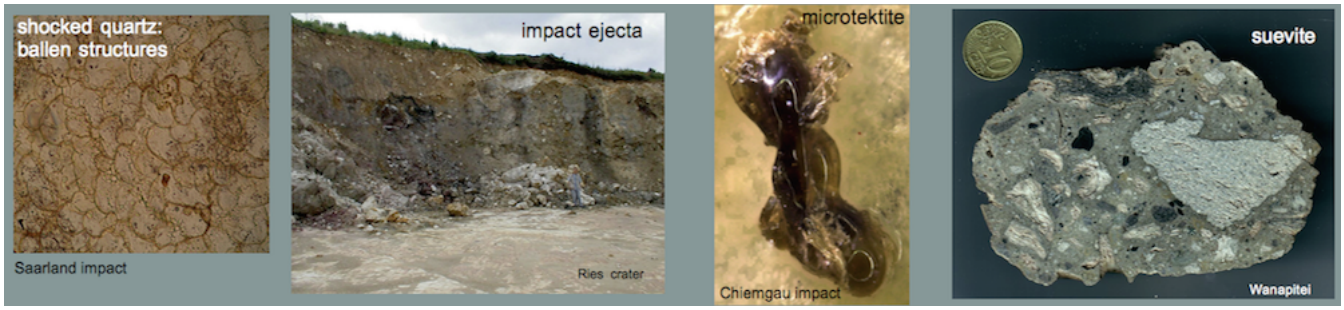

"Earth's Impact Events Through Geologic Times": Comment on Schmieder & Kring article in Astrobiology

Comment on: " Schmieder, M. and Kring, D. A. (2020) Earth's Impact Events Through Geologic Time: A List of Recommended Ages for Terrestrial Impact Structures and Deposits. – Astrobiology, 20, 91-141."

by Kord Ernstson[1] & Ferran Claudin[2] (Jan. 2021)

Abstract: We use Schmieder and Kring's article to show how science still works within the so-called "impact community" and how scientific data are manipulated and "rubber-stamped" by reviewers (here, e.g., C. Koeberl and G. Osinski). We accuse the authors of continuing to list the Azuara and Rubielos de la Cérida impact structures and one of the world's most prominent ejecta occurrences of the Pelarda Fm. in Spain

as non-existent in the compilation. The same applies to the spectacular Chiemgau impact in Germany, which has been proven by all impact criteria for several years. For the authors' dating list, we propose that the multiple impact of Azuara is included together with the crater chain of the Rubielos de la Cérida impact basin as a dated candidate for the third, so far undated impact markers in the Massignano outcrop in Italy.

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1 Introduction

In their article the authors use the habitual attitude in the "impact community(e.g. French and Koeberl 2010, Reimold et al. 2014) to treat the Spanish impacts of the Azuara event with the formation of the ca. 40 km-diameter Azuara crater and the ca. 80 km x 40 km-diameter Rubielos de la Cérida impact basin with the lined up chain of craters as non-existent, pointing out that they are not listed in the Canadian impact database as proven, although the huge and easily accessible impact findings for both structures (apart from the manifold geologic and geophysical evidence like ubiquitous monomictic and polymictic breccias, large systems of monomictic and polymictic breccia dikes, enormous and extended megabreccias, shatter cones, extended impact ejecta, gravity and geomagnetic anomalies, the unambiguously established shock metamorphism like shock melt, planar deformation features (PDFs, Therriault 2000) and diaplectic glass in various minerals) exceed in quantity, significance and importance for the international research the impact evidence for more than an estimated 90% of all structures listed as proven in the Canadian database.

We have repeatedly pointed out this untenable state of affairs in recent years, after the database was continued under John Spray at the University of New Brunswick in 2001 and Azuara was kicked out of the database and references to the Spanish proven impacts were dismissed with incredible, one must say impudence (John Spray: " You can send me publication offprints on the Spanish structures, but I won't look at them"). Why this is so and has developed, insiders know, and that this has nothing to

do with science but with purely personal campaigns of some leading people from the so-called “impact community”, we have made clear several times on these our web pages, which can be read with appropriate search words.

And exactly here the article of Schmieder and Kring is to be classified, which refers to “proven impacts (of the Canadian data base)” and sees a fine opportunity to ignore once more the Spanish impacts and also the Chiemgau impact, whereby here the attribute “proven” does not possess a jot of scientific significance and raises the actually superfluous question WHO has PROVEN the impact nature. The database? Can a data base provide a scientific proof? John Spray? Can John Spray provide evidence for the 200 or so structures listed? Can the “impact community” provide the evidence? Who or what is the “impact community”? That actually forces long ago that all publications, which refer to impacts “proved” by the Canadian data base, describe that first scientifically justified and correctly.

In the following text we omit the extensive citations to the Spanish impact structures and to the Chiemgau impact, in order not to interrupt permanently and to allow a more fluent reading. Following the text, the relevant literature citations to both complexes are then compiled with many links.

2 Dating the Azuara – Rubielos de la Cérida impact event: *Upper Eocene to Oligocene*

A stratigraphically plausible age for the Spanish giant impact was already given 20 years ago, and for the sake of simplicity we quote the corresponding paragraph from the comprehensive article (which can be clicked here):

The mid-Tertiary Azuara and Rubielos de la Cérida paired impact structures (Spain) by Kord ERNSTSON, Fernando CLAUDIN, Ulrich SCHÜSSLER and Klaudia HRADIL

THE AGE OF THE IMPACT EVENT

No radiometric absolute age is so far available for the Azuara and Rubielos de la Cérida impacts. The advanced corrosion of the glass from the impact melt rocks is expected to prevent any reliable dating.

A stratigraphic age may be addressed considering the youngest sediments affected by the impact, and the oldest undisturbed post-impact layers. A rough estimate is given by the stratigraphic position of the Pelarda Fm. ejecta at the boundary between the Lower Tertiary and the Upper Tertiary (Carls and Monninger, 1974; also see Fig. 3). According to this old and simple stratigraphic subdivision, the Lower Tertiary experienced the complete Alpidic tectonic movements, and the Upper Tertiary is the post-tectonic time, when the basins and valley systems formed with their sedimentary filling. Evidently, a comparable subdivision may apply to an impact event in this region.

Although the palaeontologic dating of Tertiary units in the Iberian chain has made progress, the stratigraphic dating still offers many problems. Explicitly, Perez et al., 1985) state that the outcrops in the zone are limited and that the rapid changes of the facies prevent the use of lithological guide beds for correlation purposes. Accordingly, the exact stratigraphic age of the impact will remain unresolved for the present.

From the sediments (units 55 – 57, in ITGE [1991]) exposed near Fonfría and Allueva and underlying the Pelarda Fm. ejecta, a lower limit is Upper Eocene or earliest Oligocene (unit 57). An upper limit is given by palaeontologic data. Foraminifera and ostracods in post-impact, Upper Tertiary gastropod marls, about 3 km north of Moneva in the Azuara structure, point to a Lower Miocene age (Doebl, in Gross, 1974). A dating of the gastropods themselves (Geyer, in Gwosdek, 1988) provides an Upper Rupelian or Chattian (Oligocene) age with a high degree of probability. A position at the base of the Aquitanian, however, cannot be excluded. A further upper-limit dating is given by gastropods (Potaminidae) in Upper Tertiary sandy limestones near Ventas de Muniesa in the Azuara structure. These gastropods lived between the Upper Eocene and the earliest Miocene (Geyer, in Mayer, 1990), which does not correspond with the Middle Miocene age for the respective unit "Areniscas en bancos, conglomerados no cementados y arcillas" in IGME (1981). The Middle Miocene age is not palaeontologically proven. Similar problems with Miocene ages are found also in the Rubielos de la Cérida structure. Unit 64 "Arcillas rojas, arenas y conglomerados" exposed south of Navarrete, is dated (ITGE, 1991) to be late Lower Miocene or Middle Miocene. Within this unit however, we observe strong structural deformations

with a pronounced horizontal component (large fault planes with prominent slickensides, excluding atectonic collapse structures by karstification). This implies either remarkable tectonics in the post-tectonic Upper Tertiary, a wrong stratigraphic classification, or an origin from the impact cratering process, which, on the other hand, is questioned by Cortes et al. (2002), Aurell et al. (1993), Aurell (1994), and others.

Disregarding these incompatibilities, we conclude from the lower and upper time limits given above, that the impact event very probably occurred in the Upper Eocene or Oligocene.

This age is interesting in that it would have made a good addition to Schmieder and Kring's list, as it could provide a possible answer to previously unanswered questions. One of the most remarkable outcrops for dating large impacts via horizons of distal impact ejecta is the outcrop of Massignano in Italy, where the Eocene – Oligocene transition is accompanied by several impact marker horizons close to each other, about which much has already been published (e.g. Koeberl 2009, and references therein). While the two major impact structures of Popigai (Russia) and Chesapeake (USA) can be assigned as probable distal ejecta suppliers to specific horizons, such relationships are lacking for other marker horizons. Linked to these findings, the question has also repeatedly arisen whether an accumulation of impact events with global distribution has occurred at the Eocene-Oligocene boundary (Eocene cluster) (e.g. Koeberl 2008, and references therein). Here, we argue that the two major candidates of Chesapeake and Popigai have distal ejecta suppliers with diameters of about 80 km and 100 km, respectively, with which the Spanish Azuara and Rubielos de La Cérida Impact event is at least on the same order of magnitude. Considering the proximity of northern Spain to Massignano in comparison to Popigai and Chesapeake, a new thinking about the impact markers there and an end-Eocene impact cluster would have a good and important place in impact research, but for this the Canadian database with John Spray and others from the "impact community" would also have to think about whether their permanent opposition and ignoring of one of the most important terrestrial impact structures does not permanently cause immense damage to science.

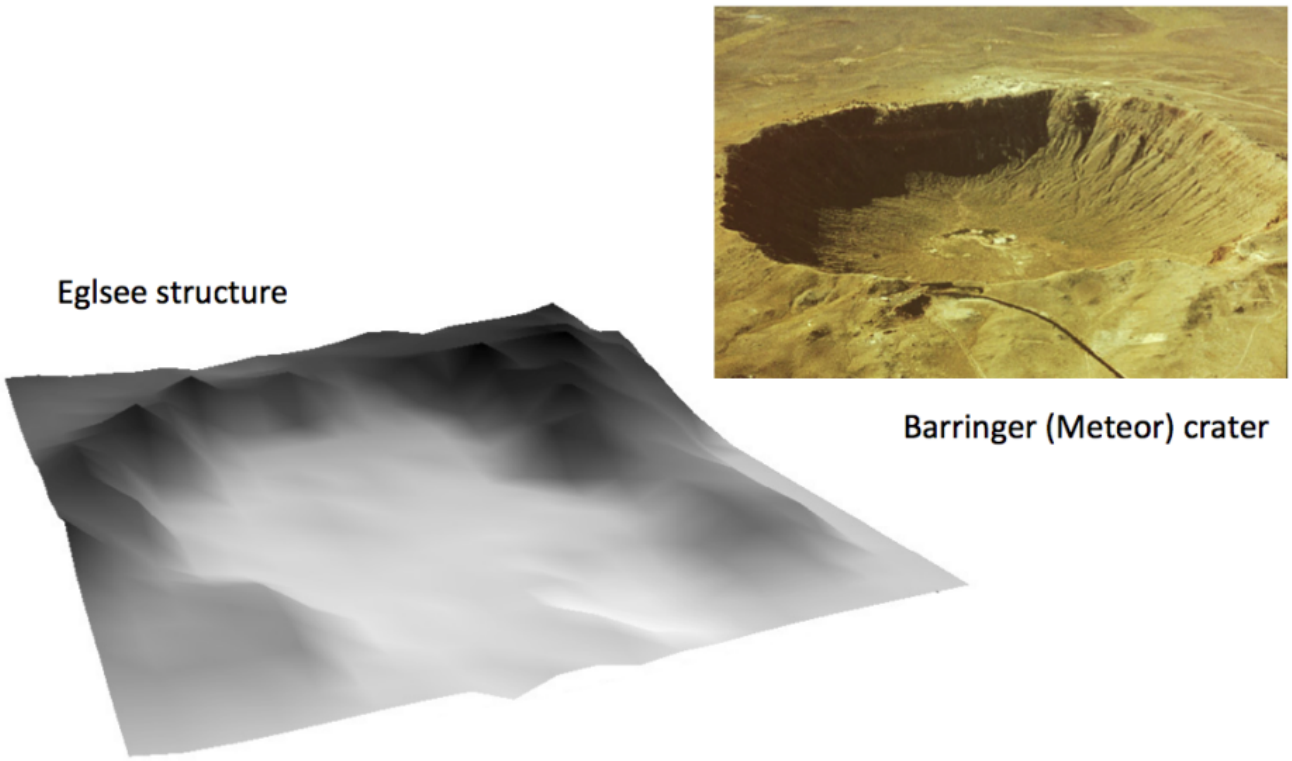
3 The dating of the Chiemgau impact (southeast Germany)

The perhaps worldwide most spectacular of the recently (since approx. 10 – 15 years) proven impacts with the large crater strewn field in southeast Germany – the Chiemgau impact – is missing (shall one say naturally?) also in the list of Schmieder and Kring with the reference to the Canadian database, where the impact – of course – is also not listed. Peer-reviewed publications and a bunch of papers at international conferences with all the evidence for an impact genesis (geology, geophysics, mineralogy-petrography, geomorphology, geochemistry, strong shock effects like PDF, diaplectic glasses, ballen structures in quartz, shatter cones, newly discovered nearly pure carbon impactites with diamonds and carbines (formation conditions 2,500 – 4,000 K, some GPa), a new class of iron silicide meteorites with excavated objects weighing up to 8 kg, and more. The craters determined with the digital terrain model add up meanwhile to roughly 200 in the 60 km x 30 km large strewn field with the largest crater Eglsee, which exceeds even with 1.3 km the Barringer crater. Published is furthermore about an enormous tsunami, which was triggered by the impact of a double projectile into Lake Chiemsee, about widespread microtektites, and much more. And all this is treated by the "impact community" by ignoring and silence as non-existent, instead of making sure that this spectacular event is spread in the "impact community". Here again also the list of Schmieder and Kring is addressed, in which the Chiemgau would have belonged compellingly, particularly since its age could be dated by newest investigations and a world-wide unique archaeological impact finding rather well on 900 – 600 B.C., which was published several times.

4 Conclusions

We do not know to what extent the authors had a free hand in compiling the "proven" impact structures according to the Canadian database and what influence e.g. the reviewers Koeberl, Osinski and an anonymous reviewer had to prevent e.g. the inclusion of the Spanish impact structures and the Chiemgau impact according to "proven manner". However, the publication in Astrobiology shows once more that even after 20 years it is still possible to block scientifically secured and exciting, partly spectacular findings in impact research with a most unpleasant influence on younger generations of researchers who are deprived of basic knowledge. We recall in this context episodes from the time when the impact structures of Azuara and Rubielos de la Cérida caused quite a stir in Spanish geology. When students of geology at the University of Madrid asked if they could do their exams with mapping (PhD, diploma)

in the newly discovered impact structures (from Internet they were best informed), they were told bluntly that they should definitely keep their hands off of the impact matter if they ever wanted to make a career in geology. Is this what leading members of the "impact community" are also striving to do – keep students and young researchers away from advances in science?



The Digital Terrain Model (DGM 1) for the 1.3 km-diameter Eglsee impact crater from the Chiemgau meteorite impact strewn field (Germany) and the 1.2 km-diameter Barringer crater (NASA).

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