

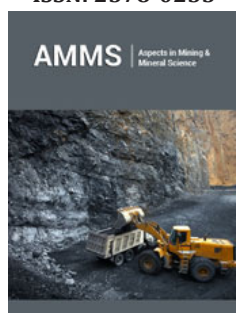
Mining and its Effects on Climate Change

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ISSN: 2578-0255



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Submission:  September 01, 2021

Published:  September 07, 2021

Volume 7 - Issue 3

How to cite this article: Mohammad Yusuf. Mining and its Effects on Climate Change. *Aspects Min Miner Sci.* 7(3). AMMS. 000662. 2021.
DOI: [10.31031/AMMS.2021.07.000662](https://doi.org/10.31031/AMMS.2021.07.000662)

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Opinion

The rising global temperature poses a great threat to the environment and ecosystems due to abrupt changes in the climate [1-3]. Several investigations suggest that the rising global population and the corresponding demand for natural resources are the main cause of global warming [4-6]. The increasing population is triggering a massive burden on natural resources like food, water, and energy [7,8]. Fossil fuels are still the largest source to meet the global energy demand contributing to about 85% of the world's energy generation [8,9]. The fossil fuels are formed in millions of years under the earth's crust, but due to high energy demands, they (oil, gas, and coal) are exploited and mined fast enough that they will exhaust in the next 6 decades [10]. Apart from creating energy scarcity, the extraction of fossil fuels (oil, gas, and coal) at such extreme rates creates the accumulation of carbon in the atmosphere. This results in the increased concentrations of Greenhouse Gases (GHG's) in the atmosphere [11,12]. The effects of greenhouse effects are visible on a large scale, causing havoc in the form of famines and flooding in various parts of the globe. The global temperature may rise by 2 °C if the total coal mining and consumption is stopped after 2017, as per the reports of IEA, indicating that the coal age must stop [13]. However, even after the Paris Agreement in 2015 was signed by 196 nations, the pledges made during the treaty seem unapproachable. The concentration of GHGs is rising continuously, and the rising trend can be clearly seen in Figure 1. The mining sector may significantly get affected due to the increasing warnings of climate change and governmental pressures [14]. The mining sector contributes to about 4-7% of GHGs emissions mainly due to the fugitive methane leakage from the formations and the corresponding power utilizations. Further, about 28% of total global GHG's emission is done via utilization of coal as fuel, which indirectly depends on coal mining. Furthermore, the enrichment of around 50% of ores (i.e., Cu, Au, Ag, and Fe) is done in areas where the water table already dropped to a considerable extent, and the intrusion of droughts may worsen the situation [15]. Furthermore, the environmental impacts of the mining sector are more studied compared to its effects on climate change. For instance, a recent case study has been conducted on the mining of Cu ore in Chile from 2001-2007. It has been reported that the fuel and electricity usage (per unit mass of mined Cu) has risen by 130% and 32%, respectively, mainly because of the deteriorating grade of Cu ore. Hence it is necessary to know the actual GHGs emissions to implement mitigation strategies [16].

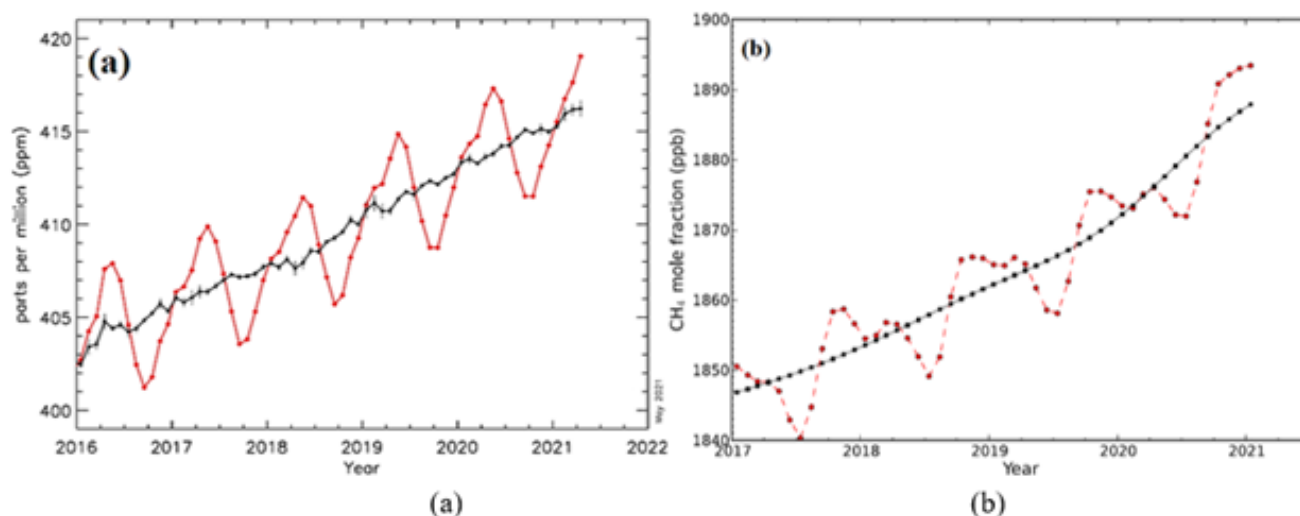


Figure 1: (a) Surface average atmospheric CO₂ concentration (ppm), (b) Globally averaged, monthly mean atmospheric CH₄ abundance [14].

Mining has been a fundamental aspect of human civilization as it endows the basic materials for industrial and technological enhancements. The vista of foreign policy argues on the gap of “Climate Change and Mining” by throwing light on various aspects of mining. The remarks made argue on various facades. Although the mining sector is significantly affecting the global GHGs concentrations, mining is a considerable contributor to several developing and emerging economies around the globe [17]. Despite the apparent agreement of the broad existing circulation models, several people still question the outcome of the models, commenting about their inadequate scientific evidence and analysis. However, besides these debates, there is a serious need to draw a conclusion from the rising GHGs concentration and the corresponding rise in global temperature. This scenario gradually but moving in the direction to strike hard to the mining sector [18]. Finally, it may be concluded that sustainable development is the only key to peaceful human survival. The balance between profit and environmental quality needs to be established via stringent government policies and enlightening the people. In addition, people need to be educated about public health and conflicts, which may occur due to the mass movement of people across borders due to the devastating effects of global warming.

Acknowledgement

The author would like to thank Universiti Teknologi PETRONAS, for providing the resources to carry out this research.

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