PROVEN, PROBABLE AND POSSIBLE IMPACT CRATERS IN SOUTH AMERICA REVEALED BY ASTER AND SRTM DATA AND IMAGE PROCESSING TECHNIQUES

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Introduction: South America (SA) is the continent where less impact craters have been detected on Earth so far, despite the availability of ample and long-standing, stable target areas. In and around the Parnaíba basin in northern Brazil, proven impacts include Serra da Cangalha and Riachão, whereas probable impacts are São Miguel do Tapuio (5º38`S; 41º24`W; d=20 km; impact affected Neo-Devonian rocks [1]), Gilbués (10º11'S, 45º15'W; d=10km; impact affected Carboniferous rocks [2]), Inajah (8º40`S; 51º00`W; d=6 km; impact affected Paleoproterozoic metamorphic rocks [3]). Araguainha is the largest and the only described and proven crater in central SA. Within the Paraná Basin in Brazil, apart from the well-defined Vargeão crater, there are two additional possible craters in this domain named Cerro Jarau (30º12`S, 56º32`W; d=10 Km) and Piratininga (22º30`S, 49º10`W; d=12km), which were also formed on Cretaceous rocks [4]. Still in the SA Phanerozoic cover, the Campo del Cielo craters and a possible feature around the Rio Cuarto region, both in Argentina, are well documented in the literature [5][6] . Other possible impacts in SA are: Colonia (23º48`, 46º 42`W; d= 3,6km; feature forming a depression nearby the city of São Paulo [7]), Aimores (19º25'S, 41º03'W; d=10km), Ubatuba (23º19'S, 44º54'W; d=1km [8]), Curuçá (5º11'S, 71º38'W; d=1km; impact event: 13 August, 1930 [9]). The Monturaqui is the only authentic crater described in Chile. The Araona (d=8km) in Bolivia has also been investigated as a product of an impact. This brief review, particularly about possible craters in SA, shows the need not only to enhance the present knowledge on these sites but also to search for data and techniques that may foster new findings in the continent.

Data and Methods: In this work, we employed data from the Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER: 14 spectral bands) and the Shuttle Radar Topographic Mission (SRTM) to investigate these possible craters in detail, bringing new information about them and other possible impacts in SA. Specially designed algorithms for generation of high resolution DEMs (15-90m) and spectral information assembly from ASTER data were developed as part of this work and successfully used to map >10 new impact-like structures in SA.

Discussions: Although several signatures extracted from remote sensing data suggests that many of these observed features are promising and good candidates to be genuine craters, field work and a suitable description of impact products are yet needed to confirm their authenticy.

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