Two types of gold mineralization from one ore district: Constraints on the genetic model of Yangshan gold deposit in western Qinling, China

J.L. LIANG[1]*AND W.D. SUN[2]

[1]Department of Geochemistry, Chengdu Univ. of Technology, No. 1, Roa. 3 of Eastern Erxianqiao, Chenghua District, Chengdu 610059, China
(*correspondence: richardljl04@yahoo.com.cn)
[2]Guangzhou Institute of Geochemistry, the Chinese Academy of Sciences, 511 St. Kehua, Wushan, Tianhe District, Guangzhou 510640, China

Yangshan gold deposit, located in western Qinling orogenic belt, was classified by most previous researchers as Carlin-type mineralization, similar to those in Nevada [1, 2]. The host rocks are middle Devonian greenschist facies siliciclastic metasediments intercalated with carbonate. The distributions of orebodies are strictly controlled by a nearly west-east-striking fault system, Anchanghe Fault. Fine-grained (10s to 100s μm in size) arsenian pyrites and arsenopyrites are the major Au carriers, visible gold was not identified under scan electronic microscope.

Here we report coarse grained pyrite-bearing quartz ore veins through the tunnel of PD051 in Anba district, one of the major district in Yangshan. Significant amount of CO_2-rich fluid inclusions were found in quartz vein. Microthermometric analyses showed that the total homogenization temperature ranges from 221 °C to 310 °C, the salinity from 2.0 to 7.2 wt.% NaCl equivalent.

The new observations suggest that Yangshan gold deposit is actually an orogenic gold deposit in deep segments, and displayed as Carlin-type mineralization in shallow parts. This supports that those Carlin-type gold deposits in western Qinling displayed the chariceteristics both epizonal orogenic and Carlin-type deposits [3].

[1] Mao *et al*. (2002) *Mineralium Deposita* **37**, 352–377.
[2] Hu *et al*. (2002) *Mineralium Deposita* **37**, 378–392.
[3] Cline *et al*. (2005) *Economic Geoogy* 100th Anniversary Volume 451–484.

Waves, channels, and diffusive porous flow: Geochemical implications for melt migration in an upwelling heterogeneous mantle

Y. LIANG[1] AND A. SCHIEMENZ[2]

[1]Department of Geological Sciences, Brown University, Providence, RI 02912, USA (yan_liang@brown.edu)
[2]Department of Earth and Environmental Sciences, Munich University, Theresienstr. 41, 80333 Munich, Germany

The style and mode of melt migration in the mantle are important to the interpretation of basalts erupted on the surface. Both grain-scale porous flow and channelized melt migration have been proposed to explain various geochemical observations of basalts. To better understand the mechanisms and consequences of melt migration in a heterogeneous mantle, we have undertaken a high-order numerical study of reactive dissolution in an upwelling mantle column where solubility of orthopyroxene increases upwards. Our setup is similar to that described in [1], except we use a larger domain size and longer simulation time. We show that strong nonlinear interactions among compaction, dissolution, and upwelling give rise to porosity waves and high-porosity melt channels, which may play an important role for melt migration in the upper part of the mantle directly beneath mid-ocean ridges. These compaction-dissolution waves have well organized but time-dependent structures in the lower part of the simulation domain. High-porosity melt channels nucleate along nodal lines of the porosity waves, growing downwards. The upper part of the melt channel is pyroxene-free dunite, whereas the lower part is harzburgite.

Transient melt flow in the wave regime results in significant lateral mixing and chromatographic fractionation of elements of different incompatibility during melt migration in the mantle even when mantle source compositions are independent of time. In one simulation with time-independent sources, we observe strong time-dependent variations in isotopic ratios in melts both within and at top of the domain: Fields of isotopically labelled melts are quickly distorted by differential flows upon entering the column from below, resulting in expansion, contraction, stretching, folding, and mixing in the mid to upper part of the column. Caution therefore must be exercised when inferring the geometry and spatial distribution of mantle heterogeneity based on spatial and temporal variations in isotopic ratios recorded in basalts.

[1] Liang *et al*. (2010) *GRL* **37**, L15306, doi, 10.1029/2010GL044162.