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Isotopic Geochemistry in Forensic Investigation of Illegal Timber Extraction: A Case Study in Brazil

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The illicit extraction of timber presents a significant challenge in Brazil, given its detrimental impact on the environment and economy. To combat this crime, the application of isotopic geochemistry, specifically the strontium isotopic ratio as an indicator of geological signatures, has emerged as a powerful tool in forensic investigations. This study critically evaluates the effectiveness of using Sr isotopic ratio data, derived from bulk soils and timber samples collected at various sites in Brazil, to address illegal logging activities. Despite the challenges posed by the widespread nature of illegal logging, the compiled Sr isotopic ratios provide valuable insights into the potential application of this method for tracing and prosecuting perpetrators involved in the illegal timber trade. Additionally, this pilot study addresses important considerations regarding sampling techniques and data interpretation. While regional variations may exist, the limited sample sizes underscore the need for complementary methods to confidently attribute timber to specific source forests. In summary, this method proves most effective in providing evidence to refute presumed origins of illegally extracted timber, contributing to efforts to combat illegal logging activities in Brazil.