strates the added value provided by the interpretation of seismic volumes, ascribing its genesis to meteor impact remains speculation. In the absence of independent supporting data, an origin through salt withdrawal is not only more plausible but also consistent with the geological history of the basin.

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doi: 10.1038/nature02476

1. Stewart, S. A. & Allen, P. J. *Nature* **418**, 520–523 (2002).
2. Jenyon, M. K. *J. Geol. Soc. Lond.* **145**, 445–454 (1988).
3. Maione, S. J. *The Leading Edge* **20**, 818–829 (2001).
4. Branney, M. J. *Bull. Volcanol.* **57**, 303–318 (1995).
5. Branney, M. J. & Gilbert, J. S. *Bull. Volcanol.* **57**, 293–302 (1995).
6. Wood, C. A. *Proc. Lunar. Planet. Sci.* **12a,** 173–180 (1981).

*Stewart and Allen reply* — The coincidence of the Silverpit crater and a Tertiary fold axis is curious. There can be no doubt that the regional folds are detachment structures accommodated by flow of Permian evaporites. It is quite straightforward, however, to demonstrate that the crater itself is not related to salt withdrawal as Underhill[1] proposes.

The Triassic strata, which separate the Silverpit structure from the Permian evaporites and contain minor evaporite layers, do not display any structures of a comparable wavelength or form to the Silverpit crater, which, as we and Underhill agree, is a sharp-edged structure in the top chalk[2]. In other words, there is no evidence for the Silverpit crater having formed by propagation of roof collapse from sub-Cretaceous level.

Unfolding or 'flattening' any of the key stratigraphic markers can further emphasize this, as previously approximated by presentation of a seismic section parallel to the fold axis[2] (a geometrically permissible approach due to radial symmetry of the crater). With the absence of short-wavelength structure in the stratigraphic markers in between the crater and the salt, there cannot be structural association between salt movement and crater formation. Indeed, all cross-sections including Underhill's Fig. 1b show that the crater is accommodated by volume loss in the Cretaceous section alone[2].

It is also worth noting that the main fold event is significantly younger than the crater, as recorded by a comparable degree of folding of the top Palaeocene and top Cretaceous (see ref. 2 and Underhill's Fig. 1b). Thus the crater was already fully formed, and buried, before the main episode of folding. Still, the puzzle of why the fold axis intersects the crater remains. We suggest the opposite sense of causality to that offered by Underhill. It is well known that flaws and weaknesses serve as nuclei and attractors for structural failure[3]. The Silverpit crater may have performed this role at a kilometre scale and been 'first to fail' during post-crater regional shortening, thereafter associated with the axis of an amplifying fold.

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doi: 10.1038/nature02480

1. Underhill, J.R. *Nature* doi:10.1038/nature02476 (2004).
2. Stewart, S. A. & Allen, P. J. *Nature* **418**, 520–523 (2002).
3. Kuksenko, V. et al. *Pure Appl. Geophys.* **146**, 253–263 (1996).