“Gold in Turkey — A missing link in Tethyan metallogeny”
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In his discussion of Yigit (2006), Kuscu comments mainly on the petrology of the magmatic rocks in Turkey, with some lesser emphasis on porphyry, IOCG and skarn deposits. Although Kuscu does not present much supplementary data to improve understanding of the gold metallogeny of Turkey, I accept the comments in a constructive spirit and welcome this opportunity to reply. First of all, the original manuscript of Yigit (2006) was written in 2003 and submitted for publication in early 2004. Therefore, many of the references cited in the discussion postdate the original paper. Furthermore, many of the references cited are abstracts, symposia paper, proceedings, short papers and even websites; these unfortunately rarely contain sufficient hard data to support the ideas presented. Most of the conclusions in these papers are drawn from published literature on the subject, rather than prospect- or regional-scale original studies with hard original data. Kuscu also mentions unpublished Turkish Geological Survey (MTA) reports. Most, if not all, of these reports on gold deposits are classified and therefore are not publicly accessible as claimed.

Kuscu highlights the debatable and complicated nature of the Tethyan evolution of Turkey. However, Yigit (2006) does not make any attempt to solve this contentious issue, since the purpose of the paper was rather to present current understanding of gold metallogeny of Turkey in the Tethyan realm. Kuscu states that there is no “missing link in Tethyan metallogeny”. While studies have been carried out on Turkish ore deposits, there is no previous definitive reference combining gold deposit distribution with the location of metallogenic belts in Turkey. Even though Kuscu talks about published articles since the late 1980s on the subject, he fails to cite any publications dated before 1998.

Yigit (2006) presented a generalized view of the tectonic and magmatic settings within Turkey. Both of these topics are contentious, with much debate about the composition, age and plate tectonic setting of magmatic rocks. Since most of the petrological studies are based on a few geochemical data without radiometric age control and regional correlations, it is not possible to make detailed country-wide correlations. Thus, there is no consensus. Gold metallogeny of Turkey with implications for mineral exploration needs a map showing distribution of these magmatic rocks based on detailed petrology and tectonic setting. Local petrological and geochemical studies with limited regional correlations have little value to evaluate gold potential of the whole country. This is especially true in mineral exploration which works on models driven by descriptive data. Speculation without any concrete data can be easily made, but will not find any orebodies.

Kuscu restates facts given by Yigit (2006) concerning porphyry gold deposits and their relationships to alkaline magmatism. Kuscu appears to have overlooked the comments on Kisladag; he should reread the paper carefully paying special attention to the host rocks in Kisladag and the reason for its comparison to the shoshonite-hosted Skouries gold deposit in Greece.
Furthermore, on the classification of porphyry deposits, Kuscu should realize that there is no available map of any scale showing types of granites in Turkey and their geochemistry, making it difficult to evaluate the gold potential of porphyry intrusives. Kuscu’s description of the border folds region adds little to the understanding to the gold metallogeny of the area.

Kuscu’s lack of careful reading of the paper is in evidence in his misquote of the land area of Upper Cretaceous subaerial to submarine volcanic rocks as 2% instead of 20%. As in other parts of the discussion, he reiterates the speculative nature of the origin and geochemistry of the volcanic rocks of Turkey with new evidence that was published while Yigit (2006) was still in the publication process.

Kuscu’s study of skarns (i.e., Kuscu et al., 2002) contains no hard data on gold geochemistry to make any implication to the gold potential of the skarn deposits in Turkey. Ideas are drawn from the literature without testing the gold potential of studied skarn zones. The study by Kuscu in the 100th anniversary volume of Economic Geology about the skarn deposits of Turkey (in fact merely an appendix to Meinert et al., 2005), was published well after the online publication of Yigit (2006). In any case, the database presented in the publication contains no single grade data for gold.

Kuscu is urged to examine the papers on the IOCG systems and their wide spectrum of deposit styles. Yigit (2006) talks about end-members of the IOCG systems and their exploration potential in Turkey and makes some suggestions for further studies. There is a potential for these types of systems in the Divriği Fe district of Turkey, and this potential remains to be fully tested. It appears that Kuscu has studied at least one gold prospect in Turkey, namely Bakirtepe. However, he did not examine the rocks in the prospect carefully, because he states that there are no intrusive rocks in the Bakirtepe area. The present author has personally sampled an exposed, altered and mineralized porphyry intrusive on the top of Bakirtepe gold mineralization (Yigit, unpublished data).

Since most of the arguments made by Kuscu are of little relevance, or have no direct implication to the gold metallogeny of Turkey, the present author would like to use this opportunity to update the database and to extend some of the ideas on the gold metallogeny of Turkey. Since the first draft of Yigit (2006), the GIS database for gold deposits and prospects has continued to increase and has now reached a total of 235 entries, compared to 194 in the published paper. Recent positive changes in the mining law in 2004 took effect and have facilitated exploration and mining activities by foreign exploration companies in Turkey. Combined with the current buoyant gold prices, this has allowed newcomers to enter the market. As of February 2006, Turkey has gold endowment, including reserves and resources, of ca. 35.5 M oz Au (1105 t) in 60 deposits. At present, 25 of these contain more than 0.2 M oz Au and the other 35 contain a total of 1.2 M oz (38 t) Au resources. Although there is a ca. 21% increase in the number of deposits and prospects, and a ca. 13% increase in total gold endowment over data given in Yigit (2006), ratios of the genetic types of gold deposits and prospects have not changed much, epithermal deposits account for 44% of the gold deposits and prospects in the database with 15% VMS, 11% porphyry, 11% orogenic gold, and 19% others.

As suggested by Yigit (2006), exploration for gold in Turkey has been focused on porphyry and epithermal gold deposits, with some lesser emphasis on VMS deposits and other types. One of the significant new discoveries, by Eldorado Gold, is the AS prospect, to the east of Kisladag in the Anatolides porphyry belt. The AS prospect is another porphyry Au–Cu system in this belt with RC drill cutting up to 115 m of 0.80 g/t Au and 0.82% Cu (Eldorado Gold News Release, 20.09.2005; http://www.eldoradogold.com/s/News.asp). Furthermore, feasibility studies in the Agi Dagi and Kirazli high-sulfidation epithermal gold systems on the Biga Peninsula continue to expand the gold resources, reaching 1.26 M oz Au and 5.12 M oz Ag and 0.8 M oz Au and 5.55 M oz Ag, respectively (Fronteer Development Group News Release, 26.01.2006; http://www.fronteergroup.com/s/Home.asp).

Yigit (2006) presents sufficient gold deposits and prospects with relevant geological and geochemical data to allow prediction of gold deposit trends including gold deposit types and their geographic positions. This can be correlated with the European portion of the Tethyan Eurasian Metallogenic Belt and provides an extremely useful tool for mineral exploration. The aim of the paper by Yigit (2006) was to fill the gap (the missing link) in Tethyan metallogeny and form a framework for future work that may help the economic geologist in academia as well as the decision makers in exploration companies.

References

