

## **HOW INCAS USED GEOLOGICAL FAULTS TO BUILD THEIR SETTLEMENTS**

**MENEGAT, Rualdo,**

Departamento de Paleontologia e Estratigrafia, Universidade Federal do Rio Grande do Sul, Av. Bento Gonçalves, 9500 - Prédio 43127 - Sala 109, PO Box 15065, Porto Alegre, 91501-970, Brazil

This communication studies the relations between Andean geo-landscape and Inca cities by showing how the town of Machu Picchu, located at Urubamba-Vilcanota valley, has been built. Through techniques of geolandscape archaeology, structural geology and geomorphology, the matrix of the site was established in terms of a very dense geological faults and fractures web. Eight orders of network scales of lineaments and faults have been analyzed, from both satellite images and field data. Both mountains' and rock blocks' geomorphology appear driven by the erosion of mutual intersection of three main faults directions – 020°, 055°, and 330° – and two secondary directions: N-S and E-W. The mutual interference between these faults networks led to typical both fractal geometry of the rock blocks and structural drainage pattern. We show that the Inca developers intentionally chose cross-tectonic faults to build their cities. Indeed, in Machu Picchu, the rocks were so fragmented that it was possible to build cities in high topographic levels, strategically safe against both geological hazards and inhospitable Andean conditions. In addition, the main sectors, buildings, and stairs were built following the three said fault directions. According to this analysis, the Machu Picchu city plan clearly shows the empirical fault and fracture map which underlies its construction.

Session No. 148

T126. Geoarchaeological Insights into Paleoenvironmental Reconstruction and Cultural Dynamics  
*Monday, 23 September 2019: 1:30 PM-5:30 PM*

*Room 125AB, North Building (Phoenix Convention Center)*

Geological Society of America *Abstracts with Programs*. Vol. 51, No. 5  
doi: 10.1130/abs/2019AM-330598

© Copyright 2019 The Geological Society of America (GSA), all rights reserved. Permission is hereby granted to the author(s) of this abstract to reproduce and distribute it freely, for noncommercial purposes. Permission is hereby granted to any individual scientist to download a single copy of this electronic file and reproduce up to 20 paper copies for noncommercial purposes advancing science and education, including classroom use, providing all reproductions include the complete content shown here, including the author information. All other forms of reproduction and/or transmittal are prohibited without written permission from GSA Copyright