



Special Annual Meeting–Themed Science Article Section



Preface

In a departure from *GSA Today's* usual single lead science article format, the following four articles are meant to familiarize you with the span of geologic time represented in the Upper Midwest and the expertise of its geoscience community as we prepare to assemble at the Annual Meeting in Minneapolis. These articles also emphasize the critical role geologists are being asked to play in a society that is increasingly focused on sustainable resource use and the long-term resilience of the planet.

The first two papers treat geologic events from opposite ends of the timeline as a controlled experiment that can be studied to help understand, and thereby forecast, system responses. The latter two speak directly to our role in society.

The EarthScope USArray is currently deployed in Minnesota. Seth Stein and colleagues describe how the information coming in regarding the failed, 1.1-Ga midcontinent rift, frozen in time, will provide a way to test the two leading theories about the fundamental cause of rifting.

Next, Karen Gran and colleagues describe Holocene valley evolution. A well-constrained down-cutting event is driving continuing adjustment on tributaries to the Minnesota River, the history of which has a strong influence on modern sediment loads and direct resource-management implications.

Ken Bradbury and Tony Runkel, geologists with two state surveys, partnered up for the third article, which examines how the mechanical behavior of Paleozoic rocks affects groundwater flow systems. This information is critical for sustainable groundwater use in the face of challenges ranging from the presence of live viruses deep beneath Madison, Wisconsin, USA, to evolving cones of depression that change hydraulic gradients.

Finally, Cathy Manduca introduces readers to the process of producing an educated citizenry (and a well-prepared geoscience community) that understands the ways that Earth and society are linked. The article also illustrates the need to act collectively to share experiences, develop them into classroom activities, and accurately diagnose student challenges.

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