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Quartz and fluid inclusions from porphyry deposits: were hydrosilicate liquids involved?

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Orthomagmatic theories rightly assume that many types of economic mineralization relate to magmas and magma-derived fluids. Liquid/fluid immiscibility at the brink of magma solidification is undoubtedly a starting point of mineralizing processes. But the composition of immiscible phases, their evolution at cooling, and when and how these phases deposit economic metals and silica, remain unsubstantiated. Saline aqueous fluid inclusions are *a priori* considered to show properties of metal-transporting hydrothermal solutions, but amounts of magmatic H_2O and rates of the fluid flow, required for silica and metal transport into and within ore-forming systems, as well as ultimate fate of chlorides, remain geologically unreasonable. In view of such controversy, we raise questions about origin of quartz in mineralized porphyries and associated fluid inclusions and ore minerals. We studied shapes and textures (by optical, cathodoluminescence-CL and backscattered electron-BSE microscopy) of quartz grains ('eyes'), and distribution and composition of quartz-hosted fluid inclusions in unaltered porphyritic rocks from major deposits (Batu Hijao, Indonesia; Climax, USA; Panguna, PNG; Antapaccay, Peru; Rio Blanco, Chile). The shapes and textures of quartz grains are inconsistent with their origin as phenocrysts. We envisage in-situ segregation of residual hydrosilicate liquids (e.g. silica-gel) into blebs and globules during magma cooling and crystallization. The solidification of globules was associated with developing coeval banding and conchoidal fractures. They perhaps remained in a plastic state even at low temperatures, when healing of fractures and trapping of chloride- and metal-rich substance, residual after coagulation of the silica-gel, as fluid inclusions occurred. As such the fluid inclusions in quartz 'eyes' are secondary in

origin, and bear no information on the parental media.