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120 Years of earth and environmental sciences in the *South African Journal of Science*

Significance:

During the 120 years in which the *South African Journal of Science* (*SAJS*) has been published, a number of important environmental milestones have occurred in South Africa and globally. The Journal has included passing commentary on many of these events, while specific events such as the inception of the Working for Water Programme have been the focus of numerous papers. The Journal has consistently reflected the key issues of the time. In recent years, the portfolio of Earth and Environmental Sciences has been dominated by submissions on water quality and climate change, in addition to geology, conservation, environmental policy and planning, waste management, and environmental health.

Introduction

The *South African Journal of Science* (*SAJS*) has, since its inception, been inherently interdisciplinary. There are therefore no explicit nor distinct thematic boundaries in the publication of material, although discipline-specific experts are appointed as Associate Editors to assist the Editor-in-Chief in soliciting peer reviewers and making final decisions on acceptance for publication. Earth and Environmental Sciences is one of 10 portfolios to which Associate Editors have been appointed in recent years. Given that many of the contemporary global polycrises intersect with earth and environmental sciences, it is unsurprising this portfolio receives among the greatest numbers of submissions to the Journal.

Earth and environmental sciences over the past 120 years

The first volume of the *SAJS* was published on 01 January 1905.[1,2] The first article in this volume was a paper by David Gill[1] on astronomy, while the rest of the volume was composed of papers on topics including astronomy, mathematical equations, metallurgy, and meteorological notes from weather stations.[2] The latter two would form part of what today is handled by the Associate Editor for Earth and Environmental Sciences, although in both domains research has become significantly more applied over the decades.[3,4] Concurrent with the publication of research in the Journal over the past 120 years, a number of key environmental events occurred in South Africa and abroad, with local impact that has continued to the present day (Figure 1).

Many of the environmental events in the earlier portion of the timeline were not directly discussed in papers published in the *SAJS*. There is a gap in global and local noteworthy environmental events between 1947 and 1961 (Figure 1). While scientific discovery did not halt in the 1950s, the main discoveries were medical, including the beginnings of heart transplant research[39], blood testing for tuberculosis, invention of full body X-ray and dialysis machines[40], and the first kidney transplant[39]. Direct discussion in papers published in the *SAJS* on environmental events has increased in recent decades (Figure 1). The Working for Water Programme, launched in 1998, was covered across three papers examining the launch and implementation of the Programme in 2004.[20–22] The 100th volume of the *SAJS*, published in 2004, covered the various aspects of the inaugural research symposium of the Working for Water Programme, held in 2003, and thus included a wealth of research examining the Programme and its implementation. Global events, such as the ban on DDT, and the discovery of the impact of CFCs on the ozone layer, have also been the topic of direct coverage in articles in the *SAJS* (Figure 1).

The timeline presented in Figure 1 highlights the thematic trends which have been the focus of earth and environmental science research in the *SAJS* throughout the past 120 years. The categories of events which are most included in the timeline include the establishment of national parks; the publishing of IPCC reports; the occurrence of natural and anthropogenic disasters; the implementation of environmental programmes, policies, protocols, and agreements; developments related to water management and nuclear power; and the hosting of significant conferences and summits. The events which can be considered to be significant environmental events affecting South Africa are thus varied in their characteristics, but all reflect critical components of the South African environment, and provide a through line with which to examine the evolution of earth and environmental science research in the *SAJS* over the past 120 years.

Submissions in recent years

Over the period 2017–2023, Earth and Environmental Sciences has been one of the largest of the 10 current portfolios and thematic areas in the *SAJS* (Table 1).

Over the period April 2021 to May 2024, the period of the term to date of the current Associate Editor, a total of 106 submissions to the *SAJS* have been allocated to the Earth and Environmental Sciences portfolio. This number slightly underrepresents the total number of submissions within this domain, as where there are potential conflicts of interest, journal policy mandates that those submissions are handled by another Associate Editor, who works reasonably closely to the field of interest. This approach is important in a large journal such as the *SAJS*, to enable authors who work closely with members of the editorial team to submit their papers to the Journal, while ensuring a high standard of editorial practice whereby peer review and editorial decisions are not influenced by personal bias and favour. A key example here is the work of Kruger et al.[41], for which the second and third authors were both supervised by the Associate Editor for Earth and Environmental Sciences. Although the paper 'AgERA5 representation of seasonal mean and extreme temperatures in the Northern Cape, South Africa' clearly falls within

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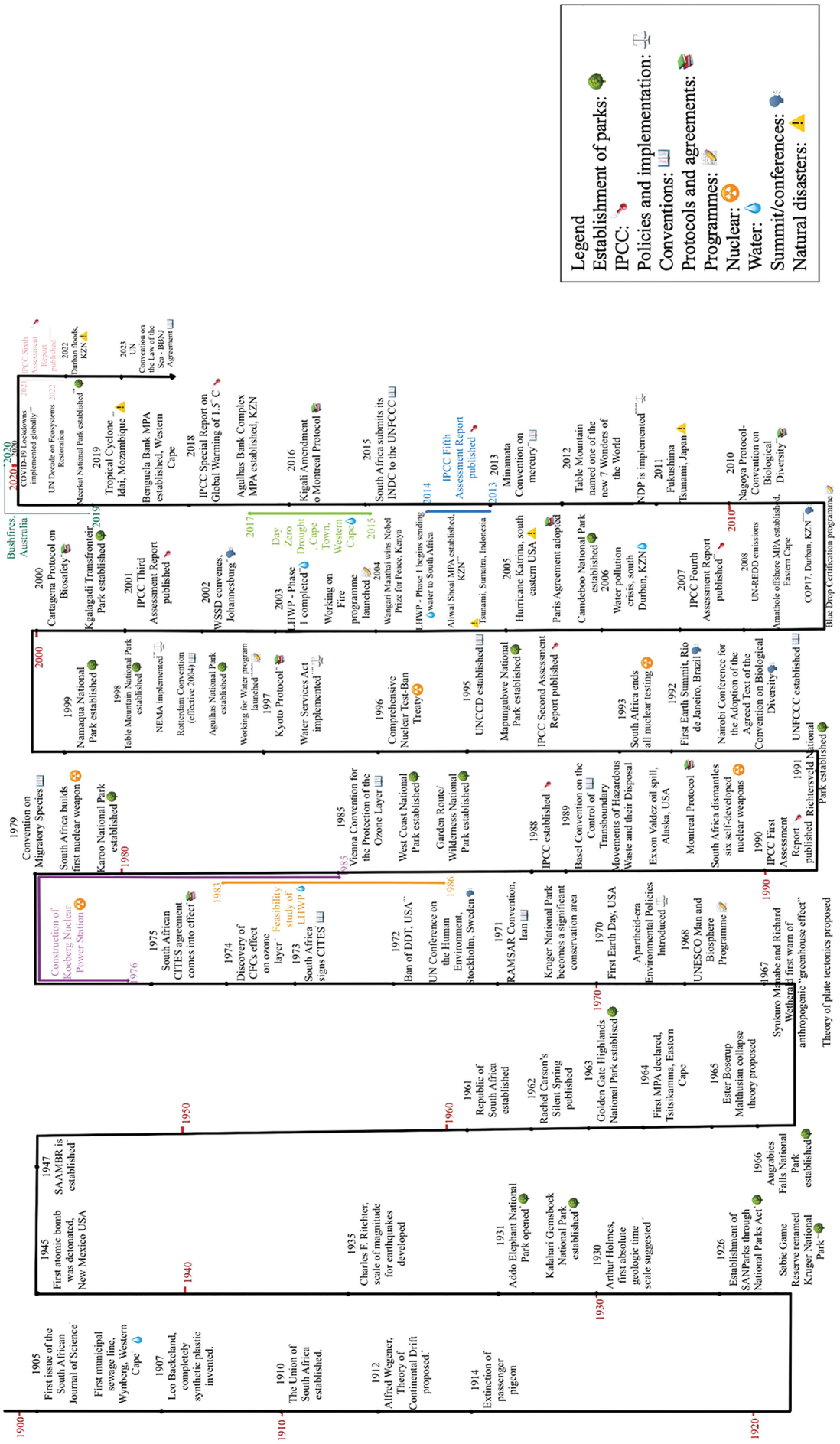

Data sources:[1,5–38]

Figure 1: Timeline depicting the major earth and environmental science events documented in the *SAJS* over the past 120 years.

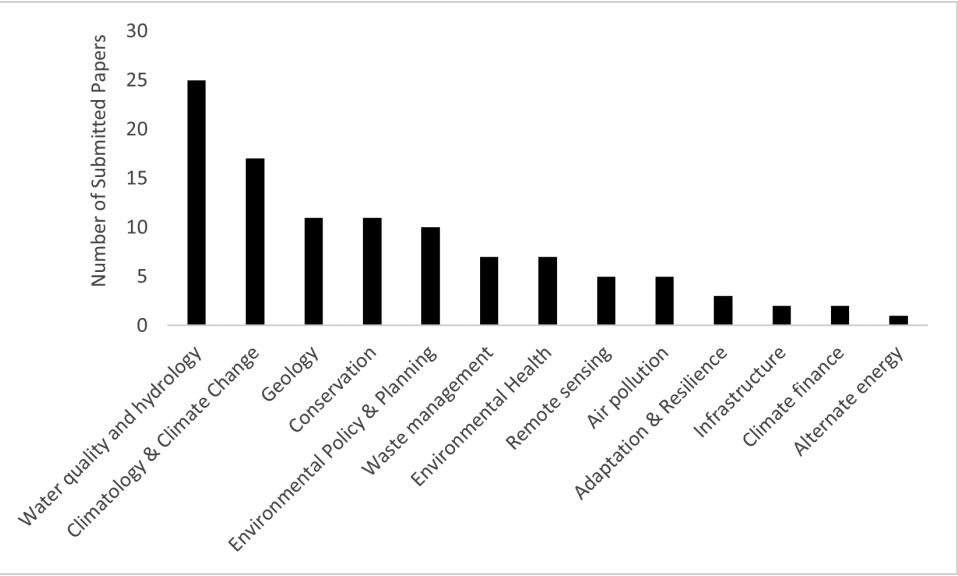

Figure 2: Submissions to the *SAJS* between April 2021 and May 2024 that were allocated to the Earth and Environmental Sciences portfolio.

Table 1: Percentage of submissions to the *South African Journal of Science* allocated to the Earth and Environmental Sciences portfolio

Year	Percentage
2017	24%
2018	17%
2019	11%
2020	17%
2021	9%
2022	13%
2023	19%

the domain of Earth and Environmental Sciences, this submission was handled by the Associate Editor for Archaeology, Anthropology and Palaeontology.

These few exceptions do not, however, skew the patterns in the subject matter of the submitted manuscripts (Figure 2). The largest proportion (23.6%) of papers submitted over the past three years has been in the field of water science, including research exploring water quality, water availability, hydroclimates and hydrology (Figure 2). This is followed by research on climatology and climate change research (16%), which has been a particular area of focus with the concurrent release of the IPCC 6th Assessment Report[37,38], and a range of climate crises across the southern African region, including the Cape Town Day Zero Drought[42] and Tropical Cyclone Idai[34] (Figure 2). This is followed by relatively equal proportions of submissions on geology, conservation, and environmental policy and practice (Figure 2). Emerging topics in climate finance[43] and recent engagement with renewable energy[44] with a focus on the Just Energy Transition are included among the less frequent submissions to the Journal (Figure 2). While not all submitted papers go on to be published, these broad patterns in disciplinary focus remain within the published outputs.

Looking forward

In the next 120 years, the importance of scientific research on the earth and environment is likely to increase. Climate change projections indicate regional temperature increases that are considerably higher than the global mean, while extreme climate events are likely to occur more frequently, and with greater severity. Continued urbanisation is projected to place an increasing pressure on our water availability, air quality, and biodiversity. The interdisciplinary nature of the *SAJS*, and the space offered for commentary pieces, perspectives and book reviews, allows for a range of voices to continue to contribute to important debates. It is likely that the Journal will remain a popular choice for researchers working in this domain.

Declarations

J.M.F. is the *SAJS* Associate Editor for Earth and Environmental Sciences. There are no competing interests to declare. There is no AI or LLM use to declare. All authors read and approved the final manuscript.

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