

Formation of massive iron deposits linked to explosive volcanic eruptions

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© 2018, The Author(s). The genetic link between magmas and ore deposit formation is well documented by studies of fossil hydrothermal systems associated with magmatic intrusions at depth. However, the role of explosive volcanic processes as active agents of mineralization remains unexplored owing to the fact that metals and volatiles are released into the atmosphere during the eruption of arc volcanoes. Here, we draw on observations of the uniquely preserved El Laco iron deposit in the Central Andes to shed new light on the metallogenic role of explosive volcanism that operates on a global scale. The massive magnetite (Fe_3O_4) ore bodies at El Laco have surface structures remarkably similar to basaltic lava flows, stimulating controversy about their origin. A long-standing debate has endured because all proposed models were constructed based exclusively on samples collected from surface outcrops representing the uppermost and most altered portion of the deposit. We overcome this samplin