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Guest Editorial

Synthetic Antarctic Science

When is a review more than a review? Especially observant readers may have noticed a subtle change in the instructions for authors on the front cover of this issue of *Antarctic Science* and on the journal website. The invitation to submit "reviews" has been replaced by an invitation to submit "synthesis" papers. This is not simply a substitution of words but an intention to solicit a more useful type of paper for the future. Here we explain the thinking behind this change.

Students and researchers will recognize the importance of articles that draw together the results of other studies into one place - articles generally known as 'reviews'. Some reviews simply bring together information from previously published papers to provide a concise but useful summary. As the literature in all fields continues to grow such summaries are a useful guide to the key papers in any topic. However, more valuable reviews, which here we call 'syntheses', go that little bit further to gain new insights from such integrations. The best 'syntheses' do much more than simply catalogue the available literature - they critically and concisely evaluate the literature and synthesize it to extract added value and new insights from the individual published studies. They often question existing paradigms and suggest new lines of enquiry for the future.

Syntheses could include, for example, a compilation of studies of rates of a biogeochemical process in different environments to understand the large scale fundamental controls, or a paper linking different types of measurements from a single location to yield a comprehensive study of a new aspect of that environment, or perhaps an article drawing together older geological observations, which, with the addition of more recently published theories, can now be used to reconstruct a picture of the evolutionary history of an area. Indeed, every scientific publication contains some element of synthesis of the available literature in order to set the context for the new results reported, but our idea of syntheses here relates to much more extensive reviews of published literature that produce important new insights, not necessarily with additional data.

The high citations associated with the best synthesis articles bears testimony to their value to a wide and diverse community, and such work should be recognized as having a central role in scientific scholarship. At its best it can stimulate new ideas across disciplines, suggest ways in which new paradigms may be testable or indicate how a modelling approach might provide new insights into the changes that are the outcome of our dynamic Earth System. Such synthesis activity forms a key role in the scientific process of advancing knowledge, alongside the equally important one of deriving new information from experimental, observational and modelling activities.

The subtle change of wording in our instructions to authors is meant to signal the value we attach to this synthesis activity, which is particularly important for a multidisciplinary journal such as *Antarctic Science*. This journal represents fields of research where the challenges of physical access to this wonderful, but remote and challenging, environment mean that observational and experimental data are often difficult to obtain and sometimes may be incomplete in a particular aspect. Hence synthesis activity serves to draw together often incomplete individual studies, to produce a more comprehensive picture, and also extracts additional value from hard and expensively-won datasets. The change of name is meant to emphasize the value we attach to these synthesis papers that provide such added value. The journal therefore looks forward to publishing your synthesis papers in the coming years.

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