Mineralogical Characterization of Puerto Rico's Beach Sand and Its Relationship to Puerto Rico's Volcanic Origin

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Puerto Rico is the smallest island of the Mayor Antilles located in the Caribbean Sea. Puerto Rico and the Virgin Islands are part of a volcanic island platform (Morelock, 2001). The purpose of this investigation was to find magnetic minerals in Puerto Rico's beach sand and to identify volcanic minerals associated with the island's volcanic origin. As part of the process, granulometry was done, which is the measurement of grain sizes and magnetic mineral extraction with the use of a magnet. X-ray powder diffraction (XRD) was used for the identification of the magnetic minerals, this way it can identify volcanic minerals that could be evidence that Puerto Rico is a volcanic island. The research questions was: Can magnetic minerals be extracted from beach sand and then be identified as volcanic minerals, serving as evidence that Puerto Rico is a volcanic island? Magnetic extraction reflected the most magnetic minerals in the eastern region of the island. The XRD identified quartz, which is the main component of sand, various types of minerals plagioclase and orthoclase, which indicates that a large quantity of sand was formed by the weathering of igneous rocks. Magnetite was also identified; this magnetic mineral is a common iron oxide and generally forms in magma. The results obtained reflected that the hypothesis was supported. This investigation contributes to Puerto Rico's geology findings and supports the theory that Puerto Rico has always been a volcanic island. By practicing the same method on land sources other volcanic islands can be distinguished.