



To the  
Akademia AGH University of Science and Technology  
AGH Earth and Environmental Sciences  
Discipline Council  
Al. A. Mickiewicza 30, 30-059 Kraków  
Poland

Ihre Zeichen

Ihr Schreiben vom

Unsere Zeichen Bo/Pet

Datum

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### **Review of the PhD-Thesis by Mr. Aung Myo Thu,**

entitled “Geology and Genesis of the NEW Yin-Kwinthoneze gold district, Central Myanmar: Insights from mineralogical, fluid inclusions and (S, C, O, H, Pb) isotopes”

The PhD-Thesis submitted by Mr. Aung Myo Thu is a voluminous and very comprehensive metallogenetic study, which I have read very carefully, in detail and – I must say – with great pleasure. The length of the thesis stems from the scientifically holistic coverage of an entire mineral (gold) district, which is an approach that is not often seen today. The holistic approach by the candidate covers a good range of scientific measures, some of which would have almost merited a PhD-Thesis of their own. The thesis is well-structured, clearly organised, and formally correct in that it contains all necessary information and chapters, including a comprehensive reference list. The thesis is written in good English and there are only minor language errors that should be corrected prior to publication in international journals.

The Abstract is comprehensive and very informative, although the absolute formation ages of the ore deposits would have been a nice inclusion, however, this is a really minor aspect in an otherwise excellent text.

The larger metallogenetic subject of the thesis is the (possible) distinction of the classification of gold deposits into so-called “Orogenic Gold Deposits” (OGD) and “Intrusion-Related Gold Deposits” (IRGD). It is important to point out that the candidate has carried out this attempt extremely well. However, the present author of this review is slightly sceptical if such a distinction is possible, given the strong overlap of many criteria between the two and the international scientific debate of the two terms.

The chapter Introduction is very informative, well-illustrated, supported with the relevant citations, and gives a first comparative table of the OGD and IRGD. The introductory chapter states also very clearly the aims of the thesis, which is applaudable. The overview of the regional, stratigraphic, and metallogenetic setting is very extensive, which reflects the complex geology of the district and its surroundings. The tectonic and temporal setting are also described in detail. That the specific ore district of this study is not clearly mentioned and shown in this chapter and geological/metallogenetic maps is a bit difficult for the reader to follow. The district-scale geological descriptions and the tectonic setting are extremely detailed and extensive.

The lithotypes are well-described in field descriptions, hand specimen and sections. Subchapter 3.4 gives very good descriptions of the gold deposits and is well-illustrated. It is also a strong point of the thesis, that each chapter on descriptions and the results of analyses ends with a discussion of the results.

The geochemical topics of whole-rock geochemistry, including the study of the REE-patterns, is comprehensive and good. Some of the many analytical tables could be moved to an appendix for future publication. It is surprising and not really comprehensible that the paragenetic table precedes the actual descriptions. Figure 5.1 is also one of the many repetitions. The microscopic descriptions are very detailed and excellent and the paragenetic tables are excellent and instructive.

Chapter 6 with mineral and geochemical investigations on the ore mineral geochemistry include element maps and micro-analyses and is very good. Again, several of the tables could be moved to an appendix, this would make the thesis more readable. Figure 6.22 shows correlation diagrams that are very instructive and 6.52 on the gold fineness is a very useful tool. The application of the chlorite geothermometry is also very helpful and good. The summary of chapter 6 is impressive and has a lot of academic “punch”.

Chapter 7 on fluid inclusions and isotope geochemistry are of scientifically high level and have been applied very methodically, again tables could be moved to an appendix. The discussion of results show very well, that the candidate has done his study very well, but that the – earlier mentioned – distinction of OGD and IRGD might be a bit far-fetched; by the scientific proponents of each model, which is not a weak point of the candidate. Figure 7.11 shows a very good attempt by the candidate to incorporate all diverging results into one interpretation, which he does admirably well. The candidate presents a very strong and convincing case on page 261 for a predominantly magmatic fluid source for the mineralisation.

Chapter 8 presents a very comprehensive and excellent synthesis of his results. The regional geological framework is well-described. The candidate gives also a very systematic synthesis and summary of all scientific methods applied. His conclusion and discussion of an attribution of his gold district to one of the two gold deposit types (OGD vs. IRGD) are well-argued. While there is a small tendency from his results towards IRGD, the decision is not too striking, which is not a criticism of the candidate’s case but a general scepticism of the possibility of such a subdivision as proposed by members of the scientific community. It is rather an excellent depiction of the potentially still “immature” and possibly forced classification.

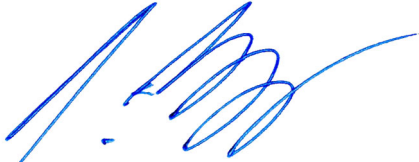
The thesis finishes with exploration recommendations, which is applaudable and shows that this thesis – besides all its cutting-edge scientific methods – is also a well-grounded study for the support of the gold exploration and mining industry of the region and is thus highly applicable for practical purposes.

The recommendations made in this review are all for possible subsequent publications of parts of this PhD-Thesis in international peer-review journals. As an academic PhD-Thesis, I recommend that the thesis should be accepted as is. The repetition of some figures and pictures, in fact, makes it easy to attribute scientific results to the previously described rocks or sections. It will simply be not advisable for peer review journals.

I have not found any signs for irregularities and can confirm that the thesis provides an original solution to the scientific challenge given to the candidate. The thesis demonstrates also conclusively that the candidate has the theoretical and methodological knowledge in his applied disciplines and has shown that the work was carried out independently, besides the assistance mentions in the thesis.

The thesis submitted for evaluation by Mr. Aung Myo Thu fulfils all the requirements for a doctoral thesis in accordance with the Act on Academic Degrees and Titles and I recommend to AGH UST Krakow to continue the doctoral procedure in Mr. Mr. Aung Myo Thu's dissertation process.

Sincerely yours,



Prof. Dr. Gregor Borg  
Petrology and Economic Geology