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## The Meteoritical Bulletin, No. 111

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**Abstract**–Meteoritical Bulletin 111 contains the 3094 meteorites approved by the Nomenclature Committee of the Meteoritical Society in 2022. It includes 11 falls (Antonin, Botohilitano, Cranfield, Golden, Great Salt Lake, Longde, Msied, Ponggo, Qiquanhu, Tiglit, Traspenna), with 2533 ordinary chondrites, 165 HED, 123 carbonaceous chondrites (including 4 ungrouped), 82 lunar meteorites, 28 Rumuruti chondrites, 27 iron meteorites, 23 ureilites, 22 mesosiderites, 22 Martian meteorites, 21 primitive achondrites (one ungrouped), 17 ungrouped achondrites, 13 pallasites, 7 enstatite achondrites, 6 enstatite chondrites, and 5 angrites. Of the meteorites classified in 2022, 1787 were from Antarctica, 1078 from Africa, 180 from South America, 34 from Asia, 6 from North America, 4 from Europe, and 1 from Oceania.

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### TRENDS AND SPECIFICITIES

Meteoritical Bulletin 111 (MB111) contains the 3094 meteorites submitted to and accepted by the Nomenclature Committee of the Meteoritical Society in 2022. This is the highest number of new meteorites since the Meteoritical Bulletin has been phased with calendar years starting with Bulletin 105 in 2016. The 3094 meteorites in MB111 amount to 5660 kg of material, half of which is from the Jikharra 001 eucrite-melt breccia (2500 kg). Six other meteorites are over 50 kg, including Orotukan 555 kg ungrouped iron, Bir

Ounane 001 80 kg primitive achondrite, and Wulong 70 kg pallasite.

In detail, 1787 were from Antarctica, 1078 from Africa, 180 from South America, 34 from Asia, 6 from North America, 4 from Europe, and 1 from Oceania. The record high number of meteorites in MB111 is driven by the large numbers of Antarctic meteorites, and the record high number of meteorites classified as Northwest Africa (NWA) meteorites (975 meteorites). The last decade has seen a steady decrease of meteorites from Oman, with South America (Chile accounts for 94%) being the third most abundant source of meteorites (Figure 1).

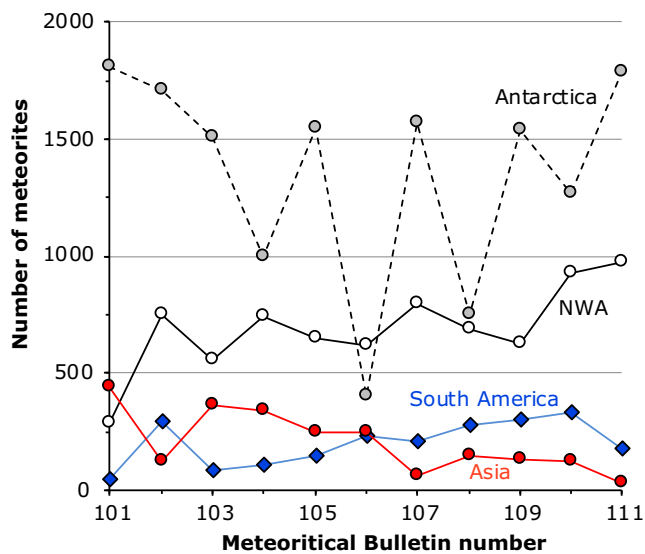


FIGURE 1. Number of meteorites from Antarctica, Northwest Africa, South America, and Asia reported in the last 11 Meteoritical Bulletins. (Color figure can be viewed at [wileyonlinelibrary.com](https://onlinelibrary.wiley.com))

The meteorites classified in MB111 include 11 falls that occurred in 2021 and 2022, with the addition of the Botohilitano Indonesian fall that occurred in 2015. It is noteworthy that four of these 11 falls (36%) were recovered with the assistance of camera networks, such as the Desert Fireball Network in Australia (Bland et al., 2012), or international networks such as FRIPON (Colas et al., 2020), and/or radar reflectivity data (Fries & Fries, 2010). This ratio increases to 80% when considering only the five falls that occurred in countries where these networks are operating (Western and Central Europe, North America).

The meteorites listed in MB111 comprise 2533 ordinary chondrites, 165 HED, 123 carbonaceous chondrites (including four ungrouped), 82 lunar meteorites, 28 Rumuruti chondrites, 27 iron meteorites, 23 ureilites, 22 mesosiderites, 22 Martian meteorites, 21 primitive achondrites (one ungrouped), 17 ungrouped achondrites, 13 pallasites, seven enstatite achondrites, six enstatite chondrites, and five angrites.

The number of lunar meteorites is still increasing over the years, with a record high number of 82 meteorites in MB111, representing 246 kg of lunar material, with seven meteorites over 10 kg. Over the last 5 years, 260 lunar meteorites have been accepted by the Nomenclature Committee, representing 790 kg of material. Combining meteorites with the ~383 kg of lunar material from the Apollo, Luna, and Chang'e-5 sample return missions (Che et al., 2021; McCubbin et al., 2019), we have now over 1000 kg of lunar material accounted for on Earth. The number of ungrouped achondrites (17) is also a record high. Four new nakhlites have been

registered in MB111, a significant addition to the total nakhlite population.

Three meteorites were reclassified in MB111: NWA 725 from acapulcoite to winonaite, NWA 2825 from primitive achondrite to CV7, and NWA 5028 from CR2 to CVred3.

The following references were used to support the classification of meteorites in MB111: Boesenberg et al. (2012), Day et al. (2012), Dunham et al. (2022), Floss et al. (2007), Gattacceca et al. (2014, 2020), Giguere et al. (2000), Goodrich et al. (2017), Greenwood et al. (2012), Gross et al. (2014), Grossman and Brearley (2005), Hewins et al. (2021), Keil (1989), Keil and McCoy (2018), Metzler (2012), Mittlefehldt et al. (1998), Munsell et al. (1933), Prinz and Keil (1977), Rochette et al. (2003), Rubin et al. (2003), Schrader et al. (2015, 2017), Scott and Jones (1990), Sears et al. (1991), Stoeffler et al. (1980), Torrano et al. (2020), Treiman (2005), Vaci et al. (2021), Warren et al. (2009), Warren (1993), Wasson and Kallemeyn (2002), Wasson et al. (1998), and Zeng et al. (2019).

## NOTABLE METEORITES

Tiglit (2.22 kg aubrite) is only the 10th aubrite fall. Another notable fall is the Qiquanhu eucrite (Chennaoui Aoudjehane et al., 2022). Meteorite finds that are notable for their mass, rarity, and/or scientific interest include Jikharra 001, a 2500 kg eucrite-melt breccia (Zilong et al., 2023), Orotukan (555 kg ungrouped iron), Bir Ounane 001 (80 kg primitive achondrite), Wulong (70 kg pallasite), NWA 15346 (67.5 kg mesosiderite), NWA 15155 (48.2 kg monomict eucrite), NWA 15373 (45 kg fragmental lunar breccia), Choum 001 (39 kg lunar anorthosite), NWA 14702 (33.8 kg CK3). Sebkh el Melah 001 is an unbrecciated pegmatitic aubrite that preserves the igneous texture/context of its large pyroxene grains (Agee et al., 2023). Néma 001, a 76 g ungrouped achondrite is of particular interest for its possible affinities with acapulcoites and lodranites (Tartese et al., 2023).

## ALPHABETICAL TEXT ENTRIES FOR NON-ANTARCTIC METEORITES

See online version of this article.

## NEW DENSE COLLECTION AREAS

In 2020, 31 new dense collection areas (DCAs) were created: 11 in Algeria, six in Mauritania, four in Mali, three in China, three in Peru, two in Libya, one in Chile, one in Morocco, and one in Western Sahara. A full list of all approved DCAs, with maps, can be found at <https://www.lpi.usra.edu/meteor/DenseAreas.php>.

## LISTING OF INSTITUTES AND COLLECTIONS

An up-to-date index of collections and approved repositories (next to a green check mark) cited in the Meteorite Bulletin can be found here:

<https://www.lpi.usra.edu/meteor/MetBullAddresses.php?grp=country>

## SUPPORTING INFORMATION

Supplementary information can be found in the online version of this article: Table S1 (data including Antarctic meteorites), and data S1 (complete copy of the text entries for non-Antarctic meteorites). Information about the approved meteorites can be obtained from the Meteoritical Bulletin Database (MBD) available online at <https://www.lpi.usra.edu/meteor/>.

*Editorial Handling*—Dr. A. J. Timothy Jull

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## SUPPORTING INFORMATION

Additional supporting information may be found in the online version of this article.

**Data S1.** Complete copy of the text entries of MB111 for non-Antarctic meteorites.

**Table S1.** Data of MB111 including Antarctic meteorites.