GLASS STREWNFIELD PRODUCED BY DRY VEGETATION FIRES RATHER THAN AIRBURST: A CASE STUDY FROM ATACAMA

P. Roperch[1], J. Gattacceca[2], M.Valenzuela[3], B. Devouard[2], J.P.Lorand[4], C. Arriagada[5], P. Rochette[2], C. Latorre[3], P. Beck[7]. [1] Géosciences Rennes, France, [2] CEREGE, Aix-en-Provence, France, [3] Universita Catolica de Chile, Santiago, Chile, [4] LPG, Nantes, France, [5] Universita de Chile, Santiago, Chile, [6] IPAG Grenoble, France.

We described in [1] extended occurrences of unusual silicate glass surface layers from the Atacama Desert (Chile). These glasses, found near the town of Pica at four localities separated by up to 70 km, are neither fulgurites, nor volcanic glasses, nor metallurgical slags related to anthropic activity, but show close similarities to other glasses that have been previously attributed to large airbursts created by meteoroids entering the Earth's atmosphere. The glasses are restricted to specific Late Pleistocene terrains: paleo-wetlands and soils rich in organic matter with SiO_2-rich plant remains, salts and carbonates. ^{14}C dating and paleomagnetic data indicate that the glasses were formed during at least two distinct periods in the 12 to 15 ka interval. This rules out the hypothesis of a single large airburst as the cause of surface melting. Instead, burning of organic-rich soils in dried-out grassy wetlands during climate oscillations between wet and dry periods can account for the formation of the Pica glasses.

The reducing combustion condition produced iron sulphides, phosphides, carbides and metal droplets in the glass; these are usually taken as evidence for ET contamination, but no trace of Ni or other highly siderophile elements (e.g. Ir, Pt) were detected. Plant imprints are numerous in the Pica glass, as observed in the Dakhleh (Egypt), Pampa (Argentina) and Edowie (Australia) glasses of presumed impact origin [2-4]. As for Pica, the glass distribution appears restricted to the paleohumid depressions in both Edowie and Dakhleh cases. In case of an airburst this topographic control cannot be explained. We therefore propose to reevaluate previously published evidence for glass strewnfields attributed to airbursts [2-5] in the light of the Pica glass study.

[1] Roperch et al. (2017) *EPSL* 469:15-26. *Meteoritics & Planetary Science* 32:A74. [2] Osinski, G. R. *et al.* (2008) *Meteorit. Planet. Sci.* **43,** 2089–2107 [3] Schultz, et al. (2014) *Geology* **42,** 515–518 [4] Haines, P. W. et al. (2001) *Geology* **29,** 899 [5] Pigati, J. S. *et al.* (2012) *Proc. Natl. Acad. Sci.* **109,** 7208–7212