

Peer Review Report

Review Report on Formation of the Figge Maar seafloor crater during the 1964 B1 blowout in the German North Sea

Original Research, Earth Sci. Syst. Soc.

Reviewer: Kevin Meazell

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EVALUATION

Q 1 Please summarize the main findings of the study.

This study details the origins and consequences of an 550-m wide, drilling-induced seafloor crater in the German North Sea. The authors use a variety of geophysical methods to investigate the surficial expression and subsurface plumbing of the Figge Maar seafloor crater. They identify secondary fluid pathways that connected a deep gas reservoir to the shallow subsurface, where it erupted violently. The authors find that the crater has filled substantially since creation in 1964, and compare their results to those from previous studies. They also find that the crater presently continues to vent gas during low tides.

Q 2 Please highlight the limitations and strengths.

The strengths of this paper include the synthesis of multiple geophysical investigations, including seismic reflection, chirp profiles, and multibeam data to show the crater geometry at a variety of scales. The figures are beautiful and informative.

The limitations of this paper are mostly due to resolution/imaging issues making the interpretations less robust than if there were more clearly imaged fluid pathways. However, the study area is a hazard, and the venting gas obscures the deeper seismic data at no fault to the authors. It would be very helpful to include a pressure vs. depth plot, and some sort of well control, even if the well is quite far away.

Q 3 Please comment on the methods, results and data interpretation. If there are any objective errors, or if the conclusions are not supported, you should detail your concerns.

The methods are solid, but need to add the phase/polarity of the seismic data. A couple of the figures should be slightly altered for clarity as discussed below. I find no major errors in the results or interpretation. The conclusions are supported by the results and discussion.

Q 4 Check List

Is the English language of sufficient quality?

Yes.

Is the quality of the figures and tables satisfactory?

Yes.

Does the reference list cover the relevant literature adequately and in an unbiased manner?

Yes.

Are the statistical methods valid and correctly applied? (e.g. sample size, choice of test)

Not Applicable.

If relevant, are the methods sufficiently documented to allow replication studies?

Yes.

Are the data underlying the study available in either the article, supplement, or deposited in a repository? (Sequence/expression data, protein/molecule characterizations, annotations, and taxonomy data are required to be deposited in public repositories prior to publication)

Yes.

Does the study adhere to ethical standards including ethics committee approval and consent procedure?

Yes.

If relevant, have standard biosecurity and institutional safety procedures been adhered to?

Not Applicable.

Q 5 Please provide your detailed review report to the editor and authors (including any comments on the Q4 Check List):

Attached.

QUALITY ASSESSMENT

| | | | | | |
|---|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| Q 6 Originality | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Q 7 Rigor | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Q 8 Significance to the field | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Q 9 Interest to a general audience | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Q 10 Quality of the writing | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Q 11 Overall quality of the study | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |