

# The Atacama Desert: A preferential arid region for the recovery of meteorites—Find location features and strewnfield distribution patterns

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## Abstract

Some terrestrial areas have favorable climatic and geomorphologic features that permit the preservation and accumulation of meteorites. The Atacama Desert is among the most important ones. Sixty-two, non-paired, meteorites have been collected in different places of Atacama since the late 19th century to date. Practically all types, classes and groups of meteorites have been recovered. In this work a review of the Atacama meteorites is carried out, listing all past recoveries, determining the principal strewnfield distribution patterns and providing a general overview of the features of the find locations. Principal find locations are concentrated in the Atacama Central Depression. Most of them coincide with ancient mining industries (metallic or non-metallic) or are located near towns, rail stations, tracks or human settlements. Whatever the meteorite find location was, all meteorite samples were collected on the desert surface and normally: (1) showed more than a quarter of their body exposed; (2) underwent some sign of terrestrial weathering; (3) stone meteorites have a brownish desert-varnish on hand specimen; (4) are non-oriented pieces and (5) are commonly members of a greater mass distributed in a certain place. The distribution of find locations in Atacama Desert is not as simple as it would seem on a first approach, as Atacama salt phases (environmental conditions and mineralogical alterations) have a crucial importance on meteorites weathering.

*Keywords:* Chile; Preservation; Salt phases; Weathering

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## 1. Introduction

In arid regions (both “hot” deserts and the “cold” desert of Antarctica) weathering is slow and accumulations of meteorites may occur (Bland et al., 1996, 1997, 2000; Benedix et al., 2006). Analyses of meteorites recovered in hot deserts or in Antarctica are increasingly used (Bischoff, 2001a, b) to get constraints on the formation of interesting groups of meteorites (e.g. many Martian meteorites, and 4 of the 6 angrites were found in such areas, where they typically spent over 10,000 yr since their fall on Earth) (Croizat et al., 2002). In accordance with Schultz et al. (1994), for the past 20 yr international expeditions (mainly American, Japanese and European) have been organized with the purpose of retrieving meteorites from these areas. The advantage of meteorites falling in deserts (Sahara, (Bischoff and Geiger, 1995) semiarid regions of western US Atacama, deserts of Australia (Bevan and Binns, 1989a, b)), rather than the Antarctic, is that deserts are easier to reach. All these sites have in common arid conditions (semiarid, arid or hyperarid), lack of vegetation and favorable geomorphologic features that permit the preservation and the accumulation of meteorites (in variable ways), according to local conditions of the region (Bland et al., 2000; MAPS, 2006; Zolensky et al., 1995a).

Sixty-two, non-paired, meteorites have been collected in different places of the Atacama Desert, Chile, since the late 19th century (Grady, 2000; Grossman, 2000; Grossman and Zipfel, 2001; Russel et al., 2002; Russell et al., 2004) (Table 1). Most are iron meteorites (more than 61% of total finds) and were found fortuitously by mine workers in the late 19th and early 20th centuries, coinciding with the great mining activity. Stone meteorites were poorly represented (only four finds) in this historical period, until 1986 when the Chilean prospector E. Martinez found the first specimen of Pampa meteorites in the Mejillones peninsula (Zolensky et al., 1995b). Nowadays the majorities of new finds are stone meteorites (35.4%) and are carried out, in most cases, by a little group of private collectors with business interests.

To date practically all types, classes and groups of meteorites have been recovered, but with a particular distribution (Fig. 1). Some of them have been studied in detail because: (1) they are members of anomalous groups (e.g. Barranca Blanca, Dehesa, La Primitiva, etc.) (Buchwald, 1975; Scott and Wasson, 1976; Wasson and Wang, 1986); (2) they are unusual finds (e.g. Imilac, Vaca Muerta, etc.) (Buchwald, 1975; Pedersen and García, 1987; Pedersen et al., 1992) or (3) geochronological dating indicates that they have very old terrestrial ages (e.g. Tamarugal) (Nishiizumi et al., 1989; Vilcsek and Wanke, 1963). From a curatorial perspective, unfortunately most of the early recoveries were on the whole sent

Table 1  
Atacama Desert meteorites

Name	Date	Class/type	Shock	Weathering	Coordinates	Location
Algarrobo	1959	IA			27°5'S/70°35'W	CD
Baquedano	1932	IIIAB			23°18'S/69°53'W	CD
Barranca Blanca	1855	IIE			28°5'S/69°20'W	CD
Balneario El Condor	2001	LL6	2	2	25°8.6'S/70°19.2'W	CR
Cachiyuyal	1874	IIIE			25°S/69°30'W	CD
Caldera	1967	Eucrite			27°03'S/70°48'W	CR
Carcote	1888	H5	3	B	21°26'S/68°26'W	CD
Cerro del Inca	1997	IIIF			22°13.05'S/68°56.5'W	WA
Cobija	1892	H6			22°34'S/70°15'W	CR
Copiapo	1863	IAB			27°18'S/70°24'W	CD
Corrizatillo	1884	IIICD			26°2'S/70°20'W	CD
Dehesa	1866	Ataxite-anom			? near to Copiapo	CD
Dolores	2002	IIIAB			19°39'S/69°57'W	?
Elqui	1990	IIAB			?	?
Guanaco	2000	IIG			25°06'S/69°32'W	?
Himaes (iron)	1870	IIIAB			26°S/70°W	CD
Imilac	1822	Pallasite			24°12.2'S/68°48.4'W	DR
Iquique	1871	IVAB			20°11'S/69°44'W	CD
Joel's iron	1858	IIIAB			24°S/69°W	?
Juncal	1866	IIIAB			26°S/69°15'W	CD
La Primitiva	1888	Iron-anom			19°55'S/69°49'W	CD
La Serena	1990	IIICD			?	?
La Yesera 001	2003	H6	$\frac{1}{2}$	3	23°16.23'S/70°28.98'W	CR
La Yesera 002	2003	LL5	$\frac{1}{2}$	2	23°16.23'S/70°28.98'W	CR
Las Salinas	1905				23°S/69°30'W	CD
Lutschaunig's stone	1861	L6			27°S/70°W	CD
Mantos Blancos	1876	IVA			23°27'S/70°7'W	CR
María Elena	1935	IVA			22°20'S/69°40'W	CR
Mejillones	1875	IIAB			23°6'S/70°30'W	CR
Merceditas	1884	IIIAB			26°20'S/70°17'W	CD
Monturaqui	1965	IAB			23°56'S/68°17'W	DR
Morro de la Mina	1986	H5	3	B	24°14'48''S/68°51'12''W	DR
Negrillos	1936	IIAB			19°53'S/69°50'W	CD
North Chile	1875	IIAB			23°S/69°W	CD
Pampa a	1986	L4	1	3	23°12'S/70°26'W	CR
Pampa b	1986	L4/5	4	3	23°12'S/70°26'W	CR
Pampa c	1986	L4	6	C	23°12'S/70°26'W	CR
Pampa d	1986	L5	2	$\frac{2}{3}$	23°12'S/70°26'W	CR
Pampa de Agua Blanca	1916	L6	4	B	24°10'S/69°50'W	CR
Pampa e	1987	L6	1	B	23°12'S/70°26'W	CR
Pampa f	2000	L4/5			23°12'S/70°26'W	CR
Pampa g	2000	L5			23°12'S/70°26'W	CR
Pampa Provid <sup>a</sup>	1994	IIIAB			24°27.0'S/ 69°34.3'W	CD
Pan de Azucar	1887	IAB			26°30'S/69°30'W	CR
Pozo al Monte	?	IIIAB			?	
Puquios	1885	IID			27°9'S/69°55'W	
Quebrada del León	1995	H6				CR
Rencoret	1996	H6	3	3	?	?
Rica Aventura	1910	IVA			21°59'S/69°37'W	CD
Salar de Imilac	2000	H5	3	1	24°12.25'S/68°48.3'W	CD
San Cristobal	1882	IAB			23°26'S/69°30'W	CD

Table 1 (*continued*)

Name	Date	Class/type	Shock	Weathering	Coordinates	Location
San Juan 1	2001	L5	$\frac{1}{2}$	2	25°34.53'S/69°47.7'W	CR
San Juan 2	2002	H6	1	3	25°34.53'S/69°47.7'W	CR
San Pedro de Quiles	1999	L6	4	1	31°01'S/71°24'W	CD
Serrania de Varas	1875	IVA			24°33'S/69°4'W	CD
Sierra Gorda	1898	IIAB			22°54'S/69°21'W	CD
Sierra Sandon	1923	IIIAB			25°10'S/69°17'W	CD
Slaghek's iron	1916	IIIAB			?	
Tamarugal	1871	IVAB			20°11'S/69°44'W	CD
Tambo del meteorito	2002	H6	1	5	23°58.86'S/68°18.78'W	CD
Tarapaca	?	?			19°58'S/69°38'W	?
Ternerera	1891	IVB			27°20'S/69°48'W	CD
Vaca Muerta	1861	Mesosiderite			25°45'S/70°30'W	

CR: Coastal range; CD: Central depression; DR: Domeyko range; WA: Western Andes (based on Grady, 2000; Grossman, 2000; Grossman and Zipfel, 2001; Russell et al., 2004, 2005).

<sup>a</sup>Pampa Providencia.

to foreign (non-Chilean) curators (24%) and private collections and only part of the recent finds are present in the collections of meteorites of the National Museum of Natural History ([http://www.dibam.cl/historia\\_natural/](http://www.dibam.cl/historia_natural/)). Thanks to the excellent searching software program of the Meteoritical Society website (<http://www.meteoriticalsociety.org/>), information about meteorites is easily available. However, if we want to understand the relationships between meteoritic finds and the physiographic (and geological) frameworks in which they are recovered (see, for instance, Cole et al., 2005), we need to have a more general perspective, which goes further than a simple inventory generated by a computer (even for the detection of nomenclature errors, which are extremely important for cataloguing meteorites). In this paper, we will review the Atacama meteorites listing all past recoveries, determining the principal strewnfield distribution patterns and providing a general overview of the features of the find locations. Finally, a comparison of the climatic and geomorphologic conditions of Atacama with respect to other hot desert areas is made, which emphasizes the future potential of this region as an important meteorite accumulation site.

## 2. Atacama Desert meteorites

### 2.1. Brief historical background

The Atacama Desert is located between the western central Andes and the Pacific coast and extends from the southern border of Peru (18°S) to Copiapó, Chile (30°S) (Rundell et al., 1991; Quinn et al., 2003). It is one of the most arid, uninhabited and old desert localities on Earth comprising areas with semiarid, arid and hyperarid conditions. The first reference about Atacama Desert meteorites was published in “Elementos de Mineralogía” in 1845 (Domeyko, 1862, 1864a, b, 1875). He was the first to note the “*meteoritic nature*” of certain samples from some areas of the Atacama Desert. Later results were given by Fletcher (1889) and Philippi (1856, 1860). Most samples recovered at this time were donated to the Universidad de La Serena, La Serena (Chile) and, at present, make up one

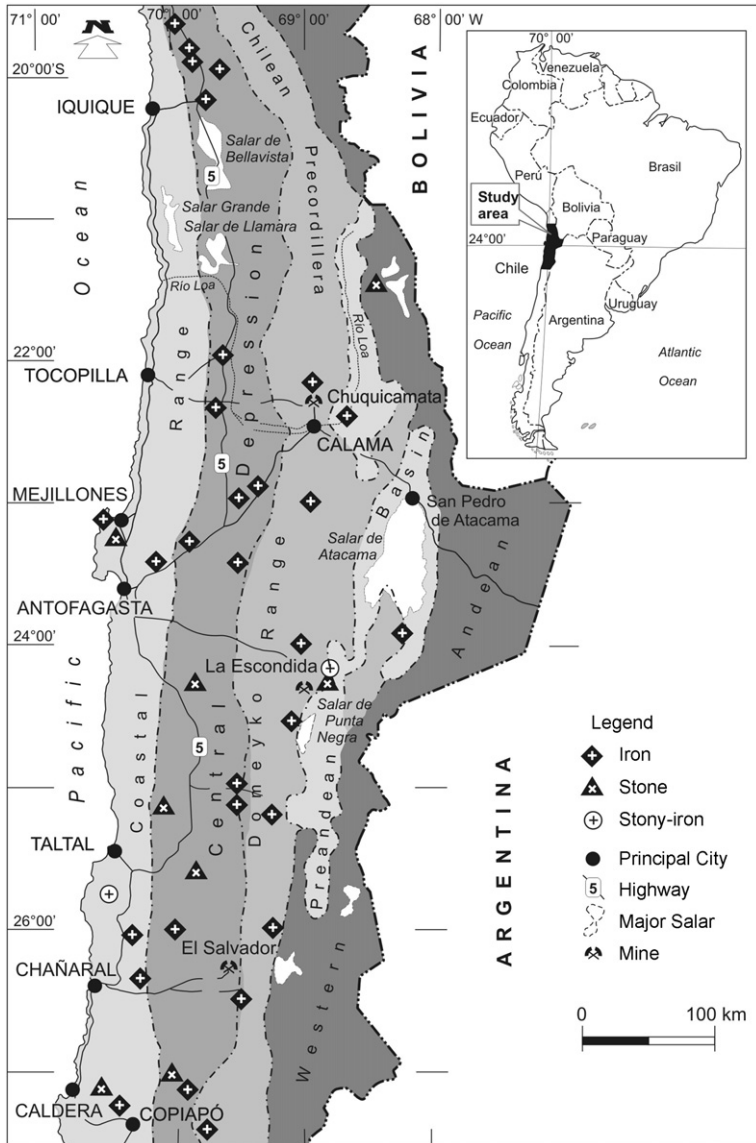


Fig. 1.

of the principal Chilean collections of meteorites at the Museo Mineralógico Ignacio Domeyko at La Serena. After Domeyko, searching, investigation and new meteorite recovery operations were carried out by different authors although, in general terms, the interest in meteorites gradually declined in Chile until the middle of the 20th century. Thanks to the scientific impulse given by the study of impact craters, the situation changed in 1966. At that time, Sánchez (Dpto. Geología-IIG—Chile) and William Cassidy reported the impact nature of Monturaqui crater (Sánchez and Cassidy, 1966) and there was a renewed interest in meteoritics.

Since 1980, the rediscovery of Imilac and Vaca Muerta strewnfields and the finding of the Pampa recovery site have reinvigorated the studies of meteorites from the Atacama Desert (Killgore, 1997; Pedersen et al., 1992; Zolensky et al., 1990; Rull and Martínez-Frías, 2003; Rull et al., 2004; Scorzelli et al., 2000; Wasson, 1992; Zolensky et al., 1995b). Also, it is important to point out that Atacama was the extreme selected region to explore ways to use automated vehicles to search for meteorites in extreme environments (nomad field experiment) (Cabrol et al., 2001).

## *2.2. Main climatic and geomorphologic features*

Five north–south morphotectonic–physiographic units are present in the Atacama Desert of northern Chile; from the Pacific coast eastward they are the: (1) Coastal Range (CR); (2) Central Depression (CD); (3) Domeyko Range (DR); (4) Preandean Basin (PB) and (5) western Andes (WA) (Padilla et al., 2001; Sillitoe and McKee, 1996). Paleoclimate data suggest that the aridity in Atacama has been maintained since the mid-Miocene (Alpers and Brimhall, 1988; Chong, 1988; Hartley and Chong, 2002; Mortimer, 1980) but with slight changes on the boundary between the distinct arid zone conditions (semiarid, arid and hyperarid) and in the mean average dry/wet rate (Kalthoff et al., 2006). These changes have been more important in the Quaternary and in the semiarid zone (Betancourt et al., 2000; Bobst et al., 2001; Grosjean and Nuñez, 1994; Grosjean et al., 1995; Geych et al., 1999; Grosjean, 2001; Grosjean et al., 2003; Latorre et al., 2003). The recent regional rain precipitation is controlled by the seasonal rainfall in the Andes (>2800 m) and by the coastal fog influences in the western margin (<1000 m).

The western margin of the Atacama is directly influenced by a coastal fog that, in topographic favorable conditions, penetrates inland up to 1 km (Schemenauer and Cereceda, 1991, 1992). The eastern margin is located in the PB and is characterized by changes of climatic conditions (to semiarid, ~3000 m) with the presence of sparse xerophytic flora (Grosjean et al., 2003; Latorre et al., 2003; Rech et al., 2003; Sillitoe and McKee, 1996). Hyperarid conditions occur in the CD between the CR and DR. In this area the precipitation is less than 10 mm/yr; measurable rainfall (1 mm or more) may be as infrequent as once in every 5–20 yr (Goudie et al., 2002). These conditions do not permit the presence of vascular plants, and only maintain, in specific places, a few microbes (Cameron et al., 1966; Quinn et al., 2003). The arid conditions occur in the western margin and principally in all the coastal areas where occasional winter rainfall and marine fog precipitation take place (Latorre et al., 2003).

Nitrate and salar salts reflective of extreme aridity are abundant in the central part of Atacama but are only located in well-defined areas (Ericksen, 1981, 1983, 1994; Searl and Rankin, 1993; Mpodozis et al., 2005). Salar salts (Mpodozis et al., 2005) are concentrated in the PB and in some places in the CD. These deposits are formed in response to the extreme desiccation conditions of interior lakes, which are supplied by the groundwater flows from the Andes or regional aquifers.

## *2.3. Strewnfield distribution patterns and find location features*

As previously defined, the distribution of meteorites in the Atacama Desert reflects a particular pattern (Fig. 1). The degree of sample weathering is variable from one place to another. The find sites are principally concentrated in the CD. Most of them coincide with

ancient mining industries (metallic or non-metallic) or are located near to towns, rail stations, tracks or human settlements (Fig. 1). Geomorphologically, all these sites have common general features. They are located on the “pampa”, which are flat extended plains with very little bare rock outcrops and minimal camouflaging ground cover. The lack of recent fluvial activity and a drainage system is a typical feature of this region. At this area, all meteorites were found near to salars (the term which is utilized here as a geomorphologic expression of the salar salts or nitrate deposits), on old alluvial fans, on gravel valley fill deposits or simply on the regolith (specimens collected on hills or in outcrop fields are extremely scarce). Generally, the *pampas* present a gypsum–anhydrite uppermost layer which is variably distributed, roughly displaying uniform salt composition (Palacios et al., 2005).

The find locations in the CR can be defined as coastal (< 150 m), midland (150–1000 m) and highland meteorite find sites (> 1000 m). The coastal find sites are commonly situated on old marine terraces or on alluvial fans. All meteorites from the midland and highland sites were collected on regolith veneered hills slopes, on alluvial fans or on regolith–gravel filled small basins.

The most productive find location area is the Mejillones peninsula (in CR-coastal find sites) (Scherer and Delisle, 1992; Zolensky et al., 1995b) where multiple samples have been collected from 1876 (principally since 1986). They can be grouped into 12 distinct meteorites (10 stones and two irons). Eight of the total samples scattered across an area of ~5 km<sup>2</sup> have been collected only in the Pampa site (Grady, 2000; Grossman and Zipfel, 2001; Zolensky et al., 1995b).

The main geomorphologic feature of the Pampa site (and generally of the N–NE side of the peninsula) is related to a tectonic elevated marine terrace that consists of a set of deflation bowls within a flat plain (Zolensky et al., 1995b). Two principal surface geomorphologic features can be recognized: (1) sites characterized by rounded and semi-angular weathered pebbles, along with a variable amount of silts and sands surfaces (regs or similar) and (2) other places in which the presence of microdune fields (ergs) predominate. The mineralogical composition of the uppermost layers of these sites is characterized by the presence of gypsum, anhydrite, halite, calcite and nitratine. In major cases, all meteorite searches were undertaken using jeeps or motorcycles (Zolensky et al., 1995b); only in very special situations, was the search carried out by foot.

Recently, a new find location was discovered by two of us (C.M. and J.C.) and another colleague: R. Martínez. Two unpaired ordinary chondrites, La Yesera 001 and La Yesera 002, were found (Russell et al., 2004). The local characteristics of this new location are broadly similar to those observed in the Pampa site; the only difference is the high salt content of the sediments, which is related to the presence of an overlying gypsum layer. The Mejillones peninsula (~1100 km<sup>2</sup>) is still largely unexplored and future organized field expeditions in search of meteorites are expected to be highly successful.

Finally, whatever the meteorite find location, all samples were collected on the desert surface and generally: (1) showed more than a quarter of their body exposed; (2) underwent some sign of terrestrial weathering; (3) the stone meteorites have a brownish desert-varnish (Lee and Bland, 2003) on hand specimen; (4) are non-oriented pieces and (5) are members of a greater mass distributed in a certain place. Recent expeditions with the objectives of revisited old find sites have resulted in the rediscoveries of numerous new fragments of the same samples and, in certain cases, new meteorites were collected (e.g., Vaca Muerta) (Killgore, 1997; Pedersen et al., 1992; Scorzelli et al., 2000).

### 3. Discussion and final considerations

An over-simplistic analysis of the meteorite distributions would indicate that the controlling factors for meteorite recovery are only social, economic and geographic (e.g. human settlements density, quantity of mines industries and exploration, accessibility to find locations areas, etc.), which clearly is not the case. On the contrary, the facts that stony meteorites are represented with normal frequency only in recent finds and in specific places could be due to: (a) the effects of the relatively recent interest in Chile for the recovery of meteorites, and (b) that only small academic groups and private collectors are participating in the identification and exploration of new potential find locations. In addition, it is also important to note that, until now, all the new potential find locations were selected on the basis of old meteorite finds, favorable geomorphological features and geographical setting, while other possible factors involved were not fully considered.

In broad terms, a number of alterations of meteorites have been described, including mineralogical and chemical changes (e.g. Crozaz and Wadhwa, 2001; Crozaz and Floss, 2002, and references therein). Through weathering, Fe-bearing minerals are progressively altered into clays and iron oxides and hydroxides, which often fill cracks and mineral fractures, together with terrestrial quartz and carbonates.

Our review allows us to suggest that the distribution of find locations in Atacama Desert is not as simple as it would seem on a first approach, and therefore its potentiality as a significant meteorite accumulation zone cannot be evaluated, in a simple way, as was described by Scherer and Delisle (1992). One of the key points are the Atacama salt phases. It is well known that salt phases are important agents in the desert weathering process (Goudie and Parker, 1998; Goudie et al., 2002) and have a crucial importance in meteorite weathering (Bland et al., 1998). Laboratory experiments have demonstrated that the fog–salt interaction is the principal agent of surface weathering in hot salt deserts and that the salts themselves have a less significant role in the absence of water (Goudie and Parker, 1998; Goudie et al., 2002).

The Atacama Desert, as all the hot desert areas with arid–hyperarid conditions, has highly saline regoliths which are mainly composed of gypsum–anhydrite and traces of other salts (Berger and Cooke, 1997; Bland et al., 1998; Goudie and Parker, 1998; Goudie et al., 2002; Palacios et al., 2005; Rech et al., 2003; Risacher et al., 2003). These mineral phases are variably distributed within the different morphotectonic units described above and their presence is the result of prolonged hyperaridity (since mid-Miocene) and extremely stable land surfaces (Hartley and Chong, 2002; Rech et al., 2003). Therefore the soils, regoliths or desert surfaces of the find locations have different quantities of salts of diverse origin (Rech et al., 2003) and are affected by different levels of local precipitation or water supply. As previously defined, the CR is directly affected by the coastal fog and its influence varies markedly between different localities in relation to the topographic frame and the elevations. The most important influence of the fog is concentrated in the coastal zone. Thus, the local high frequency of recovered L chondrites in the Pampa site (Zolensky et al., 1995b) has been interpreted as a greater resistance of this type of meteorites to chemical weathering (Bland et al., 1998; Zolensky et al., 1995b). The fact that the frequency of recovered meteorites in this site is normal (in relation to those described in the CD) means that the productivity of this site is directly related to the higher number of meteorite recovery expeditions. The new find site found by us should show this pattern, although the gypsum rich regolith possibly could modify it.

The high frequency of iron meteorites in the CD could simply be a consequence of their easy visualization on the desert surface, although our work suggests that the same factors described before are also operating here. The CD is virtually not affected by the coastal fog in topographic favorable conditions. Nevertheless, it is important to note that the saline regoliths are more abundant than in the CR. Considering the experimental results obtained by Goudie and Viles (1995), Goudie et al. (1997), Goudie and Parker (1998) and Goudie et al. (2002) and accepting that the salt content is not an important agent of weathering in the absence of water, we should expect that the distribution and frequency of meteorites in CD were mainly controlled by the variation/availability of these two factors (salts and water). In sites where both salts and near surface underground waters (or locally fog influence) are present, we should expect poor meteorite recovery areas, characterized by a high frequency of iron meteorites. By contrast, in other sites, we predict that productivity should be higher, but always in quantities according to the local conditions. The results obtained by Goudie and Viles (1995), Goudie et al. (1997), Goudie and Parker (1998) and Goudie et al. (2002) (although restricted to sodium chloride and sodium nitrate as principal salt phases) are coherent with the general pattern of distribution of meteorites in Atacama Desert. For instance, iron meteorites that were found into the salars (or very close to them) are in general highly weathered, and only few stone meteorites were found in recent times. The permanent presence of groundwater and the almost continuous precipitation of salts create highly aggressive ground conditions that rapidly weather and destroy any stone meteorite.

The famous Vaca Muerta find location area is situated in the eastern limits of CR and affected by local coastal fog. Pedersen et al. (1992) stress that the weathering degree of different fragments varies according to the physical setting where the meteorites were found. They mentioned that meteorites that were found buried into the regolith were notably more weathered than the specimens recovered on the surface. This shows that the fog alone has a minimal weathering effect in comparison to the salt–water interaction effect. The stone meteorites that were found in the eastern limits of CR, and that are not affected by the fog influence, have an apparently lower weathering degree than the meteorites found in the coastal zone. H chondrites are (also apparently) more abundant.

It is interesting to note that the sodium chloride and sodium nitrate have a more intense weathering effect than the sulfates (e.g. gypsum–anhydrite). This is because the first ones are highly soluble ionic compounds and therefore their tendency is to form stronger electrolytes than the sulfates. Thermodynamically, the values of standard free energy of formation ( $\Delta G^\circ F$ ) (Robie et al., 1978) and the constants solubility products (kps) (Weast, 1985) at standard conditions (i.e. supergene conditions) confirm this point. Given that sulfates (gypsum–anhydrite) are the principal salts in the Atacama regolith (Palacios et al., 2005), and considering that sodium chloride and sodium nitrate are restricted to salar salt and nitrate deposits, the distribution of meteorites in the Atacama Desert is therefore directly related to the action of sulfates (gypsum–anhydrite)–water weathering processes.

Finally, it is interesting to emphasize that other hot desert localities, that are highly successful meteorite find sites, have a complex paleoclimate history in relation to Atacama Desert. For example, Roosevelt County, Sahara and Nullarbor Region have experienced several humid/arid cycles over the last 40 ka (Bland et al., 1998). Likewise, the surfaces stabilities of the principal hot desert meteorites find sites are relatively young. The Nullarbor Region, for example, with a 30 ka stable land surfaces has one of the oldest meteorite accumulation surfaces (Bland et al., 2000).

In conclusion, the dimensions of the Atacama Desert, the permanent hyperarid conditions, the extremely stable mature landscape, the extremely old terrestrial age of certain samples (e.g. Tamarugal: 1.5 Ma; Vilcsek and Wanke, 1963), the wide distribution of meteorites within it and the extremely interesting mineralogical processes, which are involved in the “control” of specific find distribution patterns, make Atacama a significant meteorite accumulation hot desert. The present review indicates that, not all places of the Atacama Desert have the geomorphological features favorable for recovery of meteorites, but within the different morphotectonics units described above, it is possible to identify many interesting places for future recovery operations. The scarce number of meteorite samples recovered till now versus other hot desert areas only reflects the small number of expeditions of searching for meteorites (just a small group of private collectors). As it is indicated in the outstanding work of Bland et al. (1997) “meteorites are not only a unique geological material which opens a window on processes occurring during the formation of the solar system. They also may be of value to an understanding of various aspects of the terrestrial environment, from constraining geomorphic processes, surface stability, and timing of deflation to quantifying differences in weathering rate in diverse climatic regimes”. Atacama Desert meteorites are a perfect example of this.

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