is a very promising geoengineering technology that scientists feel may be able to reduce global warming. Marine cloud brightening is a scientific idea that would require the brightening of marine clouds through the use of sea salt. The salt would theoretically make the clouds whiter allowing for less solar radiation. One major issue for this idea is how the salt gets into the clouds. One proposal for getting the salt into the clouds is, “The proposals suggest injecting salty aerosols into marine cloud layers by spraying seawater from vessels with nozzles able to turn saltwater into tiny particles” (“Marine Cloud Brightening or Cloud Reflectivity Enhancement”). The proposal suggests using some kind of vessel to spray seawater into the clouds while also turning it into a tiny particle, so that the salt would remain in

the cloud to brighten it. Several universities have tried this method with a ship-like vessel with nozzles attached at the top, and it seems to have proven to be successful. While this does seem like an idea with much promise, it still has one major drawback in that while it does reduce solar radiation it does not reduce the levels of carbon dioxide and other greenhouse gasses. This is an issue because it does not fix the problem of greenhouse gasses blocking the heat from escaping Earth's atmosphere. However, this issue can be resolved by using this technology along with a different geoengineering technology that could reduce greenhouse gas emissions. While marine cloud brightening is a remarkable geoengineering technology there are also other technologies that could be used in conjunction with marine cloud brightening to reduce global warming and its impacts.

One technology that could work alongside marine cloud brightening is an idea called enhanced photosynthesis. This idea calls for the capture and removal of carbon dioxide from the atmosphere and industrial fumes. The method for this removal is genetically engineering plants that would do an enhanced photosynthesis process such as making the process more efficient. While this seems like a fantastic plan as it would reduce the amount of carbon dioxide in the atmosphere there are some major drawbacks. One study when discussing this technology said, “There are serious concerns that accompany all genetic engineering of plant life, involving unexpected side effects, risks of contamination in natural systems, poorly-understood long-term impacts on humans and ecosystems, and corporate control” (“Enhanced Photosynthesis”). This comment points out that while in theory genetically engineering plants to perform a more efficient form of photosynthesis there is also a large risk that due to the genetic engineering of plants there could be unknown large and harmful effects on the environment. Not only could it have a negative effect on the environment it could lead to negative effects on humans that eat the

food that might have been contaminated by these genetically engineered plants. Even though this is a possible challenge of growing plants that perform enhanced photosynthesis, it could be addressed through careful monitoring of the effects of these enhanced plants on the environment along with containing these plants to a certain location. Enhanced photosynthesis has a great possibility of impacting climate change in a positive way if it is managed and monitored correctly.

Another possible geotechnology that could be used to reduce climate change is cirrus cloud thinning. This technology requires the use of some flying device, normally a drone to break up cirrus clouds as they tend to trap more heat and solar radiation instead of reflecting it back out into space. The drones would deposit dirt into the clouds which is a natural agent that allows fewer ice crystals to form which would thin out the clouds. Since drones and dirt are the only materials needed to thin cirrus clouds cirrus cloud thinning is a cost effective method for reducing global warming. Also thinning cirrus clouds could allow for a decrease in global warming, but it must be done carefully so that the clouds do not grow larger instead of thinning. An article when discussing this technology said, “Researchers admit that the injection of “too many” ice-nucleating particles into cirrus clouds may produce the opposite effect – more and thicker clouds may be produced, so that even more heat is trapped, which could lead to increased global warming” (“Cirrus Cloud Thinning”). This quotation points out how if cirrus cloud thinning is not done appropriately it could result in an increase in global warming instead of a reduction of global warming. However if the process is performed appropriately there are very few drawbacks to cirrus cloud thinning. Cirrus cloud thinning is a very promising technology that could help reduce global warming and its effects especially if used alongside other geoengineering technologies.

Marine cloud brightening, enhanced photosynthesis, and cirrus cloud thinning are three geotechnologies that could help reduce global warming and climate change. Marine cloud brightening uses clouds to help reduce solar radiation using ships with specialized equipment on them to brighten the clouds. Enhanced photosynthesis uses genetic engineering to modify plants to perform more efficient photosynthesis which would reduce the level of carbon dioxide in the atmosphere. Cirrus cloud thinning is the use of drones and dirt to thin cirrus clouds that gather heat instead of allowing the heat to move out of the atmosphere. There are many geoengineering technologies that could be used to reduce global warming and climate change if used properly with correct scientific monitoring.

Works Cited

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