Geochemistry and metallogenesis of fluid in Liuju sandstone-bound copper deposit, Dayao, Yunnan, China

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11 typical samples are purple or bleached sandstone and ores, from K_2ml_1 (main orebody hosting bed), K_2ml_2, K_2md and K_1p in Liuju Sandstone-bound Copper Deposit, Dayao, Yunnan, China. Quartz and minor calcite were used for making fluid inclusion tests.

The original inclusions mainly are in vapor-liquid phase. Their generation period features are apparent. The original and secondary inclusions in bleached sandstone respectively represent main metallization stage (forming stratiform chalcocite orebody) and reforming stage. The ones in quartz veins respectively represent minor metallization stage (forming veiny chalcopyrite orebody) and later reforming stage. The ore-forming fluid could be two medium-low salinity fluid of organic material-bearing, medium-temperature to medium-low- temperature, reducing fluid and a little organic material-bearing, oxidizing fluid. 70% uniform temperature numbers of fluid inclusions assemble between 200°C and 100°C. The fluid belongs to NaCl-H_2O system, in which, beside agglutinates, the salinity is less than 12%. The component test results of the original quartz inclusions by La-ICP-MS show the fluid in main metallization stage is of H_2O-SO_2-CO_2-CH_4 (C_3H_8-C_2H_6) - HSO_4^- - HCO_3^- type, and the fluid in secondary metallization stage is of H_2O-SO_2-CO_2-N_2-CO-CH_4- HSO_4^- type.

Research results indicate the fluid metallogenesis mode may be described as: the forming and reforming movements of the Daxueshan Anticline provided power and energy (heat energy) for metallization, which drove deep-seated organic matter-bearing and reducing fluid to go up and cycle, with superficial oxidizing infiltrating fluid, to extract ore-forming material from the source beds. Because of the physical-chemical conditions changing in the high permeability and porosity of sandstone beds at the gently inclined wing of the Anticline, oxidation-reduction reactions occurred in the fluids which led to form the deposit.

Robust aerosol indirect effects inferred from remotely-sensed cloud properties acquired during VOCALS

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One wealth of the VOCALS field experiment in the southeast Pacific stratocumulus region is a unique dataset on cloud properties acquired through a suite of airborne remote sensors. This includes a lidar, a cloud radar and a radiometer providing cloud liquid water paths. All are valuable individually, but in combination form a powerful suite capable of extending aircraft assessments of aerosol-cloud-precipitation impacts beyond what can be done with in-situ measurements. The cloud liquid water path dataset also allows for the statistically-robust examination of thin clouds, which cloud radars and satellites have difficulty characterizing. For this presentation the new cloud liquid water path dataset is described, compared to adiabatically-derived values, and aerosol indirect effects — co-variations with cloud liquid water path, precipitation, and cloud albedos — are assessed. In keeping with the theme session, comparisons to similarly-derived satellite properties will be made to opine on satellite assessments but done on larger spatial scales.