

The Freiburg Group

Prof. Dr. Rüdiger Glaser
Dr. Dirk Riemann
Dr. Steffen Vogt
Department of Physical Geography
University of Freiburg, Germany

One major aim of our research is a deeper understanding of climatic and environmental changes in the past, present and future and its interaction with societies. The Freiburg group has long lasting experience and expertise in analysing climatic and environmental changes for the last 1200 years (Fig. 1, for further details see Glaser 2008, Glaser/Riemann, 2009). We combine methodologies from both humanities (critical source analysis, hermeneutic approaches) and natural sciences to use descriptive documentary data for climatological reconstructions. Over the last years the Freiburg group has also focused on the impact of climatic changes on societies in different cultural contexts employing concepts of vulnerability and resilience. We work towards the integration of the historical dimension in modern spatial planning processes such as flood risk management.

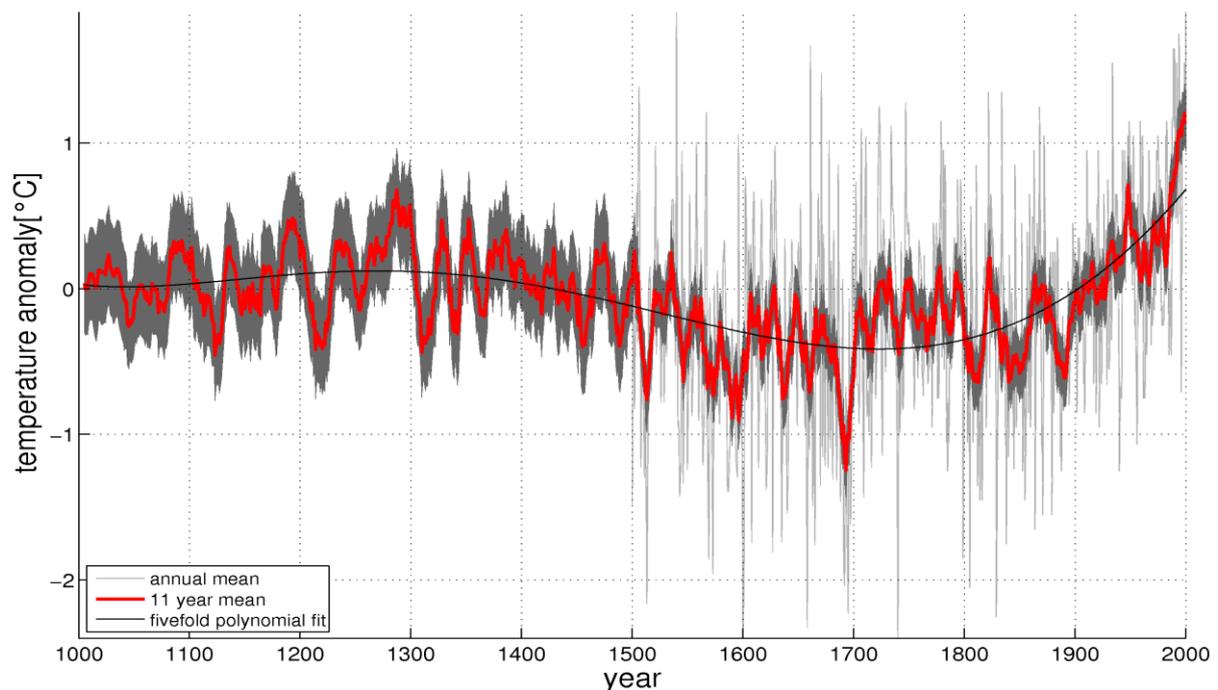


Fig. 1: Reconstructed temperature for Central Europe based on historical sources for the last 1000 years (Glaser/Riemann, 2009).

Recently completed research projects include the investigation of Europe's past climatic variability (as part of the Millennium project, funded by EU), the climate history of the Middle East from AD 800-1800 (funded by the German National Research Council), the development of a comprehensive database for Historical Climatology (Hisklid), climate variability and change: adaptation to drought in Bangladesh (funded by FAO), risk assessment of extreme precipitation in the coastal areas of Chennai as an element of catastrophe prevention (funded by GTZ), a trans-boundary analysis of flood risk management in historical perspective for France and Germany (TRANSRISK project, co-funded by the German National Research Council and the French National Agency for Research).

We have long lasting experience with data storage and handling for historical data. A major requirement is to provide spatially enabled repositories that ensure sustainable data archiving, provide open access to data and research results, and to stimulate the collaboration of researchers from different disciplines, places, and research interests.

The integration of diverse types of datasets from different regions and cultural contexts, groups and research fields requires collaborative work. The Freiburg group has experience in the development of virtual research environments (VRE) that facilitate such trans-disciplinary collaboration, especially in the field of historical climatology.

In an on-going research project funded by the German Research Foundation, a public accessible VRE was created enabling the collaborative work on information derived from historical sources. The integration and sustainable storage of existing data collections, as well as the entry of new data are core features of the system. The key data stored within the system is the original text containing relevant information on climate, environment and society together with a bibliographic reference for the quotation, information on place, time and the classified information on climate and environment derived from the quote. To ensure the acknowledgment of the scientific work of data contributors, all integrated data collections can be published and are citable by a DOI (digital object identifier).



Fig. 2: The virtual research environment www.tambora.org.

Our expectations for the meeting outcomes are

- How can our experiences from the development of tambora.org help in the creation of a digital archive that could facilitate collaborative meteorological and botanical research in the Indian Ocean World. Is it useful to link tambora.org with other resources/repositories that are relevant for the research? If so, how can this be achieved (e.g. by metadata harvesting, metasearch engines, ...)?
- Is our expertise in historical climatology in Central Europe and the Middle East applicable to the Indian Ocean World?
- Comparison of data sets from Europe and the Middle East with data from the Indian Ocean World would facilitate the investigation of teleconnections and global circulation patterns in historical perspective. We expect that an Indian Ocean World network would substantially improve the global data coverage of documentary records with climate related evidence.

Selected Publications

Borel F, Steller H: Tambora – die Entstehung einer virtuellen Forschungsumgebung. <http://www.b-i-t-online.de/heft/2012-05/fachbeitrag-borel.pdf>, last access: 2012-11-19

FAO / Department of Physical Geography, University of Freiburg: Climate and flood forecast applications in agriculture in Bangladesh (WEBGEO module developed in co-operation with the Food and Agriculture Organization of the United Nations (FAO)), http://www.webgeo.de/fw_1/, last access: 2012-11-19

Glaser R: Klimageschichte Mitteleuropas - 1200 Jahre Wetter, Klima, Katastrophen WBG, Darmstadt, 2008

Glaser S, Glaser R, Drescher A W, Pfeiffer C, Schliermann-Kraus E, Vencatesan J, Lechner M: Geo-communication for risk assessment and catastrophe prevention of flood events in the coastal areas of Chennai. Proceedings of the iEMSs Fourth Biennial Meeting: International Congress on Environmental Modelling and Software (iEMSs 2008). International Environmental Modelling and Software Society, Barcelona., 2008; 3: 1569-1573 (4th Biennial Meeting of iEMSs, July 7-10, 2008, Barcelona), Miquel Sànchez-Marrè, Javier Béjar, Joaquim Comas, Andrea E. Rizzoli, Giorgio Guariso (Ed.)

Glaser R, Militzer S, Walsh R: Weather and climate at Madras, India, in the years 1732-1737 based upon an analysis of the weather diary of the German missionary Geisler. *Würzburger Geographische Arbeiten*, 1991: 45-86

Glaser R, Riemann D, Schönbein J, Barriendos M, Brazdil R, Bertoli C, Camuffo D, Deutsch M, Dobrovolny P, van Engelen A, Enzi S, Halickova C, König S, König O, Limanowka D, Mackova J, Sghedoni M, Martin B, Himmelsbach I: The variability of European floods since AD 1500. *Climatic Change* 2010, 2010

Glaser R, Riemann D: A thousand-year record of temperature variations for Germany and Central Europe based on documentary data. *J Quaternary Sci*, 2009; 24 (5) : 437-449

Vogt S, Glaser R, Luterbacher J, Riemann D, Al Dyab G, Schönbein J, Garcia-Bustamente E: Assessing the Medieval Climate Anomaly in the Middle East: The potential of Arabic documentary sources. *PAGES News*, 2011; 19 (1) : 28-29

Walsh R.P.D., Glaser R, Militzer S: The Climate of Madras During the Eighteenth Century. *International Journal of Climatology*, 1999; 19: 1025-1047