氏名（Name）：　Vitor Ribeiro de Sá

所属（Affiliation）：　Kyoto University

講演題目（Title）：Combination of unsupervised learning algorithm and geostatistical methods to delimitate the stockwork in a vein-type gold deposits

講演要旨（Abstract）

Epithermal vein-type deposits are main sources of Au and Ag over the world, accurate 3D modeling of vein structure and extraction of rich zones are uppermost important to resource exploration and reserve assessment. However, spatial modeling of vein structure and rich zones poses a nuisance and time costly obstacle due to heterogeneity of geologic structure and the scarcity of available data mostly obtained by drilling. For this problem, we aim to develop an efficient and reliable workflow not to only clarify spatial distribution of Au-rich veins in detail but also shed light on the mechanisms of transport and deposit of ore fluids by selecting an Au-Ag low-sulfidation epithermal deposit in the Philippine archipelago. This archipelago is known to host manifold world-class epithermal Au-Ag deposits, which can be typified by veins, stockworks and disseminations. These features can either occur together or as single entities with relatively large tonnages and low Au + Ag grades, or small tonnages and high Au + Ag grades. In the selected deposit, the mineralization was hosted in open veins and breccias that are vertically continued. To attain our purpose, this study integrates whole-rock geochemical data obtained by fire assay and atomic absorption spectrometry as well as lithological information through visual core descriptions and X-ray diffraction with hierarchical clustering analysis (HCA) and conditional geostatistical methods: turning bands simulation (TBSIM) and truncated-gaussian simulation (TGSIM). TBSIM is applied to simulate the Au grade distributions and interpret the generation process of mineralization. By the ore fluid properties, Au and Ag occurrences are correlated with linear correlation coefficient ≈ 0.69 and causal in this vein-type deposit and therefore, HCA is employed to classify similar grades into clusters and the cluster distribution is simulated by TGSIM. As the result, hydrothermally mineralized and altered zones with rich Au are specified in detail. This spatial model can be linked efficiently with field works to identify ore-rich zones caused by rock fracturing and ascent of hydrothermal fluids.