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Abstract–Meteoritical Bulletin 108 contains 2141 meteorites including 12 falls (Aguas Zarcas, Benenitra, Jalangi, Komaki, Ksar El Goraane, Mhabes el Hamra, Natun Balijan, Oued Sfayat, Shidian, Taqtaq-e Rasoul, Tocache, Viñales), with 1640 ordinary chondrites, 149 carbonaceous chondrites, 134 HED achondrites, 45 lunar meteorites, 38 ureilites, 27 iron meteorites, 23 Martian meteorites, 22 primitive achondrites, 19 Rumuruti chondrites, 15 mesosiderites, 10 enstatite chondrites, 7 ungrouped achondrites, 4 pallasites, 4 ungrouped chondrites, and 4 angrites. Nine hundred and nine meteorites are from Africa, 747 from Antarctica, 279 from South America, 148 from Asia, 29 from North America, 18 from Oceania, 6 from Europe (including 2 from Russia), and 5 from unknown locations.

TRENDS AND SPECIFICITIES

Meteoritical Bulletin 108 (MB108) contains the 2141 meteorites reported to and accepted by the Nomenclature Committee of the Meteoritical Society in 2019. This is a relatively low number compared to the average of the past few years, mostly because of a lower number of Antarctic meteorites (Fig. 1). Nine hundred and nine meteorites are from Africa, 747 from Antarctica, 279 from South America, 148 from Asia, 29 from North America, 18 from Oceania, 6 from Europe (including 2 from Russia), and 5 from unknown locations. The number of Northwest Africa (NWA) meteorites classified remains steady at around 700 meteorites per year. Meteorites from Africa (mostly NWA and other Saharan meteorites) and Antarctica make up 42% and 35% of the total number of meteorites in MB108, respectively. As for the last few years, Chile, with 275 meteorites (13%), is now the main meteorite source outside of north Africa and Antarctica.

The meteorites in MB108 include 12 falls (Aguas Zarcas, Benenitra, Jalangi, Komaki, Ksar El Goraane, Mhabes el Hamra, Natun Balijan, Oued Sfayat, Shidian, Taqtaq-e Rasoul, Tocache, Viñales), 1640 ordinary chondrites (OCs), 149 carbonaceous chondrites (including 50 CV, 40 CM, 29 CO, 22 CK, 4 CR), 134 HED achondrites, 45 lunar meteorites, 38 ureilites, 27 iron meteorites, 23 Martian meteorites, 22 primitive achondrites, 19 Rumuruti chondrites, 15 mesosiderites, 10 enstatite chondrites, 7 ungrouped achondrites, 4 pallasites, 4 ungrouped chondrites, and 4 angrites. Except the variations in the number of OCs, which is mostly driven by the number of Antarctic meteorites, these numbers have been remarkably stable over the last 4 years (Fig. 2a), including for the different carbonaceous chondrite groups (Fig. 2b).

The 2141 meteorites in MB108 total over 3.4 t of material, including 16 meteorites over 50 kg, and 5 over 100 kg. Of particular significance for 2019, like in previous years, is the large number of lunar meteorites (45), totaling 253 kg, with 5 meteorites over 10 kg and 2 over 50 kg (Fig. 3a). Thirty-eight of these lunar meteorites are from NWA and coordinates are known for 6 of them.

In 2019, 23 Martian meteorites totaling 24 kg were approved, including 3 meteorites over 4 kg (Fig. 3a). All these meteorites are from NWA, and coordinates are known for 3 of them. Twenty-one are shergottites, one is a nakhlite (NWA 12542), one is a polymict breccia paired with NWA 7034 (Rabt Sbayta 012).

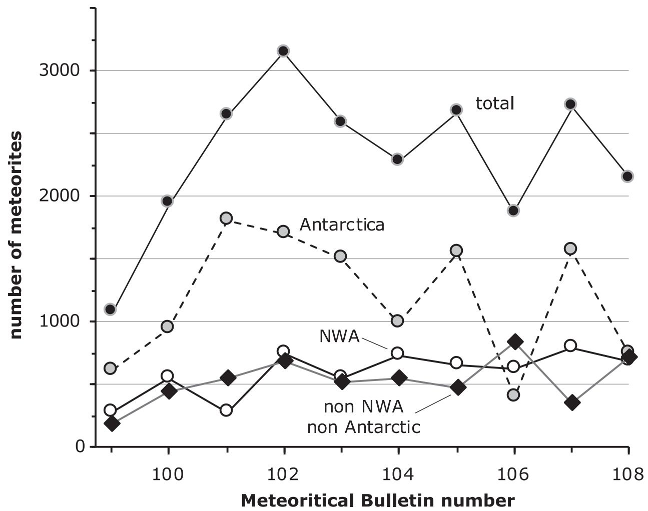

Fig. 1. Number of meteorites from Antarctica, northwest Africa, and other areas reported in the last 10 Meteoritical Bulletins.

The total numbers of classified lunar and Martian meteorites published until and including MB108 are 428 and 262, respectively, and growing at a steady rate of 40 and 20 meteorites per year, respectively (Fig. 3b).

NOTABLE METEORITES

Two CM2 falls are reported: Aguas Zarcas (with a total mass of 27 kg, the second largest one after Murchison) and Shidian. Viñales (L6) was a notable fall of over 50 kg. Other meteorites that are notable for their mass, rarity, or scientific interest include Caleta el Cobre 028 (105 kg EL6, the fifth largest enstatite chondrite), NWA 12691 (104 kg lunar feldspathic breccia, the largest ever found), Tassédet 004 (405 kg H5 melt-breccia), NWA 12388 (180 kg L-melt rock), NWA 12322 (35 kg CV3, the third largest CV), NWA 11610 (28 kg CO3), NWA 12320 (4.5 kg angrite, the second largest angrite), two primitive CO3 (NWA 12930, Dhofar 2097), NWA 12474 (CR3), NWA 12587 (72 kg eucrite, the third largest eucrite), and Sierra Gorda 013 (804 g CBa).

NEW FEATURES IN THE METEORITE BULLETIN DATABASE

The online Meteorite Bulletin Database now allows searching for and listing meteorites whose description includes oxygen isotopic composition. This is accessible by selecting “oxygen isotopes” instead of “normal table” in one of the display menus.

The online Meteorite Bulletin Database also allows searching for meteorites that have information about their strewn field characteristics (masses and coordinates of individual stones). To date, this information is available, at least partly, for 31 meteorites. Submissions of new data on the strewn fields of witnessed falls are welcome, and may be sent to the Database Editor (see the MetBull FAQ for more information: https://www.lpi.usra.edu/meteor/FAQ.php)

ALPHABETICAL TEXT ENTRIES FOR NON-ANTARCTIC METEORITES

See online version of this article.

NEW DENSE COLLECTION AREAS

In 2019, 13 new dense collection areas (DCA) were created in Chad (Bardaï), China (Dunlike, Hongshagang, Huangtuya, Korla, Shanshan, Tamusubulage, Wubao), Libya (Hamadat Zegher), Morocco (Hassi Arsane), United States (Sunfair, Daveytown), and Western Sahara (Swayyah).

Three hundred and forty-three active DCA are defined to date, containing a total of 67,222 meteorites. The average number of meteorites per DCA is 196 meteorites. The median number of meteorites per DCA is four only, reflecting a very uneven distribution of meteorites among DCA. Only 37 DCA contain more than 100 meteorites, and the 23 most populated DCA (most of them in Antarctica) contain 90% of the total DCA meteorites. 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

Nine new type specimen repositories from eight countries were approved in 2019:

BGI—Botswana Geoscience Institute, Lobatse, Botswana

CUG—Planetary Science Institute, China University of Geosciences, Wuhan, China

LeMans—Musée Vert, Muséum d’histoire naturelle du Mans, Le Mans, France

Wits—University of the Witwatersrand, Johannesburg, South Africa

MCNB—Museu de Ciències Naturals de Barcelona, Spain

KirkU–Faculty of Aeronautics and Space Sciences, Kirklareli University, Turkey

NASU—National Museum of Natural History, National Academy of Sciences, Kyiv, Ukraine

LVNHM—Las Vegas Natural History Museum, Las Vegas, United States

Marietta–Marietta College, Marietta, United States

To date, 441 repositories in 82 countries are registered by the Nomenclature Committee. Among

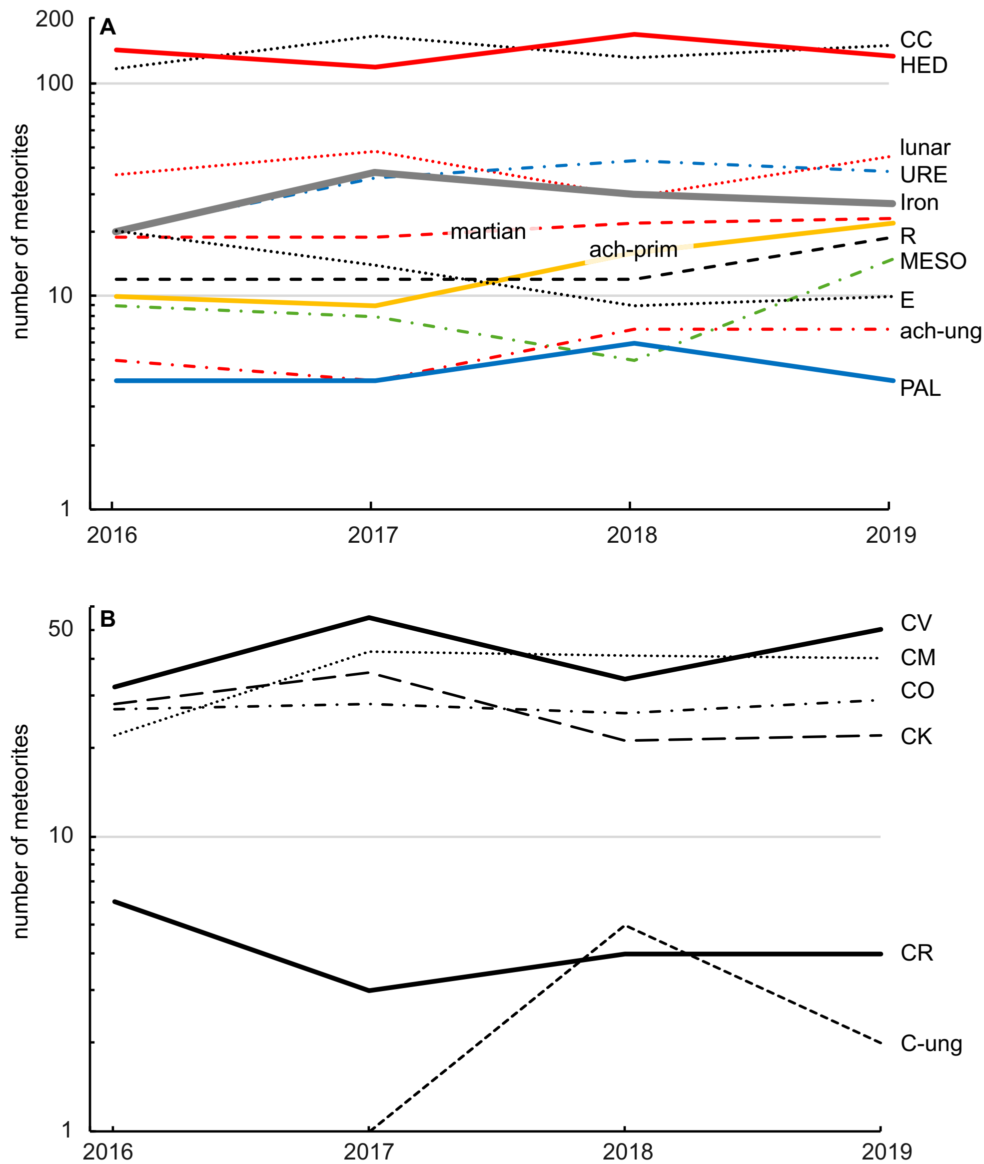

Fig. 2. A) Number of approved meteorites by main categories over the last 4 years (ordinary chondrites not shown). B) Number of approved carbonaceous chondrites by groups over the last 4 years. (Color figure can be viewed at wileyonlinelibrary.com.)

these, 82 have been approved as repositories for meteorite type specimens.

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

In accordance with §7.1 of the Guidelines for Meteorite Nomenclature, type specimens of all new meteorites "must be deposited in institutions that have well-curated meteorite collections and long-standing commitments to such curation." The minimum mass of a type specimen should be 20% of the total mass or 20 g, whichever is the lesser amount. For larger meteorites, the Nomenclature Committee *strongly* recommends the following: for 0.4–10 kg samples, at least 5% of total mass should be deposited in an approved repository, and for meteorites >10 kg, at least 500 g should be deposited. However, these larger type specimen requirements are mandatory for meteorites declared to be in Special Pairing Groups (§4.2c).

Acknowledgments—These meteorites were reviewed and approved by the Meteorite Nomenclature Committee of the Meteoritical Society. In 2019, committee members were Audrey Bouvier (Chair of the Nomenclature Committee), Jérôme Gattacceca (Meteorite Bulletin Editor), Francis McCubbin (Meteorite Bulletin Deputy Editor), Jeffrey Grossman (Meteorite Bulletin Database

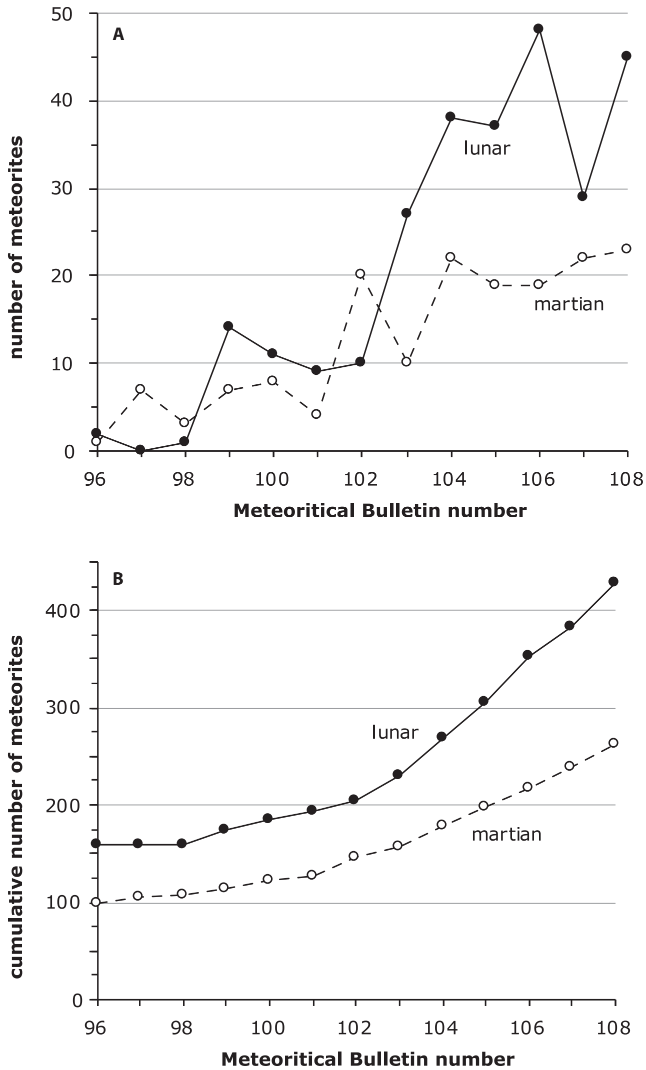

Fig. 3. A) Number of lunar and Martian meteorites reported in the last 13 Meteoritical Bulletins. B) Cumulative number of lunar and Martian meteorites with time.

Editor), Brigitte Zanda (Vice President of the Meteoritical Society), Emma Bullock, Hasnaa Chennaoui-Aoudjehane, Vinciane Debaille, Massimo D'Orazio, Tasha Dunn, Mitsumi Komatsu, and Bingkui Miao.

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SUPPORTING INFORMATION

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

Data S1. A complete copy of the text entries for non-Antarctic meteorites. This complete copy can also be found on the Meteoritical Bulletin Archive page at http://meteoriticalsociety.org/?page_id=57. Information about the approved meteorites can be obtained from the Meteoritical Bulletin Database (MBD) available online at https://www.lpi.usra.edu/meteor/.

Table S1. Data including Antarctic meteorites.