

Historical Romanian meteorites: emendations of official catalogue records

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Abstract. With its more than 50,000 valid official and provisory meteorite entries, the online catalogue of The Meteoritical Society, *i.e.*, the Meteoritical Bulletin Database (MBDB) represents the most authorized and primary source of information in the field. Unfortunately, this official reference contains some erroneous geographical information in the case of five historical Romanian meteorites. For Zsadany, the current country information is “Hungary, Bekes county” instead of Romania, Timiş County. For Mezö-Madaras and Tauti, the county affiliations “Harghita” and respectively “Cluj” have to be corrected into Mureş and Arad, respectively. Geographical coordinates for Kakowa and Ohaba require minor corrections, only.

The source of these errors resides in changes of names and administrative affiliations of the localities of the fall/find, while the formal nomenclature protocol requires the meteorite name in the original description to be preserved. The example of the historical Romanian meteorites illustrates the challenges that a researcher unfamiliar with a region faces when locating old specimens, in general. This requires knowledge of regional history and geography, and sometimes access to the original references - usually not written in English, or having a somehow limited circulation. Additionally, in the last two decades several new publications provided more detailed classification information on Sopot, Ohaba, Tauti and Mocs meteorites. Sopot was classified as H5, with shock stage S3. The studied Ohaba and Tauti samples also attested S3 shock stages. Variable shock stages (S3-5) were identified in Mocs samples, the most well-known Romanian meteorite. This new information should be added to the corresponding MBDB entries.

Keywords: meteorites, Romania, Meteoritical Bulletin Database (MBDB)

1. INTRODUCTION: WHY UPDATES ARE NEEDED

Among the ten¹ approved meteorites from present-day Romania (Fig. 1), five fell in the 19th century (in brackets, year of fall/find): Mezö-Madaras (1852), Ohaba (1857), Kakowa (1858), Zsadany (1875), and Mocs (1882). Additionally, there were two falls: Sopot (1927) and Tauti (1937), and two finds: Tuzla (1920) and Gresia (1990)² that were both registered in the 20th century. For the time being, there has been one fall in the 21st century: Pleşcoi (2008). Among these, only Tauti and Pleşcoi meteorites were described and published in the Meteoritical Bulletin (MetBull), the authorized and primary source of information for new meteorites. Nevertheless, all the Romanian historical meteorites are included in international databases such the Catalogue of Meteorites of the Natural History Museum (NHM) (published by Graham et al., 1985; revised and updated by Grady,



Fig. 1. Map of Romania with the location of the ten approved meteorites: full circle – falls; x – finds. Location information format: “official meteorite name” / “corresponding present-day official name of the locality of fall/find”.

¹currently, a search in the online Meteoritical Bulletin Database (<http://www.lpi.usra.edu/meteor/metbull.php>) retrieves only nine official meteorites from Romania, Zsadany being not included (see discussion in this paper)

²new entry in the online Meteoritical Bulletin Database only in 2013

2000³; or the online catalogue⁴), and the official Meteoritical Bulletin Database (MBDB)⁵. The latter is published online by The Meteoritical Society, the only scientific forum that through its Committee on Meteorite Nomenclature (NomCom) approves new meteorites, based on a formal application procedure. Following this procedure, Gresia, which is the newest Romanian meteorite was recently submitted⁶, approved and consequently published in the MBDB.

According to the formal rules, a meteorite preserves the name of the locality where it fell or was found, even if the locality itself changes its official name with time. In the case of historical meteorites, this situation may result in subsequent misunderstandings. This is also the case with the Mezö-Madaras, Zsadany, and Tauti meteorites, for which the main sources contain incorrect location information. This means that the county, district or even the country, and thereof the geographical coordinates are incorrect. For two other Romanian meteorites, *i.e.*, Ohaba and Kakowa, the geographical information requires just minor corrections. Another important update concerns the basic compositional information of some meteorites. During the last two decades, research teams have re-investigated several of the meteorites with respect to their petrology and geochemistry (*e.g.*, Miura et al., 1995; Iancu et al., 1997; 2004; 2006; Iancu and Iancu, 2000; Iancu, 2002; 2004; Ionescu et al., 2009). However, there is little impact on the wider international scientific community because many results were published in Romanian journals, only. Also, these details were not included in the MBDB catalogue, yet. Therefore, we include this classification information in our present review.

Below, we present emended geographical and classification information for eight of the ten officially approved Romanian meteorites listed in chronological order. The data that differ from or complete those in the MBDB are marked in bold. The geographical coordinates are drawn from Google Maps⁷ and represent the correct(ed) localities. The correspondence between the former *vs.* the present-day official locality names is according to Szabó and Szabó (2003). The first bibliographical reference is given after each meteorite name. We conclude this list with a justification for the proposed emendations supported by selected references.

2. RESULTS: SUMMARY OF EMENDED INFORMATION

Mezö-Madaras⁸ (Knöpfler, 1852)

Official locality name: Mădăraş

Corrected administrative affiliation: **Mureş** County, Romania

Corrected coordinates: **46° 36'N / 24° 26'E**

Ohaba (Hörnes, 1858)

Official locality name: Ohaba (Alba County, Romania)

Updated coordinates: **46° 4'N / 23° 47'E**

Updated classification data: Shock stage - **S3** (Iancu et al., 2006)

³obviously, these two references do not include Pleşcoi and Gresia

⁴<http://www.nhm.ac.uk/research-curation/research/projects/metcat/>

⁵<http://www.lpi.usra.edu/meteor/metbull.php>

⁶F. Brandstätter, L. Ferrière, and D. Topa (Naturhistorisches Museum in Vienna). Official report in preparation for the Meteoritical Bulletin, No. 102, *Meteoritics & Planetary Science*, 48, 2014

⁷©2014 Google

⁸spelled Mezö-Madaras in the original reference (Knöpfler, 1852); however, the official locality name at the time of the fall was spelled Mezömadaras (Szabó and Szabó, 2003)

Kakowa⁹ (Haidinger, 1859)

Official locality name: Grădinari (Caraş-Severin County, Romania)

Updated coordinates: **45° 7'N / 21° 35'E**

Zsadany¹⁰ (Krenner, 1875)

Official locality name: Corneşti

Corrected administrative affiliation: **Timiş** County, **Romania**

Corrected coordinates: **45° 55'N / 21° 13'E**

Mocs¹¹ (Koch, 1882)

Official locality name: Mociu (Cluj County, Romania)

Updated classification data: Shock stage - **S3-5** (Miura et al., 1995)

Sopot (Demetrescu, 1928)

Official locality name: Sopot (Dolj County, Romania)

Updated classification data: Class - **H5**; Shock stage - **S3** (Iancu et al., 2004)

Tauti¹² (Savu, 1959)

Official locality name: Taut

Corrected administrative affiliation: **Arad** County, Romania

Corrected coordinates: **46° 17'N / 21° 55'E**

Updated classification data: Shock stage - **S3** (Miura et al., 1995; Iancu et al., 1997)

Tuzla (Mason, 1963)

Official locality name: Tuzla

Detailed administrative affiliation: **Constanţa** County, Romania

3. DISCUSSION: JUSTIFICATION FOR THE PROPOSED EMENDATIONS

The formal nomenclature protocol requires that the name that is used in the original description becomes also the official meteorite name. When locating historical meteorites, this may be somehow confusing if the original locality name of the fall has meanwhile changed. In such cases, for the sake of scientific accuracy and for enabling further field investigations, the present-day equivalent locality names should be also added next to the historical names.

There are two reasons that have led to incorrect geographical information in the catalogues: a) historical changes of the official locality name or administrative affiliation, and b) incorrect association of the former/present-day locality name with the actual administrative unit. In both cases, the correction requires some knowledge of local history and geography, as well as access to the original references that are typically not in English.

All meteorites under consideration fell in Transylvania and the Banat during the 19th century. At that time, these regions were administrated by either Hungary or the Habsburgs in Vienna respectively or, starting with 1867, by the Austrian-Hungarian Monarchy via Budapest. Since 1918, these regions are part of Romania. Because of the complex historical changes, most of the official locality names have undergone (multiple) changes. It was also quite common that one locality had additional unofficial

⁹spelled “Kakova” in the original reference (Haidinger, 1859)

¹⁰spelled “Zsadány” in the original reference (Krenner, 1875)

¹¹the official locality name at the time of the fall was spelled Mócs (Szabó and Szabó, 2003)

¹²spelled as such in the original reference (Savu, 1959), probably coming from a variant of the locality name, *i.e.*, Tăuţi (Szabó and Szabó, 2003)

names in different languages because different populations lived there (*e.g.*, Romanians, Hungarians, and Germans).

Since long ago, the current country affiliation (*i.e.*, to Romania) has been operated in the main meteoritic references. However, in the case of the Zsadany meteorite an outdated country information has recently re-occurred in the MBDB: in May 2010, this entry was revised for its country and regional affiliation. Based on information included by Kubovics *et al.* (2001) in a conference abstract, the editors of the MBDB database have changed the country information of the Zsadany meteorite from “Romania” into “Hungary”. This erroneous change was probably based on ambiguous formulations such as “the Carpathian Basin larger country”, or “in the *historical* and in the *actual* Hungary”.

Nevertheless, the goal of Kubovics *et al.* (2001) was to emend some entries in the NHM Catalogue (Graham *et al.*, 1985). For example, they corrected the county name for the Zsadany meteorite from Bihor into Temes County - the latter being the obsolete name for present-day Timiș County, Romania (Szabó and Szabó, 2003). Currently, the online NHM Catalogue of Meteorites¹³ displays the correct country information for Zsadany, *i.e.*, Romania. However, the attached geographical coordinates (46° 56' N / 21° 30' E) are incorrect because they correspond to a homonymous locality in Békés County (Hungary) that has no connection with this particular meteorite fall. In the MBDB, Zsadany is also incorrectly affiliated to Bekes County¹⁴.

To highlight the current confusion, we point out a contribution on meteorites from Antarctica published in the same year (Bérczi and Lukacs, 2001). This paper includes the correct country information for the Zsadany meteorite. The authors selected Zsadany¹⁵ as one of the two historical proxies for the study of present-day icy meteorites. This illustrates how critically important the detailed and correct information on a meteorite, and the conditions at the time of fall really is. Accordingly, the authors include as Appendix the first English translation of the original meteorite fall report (in Hungarian, by Krenner, 1875). Detailed explanatory footnotes provide the reader with an insight into the complex historical-cultural background. Note 1 states that the present-day country name of this fall is Romania. Nevertheless, the updated locality name (Jadani) indicated by Bérczi and Lukacs (2001) is obsolete. As an illustration of the complex locality names dynamics in this region, we present below a brief chronology of the official names for the former Zsadány village:

1875 (year of fall): Zsadány, Temes County, Habsburg Kingdom of Hungary
 1921: Jádani¹⁶, Timiș County, Romania
 1960: Cornești¹⁷, Timiș County, Romania

Finally, the correct country and county information for Zsadany is also provided by the online meteoritical database of the Hungarian Natural History Museum, in its “Meteorites in the Carpathian Basin” section¹⁸. Unfortunately, this

well-documented database includes only six of the Romanian meteorites, *i.e.*, the ones that fell on the territory of Transylvania and Banat - both former parts of historical Hungary or Austro-Hungarian Monarchy. Obviously, the editors of the MBDB were not aware of all these other references/sources when operating the country change for the Zsadany entry.

In two other cases, *i.e.*, Mező-Madaras and Tauti meteorites, the incorrect administrative affiliation indicated by the official catalogues is probably due to another cause. Previously, we have defined this case as incorrect association of the former/present-day locality name with the actual administrative unit (case b). For example, there are three Romanian localities with the same name, Mădăraș, each situated in a different county: Bihor, Harghita and Mureș. The main meteorite catalogues have perpetuated the original incorrect assignment by Graham *et al.* (1985) of Mezőmadaras¹⁹ to Harghita County. Here, we correct it for Mureș County based on the original description (Knöpfler, 1852).

Tauț is the official name for two localities in northwest Romania. Confusingly enough, they are located close to each other, in two neighboring counties, *i.e.*, Arad and Bihor. Based on the indisputable location of the fall in the original sketch presented by Savu (1959), the correct county affiliation for Tauti meteorite locality is Arad. Graham (1979), even if referring to the original paper of Savu (1959), has incorrectly chosen Oradea, the administrative center of Bihor County as regional reference. This error was preserved in the later version of the NHM Catalogue (Graham *et al.*, 1985). The MBDB also uses the report of Graham (1979) as source of information for Tauti. Despite that and surprisingly, it provides a third county (Cluj) as affiliation²⁰. This probably because localities with a similar name (the spelling of “a” and “t” with/without diacritics and the presence/absence of the last “i” differs) exist in several Romanian counties: Alba, Arad, Bihor, Cluj and Maramureș. Here, we correct the affiliation of Tauti meteorite to Arad County, as already reported, *e.g.*, by Hadnagy *et al.* (1999).

Tuzla is the official name of a village in Constanța County, southeastern Romania. In the NHM catalogues (Graham *et al.*, 1985; Grady, 2000), the geographical affiliation for Tuzla meteorite is “Dobruja”. This is an obsolete name version for “Dobrogea”, which defines the whole region between the Danube and the Black Sea. Here, we propose the correct and more precise affiliation of Tuzla meteorite to Constanța County. This information is already correctly included in the MBDB.

The minor corrections we propose for the geographical coordinates of Ohaba and Kakowa meteorites are based on the exact location on Google Maps© of the corresponding present-day localities.

Finally, the classification updates concern Sopot, Ohaba, Mocș and Tauti. Iancu *et al.* (2004) have assigned the Sopot meteorite - currently still only generally classified in the MBDB as “ordinary chondrite”, to the H5 class (high-iron, petrologic type 5). The shock stage was defined for Ohaba (Iancu *et al.*, 2006), Tauti (Miura *et al.*, 1995; Iancu *et al.*, 1997) and Sopot (Iancu *et al.*, 2004) meteorites as being S3. Miura *et al.* (1995) have identified variable shock stages (S3-5) in Mocș samples.

The newly officially recorded Romanian meteorites are also under investigation; in the case of Gresia find, the paper of Stelea & Ghenciu (2012) brings details on its petrography and

¹³<http://www.nhm.ac.uk/research-curation/research/projects/metcat/>

¹⁴correct spelling is Békés, according to <http://www.bekesmegye.hu/index.php>

¹⁵spelled in the paper of Bérczi and Lukacs (2001) as Zsadány

¹⁶according to Martinovici and Istrati (1921)

¹⁷according to http://en.wikipedia.org/wiki/List_of_places_in_Romania_whose_names_were_changed

¹⁸http://www.nhmus.hu/kutatas/adatbazisok/meteorit/metkarp_start_a.html

¹⁹correct spelling of the official locality name at the date of the fall (Szabó and Szabó, 2003)

²⁰probably associating the fall locality with the similarly spelled Tăuți locality in Cluj County (see text)

weathering degree. Based on the latter, the authors estimate that the fall could have taken place in the 18th century.

4. CONCLUSIONS

Our note emphasizes the need for geographical information emendations on five historical Romanian meteorites in the Meteoritical Bulletin Database (MBDB) - the official online meteorites catalogue. For Zsadany, the country has to be changed into Romania (from Hungary) and the county into Timiș (from Bekes). For Mező-Madaras and Tauti, the county affiliations must be corrected into Mureș and Arad, respectively. In addition, minor changes are required with respect to the geographical coordinates of Kakowa and Ohaba.

Additional classification information is currently available on four Romanian meteorites. Sopot was classified as H5 with shock stage S3. Shock stage S3 was assigned also to Ohaba and Tauti. Variable shock stages (S3-5) were identified in Mocș samples, the most well-known Romanian meteorite.

In the case of historical meteorites, as well as of old mineral or fossil museum specimens, providing accurate locality information may be challenging. This requires knowledge of regional history and geography, and sometimes access to the original references. Such publications are usually not written in English, or have a somehow limited circulation. Thus, local scientists are in the best position to correctly evaluate and emend such information, especially when it represents the authorized reference for an international audience.

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