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IMPACT STUDIES IN LATIN AMERICA

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We review the studies about impact processes recently done in Latin America.

The research about impact process of extraterrestrial bodies onto the Earth is a new subject in only a few institutes in Latin America. A proof of that is the scarcity of recognised impact structures in the region. In Fig. 1 we mark with dots the 10 proven impact structures in South America, and with crosses a few proposed ones.

The very few known craters in the region is only another consequence of the low investment in scientific research among these countries. Regions with GDP *per capita* over $\sim$ 30000 USD (like Europe, North America and Australia) have a density of 2.5 to 6 crater per 1000 km^2; while regions with GDP *per capita* less than 10000 USD (like South America, Africa and Asia) have less than 1 crater per 1000 km^2.

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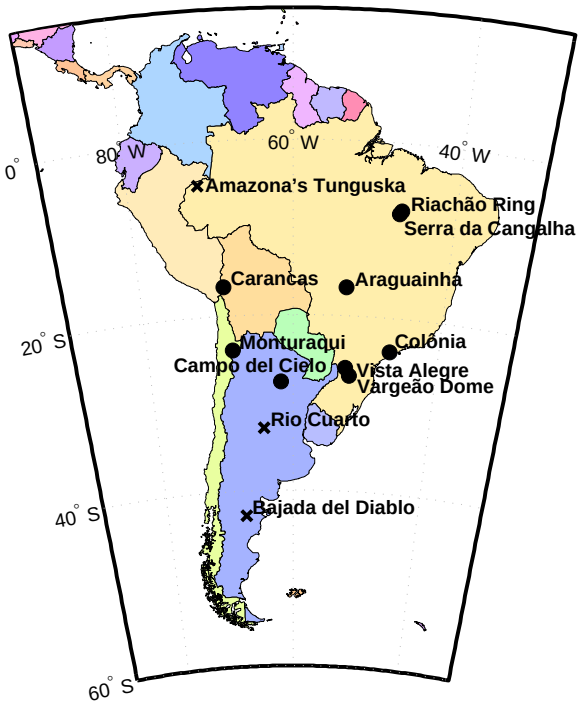

Fig. 1.

Nevertheless, we have among the most interesting features on Earth, like the meteorite strewn fields of Campo del Cielo (Chaco, Argentina) and the recently formed small crater of Carancas (Perú).

Carancas was the first crater formation process directly observed by several witnesses as well as the first unambiguous seismic recording of a meteoroid impact on Earth, which occurred in September, 15, 2007 (Tancredi *et al.*, 2009). A $\sim$1 meter ordinary chondrite meteorite impacted the ground at hypervelocity, after surviving the passage through the atmosphere. An event that challenges our present knowledge of impact processes.

In addition to the well-known meteorite strewn fields of Campo del Cielo, two other multi-crater structures in Argentina have been proposed to be associated with impact events: the double crater in Rio Cuarto (Córdoba) (Schultz & Lianza, 1992) and the multi-crater strewn field of Bajada del Diablo (Neuquén) (Acevedo *et al.*, 2009). Nevertheless, both cases has been strongly criticised by other colleagues and they deserve further and detailed studies. These cases are relevant to the ongoing discussion about the internal structure of the small solar system bodies; whether they are monolithic or an agglomerate of small pieces.

A few groups have also been involved in laboratory and theoretical studies about impact processes. Using numerical simulations Tancredi *et al.* (2012) have modelled the behaviour of granular material in low-gravity environments, like the surface and interior of small asteroids and comets. They found that seismic shaking due to impacts of m to 10m size projectiles is a relevant effect for objects of a few kms, which could produce size segregation and the ejection of particles from the surface at velocities comparable to the escape velocity.

These questions have important implications regarding the plans to deflect a threatening asteroid and the risk and consequences of small impactors.

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