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Short Contribution

A tribute to Peter Hupfer's 90th birthday

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Abstract

The development of science in the former German Democratic Republic (GDR) experienced some disruptions with the reunification of Germany. Nevertheless, it was possible to maintain a certain continuity in climate research, which can be seen as a personal merit of Prof. Dr. Peter Hupfer. The development of climate research from the 1950s to the present and his part in it will be acknowledged in the present article.

Keywords: Peter Hupfer, Climate Research, former GDR

1 Introduction

The doyen of the East German climate research Prof. Dr. habil. Peter Hupfer (Fig. 1) celebrates his 90th birthday on March 23, 2023. He published anthologies of climate research in the former German Democratic Republic (GDR) in German (Hupfer, 2007) with additional notes from Spänkuch (2008) and somewhat more condensed in English (Hupfer and Dethloff, 2009). A commemorative volume was published for his 70th birthday in 2003 (Chmielewski and Foken, 2003), already with contributions of colleagues from the East and West of Germany as well as from Russia. His work will be considered in the context of climate research at the universities in Leipzig and Berlin and after the German reunification. This seems even more important since much literature from the former GDR is no longer available in today's digital age with DOI numbers and is often only accessible in library archives. Nevertheless, it was very frequently cited in the peer-reviewed scientific literature until 1990, despite the predominantly German-language contributions, e.g., in the *Zeitschrift für Meteorologie*. The work of Hupfer was much broader than his bibliography reveals. His students appreciate very much that he ensured them the greatest scientific freedom, but always guided them purposefully. It was remarkable how he was always able to promote their work in times that were not entirely easy in terms of science policy and finances. This resulted in a great scientific breadth among his students beyond his actual field of expertise. Many of them still maintain close contact today and appreciate his suggestions and also critical advice.

Figure 1: Prof. Dr. habil. Peter Hupfer 2001, © K. Deutscher (Chmielewski and Foken, 2003)

However, it seems useful to the authors to pay tribute not only to Hupfer's work in Leipzig and Berlin until 1990, but especially to his activities in the united Germany.

2 University of Leipzig up to 1979

In 1956, Karl Schneider-Carius (1896–1959), who had come from the German Meteorological Service (DWD) in Bad Kissingen, was appointed to a chair of meteorology at the Geophysical Institute in Leipzig (Börngen et al., 2015; Ehrmann and Wendisch, 2013), which was rich in tradition, founded in 1913 by Vilhelm Bjerkness (1862–1951) and based on the work

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of the Leipzig Observatory under Carl Christian Bruhns (1830–1881, Hänsel, 2006). This was the first time that meteorology was represented in Leipzig by a climatologist, who, however, also brought process-oriented aspects into research through his work on the "*Grundschicht*'' of the troposphere (atmospheric boundary layer and convection layer, Börngen et al., 2004; Schneider-Carius, 1953), and this even in the Leipzig tradition of Heinz Lettau (1909–2005, Lettau, 1939). His close contacts to Erich Bruns (1900–1978, Brosin, 2000), the director of the Seahygrographic Service of the GDR, first opened an oceanographic and maritime-meteorological orientation to Hupfer. In his dissertation in 1961, *"Marine Climatic Changes in the Belt Sea since 1900''* (in German, Hupfer, 1962) the climatic aspect of his work was already evident. Scientific works of that time also dealt with climatological variations in the Baltic Sea region. For research and teaching purposes the Maritime Observatory Zingst was established in 1957 and directed by Captain Hans von Petersson (1906–1992, Hupfer, 2003/04) and Hupfer was scientifically responsible for it (Hupfer et al., 2005). After the early death of Schneider-Carius, Friedrich Kortüm (1912–1993, Hupfer and Helbig, 1996) was in 1961 appointed acting director of the institute and entrusted with holding a professorship with a teaching position. During this time the structure of the institute was consolidated with research focused on the heat balance and climatology in northern Germany (Kortüm), the boundary layer of the atmosphere (Karl-Heinz Bernhardt, *1935), general meteorology and synoptics (Christian Hänsel, 1924–2011, Michel, 2011) and the coastal zone of the Baltic Sea (Hupfer).

With the 3rd university reform in 1968 in the former GDR, meteorology education was transferred to the Humboldt University in Berlin, and with the graduation of students of the register 1966 the Geophysical Institute was closed in 1971. Bernhardt went to Berlin as professor in 1968, Kortüm followed him in 1971. Hupfer and Hänsel remained in Leipzig and secured maritime-climatological education in Zingst for several universities and general meteorological education in the physics section. During this time, Hupfer organized experiments on coastal climate and air-sea interaction funded by the Council for Mutual Economic Assistance (COMECON) in Zingst (1973), Russia (1975 and 1976, Caspian Sea), Poland (1974 and 1976, Lubiatowo), and Bulgaria (1977, 1978, and 1979, Kamchia); for details, see Hupfer et al. (2005). This resulted in the highly acclaimed popular science work "*Die Ostsee – kleines Meer mit großen Problemen"* (The Baltic Sea – small sea with big problems) in four editions (Hupfer, 1978, 1979, 1981, and 1984), a Russian edition in 1982 and the fifth edition in 2010, which underwent a revised new edition in 2011 (Hupfer and Tinz, 2011) as a small booklet. In 1979, Hupfer accepted the appointment to the climatologically oriented chair of meteorology (successor to Kortüm) at the Humboldt University in Berlin, which also marked the end of his leadership of the Maritime Observatory in Zingst.

3 Humboldt University Berlin up to 1990

Since 1971 with Kortüm and from 1979 with Hupfer at the Humboldt University Berlin there was the only climatology professorship for the meteorologist education in the GDR. Climatology was also taught to teachers (e.g. Potsdam, Ernst Heyer and Heiner Barsch, Heyer, 1993), geographers (e.g. Berlin, Hendl, 1991) or foresters (e.g. Tharandt, Flemming, 1991). In addition, classical climatology was covered in the Meteorological Service of the GDR in Potsdam. Hupfer's education was very broad and the Berlin years were very productive, as the book publications testify. At the Reinhardsbrunn Meteorological Conference on mesometeorology in 1986, he presented the results of his research on scales in climatology, especially in the mesoscale range (Hupfer, 1989), as it was usual in meteorology in spatial-temporal structure already for a long time (Orlanski, 1975). The scale considerations in climatology, partly separately for the components of the climate system, represented a substantial progress at the end of the 20th century (Spänkuch, 2002). There were also fundamental thoughts about the interdisciplinary climate impact research (Hupfer, 1990). The breadth of his research can best be seen in the work of his doctoral and post-doctoral students of that time, such as circulations in the Central European region (Peter C. Werner), statistical climatology (Friedrich-Wilhelm Gerstengarbe), recent climate changes in the area of the GDR (Gisela Helbig), atmospheric structures in a low-order model (Annette Wäntig, married Rinke), agricultural climatology (Frank-Michael Chmielewski) or El Niño effect (Hans-Friedrich Graf), for details see Hupfer (2007) und Hupfer and Dethloff (2009). The book *"Das Klimasystem der Erde"* (The Climate System of the Earth, Hupfer, 1991) was written with numerous authors, which unfortunately received little attention during the time of the German unification. The book *"Das Klima von Berlin"* (The Climate of Berlin, Hupfer and Chmielewski, 1990) had a similar fate, although the research from West Berlin was also included due to the cooperation of Horst Malberg. With the discontinuation of meteorology education in the former GDR step by step from 1990 on, Hupfer moved to the Physics Section at the Humboldt University Berlin to continue his research activities there. In contrast, meteorology lectures by Wolfgang von Hoyningen-Huene and Armin Raabe started again in Leipzig in 1990 and by Manfred Wendisch and Andreas Herber from 1991 on, but not under reestablishment of the Geophysical Institute. The meteorology education with complete lecture program was continued 1993 in Leipzig with the first director Gerd Tetzlaff of the Leipzig Institute of Meteorology (Ehrmann and Wendisch, 2013).

4 Influence on climatological research of the United Germany

After the political turnaround in 1989/90, it appeared that the topics worked on at Humboldt University were compatible with the tasks of German climate research in the Western part, so that the investigations were quickly promoted effectively. The intensive efforts of Hupfer to bring together scientists from both German states also contributed to this. Following an idea of Hans von Storch (Hamburg) and Graf (Berlin), he organized together with Robert Sausen (Oberpfaffenhofen) the first German-German Climate Conference in Gosen near Berlin from 19–21 Nov. 1990 (Wehry, 2008), whereupon already the next one the 2nd German Climate Conference in Neubrandenburg followed, and in 1997 he supported C.-D. Schönwiese in the organization of the 4th conference in Frankfurt a. Main. These conferences are continued up to now.

Hupfer participated in the Climate Advisory Council of the Federal Government since October 4, 1990, first as a guest, then as a member until 1995. As a member of the Council, he was already of the opinion that, in addition to preventing climate change, adaptation to unavoidable climate change must also be discussed, a view that did not only meet approval. He has served on founding commissions for the Institute for Baltic Sea Research in Warnemünde and the Potsdam Institute for Climate Impact Research, as well as participating in other committees. Both for his old field of work in Zingst as well as for the agriculturally oriented climate impact research he effectively set the course for further development. Lecture tours led to numerous universities and institutions.

Hupfer has always been interested in informing the general public about global climate change and the associated consequences. He was thus actively involved in the preparation and realization of a conference in Hamburg in 1998. As a result of which he, together with José L. Lozán and Hartmut Grassl, edited the book *"Warnsignal Klima, Climate of the 21st Century: Changes and Risks"* (Lozán et al., 1998). On the initiative of Lozán, several books have been published in the last 25 years under the title *"Warnsignal Klima"* (Climate Warning Signal), covering specific topics in many individual articles. Hupfer co-edited further the books on Water (Lozán et al., 2005) and Polar regions (Lozán et al., 2014), but also published his own research in these books, see https://www.klima-warnsignale.uni-hamburg.de/.

In the second half of the 1990s several books were written by Hupfer, including *"Unsere Umwelt: Das Klima"* (Our Environment: The Climate, Hupfer, 1996) and the continuation of the well-known work of Ernst Heyer *"Witterung und Klima"* (Weather and Climate, Heyer, 1993) from the 10th edition 1998 with an extension with meteorological chapters edited together with Wilhelm Kuttler (Essen), a project he had been trying to realize since the end of the 1980s. The 11th edition (Hupfer and Kuttler, 2005) is available online, the 12th edition published one year later is the last one, although the book with its short and concise presentation of the whole complex of climate and meteorology would certainly still find its readers. This book has sold almost 10,000 copies.

At the end of May 1998, Hupfer retired, but this did not affect his professional interests and plans. These focused again on questions of the Baltic Sea in connection with long-term changes of meteorological and oceanographic variables. One example is the monograph published in 2003 on his initiative *"Die Wasserstände an der Ostseeküste. Entwicklung – Sturmfluten – Klimawandel"* (Water Levels on the Baltic Sea Coast. Development – Storm Surges – Climate Change, Hupfer et al., 2003). Another example is a paper on the changes in thermal conditions in the area of the German Baltic Sea coast according to observations and climate projection calculations. Both the air temperature and the sea surface temperature and the duration of the bathing season derived from them were examined (Tinz and Hupfer, 2005).The last works published so far deal again with climate change and climate policy (Hupfer, 2020a), in which he urges honesty in climate protection and climate adaptation, because both are not possible at the level of our current way of life and production (Hupfer, 2019; Hupfer, 2020b).

His graduates at the Humboldt University, Annette Rinke, Dörthe Handorf, and Antje Weisheimer were able to continue their scientific work at the Alfred Wegener Institute (AWI) in Potsdam and the University of Reading. The applied approaches were based on a strategy developed at the Heinrich Hertz Institute of Academy of Sciences, Observatory for Atmospheric Research Kühlungsborn with a hierarchy of climate models (Schmitz and Dethloff, 1982), a focus on atmospheric teleconnection patterns (Schmitz and Dethloff, 1985) and nonlinear, simplified low-order models (Rinke et al., 1990). An updated hierarchy was developed at the AWI Research Unit Potsdam by the support of Hupfer and focused on atmospheric spectral models for investigating nonlinear mechanisms between planetary and baroclinic waves (Dethloff et al., 1998). To understand the role of regional Arctic tropo- and stratospheric processes for global climate changes the development of a regional climate model of the Arctic (Dethloff et al., 1996) and the analyses of global coupled climate model simulations started (Handorf et al., 1999). This work was also inspired by the ideas of Ernst Augstein and Dirk Olbers, both from AWI Bremerhaven. More recent results and developments in climate modelling from the Kühlungsborn to the AWI Potsdam School were described by Dethloff (2022).

But also the history of Leipzig's meteorology and the Geophysical Institute remained close to his heart, as the already mentioned contributions to the 100th anniversary (Börngen et al., 2015) and several chapters in Ehrmann and Wendisch (2013) showed. Papers to the Meteorological Conference in 1872 (Börngen and Fo-

KEN, 2022) or to the work of HEINZ LETTAU (FOKEN and BÖRNGEN, 2021) would probably not have been written if HUPFER had not been an initiator here.

5 Final remarks

If one deals with the history of climate research in the GDR and in united Germany, one cannot do so without dealing with the work of PETER HUPFER and his manifold contributions and books. This applies equally to Baltic Sea research. Despite many upheavals, such as the discontinuation of meteorology education at Humboldt University for political reasons, he succeeded in ensuring a continuous transition of climate research in 1990 and in the following years. His two assistants ALFRED HELBIG and HANS-FRIEDRICH GRAF received professorships in Trier and Cambridge, respectively, and the authors and other graduates of his received the necessary support to continue their scientific careers. His books have lasting value and can be recommended to the new generations, because their precise and clear style allows an easy introduction to the climate problem.

Note

Curriculum vitae, list of publications, and lists of Prof. Dr. HUPFER's supervised doctoral and postdoctoral dissertations are available online as of 2003 (CHMIELEWSKI and FOKEN, 2003)

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