Introduction: The Central Andes of Peru, Bolivia, and northern Argentina exhibit some of the thickest and most complete Paleozoic stratigraphic sequences in South America. A maximum total composite thickness exceeding 15 km was deposited during the Paleozoic at what then was the active margin of Gondwana, recording important geodynamic, paleogeographic and paleoclimatic events. The Paleozoic record of the Central Andes includes two conspicuous diamictite units with fairly well constrained ages: latest Ordovician-earliest Silurian, and latest Devonian. The coincidence of the time of deposition of these two units with important known periods of global climatic, eustatic and biotic changes has traditionally fostered their interpretation as a result of glaciations. Despite the many recent advances, knowledge about these units is still very limited with regard to detailed sedimentology, geochemistry and biostratigraphy, but presents wide possibilities for future research. The reconstruction of the Paleozoic basins in South America (Fig. 1) identifies large areas of marginal and intracratonic basins, although the Paleozoic stratigraphic record is poorly preserved in most of them, due to later deformation and erosion. The study of the Paleozoic of the Central Andes has undergone important advances during the last two decades. In this paper I attempt to summarize the evidence regarding the Paleozoic diamictites, to review their interpretation, and to propose future lines of research. Whereas interpretations such as local tectonism and/or glaciation have traditionally been accepted, meteorite impacts have never been considered as an alternative interpretation. Evidence described below shows that they may be related with impact events.

The mid-Paleozoic basin of the Central Andes of Peru and Bolivia (Peru-Bolivia basin) extended southwards into northern Argentina and western Paraguay, connecting with the Paraná basin through the Asunción Arch. To the north, it continued into Ecuador, connecting with the mid Paleozoic record of Colombia and Venezuela, and into Brazil (Solimões and Amazonas basins) to the northeast (Fig. 1). The mid Paleozoic Peru-Bolivia basin has been interpreted as a foreland basin [1-4] located in a retroarc position with respect to the magmatic arc represented by (a) the San Nicolás batholith along the southern Peruvian coast [5], and (b) other igneous rocks in northern Chile [6].

Latest Ordovician-earliest Silurian diamictites: These diamictites extend throughout the Central Andes, from Peru to Argentina, as a conspicuous unit within the otherwise monotonous siliciclastic Ordovician-Silurian package. It is called San Gabán Fm. in central and southern Peru, Cancañiri Fm. in Bolivia, and Zapla Fm. in northern Argentina [7]. The total modern extent of the outcrop area exceeds 1500 km in length (NNW-SSE) and 600 km in width (WSW-ESE). It consists of diamictites, sandstones and mudstones interpreted as submarine resedimented material (debris flows, slide slabs, slumps, turbidites, etc.) [8,9]. The lower contact is a disconformity or slight regional unconformity (locally angular unconformity) overlying different Ordovician units ranging in age from Tremadocian to Ashgillian [10]. A precise age has not yet been determined and is still under discussion due to the frequent recycled character of fossils and lack of detailed studies. In Brazil, equivalent units have been dated as Llandovery [11], whereas in northern Argentina most authors assign a late Ashgillian age. The thickness varies greatly from a few meters or not being present at all, to more than 1500 m. Apart from the large intrabasinal resedimentation...
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mented clasts, boulders and slabs, the diamictite unit also includes faceted and estriated polymictic extra-
clasts, mostly composed of sedimentary rocks, but also out-sized clasts of igneous plutonic rocks which may exceed 2 m in diameter. The source of the sediments is interpreted to be located towards the SW, as indicated by the increase in clast size and thickness of the unit [3,8,9]. The depocenter of the diamictite unit is located in southern Bolivia, coinciding with the area where striated clasts are more frequent.

**Latest Devonian diamictites:** A diamictite unit is present in the northern Bolivian Altiplano (Cumaná Fm.; Fig. 2) and parts of the Bolivian Eastern Cordillera and Sub-Andes (Toregua and Itacua Fms.) near the Devonian-Carboniferous boundary [12-14]. Together with the previously mentioned Cancañiri Fm., it is also a rather conspicuous unit within the otherwise monotonous mid-Paleozoic siliciclastic package.

The total modern extent of the outcrop area of these latest Devonian diamictites is around 1000 km in length (NNW-SSE) and 600 km in width (WSW-ESE). It mostly consists of diamictites, with few sandstone and mudstone interbeds, and is interpreted as submarine resedimented material (debris flows, slided slabs, slumps, turbidites, etc.) related with local tectonism [14,15]. The lower contact is a disconformity or slight regional unconformity overlying mid or late Devonian units. A precise age of late Famennian (Fa 2c-d, palynozone PL) has been determined by means of detailed palynology [15-17]. The thickness varies greatly from not present at all, to 120 m. As with the previous unit, faceted and striated clasts are frequent, and mostly composed of resedimented intrabasinal siliciclastic sedimentary rocks. Other lithologies are also present, such as metamorphic and igneous plutonic and volcanic rocks. Granite boulders may exceed 4 m in diameter. In the N Altiplano and N Eastern Cordillera, thickness and clast size increase towards the SE, identifying a probable source towards the south.

According to all the evidence, and also considering recent proposals for the reassessment of diamictite units [18-20], both diamictite units are excellent candidates to be impact deposits, and research should be pursued considering this possibility.

**References:**