Is there a link between IOCG and Manto-type deposits in the Andes of northern Chile?

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Several authors [e.g. 1,2] have proposed that the Andean iron oxide Cu (-Au) systems that occur along the Coastal Cordillera of northern Chile, are high temperature analogous to Fe-poor stratabound Cu (-Ag) deposits, also known as Chilean manto-type deposits. Both deposit types are hosted in Lower Cretaceous volcanic and volcano sedimentary rocks and are characterized by relatively moderate temperature sodic (-calcic) and potassic alteration with mineralization occurring in mantos, veins and/or breccias. Compilation of published fluid inclusion and sulfur isotope data show higher salinities for IOCGs (~30-50 wt.% NaCl) than for Manto-type deposits (<30 wt.%NaCl), whereas sulfide sulfur isotopes show a wider range for mantos (-12 - +28‰) than for IOCGs (-7 to +11‰).

The Casualidad prospect (300 Mt 0.5.-0.6%Cu) is a recently discovered deposit located in the Sierra Overa district, in which Manto-type, iron-oxide apatite, hematite-rich IOCG, and porphyry Cu-Au deposits of Cretaceous age are also present. Casualidad shows characteristics intermediate between both IOCG and manto extremes with copper mineralization (chalcopyrite and bornite) having mostly a stratigraphic control. Bornite mineralization is poor in gold, but has a high Ag content. Preliminary fluid inclusion data on quartz show salinity values and homogenization temperatures similar to those described for manto deposits. The geologic characteristics of the Casualidad deposit appear consistent with the idea of a genetic link between manto and some IOCG deposits in the northern Andes, in which the former deposits are located in a distal position whereas IOCG formed on a more proximal position from coeval batholiths.

[1] Haynes (2000) in Porter (ed.) v.1 p. 71-90 [2] Maksaev & Zentilli (2002) in Porter (ed.) v. 2 p. 185-205