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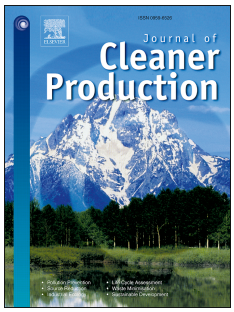

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Environmental impact and damage categories caused by air pollution emissions from mining and quarrying sectors of European countries

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Abstract

The aim of this article is to perform an environmental impact assessment of the air pollution emissions from the mining and quarrying sectors of European countries by applying the life cycle assessment technique. The mining and quarrying sectors of 12 European countries were assessed. The sectors include hard coal and lignite mining, crude petroleum and natural gas extraction, mining of metal ores, and other service activities in the mining sector. Environmental analyses consider particulate and gas emissions, including emissions of CO_2, CO, NO_x, SO_x, $PM_{2.5}$, PM_{10}, CH_4, NMVOCs and NH_3. Based on two life cycle impact assessment methods, ReCiPe and IPCC, the mining and quarrying sectors were assessed in the following impact and damage categories: greenhouse gases emission, terrestrial acidification, photochemical smog and particulate matter formation, damage to human health and ecosystem quality. The analyses were made with data for 2012. They showed that the highest particulate and gas emission occurs in Great Britain's mining and quarrying sector, and the lowest occurs in Bulgaria's. The environmental indices in all of the impact and damage categories in the mining and quarrying sectors were the highest in Great Britain, Poland, Norway and Germany. It was found that greenhouse gas emissions are quite different in this sector in each country for the time horizons of 20, 100 and 500 years, which is justified by the GWP factor for methane emission.

Keywords: mining and quarrying sector, air pollution emission, environmental impact and damage categories, Europe