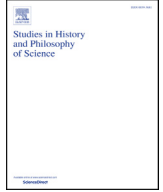




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journal homepage: www.elsevier.com/locate/shpsaAverage rainfall and the play of colors: Colonial experience and global climate data[☆]

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ABSTRACT

This paper examines the co-construction of global and local views of the weather and climate at the turn of the twentieth century through a history of data gathering efforts in the German colonies in Africa. While both governmental officials and metropolitan practitioners aimed at producing standardized – and thus globally comparable and economically useful – data in different environments, these efforts often tended to break down in practice. Rather than being able to turn the field into a finely tuned laboratory, both European and African data gatherers were confronted with complex and challenging environmental and institutional realities. Faced with these difficulties, colonial practitioners tended to embrace alternative strategies of recording weather conditions, which placed a higher value on individual sensory perception and qualitative descriptions. Thus, in a seemingly paradoxical dynamic, the attempts to gather quantitative colonial data for global maps and models also facilitated the development of a particular colonial approach to climatology that highlighted local specificities and direct embodied experience.

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Among the archival documents in the well-stocked folders of the German Colonial Office are many prime examples of Wilhelmine bureaucratic decorum.¹ For the historian reading through the files, it is thus a refreshing change of pace to discover some clear expression of emotion – albeit packaged to conform to the standards of diplomatic exchanges at the turn of the twentieth century. One of these eye-catching documents is a dispatch from the meteorologist Georg von Neumayer, the director of the Hamburg-based *Deutsche Seewarte*, to the German Foreign Office in 1894.² All the proper salutations and formalities can scarcely contain Neumayer's frustration at the state of meteorological observation in German East Africa: "Seeing the large number of erroneous recordings, the directorate [of the *Seewarte*] is forced to refrain from

calling them out one by one," he wrote in exasperation, before repeatedly demanding the deployment of a trained meteorologist to the colony. In the last paragraph of the dispatch, Neumayer even went so far as to extort the colonial division by announcing that he would withhold meteorological instruments needed in East Africa until the Foreign Office had acknowledged and responded to his critique.³

Aside from the entertainment value of Neumayer's irritation, the document is also a suitable starting point for a place-specific history of colonial meteorology that pays attention to the different kinds of experience practitioners had in recording, relaying, sorting, and translating the data that would serve as the basis for ever-more scaled up visions of climates in the late nineteenth and early twentieth centuries.⁴ Neumayer's missive introduces the tensions that existed both between different offices of the colonial

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¹ The Kolonialabteilung, or Colonial Division, was a section of the Auswärtiges Amt, or Foreign Office, but directly answerable to the German Chancellor. In 1907, the division was transformed into the independent Kolonialamt, or Colonial Office. Today, the files are kept in the Bundesarchiv Berlin-Lichterfelde. All translations are mine, unless otherwise indicated.

² The *Deutsche Seewarte*, or naval observatory, was established in 1875 and led by Georg von Neumayer until 1903. On Neumayer's work in geomagnetic and meteorological research, see: Schlegel, Schröder, and Wiederkehr (2010); Schröder and Wiederkehr (1992).

³ Bundesarchiv Berlin-Lichterfelde, Abteilung Deutsches Reich, Reichskolonialamt (below: BArch R1001), Folder 6136: Neumayer to Colonial Division, German Foreign Office, 4 June 1894. All translations are mine, unless otherwise indicated.

⁴ On the role of overseas colonial meteorology and climatology in the development of the atmospheric sciences, see: Mahony (2016); White (2015); on the importance of place in the production of scientific knowledge, see: Shapin (1998); Naylor (2005); Livingstone (2003); on the role of negotiations within transnational – and I would add, colonial – scientific networks, see: Turchetti, Herran, and Boudia (2012).

bureaucracy, and between colonial observers and metropolitan practitioners in questions of meteorological and climatological data collection. Neumayer, who was tasked with assembling, analyzing, and publishing recordings from the German colonies in Africa, called attention to one of the most persistent meteorological concerns throughout the thirty years of the German Empire in Africa: inaccurate, incomplete, and unverifiable data – an issue that was not the exclusive domain of colonial practice, but came into stark relief in the overseas territories.⁵ It featured as the centerpiece of long negotiations and disputes between Berlin, Hamburg, colonial capitals like Dar es Salaam, and the various locations of meteorological stations in the colonial hinterland, which often consisted of no more than a simple rain gauge and maybe a recording thermometer. The question of the representativeness of data, however, was not just a question of degree. Rather, it reflected arguments between practitioners in the colonies and metropolitan scientists and officials over the accuracy, and thus also the value, of different kinds of data – from quantitative tables of instrument-recorded numbers to the qualitative descriptions of sensory perceptions and embodied experiences of the data gatherers.

Far from the authoritative neatness of the published meteorological diagrams and climatological maps that made use of colonial data, the actual collection of the data was thus a deeply contested practice. Colonial climatology was uneasily situated between the rather nebulous realm of practical “colonial science,” expected to provide quick and economically useful information; the rapidly developing field of the atmospheric sciences, which had begun to shift to a focus on quantitative data and ever-larger units of analysis; and the data collection efforts in underfunded meteorological stations and makeshift observatories, in which an army of mostly anonymous and untrained government employees, soldiers, and volunteers recorded information on atmospheric conditions of the new overseas territories of the German Empire. Traveling on horseback, oxcart, or train, and then across the ocean by steamship or telegraph, the data collected in the colonial stations provided information for both economic development and scientific investigation, if not always in the format requested.

From handwritten reports and lists, practitioners in the metropole filtered out the data that appeared most accurate, comparable, or useful, and assembled these data into comparative tables, or translated them into maps depicting the territory of new colonial possessions, continents, or even the entire globe. These repositories of information then aided the emerging research into trans-regional climate systems and early global atmospheric models.⁶ Far from the places and techniques of data processing, however, the day-to-day practice of reading and recording colonial skies also developed its own identity, which sometimes diverged from practices and conceptions in Europe.⁷

The formation of a distinctly colonial approach to the atmospheric sciences was connected to both material and personal circumstances, ranging from the difficulties of transporting fragile instruments to and within the overseas colonies to the lack of professional training of the observers. Similar to science in the British Empire analyzed by Helen Tilley, German efforts at including the colonies in the scientific projects of the metropole were often subverted by both practical and scientific concerns with the local and the vernacular.⁸ These logistical issues, however, were frequently accompanied by intimations that not only the

circumstances, but also the phenomena were incongruous and incommensurable between the different environments of the colony and the metropole and could not be represented accurately by quantitative methods alone.⁹ Guided by both circumstance and design, colonial practitioners thus tended to place a higher value on narrative reports based on sensory experience.

In a seemingly paradoxical dynamic, colonial meteorology provided not only quantitative and globally comparable data for a scaling-up of the climatic vision to encompass continents or even the whole earth, but also developed place-specific practices that highlighted the qualitative and sensory experience of the observer and emphasized local specificities on the scale of the colony, the colonial district, or even the immediate surroundings of a single meteorological station.

1. Meteorology in the African colonies of the German Empire

The first years of the formal German overseas empire were inauspicious. In 1884, the government in Berlin declared Southwest Africa – today Namibia – a German protectorate. In the following years, the empire grew to encompass further territories in Africa – German East Africa, Togo, and Cameroon – and cities and islands in East Asia and the Pacific Ocean. Initially, the colonies were colonies in name only. With just a handful of colonial officials and soldiers in each territory and no budget to speak of; Germany exerted little direct control and limited its activities to support traders, travelers, and the odd scientific expedition. This situation began to change gradually in the 1890s. Southwest Africa developed into a settler colony and remained the only colony of the German Empire with a sizeable European population until the dissolution of the overseas empire during and after the First World War. The other African territories of the German crown were dotted with scattered military outposts and lined by a few railroad tracks. While support from Berlin remained at a modest scale, the funds of the colonial governments increased steadily into the twentieth century.¹⁰

Similar to the other branches and undertakings of the colonial governments, colonial science – even if as ostensibly important as geography or ethnography for control and economic development – received only scarce funding in the first few years. Private pro-colonial associations like the *Deutscher Kolonialverein* provided some money, but they only supported one-time projects or expeditions, rather than the day-to-day collection of data. The fields of colonial meteorology and climatology were no exception. While the creation of government-run meteorological stations had already been considered as early as the mid-1880s, most of the plans remained unrealized. The colonial administrations relied on volunteers from among the few officials, settlers, and missionaries for both time and instruments to gather data – particularly in regions far away from the centers of colonial power.

While the first simple meteorological stations had been established by 1890, there was still no centralized program in place to collect and analyze the data. The governor's offices in the colonies focused on the seizure of political and military control and prioritized the creation of topographical maps of the unknown territories in their early scientific endeavors. They were usually satisfied to see the locally collected meteorological material used only locally, as well. For the collection and assembly of data from across different

⁹ Cf.: Coen (2016); Coen (2006).

¹⁰ For recent overviews of the history of German overseas colonialism, see: Conrad (2008); Speitkamp (2005); Pogge von Strandmann (2009); for a short overview in English, see: Conrad (2012); the situation of funding for the German colonies was similar to that of the French Empire, in which government funds were supplemented significantly by private donations and money from corporations, learned societies, and the military; see: Osborne (2005).

⁵ For discussions of the role of standardization, precision, and exactitude in nineteenth-century science, see: Wise (1995); Porter (1986).

⁶ See: Edwards (2010), pp.22–59.

⁷ Cf.: Osborne (2005).

⁸ Tilley (2011).

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