A possible 5 km impact structure in the Alhabia–Tabernas Basin, SE Spain

The Tabernas–Alhabia Basin is a structural depression situated in the province of Almería, southeastern Spain. The basin is filled with Neogene, Pliocene, and Pleistocene sediments resting discordantly on a Paleozoic metamorphic basement. During the marine Tortonian sedimentation, a bed of breccia (Gordo megabed) was formed. It consists of rotated sedimentary megablocks commonly capped and/or surrounded by a polymict breccia composed mainly of up to dm-sized clasts of the crystalline (schist) basement. Linked to the formation of the Gordo megabed is a ~5 km wide, rimmed depression with exposed breccias on the northern flank of the Sierra de Gádor mountain. In the northern sector, this crater-like structure opens toward the Gordo megabed of the Tabernas Basin. In the southern sector, overturned strata transform outward into a putative ejecta layer. In the interior of the structure, there are occurrences of graded breccia and arenite superposed on a blocky, autochthonous breccia indicating an aquatic target setting. The geological relation between rocks (e.g. breccias) and structures (e.g. overturned strata), mineralogical shock metamorphic evidence, potential shatter cones, and a high Ir anomaly (~500 ppb) support an impact origin.