

Session S4.3 Where history, archaeology, and geology intercept: multidisciplinary approaches to document the chronology, impacts, and legacy of volcanic events

A preliminary review and evaluation of historical unrest and eruptive activity at Misti volcano, Arequipa, Peru

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Since the Spanish arrived in Arequipa in the mid-16th century, 11 potential small-volume eruptions or periods of unrest are reported at Misti. Yet, documentation of these events is scant, often based upon secondary or tertiary sources, and has never been assessed using modern volcanological methods. As a result, Misti's historical record contains significant uncertainty and iterated errors. We assess these events with modern volcanological knowledge and when possible return to primary published and archival sources. Additionally, we scrutinized historical newspapers, photos, and contemporary travelers' accounts to better understand the volcano's activity since the early-19th century. Misti's earliest reported activity in 1542CE illustrates the problems associated with the volcano's historical record. The 1542CE event first appears in the literature in the late-19th century. Despite some uncertainty of its validity in these reports, it remains listed as a potential eruption. Numerous contemporaneous accounts document a major earthquake in Arequipa on 22 January 1582CE, causing major damage and widespread fear of an eruption. Upon investigation of the volcano, such fear was quickly dispelled. We suggest that Misti's 1542CE event did not occur, rather its origin is the fear induced by the 1582CE tectonic earthquake and an iterated typographic error in the date. Historical documents also sometimes record when Misti was explicitly not active, such as in a letter from a resident of Arequipa published in 1872CE. Events are also missing from Misti's reported history, such as a period of enhanced degassing in 1971CE that is recorded in newspaper articles and eye-witness accounts. In summary, we consider three of Misti's reported events to be false, four to be possible but unlikely, three are likely, and the 1985CE degassing crisis certainly occurred. We further uncovered preliminary evidence of up to four additional degassing crises at the volcano during the 19th and 20th centuries.