



# **Introduction: Historical Earthquakes, Paleoseismology, Neotectonics and Seismic Hazard: New Insights and Suggested Procedures**

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This publication developed from the 5th International Colloquium on “Historical Earthquakes, Paleoseismology, Neotectonics and Seismic Hazard” which was held from 11 to 13 October 2017 at the Federal Institute for Geosciences and Natural Resources (BGR) in Hannover, Germany. In this colloquium, 75 experts from 17 countries presented and discussed recent results, ongoing studies and planned projects on the topics historical earthquakes, macroseismology, archeoseismology, paleoseismology, earthquake catalogues and databases, active faults, seismotectonics, neotectonics, and seismic hazard assessment.

This Colloquium was the continuation of a surprisingly successful series that began in 2013 in Paris, France with the Colloquium “Macroseismicity: sharing and use of historical data”. The need for an intensive collaboration and exchange was expressed and in 2014 the Colloquium on “Historical earthquakes and macroseismology - historical sources, methods and case studies” was organized in Freiburg, Germany. It was followed by the “International Colloquium on Major Historical Earthquakes of the Rhine Graben, Interplate - Intraplate Continental Deformation, From archives to comparative seismotectonics” 2015 in Strasbourg, France and the “4th International Colloquium on Historical Earthquakes and Macroseismology” 2016 in Vienna, Austria. Subsequent meetings have so far been the “Sixth International Colloquium on Historical earthquakes & paleoseismology studies, their contribution to the knowledge of the long-term seismic activity and to seismic hazard assessment” 2018 in Han-sur-Lesse, Belgium, and the “7th International Colloquium on Historical Earthquakes & Paleoseismology Studies - Past seismicity knowledge for today’s earthquake science” 2019 in Barcelona, Spain.

The 5th Colloquium in this series was organized by the “Seismic Hazard Assessment” Unit at BGR, the Institute of Geology of the Leibniz Universität Hannover, and the Neotectonics and Natural Hazards Group of RWTH Aachen University. Abstracts and presentations are available from the Colloquiums webpage: [https://www.bgr.bund.de/DE/Themen/Erdbeben-Gefahrungsanalysen/Veranstaltungen/HistEarth\\_Paleoseis\\_Okt2017/histEarth\\_paleoseis\\_2017\\_node.html](https://www.bgr.bund.de/DE/Themen/Erdbeben-Gefahrungsanalysen/Veranstaltungen/HistEarth_Paleoseis_Okt2017/histEarth_paleoseis_2017_node.html).

The present publication comprises four contributions:

The paper by Brüstle et al. (2020) is the result of several years of comprehensive work on the determination of macroseismic intensities as part of the compilation of a new earthquake catalogue for southwest Germany. For this purpose, the authors developed comprehensible methods for intensity assessment using EMS-98, which are presented here in full detail.

Damaging earthquakes are very rare events in Northern Germany and one of them, the so-called Alfhausen earthquake of 1770, has been under debate for three decades. Leydecker & Lehmann (2020) examine the observations for this event in detail in order to find out if it actually is an earthquake and which cause and strength may be determined.

Growing evidence shows, that earthquake occurrence in the plate interiors is episodic. Starting with a detailed description of the current state of knowledge on seismicity in Western Europe between the Lower Rhine Graben and the North Sea and its connection with fault zones and their deformation rates in the Quaternary, Camelbeeck et al. (2020) derives fundamentally different seismicity models between the Lower Rhine Graben on the one hand and the region west of it on the other.

Paleoseismology is an indispensable discipline to identify and date prehistoric large earthquakes by investigating their geologic evidence. Hürtgen et al. (2020) developed and present the first database of paleoseismic evidences in the area of Germany.

I would like to thank the Deutsche Gesellschaft für Erdbebeningenieurwesen und Baudynamik (DGEB) for the financial support that made this publication possible and Thomas Spies, Frank Wuttke and Volkmar Zabel for their basic support. The manuscripts were reviewed by the following colleagues: Anke Bebiolka, Klaus-Peter Bonjer, Uwe Braumann, Christa Hammerl, Diethelm Kaiser. The papers have been considerably improved as a result, and for this, I thank all of them sincerely.

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**Editor**

Dr. rer. nat. Diethelm Kaiser  
Bundesanstalt für Geowissenschaften und Rohstoffe,  
Hannover, Germany

**Publisher**

Deutsche Gesellschaft für Erdbebeningenieurwesen  
und Baudynamik (DGEB) e.V.  
Prof. Dr.-Ing. habil. Frank Wuttke  
c/o Christian-Albrechts-Universität zu Kiel  
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Ludewig-Meyn-Strasse 10  
24118 Kiel

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Umschlaggestaltung: Lena Haubner  
Lektorat, Korrektorat: Diethelm Kaiser

Cover image: Historical representation of earthquake  
impacts in Bielefeld 1612 (Alzenbach, 1612), Source:  
City Archive Bielefeld. Electronic Edition: Frankfurt  
a. M. : Stadt- und Universitätsbibliothek, 2002.  
urn:nbn:de:hebis:30:2-40162

ISBN 3-930108-14-3  
DOI: 10.23689/fidgeo-3860

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