

### METEORITE FALLS IN MOROCCO.

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**Introduction:** Morocco is well known for the meteorite finds on its territory. Most meteorites discoveries during the last years are from this country and the surrounding ones such as Algeria, Mauritania, Niger, Mali. 1129 meteorites are recognised as found in Morocco, 5 probably found in Morocco, and an important number of the 8762 NWA (North West Africa) meteorites are also from Morocco (Meteoritical bulletin database last consulted on 22 May 2016) [1]. These meteorites have a great scientific value and help increase meteoritics sciences. Material of a good preservation quality and accessible to all laboratories in the world is provided by these rocks. Meteorites from this part of the world play a fundamental role in the research improvement as they represent 18% of the total official meteorites, while meteorites from Antarctica 66% and Oman 6%, meteorites from all the other countries in the world represent only 12% (Meteoritical bulletin database last consulted on 22 May 2016) [1].

In addition to the important finds, during the last decade, many falls occurred in Morocco and have been correctly described, classified and submitted to the NomCom in order to make them official [2].

**Meteorite falls in Morocco during the last years:** Moroccan territory extends over 712550 km<sup>2</sup> including the Moroccan Sahara. We worked on the documentation and the classification of every fall that occurred since 2004. Among 13 known falls over the territory, 9 of them occurred after 2002 [2]. We can add to the official falls, some meteor detections that have not been recovered due to the lack of sophisticated material allowing the calculation of the potential trajectory.

First reported fall in Morocco is Douar Mghila (LL6, 1932) [3], followed by Oued El Hadjar (LL6, 1986) [4], then Itqiy (EH7-anomalous, 1990) [4] and Zag (H3-5, 1998) [5]. Since 2002, the reported falls were: Bensour (LL6, 2002) [6], Oum Dreyga (H3-5, 2003) [7], Benguerir (LL6, 2004) [8], Tamdakht (H5, 2008) [9], Tissint (Martian shergottite, 2011) [10], Tihert (Eucrite unbrecciated, 2014, 5197) [11], Tinajdad (H5, 2014, 5195) [12], Izarzar [13] then Sidi Ali Ou Azza [14]. If we add to these official falls, the non submitted and/or non official falls, at least three (Nzala area (H5, 2009), close to Al Mahbes (LL6, 2013) and one fall that is reported as from Breja area (LL6, 2010) (but no evidence of the real provenance of this latest fall has been found), the total falls since 2002 may reach the number of 12 during 14 years giving an average of about 0,9 meteorite fall per year.

**Comparison with other countries:** comparing this number of falls in Morocco to some countries in the world during the last decade and since 1850 shows a very different distribution in time and areas. Nevertheless, Morocco had more falls during the last decade than any other country in the world.

**Discussion:** What is clearly reported is that Morocco experienced a highest percentage of falls since 2000 comparing to any other country in the world [2] even those having a meteor camera network detection and radars such as the US, Australia or Tcheck republic. For sure, the high interest of meteorites hunters in Morocco plays a fundamental role on this high number of fall reports, and one can argue that this interest impacts the falls detections, but this advantage should be highly compensated by the meteor networks detections. These results pose the question of the reality of the totally random falls of meteorites on Earth.

[1] <http://www.lpi.usra.edu/meteor/index.php>. [2] Chennaoui Aoudjehane H. et al. 2015. *Meteoritics & Planetary Science* 50, SI Abstract #5186. [3] Lacroix A. 1933. *C. R. Acad. Sci. Paris* 197, p.368. [4] Grossman J. N. and Zipfel J. 2001. *Meteoritics & Planetary Science* 36, A293-A322. [5] Grossman J. N. 1999. *Meteoritics & Planetary Science* 34, A169-A186. [6] Russel S. S. et al. 2004. *Meteoritics & Planetary Science* 39, A215-A272. [7] Russel S. S. 2005 *Meteoritics & Planetary Science* 40, A201-A263. [8] Chennaoui Aoudjehane et al. 2006. *Meteoritics & Planetary Science* 41, A231-A237. [9] Chennaoui Aoudjehane H. et al. 2009. *Meteoritics & Planetary Science* 44, SI Abstract #5038. [10] Chennaoui Aoudjehane et al. 2012. *Science* 10.1126/science.1224514. [11] Chennaoui Aoudjehane H. et al. 2015. *Meteoritics & Planetary Science* 50, SI Abstract #5197. [12] Chennaoui Aoudjehane H. et al. 2015. *Meteoritics & Planetary Science* 50, SI Abstract #5195. [13] Bouvier A. et al. 2015. *Meteoritics & Planetary Science in preparation*. [14] Bouvier A. et al. 2016. *Meteoritics & Planetary Science in preparation*.