

EFFECTS OF Cu MINERALIZATION ON MAGNETIC PROPERTIES OF LA NEGRA FORMATION LAVA FLOWS (CHILEAN COASTAL CORDILLERA); IMPLICATIONS FOR AEROMAGNETIC EXPLORATION

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Paleomagnetic sampling at Cu (Fe) Michilla district (22°30'S, Chilean Coastal Cordillera) allow us to present a characterization of the magnetic properties of La Negra Formation lava flows (Jurassic island volcanic arc) with emphasis in the effects of hydrothermal process. Mining cores (400 samples, distributed in 5 cores) shows high magnetic susceptibility (K) of 0.02 to 0.05 (S.I. units) and natural magnetic remanence (NMR) of 0.1 to 0.4 A/m. These values are retained by lava flow magnetites, maghemites produced by oxidation of the former at low grade metamorphic conditions and magnetites cogenetic with py-cpy. At metric scale, lava flows replaced by hmt-cs-cv assemblage present K0.001. Demagnetization process demonstrate that hydrothermally affected lava flows, hydrothermal breccias and stocks have a reverse polarity and after correction by core dip, they intersect in a direction of 200°/35°. This result suggests that there are only one magnetization event that date one event of intrusion and mineralization, and there are a 20° clockwise rotation postdating this event. These results are confirmed by 9 drilled sites. La Negra volcanics at regional scale shows the same range of magnetic properties. This fact reflects the very local scale and selective way at which hydrothermal process act in manto-type deposits. Aeromagnetic surveys of intermediate to low resolution are useless in exploration of that kind of deposits, due to the lack of magnetic properties contrast at scales higher than ten of meters.